A taxonomic study of the calcicolous endolitic species of the genus *Verrucaria (*Ascomycotina*, Verrucariales)* with the lid-like and radiately opening involucrellum.

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Abstract

This study describes anatomy, ontogenesis and history of taxonomy of calcicolous endolitic species of the genus *Verrucaria*, which have been treated as *Baglietto*a and *Protobaglietto*a (*Verrucaria* sect. *Sphinctrina*), and that are characterized by black, flat (lid-like) radiate crackling involucrellum, completely endolitic thallus and presence of macrosferoid cells formed by hyphae in the lower part of the medullar layer.

Most of the revised taxa were described by Servít (more than 100), and show a large taxonomic heterogeneity. Consequently, a detailed study had to be done to unify the group again. The characteristic characters have been recognized as the size and shape of the involucrellum and the development of the cortex layer. Following diacritic characters were recognized just morphological variations that originate regularly during ontogenesis. After revision the number of species reducedfrom more than twenty to four: *V. baldensis, V. limborioides, V. marmorea* and *V. parmigerella*.

The genus *Baglietto*a differs from the genus *Verrucaria* in different forming of involucrellum, other significant characters (ascus morphology and further structures of hymenium), usually used to define lichen genera are identical. Therefore, a new section *Baglietto*a has been established within the genus *Verrucaria*, which is well defined by the way of opening and shape of involucrellum. The genus *Protobaglietto*a has been separated from the genus *Baglietto*a artificially for the absence of ascospores in 1955 by Servít. The separation of genera *Baglietto*a and *Protobaglietto*a to the family *Baglietto*aceae is formal too, because other families in *Verrucariales* have not been established afterwards on the base of different structure of involucrellum. Therefore, the revision disapproves such unjustified separation and recommends to keep all the studied species of genus *Verrucaria* (*Verrucariaceae*). From the practical point of view, the revision can help to determine all of the mentioned species outside.

Eleven species (*Limboria sphinctrina* Duf., *Protobaglietto*a *lactea* (Arnold) Servít, *V. bosniaca* Servít, *V. dalmatica* Servít, *V. grummanni* Servít, *V. gyelnikii* Servít, *V. parmigera* J. Steiner, *V. serbica* Servít, *V. steineri* Kušan, *V. subconcentrica* (J. Steiner) Servít and *V. suzaeana* Servít), and also other 75 varieties and forms, were synonymized with the species *V. baldensis* A. Massal. Two species (*V. ceracea* J. Steiner and *V. quarnerica* Zahlbr.) and 4 varieties or forms were restricted to synonyms of the *V. limborioides* (A. Massal.) Clauzade & Roux. The species *V. cazzae* Zahlbr., one of its varieties, and one of its forms were restricted to synonyms of the species *V. marmorea* (Scop.) Arnold. Two species (*P. kutakiana* Servít and *V. sphinctrinella* Zschacke) and 20 varieties or forms were restricted to the synonyms of the species *V. parmigerella* Zahlbr.

A new neotype and an isoneotype of the species *V. marmorea* there have been established, 19 taxa have been lectotypified (*Protobaglietto*a *lactea* (Arnold) Servít var. *ochracea* Servít, *Verrucaria baglietto*aeformis (Hazsl.) Servít var. *caesia* (Arnold) Servít, *Verrucaria baldensis* A. Massal., *Verrucaria baldensis* A. Massal. var. *canici* Servít f. *bakonyensis* Servít, *Verrucaria baldensis* A. Massal. var. *spilomatica* A. Massal., *Verrucaria calciseda* DC. f. *alocyza* Arnold, *Verrucaria calciseda* DC. var. *lactea* Arnold, *Verrucaria cazzae* Zahlbr., *Verrucaria inaequata* (Servít) Servít f. *helvetica* Servít, *Verrucaria inaequata* (Servít) Servít var. *transsilvanica* Servít, *Verrucaria parmigera* J. Steiner, *Verrucaria parmigera* J. Steiner var. *calcivoroides* J. Steiner, *Verrucaria parmigera* J. Steiner var. *calcivoroides* J. Steiner f. *arnoldiana* Servít, *Verrucaria pinguis* J. Steiner f. *alocizoides* J. Steiner, *Verrucaria sphinctrina* Ach. var. *tiroliensis* Servít, *Verrucaria sphinctrinella* Zschacke var. *elevata* Servít f. *spermogonifera* (Arnold) Servít, *Verrucaria steineri* Kušan f. *scrobicularis* Servít, *Verrucaria subconcentrica* (J. Steiner) Servít var. *nigroaureolata* (Servít) Servít f. *limitata* Servít and *Verrucaria subconcentrica* (J. Steiner) Servít var. *nigroaureolata* (Servít) Servít f. *rauca* Servít).

Content

A. General part

I. Introduction

The aim of this study is to bring new knowledge on ascoma morphology and variability of thallus of selected endolitic species of the genus *Verrucaria* (*V. baldensis, V. limborioides, V. marmorea* and *V. parmigerella*) after more than fifty years, that could help to clarify their taxonomy and thus contribute to defining and distribution of the individual species that is so little known about, obtain a summarizing outline and revise interspecific and infraspecific relations of species, their variations and forms that are mainly recognized as morphological variations. The *Baglietoa* group contains a large number of described taxa that are hardly recognized in field as well as microscopically. Further Zschacke's (1933-1934) and Servít's (1939) efforts, to revise that taxa did not bring expected results. Some type samples of the revised species were probably found difficult to study and thus there were many unclear taxa left, complicating the possibility of taxonomical explanation of the group. Unclear and universal descriptions of many taxa in the revision were found an obstacle since they contain only general information that are commonly copied by other researchers.

Unfortunately, Servít's studies contributed to complicacy of the taxonomy of the whole order *Verrucariales*. The huge amount of newly described taxa (families, genera, species, varieties or forms) and new combinations almost brought an end to good orientation necessary for new researchers. Any of his studies is not really a revision since it contains only a further list of new taxa and their combinations within the many genera and family framework. Servít neither returned to his newly described taxa nor he revised them in his monographs.

Only some taxonomists devote their time to studies on genera *Verrucaria* these days, but none of them really work on the group of calcicolous endolitic species. Only a few characters can be considered to complicate the taxonomy of the *Verrucariaceae* family. The group studied does not produce any characteristic lichen substances that were surprisingly significant in disclosing taxonomy of other lichen groups. Unfortunately, this has not been changed even with the help of preliminary results of the new molecular approch.

Nevertheless, this group of calcicolous endolitic lichens is typical and interesting for their unique organs - macrosphaeroidal hyphae which help able to actively penetrate limestone. This ability has not been recognized with any other lichens and deserves a further detailed study. For this reason, the main aim of this study is a detailed research on the microscopic structure of the thallus and ascoma and their possible changes during ontogenetic development.

I.-1. Break-down of the study

This study is divided into several parts. The practical part is dedicated to the history of the studied species with references to the researchers that described those

taxa. Servít, who described the largest number of taxa, himself and his work has been mentioned in details, and there is also Servít's conception of genera, species, varieties and forms that show a large heterogeneity of criteria defining individual taxonomical ranks. It refers to obscurities unsolved by Servít in his largest work "Československé lišejníky čeledi *Verrucariaceae*" (1954).

Consequently, Servít presents morphology of thallus and ascoma of the studied species, and their ontogenesis, too. The detailed description is accompanied by photos and drawings. The taxonomical part contains a key to determination of the studied species and describes all revised taxa in details. After the revision, there remained four species (out of the large number of taxa), (*V. baldensis, V. limborioides, V. marmorea* and *V. parmigerella*). Each of them is in alphabetical order complemented with all known synonyms and its own characteristics with data of how they differ from other relative species.

New synonyms used in the study are marked 'syn. nov.' A detailed alphabetic list complements each of the four species. The next chapter is a species story with detailed information of the revised taxa and reasons for new combinations. The following discussion summarizes Servít's mistakes in his way of understanding genera and species. It describes the most controversial questions as for taxonomy of this group (e.g. Servít's generic concept, the overestimation of the role of ascospores beeing a character of a new genus). It also mentions the issue of density and statistic evaluation. The other chapter shows recent distribution of the studied species in the Czech Republic and compares some historical localities with up to date state. The closing chapter compiles the results of the whole study and suggests a next advancement for the revision of other species of the genus *Verrucaria*.

I.-2. Aims of the study

1. To check the characters (microscopic and macroscopic) used for distinguishing of the taxa described. To collect enough of fresh material from different localities and habitats (see chapter with the studied samples of the particular species). To draw and take a photo of macroscopic characters.
2. To find and revise type specimen in European herbariums (the greater part is not marked as a type material - so it's necessary to look for them among common samples), to designate lectotypes and neotypes. To make macrophoto documentation of all type specimen.
3. To revise herbarium material (approximately 3000 samples) from various European herbariums (see chapter material and methods).
4. To study distribution of the studied species.
5. To evaluate characters on the basis of the observation and suggest a key to determination of individual species.

I.-3. Material and methods

The study is based on approximately 3000 samples of calcicolous endolitic species of the genus *Verrucaria*, formerly placed to the genus *Bagliettoa*, from herbariums

BERN, BP, BRA, BRNM, H - ACH, M, PRM, STU, VER, W, WU, Herbarium A. Vězda, and my own herbarium (JPH). I collected a greater part of the studied samples myself (approx. 800 samples) in the years 1998 - 2002, on localities chosen according to descriptions of the herbarium samples (Austria, Croatia, France, Germany, Romania, Slovakia, Slovenia and Spain). To get to understand the variability of the taxa. For that reason, I decided to collect plentiful, large samples.

When doing the research, I often found unclearly marked type specimen and thus was made to designate new lectotypes. Due to the fact that in the original descriptions of the taxa, there are mostly given informations about the date of collection, collector, locality and herbarium, the worked appeared to be easier for I could complete the missing information. Some of type specimen from different herbariums (Bp, W, UW) were stored by Servít in PRM. I translated the original descriptions from Latin to Czech (the type specimen I studied myself are marked in the text by !).

The evaluation of the ascoma, asci, ascospores, periphyses, hyphae and size, was made using the following method. The average evaluation from the whole set of measurements was rounded to the whole number, the number of measurements is given in the brackets, following the whole number. First comes the length with maximal and minimal value in parenthesis, then comes the width.

The closing evaluation is based on the results of my own observations and measurements. To make the descriptions clear, the signs used were summarized within a table.

Localities of individual herbarium samples were assorted alphabetically by countries. Non-European samples were assorted within a special chapter. Some older chapters were characterized by old, recently almost unknown local names. In that case, the original herbarium's scheda was complemented by a recently used description. Unclear or misleading names were then found in old atlases from the time of collection, or from some special recent studies (mainly Hertel 1997).

The terminology was taken from Hawksworth ed. (1995), Santesson (1952) and Servít (1954).

Preparation of samples

The samples were first carefully cleared of limestone, then they were put to HCl solution (1%) for six hours to disolve all limestone. The obtained thallus stripes were cleared with destilled water and then dried out on a sheet of paper. Sections for misroscopic study were made with a sharp razor blade by hand (water, Lugol's solution or lactophenol). To measure ascoma, ascospores and other structures of hymenium, I used samples prepared in water. The reactions of (asci) with I, were made with the use of microscope. The samples were studied with the use of stereomicroscope Olympus SZ 3060. The sections were being photographed with the use of microscope Olympus BX51 equipment.

I.-4. Historical development

The genus *Verrucaria* is a member of a large, very heterogenic group with very unclear phylogenesis that differs from schematically divided genera *Thelidium* and

Polyblastia mainly in the type of ascospores and presence of involucrellum. In literature, there are a few references to taxonomy of calcicolous endolitic species of the *Verrucariales*. The first described species with the first notice of a radiately opening apex of ascoma was *Verrucaria sphinctrina* Ach. (Syn. Meth. Lich. 1814: 91). The epiphytic sample of the type specimen (H-ACH-709, photos no. 183, 184) originates in Guinea and belongs to non-lichenized species perhaps from the *Dothideales*, with completely different ecological claims (epiphyte), and different ascoma structure.

Scopoli (1772) described a saxicolous lichen with a purple thallus as *Lichen marmoreus* Scop. Arnold (1882) later shifted this lichen to the genus *Verrucaria*.

Another researcher, who contributed with new descriptions of species *Verrucaria baldensis* A. Massal., *Bagliettoa limborioides* A. Massal. was Massalongo (1852, 1853), who also described a new genus *Bagliettoa* (1853) on the basis of radiately opening involucrellum with a special structure and completely endolitic thallus.

Steiner (1911) evaluated macrosphaeroidal hyphae in hypothallus as a new taxonomical character, differentiated chlamys (excipulum), and he was the first to mention green hyphae in the cortical layer of the thallus. He described a new species *Verrucaria parmigera* J. Steiner (a differentiating character is considered a light excipulum), and more varieties or forms based on different surface and mainly on the colour of the thallus.

Zahlbruckner (1914) described more new species. *Verrucaria cazzae* Zahlbr. was described on the basis of red crystals in the cortical layer of the thallus, and its new form *circumarata* Zahlbr., which differs in pits in its thallus. *V. parmigerella* differs in the colour of the thallus (green-grey), and in a narrow line bordering the thallus. *Verrucaria quarnerica* is typical for absence of macrosphaeroidal hyphae, light colour of excipulum, and a small ascoma (the type specimen has the biggest involucrellum out of the other studied species).

Kušan (1928) described another new species *Verrucaria steineri* Kušan on the grounds of its colourless perithecium wall (excipulum), and its size and shape of involucrellum.

The largest compiled study on *Verrucaria* - Epigloeaceae, Dermatocarpaceae and *Verrucariaceae* was written by Zschacke (1933-1934), containing all the known knowledge on systematics of all species and their morphology. In this work, he presents seven species from our group) *V. cazzae, V. parmigera, V. quarnerica, V. sphinctrina, V. sphinctrinella, V. steineri*, and *V. subrosea*.

Servít (1929b, 1931, 1934, 1936, 1939, 1952, 1955-16 species, 103 varieties or forms-see later), contributed to this species with the greatest number of species, varieties and forms. Servít's characters were similarly based on colour of thallus surface, colour or shape of excipulum, shape of involucrellum, shapes of bunches of hyphae of the hypothallus, or size and shape of macrosphaeroidal cells).

According to the thallus colour, Servít differentiated *V. cazzae* (purpur hyphae *V. quarnerica,* dirty green hyphae *V. sphinctrinella*), *V. sphinctrina*, and *V. baldensis* (colourless hyphae). According to the excipulum size and colour, he differentiated species *V. steineri*, (colourless excipulum, involucrellum is not wider than perithecium), *V. gyelniki*, *V. inaequata* (brown excipulum, involucrellum of the same width

as perithecium), and *V. subconcentrica* (excipulum dark in the upper part, pale or colourless in the bottom). *V. inaequata* differs from *V. grummanni* in perithecium shape, which neck is cylindrically extended. Species *V. suzaeana, V. bosniaca*, and *V. dalmatica* differ in the size of macrosphaeroidal cells. *V. bagliettoaeformis* differs from species *V. parmigera, V. suzaeana, V. bosnaica, V. dalmatica*, and *V. gyelniki* in forms of hyphal rhizinoids resembling hyphae in hypothallus: *V. parmigera, V. suzaeana, V. bosniaca, V. dalmatica*, and *V. gyelniki* not.

H. W. Doppelbaur (1959), noted a significant piece of fact about the detailed thallus and ascospore ontogenesis of the species *Protobagliettoa parmigera*, and other endolitic calcicolous specimen out of the *Verrucariaceae* family. His study is a real break through in terms of the *Verrucariales*. The author elaborated approx. 50.000 sections, and took a photo of approx. 1.800 preparations that capture the ascoma ontogenesis of several species of the *Verrucariaceae* family.

Grummann (1963) made more new combinations (*Amphoridium calcisedum* f. *insculptoides* (J. Steiner) Grummann, *Protobagliettoa parmigera* f. *alocyza* (Arnold) Grummann, f. *arnoldiana* (Servít) Grummann, f. *calcivoroides* (J. Steiner) Grummann, f. *circumarata* (J. Steiner) Grummann, f. *microstictoides* (Zsch.) Grummann, *P. steineri* f. *insculpta* (A. Massal.) Grummann, var. *composita* (Servít) Grummann, var. *croatica* (Servít) Grummann, var. *lactea* (Hepp) Grummann, f. *britanica* (Servít) Grummann, and var. *mittenwaldensis* (Servít) Grummann.

Poelt and Vězda (1978) revised the *Bagliettoa* reducing them to seven species (*B. baldensis*, *B. cazzae, B. parmigera, B. parmigerella, B. quarnerica, B. steineri* and *B. sphinctrina*).

More new combinations were described later: *V. limborioides* Clauzade & Roux, *Protobagliettoa baldensis* (A. Massal.) Servít ex Nowak et Tobol., *Protobagliettoa bagliettoaeformis* (Hazsl.) Servít ex Nowak et Tobol. var. *istriana* (Servít) J. Nowak & Tobolewski, *Protobagliettoa gyelnikii* (Servít) Servít ex Nowak et Tobol., *Protobagliettoa parmigera* J. Steiner var. *bohemica* (Servít) Nowak et Tobol., *Protobagliettoa steineri* (Kušan) Servít ex. Nowak et Tobol.

I.-5. Contemporary state of study of the genus *Verrucaria* in present

Towards the end of 1950's the interest in the genus *Verrucaria* slightly fell. New combinations in the framework of the genus *Verrucaria* were published by Grumman (1963). The revision of British fresh - water representatives was published by Swinscow (1968). At the very beginning of 1980's there increased a large number of new descriptions, combinations and studies within the genus *Verrucaria* in the lichen literature. New combinations were introduced by Clauzade and Roux (1985). Taxonomic notes to several species were published by Hawksworth (1989) – *V. aethiobola, V. aquilella, V. conturmatula, V. elaeomeleana, V. funckii* and *V. fuscocinerascens*. Another study concerning the question of fresh - water representatives (*V. aquatilis, V. elaeomelaena, V. praetermissa, V. margacea, V. rheithrophila, V. pachyderma* a *V. latebrosa)* was published by Keller (1996). Breuss (1988, 1989, 1990, 1993, 1994 a, b, 1998 a, b, 1999 and 2000), Breuss & Etayo (1995), Goward et al. (1996) published several other studies with new descriptions and combinations or new findings of already

described species out of various substrata - *V. bryoctona, V. cetera, V. compactum, V. fuscula, V. geophila, V. gypsophila, V. inficiens, V. kootenaica, V. lecideoides, V. lignorum, V. macrospora, V. muelleri, V. navarrensis, V. obductilis, V. phloeophila, V. poeltii, V. radiata, V. rubrocincta, V. sphaerospora, V. trabicola, V. tuerkii, V. ulmi, V. viridigrana, V. xyloxena* a *V. zamenhofiana*. New species were described by Brodo & Santesson in Canada (1997) - *V. epimaura* and *V. schofieldii*). Other water species (*V. allantoidea, V. halochlora, V. igii, V. iwatsukii, V. marinomuralis, V. minuscula, V. miyagiensis, V. praeviella* and *V. sanrikuensis*; *V. glaucinodes, V. halophila, V. maura, V. muralis, V. nipponica, V. praevia, V. rheitrophila* and *V. submicrospora*) were described or revised by Harada (1992, 1993, 1994, 1995 a, b, 1996 a, b, c, d, 2000 a, b).

A large number of new descriptions from Australia, Tasmania and New Zealand was introduced by McCarthy (1988a, b, 1990, 1991a, b, c, 1995a, b, 1996a, b, 1997, 2000, 2001, 2002) – *V. amnica, V. aranensis, V. australiensis, V. austroalpina, V. austroschisticola, V. bubalina, V. cootapatambensis, V. fiordlandica, V. fortuita, V. howensis, V. hydrela* var. *puncticulata, V. inconstans, V. knowlesiae, V. meridionalis, V. mundula, V. mundula* var. *deminuta, V. operculata, V. phaeoderma, V. sessilis, V. simplex, V. solicola, V. subdiscreta, V. subtholocarpa, V. tasmanica, V. tholocarpa, V. tessellatuloidea* and *V. tuberculiformis*. He also revised some of the species and many others were introduced in his studies, too (*V. anzianoides, V. arctica, V. aquatilis, V. calciseda, V. ceuthocarpa, V. dolosa, V. fuscella, V. fusconigrescens, V. granulosaria, V. halizoa, V. hochstetteri, V. howensis, V. hydrela, V. lecideoides var. minuta, V. macrostoma, V. margacea, V. microsporoides, V. meridionalis, V. muralis, V. naeviformis, V. nigrescens, V. papillosa, V. phaeoderma, V. praetermissa, V. prominula, V. puncticulata, V. rheitrophila, V. sphinctrinella, V. subumbrinula* and *V. tessellatula*) – 1984, 1988a, b, 1990, 1995, 1996, 2002. Complex critical revision of saxicolous water species of the genus *Verrucaria* was published by Thüs (2002). The given list is not quite complete, many other individual descriptions or combinations are difficult to name, taking into account the extent of this project. Therefore, out of the study is clear that the group of calcicolous species of the genus *Verrucaria* has not been a subject of interest for researchers for a long time.

II. Servít's concept

II.-1. Generic concept

The view of taxonomy of genera has changed during Servít's extensive work (almost thirty taxonomic studies of different parts of *Verrucariales*). Servít respected the traditional division of genera within *Verrucariales* by the type of ascospores and a character of thallus (thallus crustose, ascospores simple-*Verrucaria* Schrader, with two cells – *Thelidium* A. Massal., muriform – *Polyblastia* A. Massal., presence of photobiont cells in hymenium – *Staurothele* Norman, squamulose thallus – *Dermatocarpon* Eschw. etc.), but broke this system into a much more detailed system of families and genera.

II.-1.1. Distribution of families and genera according to shapes of involucrellum

Servít (1955) *Verrucariales* differentiates within families: *Verrucariaceae*, *Bagliettoaceae* (dimidiate involucrellum with characteristic radiate fissuring), *Bagliettoa* A. Massal. - ascospores with transversal and longitudinal septum, *Protobagliettoa* Servít - ascospores absent or faintly developed. *Dermatocarpaceae*: foliose or squamulose thallus, *Dermatocarpon* Eschw., *Placidiopsis* Beltram. - ascomata without involucrellum, *Involucrocarpon* - ascomata with involucrellum. *Microglenaceae*: crustose, squamulose thallus, paraphyses in hymenium persistent – *Thrombium* Wallr. - without involucrellum, ascospores simple, *Paraphysothele* Zschacke - involucrellum present, ascospores with several transversal, *Thelidiopsis* Vain. - involucrellum present, ascospores dark with transversal septa. *Staurotheleaceae*: photobiont's cells in hymenium present, paraphyses dissolved, ascospores multiseptate, muriform - *Staurothele* Norman - involucrellum present, *Endocarpon* Hedw. - involucrellum absent or imperfect). *Pyrenidiaceae*: paraphyses ramose, ascospores in triseriate distribution, with transversal septum, pressed in septum, *Pseudoarthopyrenia* Keissler.

It was necessary to establish new correct forms of part of ascoma in order to do new descriptions. Servít adopted the following terms: involucrellum nullum - absent, involucrellum imperfectum (imperfect) - involucrellum present around ostiolum of ascoma only, involucrellum apicale (apical)- present on upper part of ascoma only, involucrellum dimidiatum - present on the first upper part of ascoma only, involucrellum subintegrum (incomplete) - present on the most part of ascoma, but not at the base, involucrellum integrum (complete) - present at whole excipulum of ascoma (Servít 1954, 1955).

Different types of involucrellum (its size and shape mainly) led Servít to the renewal of the old or description of completely new genera (*Amphoridium* A. Massal., *Amphroblastia* Servít, *Thelidium* A. Massal., *Polyblastia* A. Massal. - without involucrellum, *Bagliettoa* A. Massal., *Protobagliettoa* Servít - involucrellum apical, *Gongylia* Körb. (involucrellum present, paraphyses present) – Körber: Syst. L. Germ. 1855: 351, *Involucrothele* Servít - *Thelidium* with involucrellum, *Paraphysothele* (involucrellum present) - Zschacke in Rabenh. p. 564 segregated as a new genus from the genus *Thelidium*, within the framework of filamentous excipulum, brownish yellow cells of photobiont and I+ brownish reaction of asci, Servít 1953, 1954), and a new family *Bagliettoaceae*.

II.-1.2. By the type of ascospores

Servít stressed (Servít 1954) size, shape and position of ascomata regarding substrata, size, shape, and number of cells of ascospores (ascospores simple - *Amphoridium, Verrucaria, Sarcopyrenia* Nyl. with one septum - *Thelidium, Involucrothele*, with transversal and longitudinal septa - *Amphoroblastia, Polyblastia*). Servít 1954 p. 193: Similarly as in in the genus *Involucrothele*, we can see almost continual row of stages of dividing ascospores from species with very rare presence of longitudinal septum in commonly four - celled ascospores with richly divided ascospores. We

can see the same process happenning in the genus *Amphoroblastia*. I added some species with ascospores commonly transversally septed, and rare ascospores of longitudinal septa to the genus *Polyblastia*, recently arranged to the genus *Thelidium*, (*Thelidium papulare* mainly), that is surely *Polyblastia* for not rare longitudinal septa.

In my opinion, and according to my findings, it is possible to see septate ascospores in other species of the genus *Verrucaria*, which are characterized by the occurance of simple ascospores - e.g. *V. bryoctona* (even four - celled ascospores), *V. dufourii, V. margacea, V. xyloxena*, and others. It's not such an exceptional phenomenon. With this Servít's set example, we would be able to divide new genera within the framework of ascospore shape (e.g. the species *V. ditmarsica* is typical for its crescent ascospores, ascospores of *V. elaemelaena* are elongate, ellipsoid, rounded at both ends, species *V. funckii*, and *V. praetermissa* have ascospores narrowly ellipsoid), or by thickness of their cell walls (*V. mucosa*).

II.-2. Interspecific and infrageneric distribution according to different thallus

Servít paid much attention (1955) to the the thickness of different layers of thallus, and to different structures it contained - mainly hypothallus, and a size and shape of macrosphaeroidal cells. Consequently, he was able to describe many new calcicolous species, varieties, and forms. Later, Servít concluded that these features are characteristic to certain extent since they depend on the quality of substrata (in this case the character of limestone, dolomit, or any other substance containing $CaCO_3$ (Servít 1955, p. 3).

A significant taxonomical character in the descriptions are cells and length of periphyses (Servít 1955 p. 2: I consider the different length of periphyses a good differentiating character of species), mainly in the upper part of ascoma, where there is a thicker excipulum hypoperiphysium (Servít 1953).

The density of ascoma in the descriptions, expresses a number of ascoma to 1 cm^2. Servít used this mark pretty inconsistently even with infraspecific taxa. With many taxa, Servít characterized instead of the number value, the density, using terms such as a dense, not so much dense, unregularly ordered, etc. (see the table of characters), or he did not mention it at all.

Servít (1953, 1954) very minutely described different types of thallus - thallus epilithinus - non endolitic, thallus hemiendocalcinus - epilitic, and a bit endolitic, thallus endocalcinus - thallus completely endolitic without cortex layer. Similarly, Servít differentiates a medullar layer - stratum gonidiale epilithinum, hemiendocalcinum, endocalcinum. He uses terms excipulum sessile- a lower wall of perithecium is in the same level of the thallus surface, excipulum emersum - ascoma is immersed to one quarter of its own height, excipulum semiemersum - immersed to one half of its height, excipulum subimmersum - to three quarters, and excipulum immersum has got completely immersed ascoma, to express the position of ascoma in the thallus. The next Servít's character (1953) was the size of photobiont's cells in the medullar layer. The concrete list of characters presents all names of revided taxa in the taxonomical part, and in the table of characters, too.

III. Characters of the studied species

III.-1. Morphology of thallus and ascoma

Thallus

Thallus is clearly heteromeric, endolitic, crustose, continuous, matt or glossy, finely dotted with ascomata, white, grey (*V. baldensis*), from greyish green to greyish blue (*V. parmigerella*), pink, purpur or red (*V. marmorea*), and ochraceous (*V. limborioides*). Different colour of thallus in species (*V. marmorea* and *V. parmigerella*) is caused by clusters of colour crystals in the cortical layer. The colour changes in different habitat's conditions such as light and humidity. The thallus either creates a prothallus or not (dark, marginal zone of the thallus without photobiont cells), 500-700 µm thick, always without isidia or soredia.

The upper cortex layer (fig. 1) is 25-40 µm thick (it depends on the habitat's conditions, too), consisting of hyphae approx. 1 µm thick, densely conglutinated (prosenchyma). The medullar layer is 80-120 µm thick, created by thicker hyphae (4-5 µm), surrounded by groups of photobiont cells (fig. 1-3). The upper part of medullar layer with the groups of photobiont cells is 60- 120 µm thick. The thickness of this layer depends on the exposition of the habitat. Thallus from shady habitats are typical for bigger occurance of photobiont cell clusters that appear close to the cortex layer, and thus are of green colour. On more lit habitats, the clusters of photobiont are found deeper in the cortex layer, and thus are lighter.

Photobiont cells do not usually penetrate deeper than half of the ascoma. Species with crystals present in the cortical layer (*V. marmorea, V. parmigerella* - fig. 1, 3), have got photobiont clusters positioned closely to the cortical layer (they might function as a filter). In the lower part of the medullar layer, in the dephth of 150-180 µm under the thallus surface, there are little groups of developing ascomata.

Under the medullar layer, there is another layer with photobiont in hypothallus (100 µm to 4 mm) from prosenchymatic hyphae (fig. 1, 2). Its thickness then depends on the age of the thallus, type of substrata, habitat, and microclimatic conditions. Hyphae of this layer are colourless with occasional septa (fig. 5-7, drawing tab. I/3), and characteristic by creating macrosphaeroidal chains on the ends of hyphae. Macrosphaeroid cells are of different size, from 5 to 20 µm, sphaeroid or oblong, with a strong wall separated by its thick septa. The end of macrosphaeroidal chain is always equipped with a tip. The cells contain a kind of unknown oil-like liquid. We can see the chains with the use of binocular (60x magn.). The macrosphaeroidal layer is formed very strikely on margins of the thallus in the prothallus zone. Macrosphaeroidal cells are created also by other endolitic species of the genus *Verrucaria*. Doppelbaur (1959) presented them e.g. in *V. dufourii* DC. hypothallus is probably the main agent as for the thallus actively penetrating deeply the calcareous substrata.

Photobiont cells (fig. 4) are the same in all mentioned species, and belong to the genus *Trebouxia*. Cells are sphaeroid, 6-12 µm in diam. They are coagulated in vivid - green groups (probably 15 to 30 cells) surrounded by medullar hyphae.

Ascoma

All the mentioned species create sphaeroidal to conically closed ascomata of perithecium type, protected by typically shaped involucrellum (fig. 8-10). Ascomata are permanent and reach quite a high age. Their ontogenesis is very slow without any influence of the four season change (Doppelbaur 1959). We can often see several generations of ascomata in one sample of the thallus.

Perithecia are sphaeroidal, conical or bottled, completely immersed in substratum, 200-400 μm in diam., with conically extended ostiolum. They usually densely cover the entire thallus. It is possible to see a plain, black carbonated involucrellum on the fresh sample of thallus. It reaches 100-450 μm in diam., 15-35 μm of thickness. Mature involucrellum is cracked by several crescent cracks (drawing tab. I/4-8), the central part is usually a bit concave, the marginal part is curved continually, and the central is cracked. The rest of the involucrellum sometimes forms a black ring around the ostiolum (fig.9). It is often possible to see passive deformations in ascomata, caused by obstacles in substratum (mainly unsoluble crystals).

The ascomatal size is the same in the species studied *V. baldensis, V. cazzae. V. limborioides*, and *V. parmigerella*. We can differentiate these species by the size of their involucrellum (drawing tab. I/5-8). In *V. baldensis*, its involucrellum is nearly as big as the size of its ascomata, whereas in *V. parmigerella*, its size does not exceed than half the size of the ascomata diam. (see fig. 10 - vertical section of ascocarp).

The perithecial wall (excipulum, chlamys) is pseudoparenchymatic, continuous, in early development colourless, later of a dark brown colour, rarely stays permanently colourless (fig. 11). Pseudoparaphyses are absent. Periphyses are well developed, permanent, 1 -2, 5 x 3-30 μm, with several septa, ended by a short cylindrical cell (fig. 12, drawing tab. I/2). They grow from the upper half of the perithecium sides to the ostiolum.

Asci of the *Verrucaria* type, clavate, ascus wall from several layers (Grube 1999). The outer layer gelatinised in the mature development. They are eight - spored biseriate positioned, with thick tholus on the apex, I -, 10-20 x 60-75 μm, narrow at the base (5 μm), the part neighbouring with tholus is the widest (-20 μm) (fig. 13, drawing tab. I/1).

Ascospores in other species are formed regularly (*V. baldensis, V. cazzae, V. limborioides*), but in *V. parmigerella*, they are rare. Ascospores are, from ellipsoid to oval, colourless, simple, 10(15) x 18(28) μm (fig. 14-15, drawing tab. I/1). The studied species do not differ in size of ascospores from one another significantly. Servít (1939) noted some ascospores with septum that can rarely be seen e.g. in sample JPH/2828). Some workers also mentioned pycnoconidiomata in ascoma yet it is impossible to prove there were produced by the thallus of the particular species.

I myself, have never noted any pycnoconidioma in the studied thalli or ascomata.

III.-2. Ontogenesis

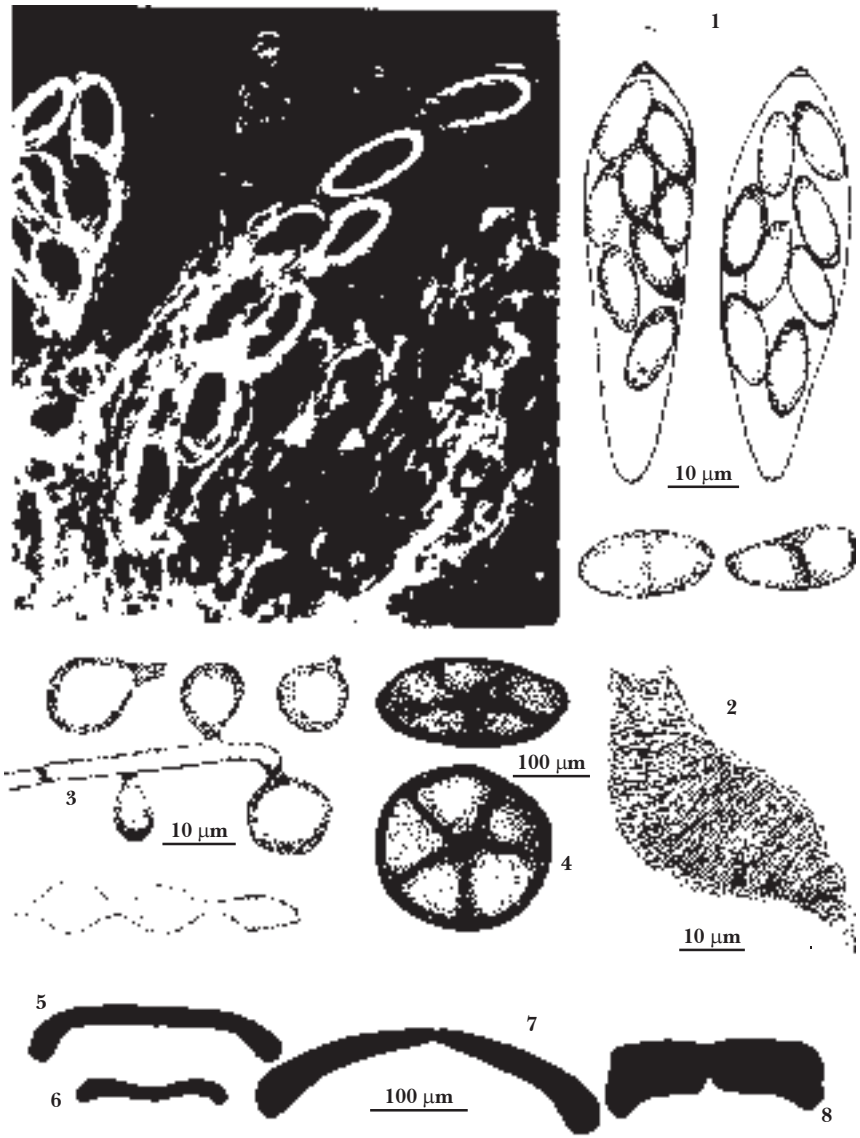
Thallus

The way the thallus colonizes the substratum is still vaguely known. It is obvious that its hyphae actively penetrate limestone through agens that at the same time disintegrate it. The thallus is entirely integrated within the substratum that is why it is inacceptable to claim that it would penetrate the substratum only through the cracks in its surface it probably only uses them when colonizing new habitats, but the mechanism of the penetrating itself is surely different. In regard to the original distribution of the heteromeric thallus with chains of macrosphaeroidal hyphae on its edges is possible, that really the role of these hyphae is to corrode limestone and thus prepare the substratum for other organs of the thallus. The proofs capturing the accurate mechanism of this activity have not been published yet.

Doppelbauer (1959) introduced the following process of the thallus‘ penetration. The thallus, by its marginal hyphae, penetrates 120-140 µm deep. Obstacles such as crystals of substratum stop it from growing. Hyphae growing by the surface and underneath it are ended by flat, blunt cell that has a dark wall, is thickly protoplasmatic and 3-7 x 2-4 µm big. The ends of the deeply penetrating hyphae are pointed like bristles (Bachmann 1907), almost without protoplasma, 5-12 x 1,5-2 µm big. The zone of the thickest penetration is in the low part, right in the place where there are endolitic algae. From this part, short hyphae grow upwards, orientated upright to the surface. Such growth secures elimination of other algae and fungal hyphae that could damage the evolving thallus. Bachman called these thick, towards surface - branching hyphae ended by brownish, torulous cell coating hyphae (Deckhyphen). They are striking during the period of ascomata development, from the edges to the the center, they progressively disappear.

In the lower part of the vegetation layer (100 µm from the surface of the thallus), there prevail simple hyphae and clusters of hyphae that penetrate the substratum in all directions. Heterogenous hyphae and algae cells are eliminated on the edges of the thallus. From the bottom growing hyphae push part of the strange hyphae and cells of algae to the surface. Other hyphae attach themselves longitudinaly or around short - celled hyphae and penetrate to the insides of the cells. After such attack, the heterogenous cells get deformed, loose their content and fall apart. First, clearly distinquishable algae cells created in the thallus can be found approx. 400 µm from the edge of the hyphae row, in the area, where there most of cells of the heterogenous algae are found. In this distance (500 µm) from the thallus edge, there begins to evolve the own algae layer. Entirely on the edge of the thallus to be, there, in the depth of 150 - 200 µm can be seen alone cells or growing hyphae threads with algae cells 3 -4 µm in diam.

The way thallus chooses the right algae cells (in this case genus *Trebouxia*), is not entirely known. Nienburg (1917) proposed the following hypothesis. Mycobiont hyphae themselves bring cells of algae to the growing hyphae in the marginal zone. Thus the deepest algae layer is found on the edge of the thallus. Another layer of hyphae then supports their growth in the hyphae threads and brings the structure



Tab. I.: 1. - Asci and ascospores *(V. baldensis)*, **2.** - periphyses, **3.** - macrosphaeroids, **4.** - radiate opening involucrellum *(V. baldensis)*, **5.** - involucrellum of *V. baldensis,* **6.** - *V. parmigerella,* **7.** - *V. limborioides,* **8.** - *V. marmorea.*

of the algae layer from the bottom to the top (retractable hyphae). This way, the hyphae threads must break the substratum to create living conditions for algae cells.

Ascoma

All the species of the genus *Bagliettoa* have the identical type of ontogenesis as Doppelbaur (1959) describes in the species *Protobagliettoa parmigera* (= *V. baldensis*).

Doppelbaur (1959) described the ascoma development as follows. The ascoma development begins on the bottom part of the medullar layer, approx 150 µm from the thallus surface. There strikingly thick, in protoplasma rich hyphae that grow quickly and create a hyphae cluster differentiate. The cluster's cells are 2-5 x 2-3 µm, are short and as thick as the hyphae of the surrounding medullar layer, 3-8 x 1,5-2,5 µm. Hyphae on the edge of the cluster are squeezed and create a dense cover, which is anilin - blue coloured. Among the hyphae of the cluster, it is impossible to distinquish generative and vegetative hyphae. The cluster of carpogonium grows slightly to depth, more to the width and mostly upwards. Progressively, on the outer side, there become attached more and more hyphae from the thallus. Above this formation, the space from the bottom to the top, fill in squeezed hyphae to the very surface of the thallus, which create paraplectenchyma out of cells 2-3 µm in diam. By these formations, the base of the ascoma reaches the height of approx. 200 µm, its biggest diameter (150 µm deep) reaches approx. 100 µm. Inside prevails vertical distribution.

The center of the cluster gets step by step loosened, from one of the cells, where an ascogonium begins start to evolve. It is created by one and only rounded cell (3 µm in diam.), other cell that is attached to it or twines it (2-2,5 µm in diam.) and one hypha that grows through in the upper part (1,5-2 µm in diam.). Trichogyne can be observed with no exception to the very edge of the paraplectenchyma complex, where there is approx. 80 - 100 µm far from the thallus, ended. From the lateral hyphae of the cluster, there evolves an ascoma wall (excipulum). At the same time, there on the cut, the polygonal cells get flattened, which are 4 x 1 µm. The hyphae of the thallus that bent during the development of the ascoma base fall apart, the rest is crushed. The ascoma base is often connected with the thallus by small hyphae. Regularly, there develop deep cracks next to the cluster and young ascoma.

On the ascogonium, there grow colour hyphae (starch) and fill in approx. half of the space of the future ascoma. In its upper part, to the inner part begin to grow hyphae from the inside of the formation, out of which later begin to evolve periphyses. In the highest part of the former cluster, approx. in the height, where there ends the tip of the trichogyne, the walls of the plectenchyma are getting black and create first ring - like, soon plate-like involucrellum approx. 100 µm in diam. and 25 µm thick.

During the ontogenesis, the involucrellum gets gelatinous and thanks to the periphyses, the peritecium content is almost filled. Also out of the hyphae rich in protoplasma there is only a thin layer left in the bottom part, out of which evolves subhymenium, later hymenium. In the spare space, there begin to evolve in all

parts, if the mentioned layer is absent, periphyses and fill in rapidly the whole of the inside. Now, from the subhymenium, there begin to evolve bases of asci that grow up to 14 x 7 μm Later on, their development stops and the separation of cores begins. This stage probably lasts quite a long time since it can be observed very often. From the lower part of the formation margin to the upper part of the involucrellum, the young ascoma is 60-140 μm big, its diam. is 90-110 μm and the ascoma, from the start of its development does not content any starch.

With the asci development, the ascoma tends to stretch mainly to the width and mostly upwards. The biggest growth then takes place right under involucrellum, in the highest zone of excipulum. Involucrellum gets stiff, the rounded shield bends upwards and pushes or runs through above the dying out plectenchymatic layer 60-80 μm thick out of the thallus, the septed hyphae are dying out and are completely falling out, too. Thus the involucrellum is getting on the top of the thallus and at the same time is still covering the neck of the small ascoma and then is ray- like cracking.

Asci reach their full size. The core development and the spore growth in the ascospores is taking place very quickly.

During the differentiation of the spores, the ostiolum is changing. The central part of the involucrellum is sometimes widely arched or the involucrellum stays flat and slowly begins to open up. Porus develops thanks to the ascoma neck development, too and thanks to breaking out of the closure.

Ascomata with riping spores grows to the width till the collar - like involucrellum is completed. The ripe ascoma is slightly of a pear - like shape, covered by flat involucrellum (Involucrellum patens, Servít 1955). Hymenium is stretching out from the ascoma base to the sides of the walls and at the same time pushes the periphyses back towards the top.

When the asci develop from the subhymenium, the excipulum cells particularly get dark, the periphyses go on growing in the neck and form a strong closure. To the empty ascoma, there grow through hyphae of mycobiont from the sides. It cannot be taken for the thallus regeneration since here, the photobiont cells are absent. Primordias of new ascomata are form their base deeper than the bases of the old ones, thallus then must penetrate the substratum deeper.

III.-3. Ecological claims and geographic distribution

All the studied species are endolitic living on limestone or dolomit. *V. baldensis* and *V. parmigerella* grow together, and are very common in Europe, along with other calcicolous species such as *Acarospora cervina, A. macrospora, Caloplaca cirrochroa, C. holocarpa, Clauzadea immersa, Polyblastia cupularis, Protoblastenia rupestris*, *Verrucaria calciseda*, they like to colonise sunny habitats. *V. baldensis* and *V. marmorea*, in my opinion and according to my own collections, forms large thalli that can reach up to several square decimetres. *V. parmigerella* prefers places that are not exposed to the sunshine that much, and are rather shaded by vegetation (stone slots, small boulders). I never collected samples of this species on places where they would not be protected from the sun. I never collected *V. limborioides*, and it is impossible to determine specific ecological requirements according to several herbarium samples.

The studied species are distributed on limestone and dolomite around the whole Europe, *V. baldensis* also in Asia (China, Palestina, Libanon, Turkey), Africa (Tunisia), Australia and New Zealand, too. One sample is also localised in U. S. A., *V. parmigerella* has also localities in Asia (China, Palestina and Libanon). We must should expect other extra European distribution of other species too, but we can support this by herbarium samples. *V. marmorea* is a bit rare, and according to my experience as a collector, it is often distributed in higher altitudes of the mountains. A detailed list is given along with characteristics of the species studied.

III.-4. Taxonomical characters

The described taxa are characterized by authors by the following features.

Thallus

In all the representatives, the thallus is always heteromeric, completely endolitic (only the upper part of the cortical layer protrudes), with a typical macrosphaeroids forming in prominent layer under the medullar layer - hypothallus (the thallus build is identical with the ones appearing in other relative endolitic, calcicolous species of the family e.g. *Verrucaria calciseda* DC., or *Thelidium immersum* Mudd). In some species in the cortical layer red or green crystalsare formed, that react with KOH.

The thallus can vary very often, half of the described species was described on the base of difference in thallus. As far as I am concerned, the substrata influence (on which the thallus is found), was being very underestimated as well as the microclimatic conditions under which it grows. Often, a black prothallus is created, that (in the form of brown black line), can border the thallus.

Macrosphaeroids

A very frequently used character is the difference of size and shape, or the absence of macrosphaeroidal cells of hypothallus. Macrosphaeroidal cells (oil cells, macrosphaeroids) create a thick layer under the medulla one that can be thick as much as 500 μm. Hyphae of this layer are colourless, with occasional septa, and typical of forming conspicuous chains of macrosphaeroid which are formed on the ends of hyphae. Macrosphaeroids differ in size, 5-20 μm, are sphaeroid or oblong, with a thick wall separated by strong septa, the end of the hyphae has always got a tip. The cells contain oil liquid. In a great blow- up (at least 60x), it is possible to see decalcified hyphae with individual macrosphaeroids seen also with the use of binocular. On the edges of the prothallus zone, there is a conspicuous layer of macrosphaeroids.

Servít (1939) stressed the taxonomical importance of macrosphaeroid cells - mainly their shape, size and number. During my studies, I observed a relationship between the number of macrosphaeroid and the strength of the layer in which they are formed: In samples in a good state (thallus with ascomata, with maturing or mature spores), this layer was very prominent, macrosphaeroids were frequent, whereas the thalli were dying out or were in a worse physiological state (with no ascomata and spores, or with breaking - up ascomata), had this layer thinly devel-

oped, macrosphaeroids were not observed. Macrosphaeroids probably strongly influence the process of hyphae penetrating substrata (limestone), and thus their number can vary in the dependance on the developmental activity of the thallus.

Ascoma, involucrellum, density

Typically flat, lid - like involucrellum with down bent edges is completely immersed, does not overlap the thallus, and in older ascoma can be concave with time. In the zone of ostiolum the ascoma is covered from above, does not continue to depth, which is different with other representatives of genus *Verrucaria*, where it protects a greater part of excipulum. Involucrellum is 20-40 μm thick, 10-450 μm wide, and when mature, we can observe ray- like septa thanks to which it can open. The variability of the involucrellum is little since its thick and coal - like structure is pretty resistent against damage. Ascomata are formed along the whole surface. Their density to certain extent is dependent on the microclimatic conditions of the habitat, for a few number of characters, the term ascomata density (it expresses the numer of ascomata in cm^2) was put in use by Lettau (1912) in order to characterize the thallus better. The ascomata density was often used by Servít as a significant sign, when doing descriptions.

Asci

Asci are *Verrucaria* type (fissitunicate), cylindrical, with a thick tholus, not reacting with I. They are 10-20 x 60-75 μm, narrow on the base (5-7 μm), the part neigbouring with tholus is the widest (-20 μm). Asci of the studied species do not differ from one another significantly.

Ascospores

Ascospores are simple, occasionally two - celled, ellipsoid, 15- 20 x 7-10 μm in eights formed, and in biseriate distribution in asci. In some described species it is noted that ascospores are produced rarely. I can prove this fact in the species *V. parmigerella*, where I observed ascospores at least in half of the samples.

Periphyses

Periphyses are well developed, perrenial 1-2, 5 x 15-35 μm, articulated, ended by a shorter, clavate cell, non - branching, non - anastomous. They grow from the sides of perithecium, from the half of its height up to ostiolum. Species never create pycnoconidiomata.

III.-5. Described taxa

Most of the described taxa exist in the herbarium types (acronym of the relevant herbarium where the specimen deposited given in brackets); the name of the concrete herbarium for certain specimen is always given in individual taxa - BERN, BP, BRA, BRNM, H-ACH, M, PRM, STU, VER, W, WU, herbarium A. Vězda and I could study them. From some types that got lost from the original herbaria, I was able to locate isotypes in Servít's herbarium (PRM). Unfortunately, I couldn't study several other type specimens as they got lost completely (e.g. *V. steineri*).

The fundamental problem in taxonomy of this genus seems to be the absence of the species – concept. Thanks to Acharius description of the species *V. sphinctrina* the major differentiating character of the genus, which is radiately fissuring ascoma, was established -. Although the type specimen of this species does not belong to *Verrucariales* (see p. 6), other researchers took reffered to it as base of new genus for a long time. Improper or insufficient labelling of the type material resulted.

Obviously, in a taxonomic disorder and chaos, because of difficulties to find, study and compare original material. In the past, similar situations were often regular, more over during the wars several herbaria were destroyed. Thus Kušan's and Steiner's types (*V. steineri, V. parmigera*) probably got lost. In the course of time, the number of the described taxa increased and the group of the related species mentioned above became considerably incomprehensible. Although the studied species have very few significant charasters, none of the authors set any criteria to delimit particular species, varieties and forms and thit also explains confusion existing up till now. Frequently, the same characters are used to differentiate different taxonomical levels, e.g. species, varieties and forms; which are, moreover used repeatedly within individual taxa.

This state can only be solved by the consistent revision of all taxa. Zschacke's list (1934) consists of 7 species (*V. cazzae, V. parmigera, V. quarnerica, V. sphinctrina, V. sphinctrinella, V. steineri* and *V. subrosea*). Servít's revision (1939) notes 15 species and 103 varieties and forms (*V. bagliettoaeformis, V. baldensis, V. bosniaca, V. cazzae, V. dalmatica, V. grummanni, V. gyelnikii, V. inaequata, V. parmigera, V. quarnerica, V. sphinctrina, V. sphinctrinella, V. steineri, V. subconcentrica,* and *V. suzaeana*). Later, Servít (1955) presented other combinations and descriptions. They are *Protobagliettoa alocyza, P. erumpens, P. exesa, P. graeca, P. kutakiana, P. lactea, P. obscurata, P. parmigerella, Polyblastia sphinctrina* and other varieties and forms. Individual taxa are in detail described in the taxonomic part.

III.-6. Table of characters

In the table, there are arranged characters used in the descriptions of all the studied taxa.

Evaluation of characters

The revision of all the studied taxa resulted in the need of reduction and unity of many described taxa. Most characters that used to be considered meaningful (e. g. prothallus character, size of periphyses, size of asci, colour of excipulum, ascomata shape, division of spores, shape and size of macrosphaeroids, the thickness of hypothallus), cannot be respected. Colouring of excipulum and other parts of inner parts of ascomata is variable and clearly dependant on their ontogenetic age. Remeasuring of microscopic preparations of ascomata, asci, periphyses, hyphae of medullar layer and macrosphaeroids of a large number of samples did not bring any meaningful results.

On the other hand, big differences were found in the size of involucrellum of the studied species. The size of involucrellum differs species *V. limborioides* (the big-

III.-6. Table of characters

Taxon	C	S	SH	H	M	D	EV	ED	PR	I	PF	AD	AS	S
1. *P. alocyza*	1	0	1	1	1	2	2	1	1	2	1	1	0	0
2. *P. erumpens*	3	1	2	0	1	1	0	0	2	1	1	1	0	0
3. *P. exesa*	1	3	0	0	1	1	2	2	2	2	1	1	0	0
4. *P. kutakiana*	3	2	2	0	0	2	0	0	2	1	1	0	0	0
5. *P. lactea*	1	0	0	0	2	3	1	1	2	2	1	1	2	2
6. *P. lactea* var. *ochracea*	4	3	0	0	0	0	0	0	0	0	0	0	0	0
7. *V. bagliettoaeformis* var. *baglietoaef.* f. *perarata*	1	3	0	0	0	0	0	0	0	0	0	0	0	0
8. *V. baglietoaeformis* var. *caesia*	1	0	1	0	2	0	0	0	0	2	2	0	0	0
9. *V. baglietoaeformis* var. *dealbata*	1	2	0	0	1	0	0	0	0	0	0	0	0	0
10. *V. baglietoaeformis* var. *graeca* f. *subinterrupta*	1	0	0	0	1	0	0	0	0	0	0	0	0	0
11. *V. baglietoaeformis* var. *istriana*	1	1	0	0	1	0	0	0	2	1	0	0	0	0
12. *V. baglietoaeformis* var. *pseudointerrupta*	1	1	0	0	2	0	2	2	0	1	0	0	0	0
13. *V. baglietoaeformis* var. *pseudointer.* f. *arbensis*	1	0	0	0	0	0	0	0	0	0	0	0	0	0
14. *V. baldensis* var. *canici*	1	1	0	2	2	0	0	0	0	0	2	1	0	0
15. *V. baldensis* var. *canici* f. *bakonyensis*	1	0	0	0	0	0	0	0	0	0	0	0	0	0
16. *V. baldensis* var. *canicii* f. *incavatula*	1	3	0	0	0	0	0	0	2	2	0	0	2	2
17. *V. baldensis* var. *cretzoiui*	1	1	0	0	1	0	1	2	2	1	1	0	1	2
18. *V. baldensis* var. *cretzoiui* f. *meridionalis*	1	1	0	0	0	0	0	0	0	0	0	0	0	0
19. *V. baldensis* var. *insculptoides*	1	3	0	0	1	0	0	0	0	1	0	0	0	0
20. *V. baldensis* var. *rechingeri*	1	1	0	0	1	0	2	2	1	1	0	0	1	1
21. *V. baldensis* var. *serbica*	1	1	1	0	0	0	1	2	2	2	0	0	2	2
22. *V. baldensis* var. *spilomatica*	1	0	0	0	0	0	0	0	0	0	0	0	0	0
23. *V. bosniaca*	1	1	0	1	2	0	1	2	2	2	1	0	0	2
24. *V. bosniaca* f. *incavata*	1	3	0	0	0	0	0	0	0	0	0	0	0	0
25. *V. bosniaca* f. *sinaiensis*	1	3	1	0	0	0	0	0	0	0	0	0	0	0
26. *V. bosniaca* var. *cretzoiuana*	1	2	0	0	0	0	0	0	0	0	0	0	0	0
27. *V. bosniaca* var. *lovcenensis*	1	1	1	0	0	0	0	0	2	2	0	0	2	0
28. *V. bosniaca* var. *lovcenensis* f. *albae*	1	3	0	0	0	0	0	0	0	0	0	0	0	0
29. *V. bosniaca* var. *lovcenensis* f. *plumbea*	1	0	0	0	0	0	0	0	0	0	0	0	0	0
30. *V. bosniaca* var. *mirovensis*	1	3	1	0	0	0	0	0	0	0	0	0	0	0
31. *V. bosniaca* var. *romanica*	1	3	1	0	0	0	0	0	0	0	0	0	0	0
32. *V. calciseda* f. *baglietoaeformis*	1	1	0	0	2	0	2	2	2	1	2	0	1	0
33. *V. cazzae*	2	1	2	1	1	0	0	0	1	1	1	2	1	0
34. *V. cazzae* var. *cazzae* f. *circumarata*	2	3	0	0	0	0	0	0	0	0	0	0	0	0
35. *V. cazzae* var. *cazzae* f. *dealbata*	1	0	0	0	0	0	0	0	0	0	0	0	0	0
36. *V. cazzae* var. *graeca*	1	1	0	2	1	3	1	2	2	1	1	1	0	0
37. *V. cazzae* var. *pseudomarmorea*	2	0	0	0	0	0	0	0	0	1	0	0	0	0
38. *V. dalmatica*	1	1	0	0	1	0	1	2	0	1	1	2	1	1
39. *V. grummanni*	1	1	1	2	1	0	1	2	2	2	2	2	2	2
40. *V. gyelnikii*	1	0	0	0	2	0	1	1	1	2	1	0	0	2
41. *V. gyelnikii* f. *alanensis*	1	1	0	0	2	0	1	1	0	1	0	0	0	0
42. *V. gyelnikii* f. *obscurata*	1	1	0	0	1	3	2	2	0	2	1	0	2	2
43. *V. gyelnikii* var. *velebitica*	1	1	0	0	0	0	0	0	1	1	0	0	0	2
44. *V. gyelnikii* var. *velebitica* f. *sulcata*	1	3	0	0	0	0	0	0	0	0	0	0	0	0
45. *V. inaequata* var. *berchtesgadensis*	1	3	0	0	1	0	1	0	1	2	1	0	2	2
46. *V. inaequata* var. *inaequata* f. *helvetica*	1	0	0	0	0	0	0	0	1	2	0	0	0	0
47. *V. inaequata* var. *kuemmerleana*	1	3	1	0	2	0	0	0	0	2	2	1	0	0
48. *V. inaequata* var. *transsilvanica*	1	1	0	0	2	0	0	0	0	2	1	0	0	2
49. *V. inaequata* var. *transsilvanica* f. *expallens*	1	2	0	0	0	0	0	0	0	1	0	0	0	0
50. *V. inaequata* var. *triglavensis*	1	3	0	0	1	0	0	0	0	3	0	1	0	0
51. *V. limborioides*	4	0	0	0	2	0	0	0	0	3	2	2	1	2
52. *V. marmorea*	2	1	0	0	0	0	0	0	0	0	0	0	0	0
53. *V. parmigera*	1	1	0	0	2	0	0	2	1	2	1	1	1	0
54. *V. parmigera* f. *geographica*	1	1	1	0	0	0	0	0	0	0	0	0	0	0
55. *V. parmigera* var. *adriatica*	1	3	0	0	0	0	0	2	0	2	0	0	0	0
56. *V. parmigera* var. *bohemica*	1	2	1	1	2	0	1	2	1	2	1	1	0	0
57. *V. parmigera* var. *calcivoroides*	1	3	0	0	1	0	0	0	0	0	0	0	0	2
58. *V. parmigera* var. *calcivoroides* f. *arnoldiana*	1	3	0	0	2	0	1	1	0	0	2	0	0	0
59. *V. parmigera* var. *calcivoroides* f. *biokovensis*	1	0	0	0	0	0	0	0	0	1	0	0	2	0
60. *V. parmigera* var. *calcivoroides* f. *elegans*	1	0	1	0	0	0	0	0	0	0	0	0	0	0
61. *V. parmigera* var. *calcivoroides* f. *kierkiensis*	1	3	0	0	0	0	0	0	0	0	0	0	0	0
62. *V. parmigera* var. *circumarata*	1	1	1	0	1	0	0	0	0	2	0	0	0	0
63. *V. parmigera* var. *dvorakii*	1	0	0	1	1	0	1	0	0	2	0	0	0	0
64. *V. parmigera* var. *forissi*	1	2	1	0	2	0	2	2	0	0	1	1	0	0

Taxon	C	S	SH	H	M	D	EV	ED	PR	I	PF	AD	AS	S
65. V. parmigera var. *gyelnikiana*	1	0	0	0	1	0	1	2	0	0	1	0	0	0
66. V. parmigera var. *hazslinszkyi*	1	1	0	0	1	0	0	2	0	0	2	1	0	0
67. V. parmigera var. *hilitzeri*	1	1	0	1	0	0	1	1	1	2	1	1	0	0
68. V. parmigera var. *lapadensis*	1	1	1	0	1	0	0	2	1	2	1	1	0	0
69. V. parmigera var. *lapadensis* f. *subcomposita*	1	3	1	0	2	0	0	0	0	0	0	0	0	0
70. V. parmigera var. *pieninensis*	1	1	1	0	1	0	0	1	2	1	0	0	0	0
71. V. parmigera var. *subrosea*	1	1	1	1	2	0	2	2	1	2	1	0	0	1
72. V. parmigerella	3	1	1	0	2	0	0	0	1	1	2	1	1	1
73. V. pinguis f. *alocizoides*	3	0	0	0	0	0	0	0	0	0	0	0	0	0
74. V. quarnerica	4	3	1	0	0	0	0	0	1	3	0	0	0	2
75. V. sphinctrina f. *bavarica*	1	0	0	0	1	0	2	2	0	0	0	0	2	2
76. V. sphinctrina f. *limborioides*	4	0	0	0	0	0	0	0	0	0	0	0	0	2
77. V. sphinctrina var. *calcivora*	1	3	0	0	0	0	0	0	0	0	0	0	0	2
78. V. sphinctrina var. *lojkae*	1	0	1	0	0	0	2	2	0	0	0	0	0	0
79. V. sphinctrina var. *sphinctrina* f. *gallica*	1	0	0	0	0	0	0	0	0	2	0	0	0	0
80. V. sphinctrina var. *tiroliensis*	1	0	0	0	0	0	0	0	0	0	2	0	0	2
81. V. sphinctrinella var. *sphinctrinella* f. *herculana*	1	0	0	0	0	0	0	0	0	0	0	0	0	0
82. V. sphinctrinella var. *sphinctrinella* f. *loferensis*	3	1	0	0	0	0	0	0	0	0	0	0	0	0
83. V. sphinctrinella var. *alocizoides* f. *domogledensis*	3	0	0	0	0	0	0	0	0	0	0	0	0	0
84. V. sphinctrinella var. *elevata*	3	3	0	0	0	0	0	0	0	0	1	0	0	0
85. V. sphinctrinella var. *elevata* f. *spermogonifera*	3	3	0	0	0	0	0	0	0	0	0	0	0	0
86. V. sphinctrinella var. *expallida*	1	1	1	0	2	0	0	0	0	0	0	0	0	0
87. V. sphinctrinella var. *italica*	1	0	0	0	1	0	0	0	0	0	0	0	0	2
88. V. sphinctrinella var. *parmigerella* f. *calcivorella*	3	2	0	0	0	0	0	0	0	0	0	0	0	0
89. V. sphinctrinella var. *parmigerella* f. *pallida*	1	0	0	0	0	0	0	0	0	0	0	0	0	0
90. V. sphinctrinella var. *sphinctrinella* f. *viridis*	3	2	0	0	0	0	0	0	0	0	0	0	0	0
91. V. sphinctrinella var. *thalassiformis*	3	3	0	0	0	0	0	0	0	0	0	0	0	0
92. V. steineri	1	1	0	0	2	0	0	0	2	2	2	0	0	2
93. V. steineri f. *scrobicularis*	1	3	0	0	0	0	0	0	0	2	0	0	0	0
94. V. steineri f. *turgescens*	1	2	0	0	0	0	0	0	0	2	1	0	0	2
95. V. steineri var. *composita*	1	1	1	0	0	0	0	0	0	0	0	0	0	2
96. V. steineri var. *croatica*	1	3	0	0	1	0	0	0	0	0	0	0	0	0
97. V. steineri var. *inaequata*	1	1	0	0	2	0	1	1	0	1	1	1	0	1
98. V. steineri var. *lactea* f. *britanica*	1	1	0	0	0	0	0	0	0	2	0	0	0	0
99. V. steineri var. *lactea* f. *geographica*	1	2	1	0	0	0	0	0	0	2	0	0	0	2
100. V. steineri var. *mittenwaldensis*	1	3	0	0	0	0	0	0	0	2	0	0	0	2
101. V. subconcentrica	1	1	1	0	1	0	1	2	1	1	1	2	1	1
102. V. subconcentrica f. *punctatissima*	1	3	1	0	0	0	0	0	2	2	0	0	0	0
103. V. subconcentrica var. *eumacrosphaeroidea*	1	2	0	0	2	0	0	2	0	1	0	1	0	0
104. V. subconcentrica var. *euthallina*	1	1	1	0	2	0	2	0	2	1	0	0	2	1
105. V. subconcentrica var. *euthallina* f. *asperella*	1	2	0	0	0	0	0	0	0	0	0	0	0	0
106. V. subconcentrica var. *euthallina* f. *genovensis*	4	0	0	0	0	0	0	0	0	0	0	0	0	0
107. V. subconcentrica var. *metzleri*	1	3	0	0	2	0	1	1	0	0	0	0	0	0
108. V. subconcentrica var. *nigroaureolata*	1	3	1	0	2	0	2	1	2	2	1	0	1	1
109. V. subconcentrica var. *nigroaureolata* f. *limitata*	3	2	1	0	0	0	0	0	0	0	0	0	0	0
110. V. subconcentrica var. *nigroaureolata* f. *rauca*	3	2	0	0	0	0	0	0	0	0	0	0	0	0
111. V. subconcentrica var. *petkae*	1	3	1	0	0	0	0	0	2	1	0	0	0	0
112. V. subconcentrica var. *saxivora*	1	3	0	0	0	0	0	0	0	1	0	1	0	0
113. V. subconcentrica var. *saxivora* f. *interruptoides*	1	3	0	0	2	0	0	0	0	0	0	0	0	0
114. V. subconcentrica var. *saxivora* f. *ninensis*	1	0	1	0	0	0	0	0	0	0	0	0	0	0
115. V. subconcentrica var. *sinensis*	1	3	0	1	2	0	2	2	2	2	2	1	0	0
116. V. suzaeana	1	1	0	1	1	0	2	0	2	3	1	1	0	0
117. V. suzaeana var. *sendtneriana*	1	0	1	2	0	0	1	1	0	2	0	0	0	0
118. V. suzaeana var. *suzaeana* f. *moravica*	1	3	0	0	0	0	0	0	0	0	0	0	0	0

C (colour of a thallus): 0 = not mentioned, 1 = white to gray, 2 = purpur, 3 = green to grey or blue-green, 4 = ochre; **S** (surface of a thallus): 0 = not mentioned, 1 = smooth, 2 = rough, 3 = scrobiculate or wrinkled; **SH** (separated by a hypothallus): 0 = not mentioned, 1 = present, 2 = absent; **H** (hypothallus): 0 = not mentioned, 1 = to 800 µm, 2 = over 1000 µm; **M** (size of macrosphaeroidal cells): 0 = not mentioned, 1 = to 15 µm, 2 = over 15 µm; **D** (dense): 0 = not mentioned, 1 = to 200, 2 = 200-500, 3 = over 500; **EV** (upper part of an excipulum): 0 = not mentioned, 1 = colourless or pale brown, 2 = dark; **ED** (bottom part of an excipulum): 0 = not mentioned, 1 = colourless or pale, 2 = dark to black; **PR** (perithecium): 0 = not mentioned, 1 = to 250 µm, 2 = over 250 µm; **I** (involucrellum): 0 = not mentioned, 1 = to 180 µm, 2 = 200-300 µm, 3 = over 300 µm; **PF** (periphyses): 0 = not mentioned, 1 = to 35 µm, 2 = over 35 µm; **AD** (development of asci): 0 = not mentioned, 1 = ascospores absent, 2 = ascospores present; **AS** (size of asci): 0 = not mentioned, 1 = to 50 µm, 2 = over 50 µm; **S** (size of ascospores): 0 = not mentioned, 1 = length to 15 µm, 2 = over 15 µm.

gest up to 450 μm), *V. baldensis* (mostly 250-300 μm in diam.), *V. parmigerella* (is characterized by the smallest involucrellum – about 120-150 μm in diam.). The species *V. marmorea* is characterized by rapid evolution and following degradation of ascomata. That is why it is possible to observe ascomata in different stages of development and size (with involucrellum from 100 to 300 μm) in this species.

This separation then supports different character of the cortex layer of thallus, which can be found in the already mentioned species. The most striking thallus probably has the species *V. marmorea*, where in the cortex layer clusters of red crystals that KOH turn green can be found. The concentration of the crystals differs in the framework of the cortex layer of the thallus surface. Some fresh samples showed bright purpur colour - here, the crystal concentration was high. Other contained less crystals - the thallus was pink. Crystals can also create interesting patterns on the thallus- there were observed samples, where they were present only around ascomata (pink ring), and they were absent in the neighbouring thallus. On other samples, the crystals created red spots in the neighbouring light (white or greyish) thallus. *V. parmigerella* is another species with crystals present in the cortex layer. The crystals are blue - green and much smaller than in the previous sample. They cause the typical blue - green or green - grey colouring of the thallus.

The species *V. baldensis* is characterized by white or greyish thallus without colourful crystals in the cortex layer. Within this species, the largest number of species, varieties or forms was described. Revision of specimens indicated a great variability of the thallus of this taxon. Colour of the thallus is very changeable in dependance on microclimatic conditions of the habitat (see the commentary of this species). The prothallus is also created in various ways - from the simple margin to complicated patterns that sometimes divide the thallus ti miniature fields. This variety is depicted in many varieties and forms.

The species *V. limborioides* also does not content any visible crystals in the cortex layer of the thallus. The ochraceous colour of the thallus is typical for this species.

B. Taxonomic part

Most of the studied species were in the past put in the following two genera.

Bagliettoa A. Massal.

Bagliettoa limborioides A. Massal., *Mem. Lichenogr.*: **147**, fig. no. 168, tab. 25 (1853); type: [Italy], Vive sulle roccie calcaree nel Bosco Bagato presso Genova, F. Baglietto (**VER** – holotypus!).

The original description

Apothecia haemisphaerica thallo omnino immersa, excipulo proprio cartilagineo subtus non deficiens, carbonaceo, primum clauso, dein stellato-radiatim dehiscente praedita, nucleum homogeneum compactum subfarinosum, includentia. Asci 5-6-8 sporis saccati, tenues, evanidi, paraphysibus filiformibus laxis obsoletisqus, obvalati, sporidia ovoideo – elliptica, primum blastidiis circularibus minimis, plus minusve homogeneo – nebulosa, subinde nucleolis 2-5-4 rotundis referta, tandem nucleolutescente oblongo v. subrotundo, episporio laxo recepto, foeta.

Thallus crustaceus uniformis, amylaceus, cum matricis confusus.

Ascomata hemisheric, entirely immersed, proper excipulum colourless, does not overlap the lower part, covered by coal - like, first whole, later star - or ray - like cracking involucrellum. Asci clavate, 5-6-8 sporic, thin, developed, periphyses thin, loose, melting. Ascospores pavingly ellipsoid, first with sphaeroid content, almost opaque, sometimes 2-5-4 round cores, later yellowish cores, oval or sphaeroid, episporium does not evolve. Thallus crustose, continual, starcheous, attached to the substratum.

Drawing IV/1, A. B. Massalongo 1853, fig. no. 168, photos 138-140: VER – holotypus.

Protobagliettoa Servít

Protobagliettoa parmigera (J. Steiner) Servít, *Rozp. Čs. Akad. Věd*, **65(3)**: 31, (1955); *Verrucaria parmigera* J. Steiner, *Verh. Zool.-Bot. Ges. Wien* **61**: 34 (1911), type: [Belgium], Spa, W. Nylander (**PRM-758127** – lectotypus!); *Bagliettoa parmigera* (J. Steiner) Vězda et Poelt, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, **1981**: 363.

The original description

Sporae monoblastae saepe vix rite evolutae.

One - celled spores rarely developed.

IV. Studied species

IV.-1. Position of the studied species

Putting the following species into the *Sphinctrina* section is from the previously mentioned reasons unacceptable. Ranking it to the separate species of *Bagliettoa* is not suitable from the phylogenetic point of view, too for all of the other relative representatives have - except for different structure of involucrellum, identical structure of ascomata and thallus (macrosphaeroids are formed by other species, too). Thus in the genus *Verrucaria*, a new section was established. Species that belong, are there characterized by simple ascospores and flat, lid - like and ray - like opening involucrellum. The involucrellum covers the upper part of the ascoma only, and does not overlap the excipulum from the side.

***Verrucaria* Schrader**

sect. *Bagliettoa* (A. Massal.) J. Halda comb. nova, here designated.

basionym: Bagliettoa A. Massal., *Mem. Lichenogr.*: **147** (1853); *Bagliettoa limborioides* A. Massal., *ibid.*, fig. 168, tab. 25 (1853); type: [Italy], Vive sulle roccie calcaree nel Bosco Bagato presso Genova, F. Baglietto (**VER** – holotypus!).

IV.-2. A key for species determination of the studied species

1. Thallus of blue green, grey blue or ochre colour 2

   Thallus of purpur red or chalk- white to greyish colour 3

2. Thallus dark green, blue green or blue grey (blue green crystals in the cortical layer (mostly glass - like fine, involucrellum 100-150 μm in diam.
   ..... ***Verrucaria parmigerella*** Zahlbr. (p. 118).

   Thallus ochraceous, the surface powdery, is not bordered with the dark line of the prothallus, thickly covered by ascomata, flat or slightly archeous involucrellum up to 500 μm in diam.
   ..... ***Verrucaria limborioides*** (A. Massal.) Clauzade & Roux (p. 109).

3. Thallus of purpur, pink or red tint (red crystals in the cortical layer), often sterile, with big and deep pits left after died out ascomata, or with ascomata having flat or slightly archeous involucrellum 100-300 μm in diam., that can star - shapely crack
   ..... ***Verrucaria marmorea*** (Scop.) Arnold (p. 113).

   Thallus white, dirty white to grey, powdery surface, densely covered by ascomata with flat, black involucrellum 200-300 μm in diam., often bordered by a black line of the prothallus ..... ***Verrucaria baldensis*** A. Massal. (p. 24).

V. *Verrucaria baldensis* A. Massal.

Ric. Auton. Lich. Crost.: **173**, fig. no. 349 (1852); type: [Italy], Mt. Baldo (Mad. Corona)., A. Massalongo (**VER** – lectotypus – here designated). *Verrucaria schraderi* var. *nubilosa* Ach. Syn. pag. 338? - (Verrucariam macro stomam declaravit quondam Schaererius in litt. 1851 quod non probo.); *Protobagliettoa baldensis* (A. Massal.) Servít ex Nowak et Tobol., *Porosty polskie*: 1118 (1975); *Bagliettoa baldensis* (A. Massal.) Vězda, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, **1981**: 363.

Synonyms: **Eleven species (*Limboria sphinctrina*, *Protobagliettoa lactea*, *V. bosniaca*, *V. dalmatica*, *V. grummanni*, *V. gyelnikii*, *V. parmigera*, *V. serbica*, *V. steineri*, *V. subconcentrica* and *V. suzaeana*), and also other 75 varieties and forms, were put into synonyms of the species *V. baldensis*. The revision did not aprove such division.**

Limboria sphinctrina Duf., *Fr. Lich. Eur. Ref.* 465 (1831); *Bagliettoa sphinctrina* (Duf.) Körber , *Syst. Lich. Germ.* 375: (1855); type: [Germany] Mittenwald in Bayern, A. Krempelhuber - not seen, see p. 40).

Protobagliettoa lactea (Arnold) Servít var. *ochracea* Servít, *Rozp. Čs. Akad. Věd*, 65(3): 35 (1955); type: PRM-757631 – lectotypus!, here designated, syn. nov., (see p. 41).

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *istriana* Servít, *Beih. Bot. Cbl.* 59: 157 (1939); type: PRM-756855 – holotypus!, syn. nov.; *Protobagliettoa bagliettoaeformis* (Hazsl.) Servít ex Nowak et Tobol. var. *istriana* (Servít) J. Nowak & Tobolewski, *Porosty Polskie*: 1118 (1975), (see p. 41).

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *caesia* (Arnold) Servít, *Beih. Bot. Cbl.* 59: 158, (1939); type: PRM-758654 – lectotypus!, here designated, syn. nov., (see p. 41).

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *pseudointerrupta* (Servít) Servít f. *arbensis* Servít, *Beih. Bot. Cbl.* 59: 158, (1939); type: BP – holotypus!, PRM-756854 – isotypus!, syn. nov., (see p. 41).

Verrucaria baldensis A. Massal. var. *canici* Servít, *Beih. Bot. Cbl.* 59: 135 (1939); type: PRM-757322 – holotypus! , syn. nov., (see p. 42).

Verrucaria baldensis A. Massal. var. *canici* Servít f. *bakonyensis* Servít, *Beih. Bot. Cbl.* 59: 135 (1939); type: PRM-756851 – lectotypus!, here designated, syn. nov., (see p. 42).

Verrucaria baldensis A. Massal. var. *canici* Servít f. *incavatula* Servít, *Beih. Bot. Cbl.* 59: 135, (1939); type: PRM-757475 – holotypus!, syn. nov., (see p. 42).

Verrucaria baldensis A. Massal. var. *cretzoiui* Servít, *Beih. Bot. Cbl.* 59: 132 (1939), fig. p. 133; type: PRM-757354 – holotypus!, syn. nov., (see p. 42).

Verrucaria baldensis A. Massal. var. *spilomatica* A. Massal., *Sched Crit. Lich. Ital.* I.: 30, n. 9 (1855); type: [Italy], ad saxa oolitica prov. Veronensis in oppido Velo (Covoli), A. Massalongo, (VER – lectotypus, here designated!, M-0024475, M-0024476 – isolectotypus!, syn. nov., see p. 43).

Verrucaria bosniaca Servít, *Beih. Bot. Cbl.* 59: 151 (1939), fig. p. 152; type: W-3792 – holotypus!, PRM-756856 – isotypus!, syn. nov., (see p. 43).

Verrucaria bosniaca Servít f. *incavata* Servít, *Beih. Bot. Cbl.* 59: 153 (1939); type: PRM-756857 – holotypus!, syn. nov., (see p. 43).

Verrucaria bosniaca Servít f. *sinaiensis* Servít, *Beih. Bot. Cbl.* 59: 153 (1939); type: PRM-756823 – holotypus!, syn. nov., (see p. 44).

Verrucaria bosniaca Servít var. *cretzoiuana* Servít, *Beih. Bot. Cbl.* 59: 153, (1939); type: PRM-757416 – holotypus!, W-3399 – isotypus!, syn. nov., (see p. 44).

Verrucaria bosniaca Servít var. *lovcenensis* Servít, *Beih. Bot. Cbl.* 59: 153 (1939), fig. p. 154; type: PRM-756859 – holotypus!, syn. nov., (see p. 44).

Verrucaria bosniaca Servít var. *lovcenensis* Servít f. *albae* Servít, *Beih. Bot. Cbl.* 59: 154 (1939); type: M-0024473 – holotypus!, PRM-756868 – isotypus!, syn. nov., (see p. 44).

Verrucaria bosniaca Servít var. *lovcenensis* Servít f. *plumbea* Servít, *Beih. Bot. Cbl.* 59: 154, (1939); type: PRM-758652 – holotypus!, syn. nov., (see p. 45).

Verrucaria bosniaca Servít var. *mirovensis* Servít, *Beih. Bot. Cbl.* 59: 153, (1939); type: PRM-758653 – holotypus!, syn. nov., (see p. 45).

Verrucaria bosniaca Servít var. *romanica* Servít, *Beih. Bot. Cbl.* 59: 153 (1939); type: PRM-757280 – holotypus!, syn. nov., (see p. 45).

Verrucaria calciseda DC. f. *alocyza* Arnold in *Flora* 44: 537 (1858), 68: 79 (1885); type: PRM – lectotypus!, here designated, PRM – isolectotypus!, W - isolectotypus!, syn. nov.; *Verrucaria parmigera* J. Steiner var. *alocyza* (Arnold) J. Steiner *Verh. Zool.- Bot. Ges. Wien* 61: 35 (1921); *Verrucaria parmigera* J. Steiner var. *alociza* (Arnold) J. Steiner *Beih. Bot. Cbl.* 59: 145, (1939), fig. p. 145; *Protobagliettoa alocyza* (Arnold) Servít, *Rozp. Čs. Akad. Věd*, 65(3): 31 (1955); *Protobagliettoa parmigera* (J. Steiner) Servít f. *alocyza* (Arnold) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963), (see p. 45).

Verrucaria calciseda DC. f. *insculptoides* J. Steiner, *Verh. Zool.- Bot. Ges. Wien* 61: 37 (1911); *Verrucaria baldensis* A. Massal. var. *insculptoides* (J. Steiner) Servít, *Beih. Bot. Cbl.* 59: 134 (1939); type: W-1903-11150 – holotypus!, syn. nov., (see p. 46).

Verrucaria calciseda DC. var. *lactea* Arnold, *Verh. Zool.- Bot. Ges. Wien* 20: 463 (1870); type: M-0024499 – lectotypus!, here designated, W-9427 – isolectotypus!, PRM-757593 – isolectotypus!, syn. nov.; *V. steineri* Kušan var. *lactea* Servít, *Beih. Bot. Cbl.* 59: 124, (1939), *Protobagliettoa lactea* (Arnold) Servít, *Rozp. Čs. Akad. Věd*, 65(3): 35 (1955); *Protobagliettoa steineri* (Kušan) Servít var. *lactea* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963), (see p. 46).

Verrucaria cazzae Zahlbr. f. *dealbata* Servít, *Hedwigia* 71: 226 (1931), fig. no. 1; type: PRM-644842 – holotypus!, syn. nov., (see p. 47).

Verrucaria cazzae Zahlbr. var. *graeca* Servít, *Beih. Bot. Cbl.* 55: 251, (1936); type: W - holotypus!, syn. nov.; *V. bagliettoaeformis* (Hazsl.) Servít var. *graeca* Servít, *Beih. Bot. Cbl.* 59: 158 (1939), fig. no. 28 p. 159; *Protobagliettoa graeca* Servít, *Rozp. Čs. Akad. Věd*, 65(3): 34, (1955), (see p. 47).

Verrucaria dalmatica Servít, *Beih. Bot. Cbl.* 55: 252 (1936); type: PRM-756698 – holotypus, PRM-644909, PRM-756965 – isotypus!, syn. nov., (see p. 47).

Verrucaria grummanni Servít, *Beih. Bot. Cbl.* 59: 129 (1939), fig. p. 130; type: PRM-757278 – holotypus!, syn. nov., (see p. 48).

Verrucaria gyelnikii Servít, *Beih. Bot. Cbl.* 59: 126 (1939); type: BP – holotypus!, PRM-757201 – isotypus!, syn. nov.; *Protobagliettoa gyelnikii* (Servít) Servít ex Nowak et Tobol., *Porosty polskie*: 1118 (1975), (see p. 48).

Verrucaria gyelnikii Servít f. *alanensis* Servít, *Beih. Bot. Cbl.* 59: 127 (1939); type: PRM-756865 – holotypus!, syn. nov., (see p. 49).

Verrucaria gyelnikii Servít f. *obscurata* Servít, *Beih. Bot. Cbl.* 59: 126 (1939); type: PRM-756702 – holotypus!, PRM- 783882 – isotypus!, syn. nov.; *Protobagliettoa obscurata* (Servít) Servít, *Rozp. Čs. Akad. Věd*, 65(3): 35 (1955), (see p. 49).

Verrucaria gyelnikii Servít var. *velebitica* Servít f. *sulcata* Servít, *Beih. Bot. Cbl.* 59: 127, (1939); type: PRM-756701 – holotypus!, syn. nov., (see p. 50).

Verrucaria inaequata (Servít) Servít f. *helvetica* Servít, *Beih. Bot. Cbl.* 59: 128 (1939); type: M – lectotypus!, here designated, syn. nov., (see p. 50).

Verrucaria inaequata (Servít) Servít var. *berchtesgadensis* Servít, *Beih. Bot. Cbl.* 59: 129, (1939); type: WU – holotypus!, PRM-757505 – isotypus!, syn. nov., (see p. 50).

Verrucaria inaequata (Servít) Servít var. *transsilvanica* Servít, *Beih. Bot. Cbl.* 59: 129, (1939); type: PRM-757482 – lectotypus!, here designated, PRM-757494 -isolectotypus!, syn. nov., (see p. 51).

Verrucaria inaequata (Servít) Servít var. *transsilvanica* Servít f. *expallens* Servít, *Beih. Bot. Cbl.* 59: 129 (1939); type: WU-00-68/8 – holotypus!, PRM-757250 – isotypus!, syn. nov., (see p. 51).

Verrucaria inaequata (Servít) Servít var. *triglavensis* Servít, *Beih. Bot. Cbl.* 59: 129 (1939), fig. 9 p. 129; type: PRM-756700 – holotypus!, syn. nov., (see p. 51).

Verrucaria inaequata Servít var. *kuemmerleana* Servít, *Beih. Bot. Cbl.* 59: 129, (1939); type: BP – holotypus!, syn. nov., (see p. 50).

Verrucaria parmigera J. Steiner, *Verh. Zool.- Bot. Ges. Wien* 61: 34 (1911), type: PRM-758127 – lectotypus!, here designated; *Protobagliettoa parmigera* (J. Steiner) Servít, *Rozp. Čs. Akad. Věd*, 65(3): 31, (1955); *Bagliettoa parmigera* (J. Steiner) Vězda et Poelt, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, 1981: 363, (see p. 51).

Verrucaria parmigera J. Steiner f. *geographica* J. Steiner, *Beih. Bot. Cbl.* 59: 143, (1939); type: PRM-645238 – holotypus!, PRM-757244 – isotypus!, syn. nov., (see p. 52).

Verrucaria parmigera f. *nigroaureolata* Servít, *Hedwigia* 71: 230 (1931); type: PRM-757913 – holotypus!), syn. nov.; *V. subconcentrica* (J. Steiner) Servít var. *nigroaureolata* (Zahlbr.) Servít, *Beih. Bot. Cbl.* 59: 161, (1939), fig. p. 162, (see p. 52).

Verrucaria parmigera J. Steiner var. *adriatica* Servít; *Beih. Bot. Cbl.* 59: 147 (1939); type: PRM-645283 – holotypus!, PRM-783903, PRM-783904 – isotypus!, syn. nov., (see p. 53).

Verrucaria parmigera J. Steiner var. *bohemica* Servít, *Beih. Bot. Cbl.* 59: 143, (1939), fig. p. 143; type: PRM-757221 – holotypus!; *Protobagliettoa parmigera* J. Steiner var. *bohemica* (Servít) Nowak et Tobol., *Porosty polskie*: 1119 (1975, syn. nov., (see p. 53).

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner, *Verh. Zool.- Bot. Ges. Wien* 61: 35 (1911), type: PRM-758067 – lectotypus in Servít 1939, p. 147-148, syn. nov.; *Protobagliettoa parmigera* (J. Steiner) Servít f. *calcivoroides* (J. Steiner) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963), (see p. 53).

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner f. *arnoldiana* Servít, *Beih. Bot. Cbl.* 59: 148, (1939); type: PRM-758185 – lectotypus!, here designated, syn. nov.; *Protobagliettoa parmigera* (J. Steiner) Servít f. *arnoldiana* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963), (see p. 53).

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner f. *biokovensis* Servít, *Beih. Bot. Cbl.* 59: 148, (1939); type: WU – holotypus!, PRM-757239 – isotypus!, syn. nov., (see p. 54).

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner f. *elegans* Servít, *Beih. Bot. Cbl.* 59: 148, (1939); type: PRM-758238 – holotypus!, M – isotypus!, syn. nov., (see p. 54).

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner f. *kierkiensis* Servít, *Beih. Bot. Cbl.* 59: 148, (1939); type: PRM-758178 – holotypus!, syn. nov., (see p. 54).

Verrucaria parmigera J. Steiner var. *circumarata* J. Steiner, *Verh. Zool.-Bot. Ges. Wien* 61: 35 (1911); type: WU-00-68/11 – holotypus!, PRM-757212 – isotypus!, syn. nov.; *Protobagliettoa parmigera* (J. Steiner) Servít f. *circumarata* (J. Steiner) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963), (see p. 54).

Verrucaria parmigera J. Steiner var. *dvorakii* Servít, *Beih. Bot. Cbl.* 59: 150, (1939); type: PRM-758245 – holotypus!, PRM-645237 – isotypus!, syn. nov., (see p. 55).

Verrucaria parmigera J. Steiner var. *forissi* Servít, *Beih. Bot. Cbl.* 59: 148, (1939); type: PRM-758651 – holotypus!, syn. nov., (see p. 55).

Verrucaria parmigera J. Steiner var. *gyelnikiana* Servít, *Beih. Bot. Cbl.* 59: 143, (1939); type: PRM-758181 – holotypus!, syn. nov., (see p. 55).

Verrucaria parmigera J. Steiner var. *hazslinszkyi* Servít, *Beih. Bot. Cbl.* 59: 146 (1939); type: PRM-756860 – holotypus!, syn. nov., (see p. 56).

Verrucaria parmigera J. Steiner var. *hilitzeri* Servít, *Beih. Bot. Cbl.* 59: 146, (1939); type: PRM-758253 – holotypus!, syn. nov., (see p. 56).

Verrucaria parmigera J. Steiner var. *lapadensis* Servít, *Beih. Bot. Cbl.* 59: 149, (1939), fig. p. 149, type: PRM-758246 – holotypus!, syn. nov., (see p. 56).

Verrucaria parmigera J. Steiner var. *lapadensis* Servít f. *subcomposita* Servít, *Beih. Bot. Cbl.* 59: 150, (1939); type: PRM-758235 – holotypus!, syn. nov., (see p. 57).

Verrucaria parmigera J. Steiner var. *sinensis* Zahlbr. Catal. Lich. Univ. 8: 26 (1931); type: WU-2730 – holotypus!, PRM-783905 – isotypus!, syn. nov.; *V. subconcentrica* (J. Steiner) Servít var. *sinensis* (Zahlbr.) Servít, *Beih. Bot. Cbl.* 59: 165 (1939), (see p. 57).

Verrucaria parmigera J. Steiner var. *subrosea* (Servít) Servít, *Beih. Bot. Cbl.* 59: 144, (1939); type: PRM-756705 – holotypus!, syn. nov.; *V. subrosea* Servít, *Rabenh. Krypt. Fl.* 9 I/1: 107 (1934), (see p. 57).

Verrucaria pinguis J. Steiner f. *dealbata* J. Steiner, *Verh. Zool.-Bot. Ges. Wien* 69: 101. (1919), type: WU-00-68/5 – holotypus!, PRM-756852 – isotypus!, syn. nov.; *Verrucaria bagliettoaeformis* (Hazsl.) Servít var. *dealbata* (J. Steiner) Servít, *Beih. Bot. Cbl.* 59: 158 (1939), (see p. 58).

Verrucaria serbica Servít, *Beih. Bot. Cbl.* 55: 258 (1936); type: PRM-645092 – holotypus!, syn. nov.; *Verrucaria baldensis* A. Massal. var. *serbica* Servít, *Beih. Bot. Cbl.* 59: 132 (1939), (see p. 58).

Verrucaria sphinctrina Ach. f. *gallica* Servít, *Beih. Bot. Cbl.* 59: 120 (1939); type: PRM-645317 – holotypus!, syn. nov.; *Polyblastia sphinctrina* (Duf.) Servít f. *gallica* (Servít) Servít, *Preslia*, 24: 381 (1952), (see p. 58).

Verrucaria sphinctrina Ach. var. *lojkae* Servít, *Beih. Bot. Cbl.* 59: 122 (1939); type: BP – holotypus!, PRM-783798 – isotypus!, syn. nov.; *Polyblastia sphinctrina* (Duf.) Servít f. *lojkae* (Servít) Servít, *Preslia*, 24: 381 (1952), (see p. 59).

Verrucaria sphinctrinella Zschacke f. *pseudointerrupta* Servít, *Beih. Bot. Cbl.* 55: 260, (1936); type: PRM-757046 – holotypus!, PRM-645337 – isotypus!, syn. nov.; *Verrucaria bagliettoaeformis* (Hazsl.) Servít var. *pseudointerrupta* (Servít) Servít, *Beih. Bot. Cbl.* 59: 158, (1939), (see p. 59).

Verrucaria sphinctrinella Zschacke var. *alocizoides* (J. Steiner) Servít f. *domogledensis* Servít, *Beih. Bot. Cbl.* 59: 140, (1939); type: PRM-757733 – holotypus!, syn. nov., (see p. 59).

Verrucaria steineri Kušan, *Acta Bot. Inst. Bot. Univ. Zagreb* 5: 28, (1930) fig. 1B, p. 27, type: not seen, syn. nov.; *Protobagliettoa steineri* (Kušan) Servít ex Nowak et Tobol., *Porosty polskie*: 1119 (1975); *Bagliettoa steineri* (Kušan) Vězda, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, 1981: 363, (see p. 59).

Verrucaria steineri Kušan f. *scrobicularis* Servít, *Beih. Bot. Cbl.* 59: 124 (1939); type: M – lectotypus!, here designated, PRM-783743 – isolectotypus!, syn. nov., (see p. 60).

Verrucaria steineri Kušan f. *turgescens* Servít, *Beih. Bot. Cbl.* 59: 124 (1939); type: PRM-783686 – holotypus!, syn. nov., (see p. 60).

Verrucaria steineri Kušan var. *composita* Servít, *Beih. Bot. Cbl.* 59: 124 (1939); type: WU – holotypus, PRM-783750 – isotypus!, syn. nov.; *Protobagliettoa steineri* (Kušan) Servít var. *composita* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963), (see p. 60).

Verrucaria steineri Kušan var. *croatica* Servít, *Beih. Bot. Cbl.* 59: 125, (1939); type: PRM-757610 – holotypus!, PRM-757620 – isotypus!, syn. nov.; *Protobagliettoa steineri* (Kušan) Servít f. *croatica* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963), (see p. 61).

Verrucaria steineri Kušan var. *lactea* (Arnold) Servít f. *britanica* Servít, *Beih. Bot. Cbl.* 59: 124, (1939); type: WU-00-68/3 – holotypus!, PRM-757594 – isotypus!, PRM-757595 – isotypus!, syn. nov.; *Protobagliettoa steineri* (Kušan) Servít f. *britanica* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963), (see p. 61).

Verrucaria steineri Kušan var. *lactea* (Arnold) Servít f. *geographica* Servít, *Beih. Bot. Cbl.* 59: 124, (1939); type: PRM-757606 – holotypus!, PRM-757605 – isotypus!, syn. nov., (see p. 61).

Verrucaria steineri (Kušan) var. *mittenwaldensis* Servít, *Beih. Bot. Cbl.* 59: 124 (1939); type: M-0024472 – holotypus!, PRM-756302 – isotypus!, syn. nov.; *Protobagliettoa steineri* (Kušan) Servít var. *mittenwaldensis* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963), (see p. 61).

Verrucaria subconcentrica (J. Steiner) Servít, *Beih. Bot. Cbl.* 59: 160, (1939), fig. p. 160, type: WU-00-68/2 – holotypus!, PRM-757907 – isotypus!; *Verrucaria parmigera* J. Steiner f. *subconcentrica* J. Steiner, *Verh. Zool.- Bot. Ges. Wien* 61: 35 (1911), (see p. 61).

Verrucaria subconcentrica (J. Steiner) Servít f. *exesa* Servít, *Beih. Bot. Cbl.* 59: 161, (1939), *Protobagliettoa exesa* (Servít) Servít, *Rozp. Čs. Akad. Věd*, 65(3): 32, (1955), type: PRM-757468 – holotypus!, (see p. 62).

Verrucaria subconcentrica (J. Steiner) Servít f. *punctatissima* Černohorský, *Stud. Bot. Čech.*, 5: 148-155, (1942); type: PRM-783882 – holotypus!, (see p. 62).

Verrucaria subconcentrica (J. Steiner) Servít var. *eumacrosphaeroidea* Servít, *Beih. Bot. Cbl.* 59: 166, (1939); type: PRM-757978 – holotypus!, syn. nov., (see p. 63).

Verrucaria subconcentrica (J. Steiner) Servít var. *euthallina* Servít, *Beih. Bot. Cbl.* 59: 164 (1939), fig. p. 164; type: PRM-757293 – holotypus!, syn. nov., (see p. 63).

Verrucaria subconcentrica (J. Steiner) Servít var. *euthallina* Servít f. *asperella* Servít, *Beih. Bot. Cbl.* 59: 164, (1939); type: PRM-757935 – holotypus!, syn. nov., (see p. 63).

Verrucaria subconcentrica (J. Steiner) Servít var. *metzleri* Servít, *Beih. Bot. Cbl.* 59: 166, (1939); type: W-1903-11150 – holotypus!, PRM-758039 – isotypus!, syn. nov., (see p. 63).

Verrucaria subconcentrica (J. Steiner) Servít var. *nigroaureolata* (Servít) Servít f. *limitata* Servít, *Beih. Bot. Cbl.* 59: 162, (1939); type: PRM-758042 – lectotypus!, here designated, syn. nov., (see p. 64).

Verrucaria subconcentrica (J. Steiner) Servít var. *nigroaureolata* (Servít) Servít f. *rauca* Servít, *Beih. Bot. Cbl.* 59: 162, (1939); type: PRM-758020 – lectotypus!, here designated, syn. nov., (see p. 64).

Verrucaria subconcentrica (J. Steiner) Servít var. *petkae* Servít, *Beih. Bot. Cbl.* 59: 162 (1939); type: PRM-756699 – holotypus!, syn. nov., (see p. 64).

Verrucaria subconcentrica (J. Steiner) Servít var. *saxivora* Servít, *Beih. Bot. Cbl.* 59: 163, (1939), fig. p. 163, type: PRM-757973 – holotypus!, syn. nov., (see p. 64).

Verrucaria subconcentrica (J. Steiner) Servít var. *saxivora* Servít f. *interruptoides* Servít, *Beih. Bot. Cbl.* 59: 163, (1939); type: PRM-757925 – holotypus!, syn. nov., (see p. 105).

Verrucaria subconcentrica (J. Steiner) Servít var. *saxivora* Servít f. *ninensis* Servít, *Beih. Bot. Cbl.* 59: 164, (1939); type: PRM-757922 – holotypus!, syn. nov., (see p. 105).

Verrucaria suzaeana Servít, *Beih. Bot. Cbl.* 59: 150, (1939), fig. p. 150, type: PRM-757903 – holotypus!, PRM-645277 – isotypus!, syn. nov., (see p. 105).

Verrucaria suzaeana Servít f. *moravica* Servít, *Beih. Bot. Cbl.* 59: 151, (1939); type: W - holotypus!, PRM-757897 – isotypus!, syn. nov., (see p. 105).

Verrucaria suzaeana Servít var. *sendtneriana* Servít, *Beih. Bot. Cbl.* 59: 151, (1939); type: WU-00-68/1 – holotypus!, PRM-757900 – isotypus!, syn. nov., (see p. 106).

An original description of *Verrucaria baldensis* A. Massal.

Thallo tartareo albo-cinereo-fusco nigro-limitato, continuo, nubeculis nigris difformibus, variegato. Apotheciis confluentibus minutissimis, immersis, papillatis. Ascis crebris ventricoso-clavatis 8-sporis, paraphysibus tenuibus, obvallatis, sporiidis ovoideis hyalino virudulis, d. long. 0,mm0122. transv. 0,mm0061. Sinon. Verrucaria schraderi v. nubilosa Ach. Syn. p. 338? – (Verrucariam macrostomam declaravit quondam Schaererius in litt. 1851 quod non probo). Abit. Vive sulle roccie calcaree compatte juresi per tuto il Veronese, nei luoghi ombrosi, ma specialmente sul M. Baldo (Mad. Corona). Figura 349. A. porzione del nucleo. B. sporidii.

Description

Continual thallus, usually white, dirty white - grey, in regard to the substratum can be of a different colour (type specimen on the surface sparingly covered by heterogeneous black hyphae), powdery matt or glossy, on the edges often bordered by (grey, brown black or black) link of prothallus, or is differently wrinkled, dotted by black ascomata or pockmarked by shallows left after died out ascomata. The cortical layer is 25-30 µm thick, created by thickly tangled hyphae (prosenchym), approx. 1-4 µm thick. The upper part of the layer is dirty white or grey, and there were not noted any colourful crystals as in the species *V. marmorea* and *V. parmigerella*.

The medullar layer is approx. 80-800 µm thick, hyphae are freely tangled, approx. 3-4 µm thick. In the lower part (hypothallus), there are cylindrical or oblong cells, usually 12-14 µm in diam (macrosphaeroids). Hypothalline part is in the optimally developed ascomata light, and is getting darker when maturing. The layer containing photobiont cells is 50-120 µm high. Photobiont cells in clusters (25-40 µm in diam.), clews rounded, scattered, photobiont cells 6-12 µm in diam.

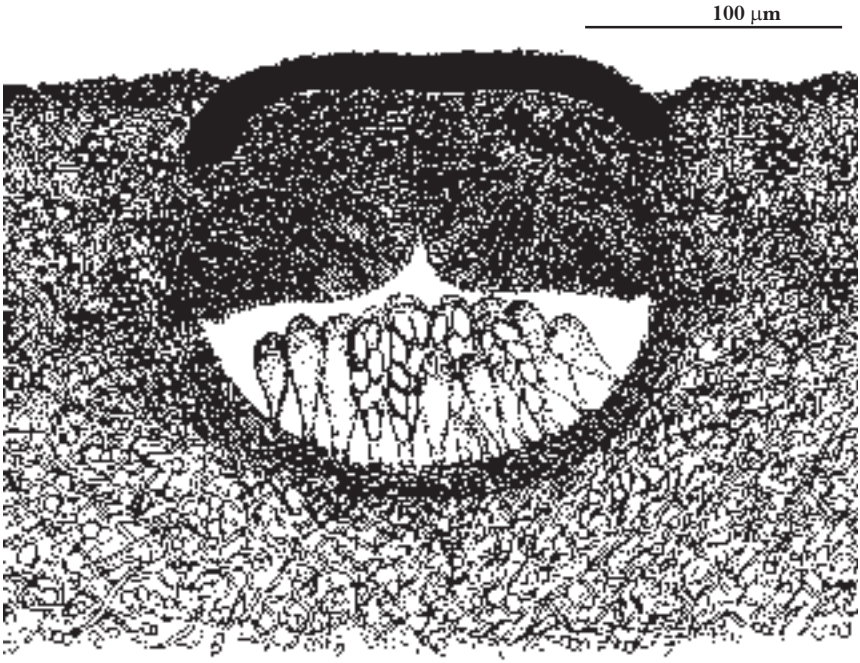
Ascomata are mostly formed in great numbers on the whole thallus, from up above covered with flat, coal-like, black, glossy, lid-like involucrellum, that mostly does not overlap the thallus, progresses on the edges downwards, in more matured ascomata might be a little arched. Involucrellum is 200-300 µm in diam., and is 20-25 µm thick (150 measurements). On the mature ascoma, the involucrellum star-shapely bursts from the centre by three to five cracks. On the walls of the died- out ascomata, closely to ostiolum, sometimes a black ring is left.

Perithecium completely immersed, flat sphaeroid, conical, usually 300- 400 µm wide, 220- 300 µm high, excipulum (chlamys) colourless (pseudoparenchym), later, when maturing, the ascoma is getting dark from the upper part (prominently, mainly on the base of the matured ascomata), 10- 20 µm thick. Matured perithecium is not covered by thallus in the upper part (only by involucrellum). Periphyses are perennial, filiform, usually 5 -50 µm long, 2-4 µm thick, articulated, ended by a short clavate cell, non - branching. They continually cover the upper half of the perithecium wall up to ostiolum. Asci with eight spores, clavate, oblong or cylindrical, 30-60 µm long, 5-15 µm wide, on the base narrowed, the widest in apical part with a thick tholus. Ascospores are simple, 18-28(16, 30) x 8-12(6, 15) µm (100 measurements), oblong to ellipsoid, biseriatly distributed. In this species, ascospores are often formed, but ascomata with faintly developed ascospores without spores. Neither pycnoconidioma nor pycnidia were observed during the study of the fresh material.

Drawing tab. II/1, 3: (A. B. Massalongo fig. 349, M. Servít 1939: fig. 11 p. 131), photos 16, 17, 18, 19 - details of thallus and acocarp, 22 - VER – lectotypus.

V.-1. Geographic distribution in Europe

Austria: Kärnten, Klagenfurt, Fuss des Johannesberg, Steiner, (PRM-757012, 757149); **Niederösterreich** Agr. Vindobonensis, Hil(?d)enbrand (PRM-758175, 757498); Oberösterreich, Hallstatt, Waldbachstrub, H. Magnusson, 1922 (PRM-757241); Mödling, J. Holzinger, 1862 (PRM-758145), H. Lojka, 1868 (PRM-757489, 758159, BP, PRM-783798); Kalenderberg bei Mödling, H. Lojka, 1869 (PRM-757988); Mödling, von Schwarzen Thurm, K. Eggerth, 1887 (PRM-758112); (Wienerwald) bei Brunn, H. Lojka, 1868 (PRM-757550); Baden bei Wien, R. Wettstein (PRM-757250, WU-00-68/8); Baden, Helenenthal, J. Brunnthaler, 1903 (PRM-757566); Stiftberg bei Lilienfeld, J. Suza, 1917



***V. baldensis*. Vertical section of ascocarp and thallus.**

(PRM-783863); **Salzburger Alpen**, G. Zwanziger, 1867 (PRM-757134); Salzburger Voralpen, Fuss des Gainzenberges bei Ischl, H. Lojka, 1867 (PRM-757667); **Pinzgau**, Lofer, H. Zschacke, (PRM-757920, 757994); A. Krempelhuber, (PRM-758064, 783780); **Tirol**, Meyer (PRM-783643); Kaiserthall bei Kufstein, F. Arnold, 1866 (PRM-757158); Tirol, Seefeld, O. Klement, 1940 (PRM-783794); Tirol, Welschhoper, Bausch, 1908 (PRM-757091).

Belgium: Spa, W. Nylander, (PRM-758127).

Bosna Hercegovina: ad saxa calc. montis Trebevič pr. Sarajevo, G. Beck, 1885/06 (PRM-756856, PRM-758219, W-3792).

Bulgaria: mt. Balkan, in monte Ferdinandov vrh supra urb. **Kalofer**, Ö. Szatala, 1929 (BP 34236); Bačkova, Červenata skala, 1933 (PRM-783861); **mt. Stara Planina**, supra urbem **Vratza**, Nikoloff, 1934 (BP 34338).

Croatia: Istria, Ostküste des HalbIns., Punta Zuffo (Cinffa) bei Rakalj (Altura), am Meere, J. Baumgartner, 1925 (PRM-757238); Punta Pustigna unter Rovinj (Rovigno), im Strandnähe, J. Baumgartner, 1921 (PRM-757938); Istria, im monte Debela griža inter Ružiči et Skalnica, Blechsmidt, (PRM-758171, 757443); Istria, ad occid. ab urbe **Rijeka** versus (30 km), secus viam supra pagum Ičiči (sub Učka), 650 m, J. Halda & Š. Haldová, 2000/06/19 (JPH/4331); Rijeka (Modrus Fiume), Vinodol, Velo Polje, J. Kümmerle, 1926 (PRM-757018, BP); Lokve im Croatia Lepa, F. Hazslinszky, (PRM-758008); **Jablanac**, Jablanacka draga, Servít, 1927, (PRM-783624, 757930, 757949, 757952, 757955, 757959, 757961, 757984, 757990, 757522, 758191, 757230, 757908, 757467, 757301, 783681); Primorje, Jablanac, M. Servít, 1927 (PRM-757611, 757294, 757298, 757946, 757027); Jablanac, Klašnica, M. Servít, 1927 (PRM-758000, 757473, 757480, 757476, 757483, 757279, 757921); Jablanac, Dundovič selo, Servít, 1927 (PRM-757943, 757620, 757610, 757628); **Rijeka**, mt. Risnjak pr. pag. Gornje Jelenje, V. Gyelnik, 1939 (PRM-757516, 757085, 757108, 757123); **Ogulin**, mt. Klek, V. Gyelnik, 1939 (PRM-758234, 757521, 757991, 757227); Croatien, Hl. Doeikönig b. Drachenstein, J. Glowacki, 1877 (PRM-758084); Otelia, J. Glowacki, 1869 (PRM-757094). **Zadar** (Zara), Arbanense, M. Servít, 1906 (PRM-757050); ibid., Sukošan, Vrčevo, M. Servít, 1907 (PRM-783825, 757947, 783821, 783816, 783820, 756943); ibid., Tustica, M. Servít, 1907 (PRM-645304, 758149, 783899, 783841, 757980); ibid., Bibinje,

M. Servít, 1907 (PRM-644840), 1908 (PRM-757379); ibid., **mt. Bukovica**, Oreljak, M. Servít, 1906 (PRM-644909, 756698), 1907 (PRM-757304, 756965, 783651); ibid., Vožina, M. Servít, 1907 (PRM-783697); ibid., Pržun, M. Servít, 1907 (PRM-783829, 783830, 757810); ibid., Krunjača, M. Servít, 1907 (PRM-757555, 757574); ibid., Punta Amica, M. Servít, 1907 (PRM-757309, 757308, 757299, 757293, 757291, 757297, 758035); ibid., Bokanjaško slabo, M. Servít, 1907 (PRM-757296); ibid., Bokanjac, M. Servít, 1907 (PRM-757177); **Nin** (Nona), Sekanovič, M. Servít, 1907 (PRM-757303, 783683, 757625, 758251, 757922); ibid., Matak, M. Servít, 1907 (PRM-757310); ibid., Krneša potok, M. Servít, 1907 (PRM-783771, 783634). **Lika Krbava**, **mt. Mala Kapela**, ad lacus Plitvicenses, J. Kümmerle, 1925 (PRM, BP); Lika Krbava, mt. Sejnsko Bilo, Snižnica Žukalj, J. Čanič, 1927 (PRM-757940, 757974, 758092, 757295, 757118, 757119, 757322); ibid. Ostrovo supra portum Senj (Zengy), J. Kümmerle, 1927 (BP 148, 150); J. Čanič, 1927 (PRM-783740); J. Kümmerle, 1924 (BP, BP 151); ibid., Veliki Stolac et Žukal, J. Kümmerle, 1925 (BP 112, PRM-758208); ibid., Ruja Voda, Čanič, 1927 (BP 67, BP 5, PRM-757131, 758186, 758154); ibid., Duliba Velebitika, J. Čanič, 1927 (PRM-757125); ibid., Senj, Kerstenje, J. Kümmerle, 1924 (PRM-758038); ibid., Ripiště, J. Čanič, 1927 (PRM-757450); ibid., Spasovac, J. Kümmerle, 1925, 1926 (PRM-783765, 783772); ibid., Medarija, J. Kümmerle, 1924 (PRM-783645); ibid., Pleševica, Zavalje, Jeleni vrch, M. Servít, 1907 (PRM-783677); ibid., Zakulanok, supra pagum Zavalje, J. Kümmerle, 1927 (PRM-757133, BP 149); ibid., J. Baumgartner, 1912 (PRM-758236).**Velebit**, Knežnevič, M. Servít, 1907 (PRM-757129, 783871); ibid., Stirovača, Servít, 1927 (PRM-783897); ibid., **Alan** Mirovo, M. Servít, 1927 (PRM-756865, 757481, 757487, 757502, 756701, 757441, 757438, 758653, 757365, 758237, 758128, 757925, 757913, 757449, 757111); ibid., **Alančič**, M. Servít, 1927 (PRM-758024, 756947, 757101); ibid., **Paklenica national park**, M. Servít, 1907 (PRM-758148, 758055, 757985, 757982, 758169); Tignarossa, Stara Paklina, J. Kümmerle, 1927 (BP, PRM-758043); ibid., Furlanski virovi Samardinovac, Ivine vodice, 750 m, J. Halda, 2000/09/03 (JPH/4427); ibid., Kuk od Ivinih vodica, 1100 m, J. Halda, 2000/09/03 (JPH/4438); ibid. Vlaški Grad, 1300 m, J. Halda, 2000/09/04 (JPH/4418); Vlaški Grad - Sveto Brdo, 1450 m, J. Halda, 2000/09/04 (JPH/4420, JPH/4426); ibid. Mala Paklenica, 480 m, J. Halda, 2000/09/05 (JPH/4456); ibid., caverna Pozdrovača, 400 m, J. Halda, 2000/09/05 (JPH/4458); ibid., caverna Lucinka, 600 m, J. Halda, 2000/09/05 (JPH/4461); ibid., Čubavac, 1550 m, J. Halda, 2000/09/04 (JPH/4423); ibid., Katica mlin, Dom Paklenica, 440 m, J. Halda, 2000/09/03 (JPH/4431, JPH/4442); ibid., Markov mlin, 370 m, J. Halda, 2000/09/02 (JPH/4446); Velka Paklenica, 350 m, J. Halda, 2000/09/02 (JPH/4444); Malovan, 1670 m, J. Halda, 2000/09/06 (JPH/4477); Vaganski vrh, 1700 m, J. Halda, 2000/09/06 (JPH/4476); Samardinovac, 600 m, J. Halda, 2000/09/03 (JPH/4440); Babin vrh, 1650 m, J. Halda, 2000/09/06 (JPH/4475); Štirovac, 1650 m, J. Halda, 2000/09/06 (JPH/4472); Crni vrh (inter Veliko Močilo - Malo Močilo), 1000 m, J. Halda, 2000/09/08 (JPH/4452); Dom Ramiči, 700 m, J. Halda, 2000/09/08 (JPH/4448). **Lacus Plitvicenses**, V. Gyelnik, 1939 (PRM-757939, 758006, 758071, 757876, 757874, 757161, 757226, 783759, 783632). **Dubrovnik**, Žarkovica (sub Ragusa, Reitweg zu Zarkovica), 90 m, A. Latzel, 1907/10/21 (PRM-757058, 783684); Dubrovnik, Garten nachst de Villa Gondola, **Lapad**, A. Latzel, 1908 (PRM-645337, 757032, 757046, 758108), ibid., M. Servít, 1929 (PRM-644842); ibid. Zwischen Pulvemegazin und Babin Kuk auf Lapad, A. Latzel, 1907 (PRM-756313, 757623, 757998, 783673, 758088, W-18713); ibid. M. Servít, 1927 (PRM-758161); ibid., Rašica, M. Servít, 1927 (PRM-783665); ibid., A. Latzel, 1907 (PRM-758255, 783656); ibid., Mali Petka, M. Servít, 1927 (PRM-756699, 756705, 757283, 757284, 757906, 758021, 758086, 758173, 758246, 758248, 758250, 783669, 783696, 783819, 783858); ibid., Velki Petka, M. Servít, 1927 (PRM-757048, 757945, 758249, 783650, 783664, 783674); Župa Dubrovačka, **Kupari**, R. Dvořák, 1917 (PRM-783826, 757914, 783903, 783904, 783844, 783685, 783686, 783662, 645283, 783900); ibid., **Čelopeči**, R. Dvořák, 1917 (PRM-757037, 757030, 758059, 758244, 645237, 758245, 783823, 783705, 783720); ibid., **Slano**, A. Latzel, 1907 (PRM-757036, 757031); **Biokovo**, Donja Brela (über Duare unter falb dem Brela), J. Baumgartner, 1911/02/14 (W-4261, PRM-757224, 757239).**Medvedica** Kraj, Zagreba, F. Kušan, 1907 (PRM-783767); Szusák, m. Martinsčica, V. Gyelnik, 1939 (PRM-757968, 783822); Módruš, Jelenje, Veliki Pliš, J. Kümmerle, 1911 (PRM-757083).**Obrovac**, M. Servít, 1907 (PRM-757307). **Ins. Biševo** (Busi), oberhalb Porto Mezzo, J. Brunnthaler & A. Ginzberger, 1911 (PRM-757026); oberhalb Porto Busi, A. Ginzberger, 1911 (PRM-757240). **Ins Goli**, Sv. Juraj, Čanič, 1929 (PRM-757993, 757344, 757237). **Ins. Hvar** (Lesina), L. Radlkofer, 1857 (PRM-758057); Zadar, Casa zona, 1907 (PRM-783627, 758080, 783654); Zadar, Dražnice, M. Servít, 1907 (PRM); Zadar, Malpaga, M. Servít, 1906 (PRM-757517); Zadar, Matak, M. Servít, 1907 (PRM-783843); Zadar, Musapsotan Baričevič, M. Servít, 1907 (PRM-783847); Zadar, Ins. Ugljan, Otra, J. Baumgartner, 1913 (PRM-783652). **Ins. Jabuka** (San Andrea) west von Lissa, unweis Porto Slatina, A. Ginzberger, 1911 (PRM-757934). **Ins. Kopište** (Cazziol) w. von Lagosta, A. Ginzberger, 1911 (PRM-757909, 757936,WU-2650, PRM-758247, 783850). **Ins. Korčula** (West Curzola), am Goptel des Honi bei Vela Luka (Walle grande), J. Baumgartner, 1910 (PRM). **Ins. Kornat** (Incoronata), **Ins. Dugi Otok** (Süd Lunga), Vela Straža über Luka, J. Baumgartner, 1913 (PRM-758058); Zadar, Süd Lunga, Wegmauern zo Sale „Žman", J. Baumgartner, 1913 (PRM-757311). **Ins. Lastovo** (Lagosta), abhänge des Hum, A. Ginzberger, 1901 (PRM-758030, 783641); Ins. Lastovo (Lagosta, Lagostini) Veli Vlastnik, A. Ginzberger, (PRM-758136). **Ins. Lokrum** (Lacroma), Steinerne Parkbänke, A. Latzel, 1907 (PRM-

756941, 757519, 783672). **Ins. Lošinj** (Lussin), Norokam, mt. Osor (Ossero), J. Baumgartner, 1914 (PRM-757285); Lussin, calcicola ad pedicus montis Mt Ossero apud Neresina, J. Hruby, 1910/07 (PRM-645314, 645316, 783783, 783784); Istria, Pula (Pola). Pt. Christo, J. Hruby, 1913 (PRM-757038, 757033, 756855, 757368); Südspitzel s. Istrien Premantura (Promontore), J. Brunnthaler, 1911 (PRM-783833), A. Ginzberger, (PRM-758217). **Ins. Mljet** (Meleda), Porto Sovra (Mezza Meleda), J. Baumgartner, 1910/03/13 (W, PRM-783704). **Ins. Molat**, (Melada), Wegmauern Brgulje gegen Zapuntello, J. Baumgartner, 1913 (PRM-757169, 757163); Ins. Molat (Melada) beim Dorfe Prožura, J. Baumgartner, 1910 (PRM-757918). **Ins. Premuda**, J. Baumgartner, 1913 (PRM-758115); J. Brunnthaller, (PRM, PRM-783849). **Ins. Rab** (Arbe), territoria Bagnol, J. Kümmerle, 1926/06/28 (BP); Rab, Bagnol, J. Kümmerle (PRM-757016); ibid., Cristoforo, J. Kümmerle, 1926 (BP, PRM-756854, PRM-757803, 758152, 757479, 757292); ibid., Tignarossa supra. St. Mateo, J. Kümmerle, 1926 (BP, PRM-757022); ibid., Pt. Ferkanjo, J. Kümmerle, 1926 (PRM-758223, 757937); ibid. Ins. Dolin, J. Kümmerle, 1926 (BP, PRM-757053, 783788); ibid., Dundo, J. Kümmerle, 1926 (PRM-757034, BP). **Ins. Šipan** (Giuppana), am Felsen im Gärten von Luka, A. Latzel, 1907 (PRM-758156). **Ins. Sušac** (Cazza) watl. von Lagosto Marchien, A. Ginzberger, 1911 (PRM-757245); J. Brunnthaler & A. Ginzberger 1911 (PRM-757975). **Ins. Žut**, **Ins. Mali Crnikovac**, J. Brunnthaler & A. Ginzberger, 1911 (PRM-757217, 783852, 783837, 758010, 757964). **Ins. Svilan** bei Rogožnica, J. Brunnthaler, 1911/05/19 (WU-00-68/13, PRM-78381); Scoglio **Galiola** in Guarnero, J. Brunnthaler, 1920 (PRM-757523);

Czech Republic: Český kras, Beroun, Koda, Z. Černohorský, 1943 (PRM-757180, 757202, 756948); J. Podpěra, 1903 (PRM-758172, 758157); Nižbor, Podzimek, 1928 (PRM-757581); **Sv. Jan p. Skalou** (Sv. Ivan), M. Servít, 1925 (PRM-757179, 757203, 757221, 757268, 758047, 758144, 758177, 758227); Karlštejn, Sv. Jan pod Skalou, E. Bayer, 1902 (PRM-756957, 758132, 758140, 758164, 758168); Skryté vody, A. Hilitzer, 1930 (PRM-758150); Srbsko - Sv. Jan pod Skalou, 300 m, J. Halda, 1999/04/16 (JPH/3251); Svatý Jan pod Skalou, apud viam trans monasterii in silva, 260 m, 2002/08/10, D. Svoboda (herb. D. S.: 517); Tetínská rokle prope Tetín in valle fluminis Berounka, 260 m 2002/10/08, D. Svoboda (herb. D. S.: 506); Císařská rokle prope pagum Srbsko, 230-250 m, 2002/11/13, D. Svoboda, (herb. D. S.: 507, 508, 509); in colle „Na Závěrce" Berounka prope pagum Srbsko, alt. 260 m, 2002/08/10, D. Svoboda (herb. D. S.: 510, 516); Berounka apud Barandova jeskyně caverna, 250, 2002/10/23, D. Svoboda (herb. D. S.: 511, 512, 514); Berounka prope Tomáškův lom apud Srbsko, 240 m, 2002/11/17, D. Svoboda (herb. D. S.: 513); in clivo supra viam ferream apud domum „Vechtrovna Korno" prope pagum Srbsko, 250 m, 2002/07/29 (herb. D. S.: 515); **Velká Hora** u Karlštejna (nad vodopády), Z. Černohorský, 1941 (PRM-783882, 758124); Praha, Hlubočepy, **Sv. Prokop**, M. Servít, 1906, 1920, 1925 (PRM-757208, 757570, 758120); Sv. Prokop, J. Hora, 1884 (PRM-757186); **Prokopské údolí**, Bílé skály, J. Kocourková, 1999/09/24 (PRM-760589); Praha, Klukovice, M. Servít, 1925 (PRM-757549); **Praha**, **Kosoř, Radotín**, E. Bayer, 1892 (PRM-758135, 783878); E. Bayer, 1901 (PRM-757507); Radotín, Cikánka, Z. Černohorský, 1944 (PRM-757569); Radotín, J. Podpěra, 1902, 1907 (PRM-757192, 758118); Zadní Kopanina, Z. Černohorský, 1943 (PRM-757155, 757258, 757577, 758116, 758143); **Vápenný Podol**, V. Kuťák, 1907 (PRM-757979), 1909 (PRM-756956, 757140), 1910 (PRM-757506), **Krkonoše**, Prostř. Lánov, V. Kuťák, 1925 (PRM-756946); **Kralický Sněžník**, Tvarožné díry, J. Halda, 2000/10/19 (JPH/4553).**Morava**, C. Hochstetter, (W, PRM-757897); Morava, **Brno**, in colle Hády, J. Suza, 1911 (PRM-758077, 757248, 758087, 756702, 645210), 1913 (PRM-783882); bei Brno (Brünn), C. Hochstetter, 1825 (PRM-757233, 757223); Stránská skála u **Líšně**, F. Kovář, (PRM-757204); **Pavlovské Kopce**, J. Suza, 1922/05 (PRM-645307, 757490); Pavlovské Kopce, Děvín, J. Suza, 1922 (PRM-757205); **Kotouč** pr. op. Štramberk, J. Suza, 1920/05/23 (PRM-645105); **Moravský Kras,** Macocha, M. Servít, 1906 (PRM-757244); Macocha, Suchý žleb, M. Servít, 1906 (PRM-645238, 758003); Macocha: ruina Hrad, M. Servít, 1906 (PRM-757265, 758060, 758220); Moravský Kras, **Býčí skála**, J. Suza, 1921 (PRM-758201); Moravský Kras, **Skalský mlýn** ad pluv. Punkva, J. Suza, 1920/04/28 (PRM-645349); ibid., J. Suza, 1920 (PRM-757207, 757568, 758031, 758174, 758211, 783870, 757608, 757622); údolí Punkvy, F. Kovář, 1905 (PRM-758034); **Mikulov,** Svatý kopeček (Nikolsburg, Heiliger Berg), Fr. Zimmermann, 1936 (PRM-757156, 758007); V. Grummann, 1936 (PRM-757174); 300 m, J. Halda, 2001/10/11 (JPH/5282); Mikulov, na Mariánské hoře, F. Kovář, 1907 (PRM-757613); Mikulov, Šibeničník, J. Suza, 1922 (PRM-757263, 757269, 757256); Květnice prope **Tišnov**, rup. calc., J. Suza, 1920 (PRM-783855); Tišnov, Květnice, M. Servít, 1907 (PRM-783874, 783875); Tišnov, **Čebínka**, Z. Černohorský, 1943 (PRM-756962, 757572, 757579, 758029), J. Suza, 1919 (PRM-757172, 757511), J. Suza, 1929 (PRM-757958), M. Servít, 1906 (PRM-756936, 758005, 758119, 758147), 1907 (PRM-757987); Tišnov, **Drásovský kopec**, J. Suza, 1922 (PRM-758162, 758216); **Zkamenělé Zámky**, J. Suza, 1921 (PRM-758131);

Denmark: Ins. Sjaeland, Gerley, on calcareous block in a stone wall in the border of a wood, S. Christiansen, 1946 (PRM-757617).

France: Salses, A. Hilitzer, 1931 (PRM-758032, 757589, 757592); Nice, Ville Franche, Cime de Vinaigrier, J. Suza, 1927/04 (PRM-645317); La Valette, A. Hilitzer, 1931 (PRM-758126, 758253, 757385); Rochers calcaires ŕ Arguel, Besançon, (PRM-758096); Besançon, Hagey, (PRM-758142); Rouen, Petit Conrome, (PRM-783881); mt. **Vosges**, (PRM-783877); Sur les roches atto Pyrenées et Vosges, (PRM-

757261); **Rouen**, W. Nylander, (PRM-783713); **Provence**, Bouches du Rhone: Marseille, F. Clauzade, 1964 (BP); **Paris** (Monet), W. Nylander, (PRM-783648); **Dept. Ardčche**: **Vallon Pont d'Arc**, les Brugičres, Wald ca 1,5-2 km südl. Šalavas, M. Heklau, 1993/04/12 (STU); Hyčres, A. Metzler (PRM-783776, 783775); Plateau de Malzéville (Malzéville), J. H. Harmand?, 1888, (PRM-757915).

Germany: Nordrhein, Brünen, Oberfranken, 1855 (M).

Thüringen, Wartberg bei Thal, G. Lettau, 1915 (PRM-758151, 757162, 758167); ibid., Ziegenried b. Plane, a Muschelkalksteinen, G. Lettau, 1909 (PRM-757540, 757600); ibid., Rutha, Rausch, 1909 (PRM-758049).

Bayern, F. Arnold, (PRM-783690); Schwabenitzer Kalkberge bei Regensburg, F. Arnold, 1862 (PRM-75799, 7580767, 757178); Fränkischen Jura, Wasserzell bei Eichstätt, F. Arnold, 1857 (WU, PRM-783748, 783750); 1886, 1866 (PRM-757560, 757552, 757557, 757593, 757189, 758070, 783745, 783758, M-002449, W-94279); Boestenfurt n. Dollenstein bei Eichstätt, F. Arnold, 1874 (PRM); Kunstein bei Eichstätt, F. Arnold, 1851 (PRM-758004); 1866/06/03 (W, PRM-758654, 757181, 758020, 757941); Kunstein im Schuttershale, F. Arnold, 1858 (PRM-758013); Eichstätt, Arnold Clar., 1866 (HP-1184); Eichstätt, Tiefenthal, F. Arnold, 1857 (PRM); ibid., Kipfenberg, F. Arnold, 1859 (PRM-758224, 758033); Altmühlthale unterhalb Schönfeld bei Eichstätt, F. Arnold, 1862 (PRM-757929); ibid., Neuessnig, F. Arnold, 1939 (PRM-783873, 758100); ibid. F. Arnold, 1859 (PRM-757060); ibid., Dollenstein, F. Arnold, 1857 (PRM-757932, 757536, 758028); bei Altmühlthall oberhalb Essing, Donausthall zu Kehlheim und Weltenburg, F. Arnold, 1858 (PRM-757159); ibid., Brudes, 1862, F. Arnold, (PRM-757251); 1936 (PRM-757967); Würgau Sem Leiterle, F. Arnold, 1860 (PRM-783689); Muggendorf, F. Arnold, (PRM-757607, 758170); Oberfranken, F. Arnold, 1855 (PRM-783693); bei Hoeilberg, F. Arnold, (PRM-757533, 757595); München, Grünwald, F. Arnold, (PRM-757567); Aachen, Altenburg, Förster, (PRM-783682); Opchinae in monte Karst., O. Sendtner, 1856 (PRM-757472); zw. Friesenrath und Halen, Förster, (PRM-757153); Im Hönnethal, Nitschke, 1863 (PRM-783692); Kümmel Berg: Falkenstein, M. Servít (PRM-756963); Kümmel: Hohe Tanesee, Schaffert, (PRM-758017). Bayerische Alpen, (M-0024472); Oberandorf, A. Krempelhuber, 1858 (PRM-783768); Partenkirchen, A. Krempelhuber, 1851 (PRM-757020, 758078, 758102, 783828); ibid., Mittenwald, A. Krempelhuber, (PRM-756302, 757132, 757147, WU, PRM-783763, 783792); H. Zschacke, (PRM-756949, 758068); ibid., Seinsborücke in Isar, (PRM-783795, 783781, 783781); ibid, Wissmat, A. Krempelhuber, (PRM-758200, 757110, 783869, 783868); ibid., Couglomund Gett., A. Krempelhuber, 1850 (PRM-783796); Schlehdorf, C. Martius, (PRM-783796); Oberandorf, A. Krempelhuber, 1858 (PRM-783768); Waltlichtung w. von Irschenhausen München, F. Arnold, 1894 (PRM-758185); Haarkirchen „Milbach, München, F. Arnold, 1890 (PRM-783668); ibid., Getlings, F. Arnold, (PRM-783880); ibid. Schwaneck, F. Arnold, 1893 (PRM-783714); München, F. Arnold, (PRM-783708, 783694); Fränkische Alb: Muggendorf bei Pottenstein, V. Wirth, 1973 (STU); Bayer. Alpen: Oberammergau, G. Lettau, 1902 (PRM-756298); Burglengenfeld, Gümbel, (PRM-758098); der Goppelschneide auf dem Wallberg bei Tegernsee, F. Arnold, 1973 (PRM-758001); Berchtesgaden, Hintere Gern, O. Sendtner, 1850 (PRM-758242, 757117), Hruška, 1950 (PRM-757087); ibid., Scharitzkehl, O. Sendtner, 1850/09/13 (WU-00-68/1, PRM-757900, 757505); Königssee am Obersee, 1923 (PRM-758081), C. Erichsen, 1927 (PRM-758222, 758222, 757116), V. Grummann, 1923 (PRM-757278).

Baden Württemberg, Hagschutz b. Niedereggenen (unweit Mühlheim), G. Lettau, 1922 (PRM-757051); Baar: Bachheim, Gauchachschlucht zwischen Grünmühle und Burgmühle, Talgrund, V. Wirth, 1984/06/13 (STU); Bodensee: Eigeltingen, Schloss Langenstein, Felsen östl./nordöstl. des Schlosses, an der Talverengung, V. Wirth, 1988/06/23 (STU); Schienen, Quinttal, V. Wirth, 1984/05/12 (STU); Hochrhein: Jestetten bei Schaffhausen, römische Brücke im Volkenbachtal, V. Wirth, 1985/07/24 (STU); Rheinebene: Istein, Isteiner Klotz, unterhalb der Ruine, mtb 8311/1, V. Wirth, 1984/10/10 (STU); Schwarzwald Voberge: Kandern, Wolfsschlucht, MTB 8211/4, V. Wirth, 1993/03/12 (STU); Engen, Wasserburger Tal, bei Höhenpunkt 537 m, kalkfelsdurchsetzter Wald auf der östl. Talseite ca., V. Wirth, 1983/09/27 (STU); Allgäu, Tiefenbach im Allgäu, Rehm, (PRM-783785, 757136, 783797); Allgäuer Alpen, Birgsau, Einödsbach, E. Dröge (PRM-783706); Allgäuer Alpen, Gümbel (PRM-757231); Hohenzollern, Schwabische Alb: Ebingen, Ehestetten, Mühlenfels, V. Wirth, 1978/08/15 (STU); Bad Ditzenbach, Oberbergfels, MTB 7424, V. Wirth & M. Heklau, 1989/06/09 (STU); Bad Urach, Wittlingen, Föhrental, MTB 7522/2, V. Wirth, 1998/07/09 (STU); Blaustein, Bermaringen, felsdurchsetzter Magerrasen WNW von „Hoher Fels", oberhalb der S, V. Wirth & R. Wirth, 1992/09/10 (STU); Heidenheim, Crenz, C. Kemmler, 1854 (PRM-757435, 1854 (PRM); Anhausen, C. Kemmler, 1862 (PRM-757184); Anhausen bei Heidenheim, C. Kemmler, 1855 (STU); Heidenheim, Grosskuchen, Katzental, Hohler Stein, V. Wirth, 1994/10/16 (STU); Bopfingen, Schlossberg, Umgebung der Burgruine, V. Wirth, 1979/05/17 (STU); ibid. , Galgenberg, C. Kemmler, 1856 (PRM-783802); 1859 (PRM-783766, 783799); ibid., Sandberg, Remmles, 1859 (PRM-783761); Dischingen, Buchberg bei Demmingen, MTB 7328/2, V. Wirth, 1994/10/12 (STU); Dotterhausen, Plettenberg, N von Steinbruch am Westhang, neben der Strasse, Fichtenwald, V. Wirth, 1993/10/28 (STU); Ehingen, Kirchen, Mochental, M. Eggler, 1918/06/02 (STU); Ehingen, M. Eggler, 1920/07/30 (STU); Friedingen bei Riedlingen, Grosse Heuneburg, Südhang, V. Wirth &

M. Heklau, 1985/07/03 (STU); Gammertingen, Fehlatal, Felsen am Hangfuss beim Schloss Baldenstein, MTB 7721/3, V. Wirth, 1993/06/30 (STU); ibid., Wendelstein, V. Wirth, 1984/11/08 (STU); ibid., V. Wirth, 1984/11/08 (STU); ibid., V. Wirth, 1984/11/08 (STU); Geislingen/Steige, Felsen in unmittelbarer Umgebung von Helfenstein, V. Wirth, 1984/07/04 (STU); ibid., Magental, M. Heklau, M. Nebel, 1986/03/26 (STU); Gerstetten, Sackental, Wacholderheide, 580-610 m, MTB 7325/4, r 3572 h 5386, E. Klotz, 2000/04/19 (STU); Hechingen, Zeller Horn, MTB 7619/4, V. Wirth, 1993/06/30 (STU); Heubach, Lautern, Finsteres Loch und Umgebung, MTB 7225/2, V. Wirth, 1984/10/09 (STU); Honau bei Reutlingen, Umgebung des Locersteins, V. Wirth, 1975/06/24 (STU); Indelhausen, Weiler, MTB 7622, V. Wirth, 1985/07/16 (STU); Laichlingen, Westhang des Galgenbergs, Rand von MTB 7423, V. Wirth, 1988/08/30 (STU); ibid., Rand von MTB 7423, V. Wirth, 1988/08/30 (STU); Langenau, Albeck, Tälchen westl. Kornberghöfe, direkt südl.Punkt 555 m, Felsen, MTB 7526, V. Wirth, 1984/11/02 (STU); Rauhe Alb, Schöberg, V. Grummann, 1923 (PRM-758209); ibid., Geislingen, Oeden turn, C. Erichsen, 1918 (PRM-758214); Mühlheim/Donau, Lippachtal, Walterstein, Hegelmaier, 1869/08 (STU); Neresheim, V. Wirth, 1985/08/20 (STU); Oberlenningen, Schlopfloch, MTB 7423/3, V. Wirth, 1988/07/30 (STU); Öllingen bei Langenau, Lontal, Hohlenstein, V. Wirth, 1980/03/31 (STU); Schelklingen, Schmiechen, M. Eggler, 1918/06/19 (STU); Sigmaringen, 0,3 km SW Hertenstein, V. Wirth & T. Nash, 1981/07/24 (STU); Stetten am kalten Markt, Donautal, Mühlfessen, V. Wirth, 1988/09/08 (STU); Stetten am kalten Markt, Storzingen, Schmeietal südl. der Kläniage, MTB 7820/4, V. Wirth, 1993/06/30 (STU); Ulm, Tobeltal, südl. der Kurve am Agenberg, V. Wirth, 1984/11/02 (STU); Urach, Hammerfelsen, V. Wirth & M. Heklau, 1985/09/27 (STU); Zwiefalten, Tobeltal, 1,5 km WSW der Klosterkirche, Kleebwald, MTB 7722/4, V. Wirth, 1998/05/17 (STU); zwischen Sontheim bei Laichingen und Weiler bei Blaubeuren, Tiefental unterhalb Sontheim, V. Wirth, 1985/05/14 (STU); Dotternhausen, Plettenberg, N vom Steinbruch am Westhang, Wirth, 1993/10/28 (STU); Ehingen, Kirchen, M. Eggler, 1928/07/06 (STU); ibid., Mundingen, M. Eggler, 1917/09/17 (STU); Geislingen, Bad Überkingen, Jungfrau, V. Wirth & M. Heklau, 1987/10/21 (STU); Hayingen, Oberwilzingen, M. Eggler, 1926/08/31 (STU); Heubach, Lautern, Finsteres Loch und Umgebung, MTB 7225/2, V. Wirth, 1984/10/09 (STU); Lonsee, Naturschutzgebiet, Wachholderheide, MTB 7425, V. Wirth, 1984/07/04 (STU); Munderkingen, Rechtnstein, M. Eggler, 1928/03/25 (STU); Oberlernningen, Schopfloch, Stellfelsen, MTB 7423/3, V. Wirth, 1988/07/30 (STU); Schelklingen, Justingen, M. Eggler, 1920/09/28 (STU); Sigmaringen, Laiz, schattige Felsen beim Nickhof, V. Wirth, 1981/05/08 (STU); Aalen, Essingen, Teussenberg, Falkensprung, V. Wirth, 1984/06/28 (STU); Mühlhausen bei Vaihingen an der Enz, Trockenrasen und Muschelkalk Felsen oberhalb des Steges über die Enz, V. Wirth, 1981/04/14 (STU); Klosterbenron (=Klosterbeuren?), C. Erichsen, 1918 (PRM-757078); Göttingen, (PRM-783637); Germany (PRM-757275).

Great Britain: England, Bilsdale Yorkshire, W. Mudd, (PRM-757531); Pentregaer w. **Oswestry**, Ilnopshire, W. Leighton, (PRM-758097); **Wales**, Great Orme's Head, Caernavonshire, W. Leighton, 1850 (WU-00-68/3, PRM-757594).

Greece: Ins. Amorgos, Lankádia, K. Rechinger (PRM-757605, 757606), Ö. Szatala, 1932 (BP 34383); Amorgos, Kloster Panagia Chorovitina, K. Rechinger, 1932/07/01 (W, PRM-783663, 758095), Ö. Szatala, 1932 (BP 34382, BP 34336, BP 34384); Amorgos, Lankádia (Lanzada), K. Rechinger, (PRM-757624); **Ins Samos**, Bachschlucht bei Vathy, K. Rechinger, 1934 (PRM-783718, BP 34234, BP 34385); 1904 (W, PRM-756704, 758012); Ins. Samos: in rupibus calc. montis Kerki, K. Rechinger, 1932/02 (W-6575, PRM-758178); Peninsula **Athos**, monastir Aja Anna, Ö. Szatala, 1934 (BP); **Ins. Rodi**, mt. Prozeta, K. Rechinger, (PRM-758198, 758075); **Ins. Sampalia**, mt. Alhymadari, K. Rechinger, (PRM-758221, 757302); **Ins. Levkáda** (Levkas), Gipfel, Megalos Rahi, J. Just, 1929/04/11 (W); **Ins. Astypálaya** (Astropalia), mt. Athymadervi,Ö. Szatala, (BP), K. Rechinger, 1935/05/26 (W); **Ins. Evvoia** (Euböa), Berg Xerowuni (Xerochorion) K. Rechinger, 1932 (PRM-758026); **Mykene**, A. Ginzberger, (PRM-756852,WU-00-68/5); Graecia, (PRM-783629). **Ins. Corfu:** P. Sydow, (PRM-757518, 757910, 758045); hinter dem **Koenigs Garten**, P. Sydow, 1856 (PRM-757075, 757995); **Berg Herakli**, K. Rechinger, 1912 (PRM-758228, 783824, 758071, 757911); Berg Pantokrator, K. Rechinger, 1912 (PRM-758232); **Berg Santi** Deka, K. Rechinger, 1912 (PRM-757164, 757944), 1917 (PRM-758069); K. Eggerth, 1885 (WU-00-68/2, PRM-757907); **Gamzi**, K. Just, (PRM-756297);

Hungary: Bakony, Pénzeskut, Gerenceszoros, V. Gyelnik, 1933 (PRM-756851); **Balatonicum**, Sümog, Sümegi várhegy, V. Gyelnik, 1934 (PRM-757196, 757264); **Baranya**, Villány, Harsányi, V. Gyelnik, 1925 (PRM-757193); **Borsod**, Bányahegy pr. Diosgyör, F. Fóriss, 1923 (PRM), 1921 (PRM-757274); Diosgyöri völgy, F. Hazslinsky, (PRM-757553, 757960); mt. Görénykö, pr. pag. Vavbó, **Borsod**, F. Foriss, 1920 (BP 163); Borsod, montium **Bükk**, F. Fóriss, 1921 (PRM), montium Bükk, Haromkö, F. Fóriss, 1936 (PRM-758093, 757485), Bükk, in monte Bányahegy: Kokapu, F. Fóriss, 1924/07/08 (PRM-758230, 758651); Bükk, Merikói völgy prop. pag. Ókuter, F. Fóriss, 1922 (PRM-757260); Bükk, Nagyvisnyó, m. Bálvány, F. Fóriss, 1938/07/12 (PRM, BP 77909, BP, PRM-757211, W); Bükk, Purkaporos, F. Fóriss, 1935 (PRM-756306); mont. Bükk, Repashuta, Banyahegy, F. Foriss, 1924 (BP 5603); Bükk: Málinka, mt. **Odvaskö**, F. Fóriss, 1938/04/10 (PRM-758204, BP, M, PRM-757102, W-2422); Bükk, Bányabükk, F. Fóriss, 1938 (PRM-783644); **Budapest**, Csobánka Kis Kévély, V. Gyelnik, 1925 (PRM-

758141, 757501); Budapest, Hárshegy, Juliana major, V. Gyelnik, 1910 (PRM-757421), 1930 (PRM-757474); Budapest, Huvösvölgy, Fazekashegy, G. Timkó, 1916 (PRM-757175, 758195); **Esztergom**, Csév, Csévi Szirtek, V. Gyelnik, 1925 (PRM-757171, 757493); **Hadittöi** völgy, F. Hazslinszky, (PRM-758104, 758218); **Pilishegy, Chapec** (Legénybarlang) pr. Csév, M. Servít, 1928 (PRM-758176, 757259); juxta pagum **Diósgyör**, in declivibus montis Várhegy, F. Fóriss, 1937/07/22 (W, PRM-757086); **Kopaszerdö**, **Pest**, G. Timkó, 1916 (PRM-758166, PRM); Kr. **Szörény**, Alte Roll, Csiklova, G. Timkó, 1914 (PRM-757475); p. pag. **Berzéte**, Szilicei fenusik, V. Gyelnik, 1939 (PRM-757191); **Pest**, Bia mal., **Dobogóhegy**, G. Timkó, 1917 (PRM-758129); **Pest**, **Budakaház**, Monalovac Berg, G. Timkó, 1926 (PRM-757254, 757157, 757195); 1911 (PRM-758193, 758193), 1911 (PRM-757966); **Pest**, **Dobogóhegy**, G. Timkó, 1917 (PRM-757190); Pest, Nagykopaszhegy, G. Timkó, 1928 (PRM-757257); Pest, Pilishegy, G. Timkó & Fóriss, 1914 (PRM-757104); Pest, Remetehegy, V. Gyelnik, 1925 (PRM-757931), G. Timkó, 1911 (PRM-757491, 758016); Pest, pr. Vác, mellet, Ö. Szatala, (BP); Pest: in monte **Szarvas** pr. Vác, Ö. Szatala, 1916 (BP 34377); Pest pr. Solymás, Ehill, 1913 (BP 34333); Pest, in monte **Jánoshegy** pr. Budapest, Ö. Szatala, 1918 (BP 34375); Pest: in monte N. Kopasz supra **Nagykovácsi**, Ö. Szatala, 1918 (BP 34378); **Pilisense**, **Mária Remete**, mt. **Várhegy**, G. Timkó, 1915 (PRM-758233, 757182); Mária Remete, **Hoszúerdö**, V. Gyelnik, 1925 (PRM-783866); Pilisense, Mária Remete, **Hoszúerdö**, V. Gyelnik, 1925 (PRM-757429, 757500, 758133, 758105, 758210), 1925 (PRM, 1925 (PRM, 757183, 757272); Pilisense, **Csév**, **Ledénybarlang**, V. Gyelnik, 1938 (PRM-758180, 758181, 758182, 758083, 758109, 758139, 757267, 757262), M. Servít, 1917 (BP); Pilisense, Polishegy, V. Gyelnik, 1925 (PRM-758196); **Pest**: in monte Pilis prope Csév, O: Szatala, 1925 (BP, BP 34368); Pest, mt. Vaskapu, Szatala, 1921 (BP 34372); Rischer auf Ungarn, B. Veselský, 1857 (PRM-758052); Vértéshg., Zsár Ujklepe, Mariaszakadell, V. Gyelnik, 1939 (PRM-757604, 783633); **Veszprém**, Porva, **Köröshegy**, V. Gyelnik, 1916 (PRM-757069, 757986), 1925 (PRM-783746, 783747), V. Gyelnik, 1928 (PRM-757128), G. Timkó, 1935 (PRM-758226, 757214); Veszprém, **Zirez**, **Czukavölgy**, V. Gyelnik, 1925 (PRM-757194, 757198); **Zala**, **Kövázóörs**, Hornyitó, G. Timkó, 1926 (PRM-758125); **Zala**, **Tihany**, Akasztohegy, V. Gyelnik, 1930 (PRM-757201), F. Fóriss, 1954 (BP); Zürok, Háromkó, V. Gyelnik, 1936 (PRM-756305); **Tihany,** Akasztohegy, Zala, **Tapolcza**, F. Hazslinszky, (PRM-757928); Megalodus mászkötuskón, Nagykopasyhegy, G. Timkó, 1912 (BP 227); Pilisense, Megalodus, Várhegy, Mária Remete, G. Timkó, 1915 (BP); pag. Üröm, m. Erüsthegy, Szatala, 1933 (BP).

Ireland: Limestone wall, Carbon Co Kildare, Knowles, 1925 (PRM-757530).

Italy: Ins. Ema, an Wegmauern von Sv. Ante bei Comisa nach Porto Chiavari (Chiava), J. Baumgartner, 1910 (PRM-758099);prov. **Veronensis** (monte Alba), A. Massalongo, (PRM-756826, M-0024473, PRM-756868, 783657, 783755, 783754, 757544, Bern); prov. Veronensis in oppido Velo (Covoli), A. Massalongo, (VER); Vive sulle roccie calcaree compatte juresi per tutto il Veronese, nei luoghi ombrosi, ma specialmente sul M. Baldo (Mad. Corona), A. Massalongo, (VER); Südtirol (Lago di Garda), **Arco**, Dietrich Kalbhof, 1910 (PRM-757249); **Genova**, **Val Bisagno**, loco **S. Eusebio**, C. Sbarbaro, 1951 (PRM-757021, 783807, 783814, 783812, 783813, 783885, 783839, 757314, 783701, 757017, 757561, 758252, 757629, 757626, 757609, 757621, 757614, 757564, 757563), 1947 (PRM-757312); prope **Genova** (Genuan), (valli di Bisagno e di Granarola), F. Baglietto, (PRM-783810, 783808, 783811); Genova (Genuae), in vallecula di Granarolo, F. Baglietto, (W, PRM-757631, 783760); Genova, in vallecula di Granarolo, Baglietto, (PRM-783806, 783815, 783805); Genova, **Staglieno**: loco Montino, C. Sbarbaro, 1951 (PRM-757630); Vive sulle roccie calcaree nel Bosco Bagato presso Genova, F. Baglietto, (VER); Boghe (PRM-783777); Reghello, (PRM-783774); Genova (Genua), Val Bisagno, Serino, C. Sbarbaro, 1931 (PRM-783893, 757548, 783703); Genova, Fullo, Val Bisagno, C. Sbarbaro, 1951 (PRM-757627, 783809, 757565, 757558); 1937 (PRM-757580, 783687), 1946/01/30 (Bern), 1951 (PRM-757035); Val Bisagno, Prato, C. Sbarbaro, 1946 (PRM-757043); Niusei (Genova), C. Sbarbaro, 1951 (PRM-758018, 758089, 783753, 757612); Genova, Marassi, C. Sbarbaro, 1951 (PRM-757618); Pontecarrega, C. Sbarbaro, 1924 (PRM-783804); Genova, mt. Fasce, C. Sbarbaro, 1947 (PRM-756309); Contormi di Genova, (PRM-783803); Genova, L. Calechi, (PRM-757313); **Calabria**: Valle di Fiume Argentino, E Orsomarso, R. Türk & D. Puntillo, 1991/05/22 (STU); **Napoli:** Gragnano, V. Gyelnik, 1928 (PRM-757504, 758155); Gragnano, S. Angelo, V. Gyelnik, 1928 (PRM-758199); Roma, Haymald, 1862 (PRM-757029, 783742); Rojatal bei **Ventimiglia** Breglio, J. Brunnthaler & O. Porsch, 1907 (WU, PRM-757212, 68/11); Ventimiglia, Rojatal, S. Michele, J. Brunnthaler & O. Porsch, (PRM-758067); **Venezianer Alpen**, ad rupes cina **Valstagna** in ditione Bassanensis, (W, PRM-758117, 783666, 783658); ad rupis montium **Caluga** et grappa in ditione Bassanensis (Bassano), V. Trevisan, (PRM-783902); **La Spezia: Portovenere**, C. Sbarbaro, 1950 (PRM-757632); **La Spezia**, Lérici, C. Sbarbaro, 1950 (PRM-783831, 783773); bei **Verona**, (PRM-783756); **Pino** 360 (Val Polceveras), C. Sbarbaro, 1951 (PRM-783854, 758051); **Spotorno**, Lajolo, C. Sbarbaro, 1952 (PRM-757587); Spotorno, C. Sbarbaro, 1952 (PRM-757528); Spotorno, „Monte" Conglomerati, 1946 (PRM-783626); Spotorno, Mortón, C. Sbarbaro, 1952 (PRM-757603, 757526); Spotorno: Merello, C. Sbarbaro, 1952 (PRM-757585); ad rupes in memore **Montello** prov. Trevisinal, T. Nitschke, 1863 (PRM-783691); ad saxa calcarea in rupibus Rhaetinis (**Madesimo**), (PRM-756864); Liguria, **Varigotti**, C. Sbarbaro, 1952 (PRM-757573, 757597, 757583, 757571, 757534); mt Varigotti muricole sub oleis, C. Sbarbaro, 1937 (PRM); Liguria, **Chiavari**, C. Sbarbaro, 1950 (PRM); Finalmarina, **Capo**

di Caprazoppa, C. Sbarbaro, 1952 (PRM-757532, 757575, 757537, 757578, 757586, 757590); **Firenze, Impruneta**, G. Cei, 1940 (PRM-757541); **Nice** (Nizza), E. Graeffe, 1858 (PRM-757040), 1857 (PRM-757044); **Tobote** nach Nago Garbasee, Tirol, F. Arnold, 1900 (PRM-783635, 783636).

Poland: Kielce, G. Moesz, 1918 (PRM, 783859, 758215, 758165); „Sakrau Stalag" (Sacrauer Berg) bei Gogolin, Eitner, (PRM).

Romania: Dom **Durator**, in sylvis Ghiurlerchioi inter opp. Silistra et Curtbunar, P. Cretzoiu, 1931 (PRM-758085); **Severin**, mt. **Domugled**, V. Gyelnik, 1935 (PRM-757092), P: Cretzoiu, 1936 (PRM-757170), 1937 (BP, PRM-757007); F. Hazslinsky, (PRM-757028, BP 111, PRM-758187), mt. Domugled, Crucea Alba, P. Cretzoiu, 1936 (PRM-757733, 783846); mt. Domugled, Cserna patak, V. Gyelnik, 1935 (PRM-757494, 757453, 783659, 756954, 757482), mt. Domugled, Istáráce, P. Cretzoiu, 1936 (PRM-757354), mt. Domugled, Mehadia, F. Hazslinsky, (PRM-757089); mt. Domugled, **Herkulesfürdö**, V. Gyelnik, 1935 (PRM), H. Lojka, 1872 (PRM-756867, 757996, BP 147), V. Gyelnik, 1935 (PRM-756939, 757185, 757556, 757014, 757978, 757703), Herkulesfürdö, Zserelen, H. Lojka, 1872 (PRM-783655); **Brasso**, Nagykohavas, V. Gyelnik, 1935 (PRM-757109); Burcicum, Brassó, Cyenk., V. Gyelnik, 1935 (PRM-757599); Danubicum, **Dubova** Ogradina, V. Gyelnik, 1934 (PRM-757215); Danubicum, **Plaviševica**, Denevérbarlang, V. Gyelnik, 1934 (PRM-757126, 757135, 758207, 757529); Severin, vall. Dinarei im Cazanc, inter Plaviševica et Dubrava, P. Cretzoiu, 1936 (PRM-757584); Distr. Muscel: in montibus **Piatra Craiului** in calcareis Cheile Dambovicioarei, P. Cretzoiu, 1935 (PRM-757127, W-3399, PRM-783834, 757427, 757419, 757452, 757416, 757899); Piatra Craiului, K. Loitlesberger, 1897 (PRM-757124); Hargitanum, Homoródalmási barlang, J. Bányai, 1934 (PRM-758231); Praebiharicum, **Gyulafehérvar**, Intrégáld, V. Gyelnik, 1934 (PRM-758212, 758194, 756966) Praebiharicum, Tarockó, **Székelykö**, V. Gyelnik, 1934 (PRM-757999); Praebiharicum **Torda**, V. Gyelnik, 1934 (PRM-757912, 757965); Torda, Turi hasadek, V. Gyelnik, 1934 (PRM-757582); **Bucegi**, Babele, P. Cretzoiu, 1936 (PRM-758027); Bucegi, Salomitioara, Cheile Tararului, P. Cretzoiu, 1932 (PRM-757933, 757439, 783827); Bucegi, Santa Ana, P. Cretzoiu, 1935 (PRM-757616, 757137, 757100, 757280); Bucegi, Sinaia, P. Cretzoiu, 1935 (PRM-756824), J. Müller, (Bern); Bucegi, Valea Vanturis, P. Cretzoiu, 1935 (PRM-757972, 783649); Baile Herculane, Grota Hotilor, P. Cretzoiu, 1936 (PRM-757199); **Brasov**, Räsnov, Cetate, P. Cretzoiu, 1936 (PRM-757154); Durostor: in sylvis Ghiurlerchoi, inter opp. Silistra et Curtbunar, P. Cretzoiu, 1937 (PRM-757197); **Moraru**, Poiana Morarului, O. Klement, P. Cretzoiu, 1935 (PRM-757576); montes **Bihor**, pars Padis, Cheile Galbenei, in sylva, 880 m, J. Halda, Z. Palice & Š. Haldová, 1998/07/29 (JPH/2805); Bihor, pars Padis, Cheile Somesului Cald (Bazarul Somesului), in declivibus vallis, Cetacea Radesci, ad ripam rivi Feredö, 1400-1450 m, J. Halda, Z. Palice & Š. Haldová, 1998/07/26 (JPH/2828); Bihor, pars Padis, secus viam inter Cetatile Ponorului Dolina 2, 900 m, J. Halda, Z. Palice & Š. Haldová, 1998/07/28 (JPH/2797); Bihor, pars Padis, secus viam inter Groapa Ruginoasa et urb. Sighistel, ad ripam rivi Sighistel, 500 m, J. Halda, Z. Palice & Š. Haldová, 1998/07/31 (JPH/2760); Karpathen: Petroszeny, H. Zschacke, (PRM-783851, 757588).

Slovakia: Bratislava, Ballensteiner Schlucht Malé Karpaty, Pajštúnske údolí), J. Suza, 1921 (PRM-757538, 757535); Bratislava, in valle Pajštúnské údolí, J. Suza, 1916 (PRM-757601); **Lipovce** (Lipócz prope Eperjés = Branisko), H. Lojka, 1869 (PRM-783786, 783800, 783801); Lipovce (Lipócz), F. Hazslinszky, (PRM-756860, 757209); **Spišská kotlina**, Smižany, mlyn (Szepes, Szepessumeg, Jasnita malom), G. Timkó, 1915 (PRM-783661); Spiš (Scepusii), K. Kalchbrenner, (PRM-757255); Spišské Vlachy (Kirchdorf Oberungarn), B. Veselský, 1858 (PRM-757422, 757430, 783623, 783630, 783638, 783639); (Wallendorf, Ungarn), B. Veselsky, 1858 (PRM-757247, 757425, 757428; (Thal Zeleni bei Wallendorf), F. Hazslinszky, (PRM-757423, 757431, 757434); Veszprém, **Zirez**, **Czukavölgy**, V. Gyelnik, 1925 (PRM-757194, 757198); **Drevenik**, F. Hazslinsky, (PRM-758111); Drevenik, J. Suza, 1930 (PRM-757524); Drevenik, Spišský hrad, J. Suza, 1930 (PRM-757266); **Slovenské rudohorie**, Gelnica, in m. Folkmanská skála, J. Suza, 1938 (PRM-758048); **Vihorlat**, Humenné, Křivosčanka, J. Nádv., 1931 (PRM); Humenné, Sokol, J. Nádvorník, 1930 (PRM-757188); **Malá Fatra**, in monte Kriváň, J. Suza, 1923 (PRM-757130); **Malé Karpaty**, Plavecké Podhradie, J. Suza, 1938 (PRM-757122, 757499); ibid., Dobrá Voda, J. Suza, 1937 (PRM-757187); ibid., Smolenice, Ostrý kameň Burian, J. Suza, 1937 (PRM); Háj, Turčianská kotlina (Turócligen, **Margittai**), 1915 (BP, PRM); Turia, Zadielská dolina (Torna, mt. Szádellöi völgy), V. Gyelnik, 1939 (PRM-757495, 758094, 758153); Torna, Várhegy, V. Gyelnik, 1934 (PRM-757206). **Muránska planina**, Malá Stožka, J. Suza, 1937 (PRM-757935); ibid., Muráň, in valle Klatná loco Machnatá, J. Suza, 1938 (PRM-757143); ibid., Muráň, Cigánka, in sylva, 900 m, J. Halda, Z. Palice & A. Guttová, 1999/05/14 (JPH/3207); Cigánka, Muráňský hrad, 900 m, J. Halda, Z. Palice & A. Guttová, 2001/05/06 (JPH/4832); Červená Skala (2 km), ad ripam rivi, 900-950 m, J. Halda, Z. Palice & A. Guttová, 1999/05/13 (JPH/3378), ibid. 2000/05/06 (JPH/4389); Zlatnica, Zlatno, 750 m, J. Halda, Z. Palice & A. Guttová, 2000/05/06 (JPH/3981); ibid. Zlatianské skalky, 700 m, J. Halda, Z. Palice & A. Guttová, 1999/05/10 (JPH/3229); Kľak, 1260 m, J. Halda, Z. Palice & A. Guttová, 1999/05/11 (JPH/3175); Martinova dolina, Šarkanica, 850 m, J. Halda, Z. Palice & A. Guttová, 1999/05/12 (JPH/3156, 3157, 3158); Javorníčková dolina, 560 m, J. Halda, Z. Palice & A. Guttová, 2000/05/08 (JPH/4346); Šiance, 900 m, J. Halda, Z. Palice & A. Guttová, 2001/05/07 (JPH/4816); Vrbiarka, 950 m, J. Halda, Z. Palice & A. Guttová, 2000/10/27 (JPH/4535); Javorníková dolina, 750 m, J. Halda, Z. Palice & A. Guttová, 2001/05/08 (JPH/4721); Velká Stožka, 1000 m, J. Halda, Z.

Palice & A. Guttová, 2001/05/06 (JPH/4834); ibid., Machová (sept.), 1000 m, J. Halda, Z. Palice & A. Guttová, 2000/05/06 (JPH/4392); Malá Stožka, 800 m, J. Halda, Z. Palice & A. Guttová, 2002/05/13 (JPH/5445); Poľudnica, 700 m, J. Halda, Z. Palice & A. Guttová, 2002/05/14 (JPH/5431, 5435). **Slovenský raj:** Raj Thal bei Wallendorf, Zis im Ungarn, F. Arnold, 1860 (PRM-757512); ibid. H. Lojka, 1869 (PRM-757222); Piecky: Velký vodopád, ad ripam rivi, 600 m, J. Halda, Z. Palice & Š. Bayerová, 1998/06/08 (JPH/2780); Prielom Hornádu, ad ripam fluminis Hornád, 580 m, J. Halda, Z. Palice & Š. Bayerová, 1998/06/09 (JPH/2765); Suchá Belá, ad ripam rivi, 600 m, J. Halda, Z. Palice & Š. Bayerová, 1998/06/11 (JPH/2755); Velký Sokol, ad ripam rivi, 650 m, J. Halda, Z. Palice & Š. Bayerová, 1998/06/10 (JPH/2745); Ztratená, Havrania skala, J. Suza, 1937 (PRM-757229, 757168); ibid., Hnilec, J. Suza, 1937 (PRM-757424, 783862, 645258, 645236); Ztratená, J. Suza, 1937 (PRM-757903, 758130, 758206, 783857, 645276, 645277); Hrabušice, in der Schlucht Suchá Belá oberhalb Podliesok, V. Wirth, 1973/08 (STU); ibid. , Zelená hora (Szepes, Kaposztafalu, Zelena hura), G. Timkó, 1915 (PRM-757277, 757173); Dubnica (kóta 990) occ. ab Novoveská Huta (Szepes, Igló, Fischberg), G. Timkó, 1915 (PRM-756944, 757486). **Slovenský Kras:** Jovice, Dievčia skala (Berg Leánykö bei Jolész, Gömörer Comites im Ungarn), H. Lojka, 1868 (BP 265, PRM-757210, 757220, BP 161). **Pieniny**, Červený Kláštor, J. Suza, 1937 (PRM-757243, 758091); ibid., Haligovce, J. Suza, 1937 (PRM-757235, 757542, 757559, 757165); ibid. Aksamitka, J. Suza, 1937 (PRM-758101, 758113, 757477); soutěska Dunajce (Hohe Tatra, Dunajeczdurch), 1931 (PRM-783631); **Slovenské rudohorie**, Košické Hámre, Sivec, J. Suza, 1937 (PRM-758114, 783856, 645259); Margecany, Vápenica, J. Suza, 1937 (PRM-758054); Poráčská dolina, J. Suza, 1937 (PRM-758138, 645280); **Belianske Tatry**, Faiksová in declivi Žihlavno, J. Suza, 1925 (PRM-758062); ibid. Jatky, J. Suza, 1925 (PRM-757484, 756872); ibid., Faiksova lúka (na hrebeni pod Skalnými vrátami) (M. Tatra, Bélai Mészalpok Faixblösse), G. Timkó, 1915 (PRM-758192); ibid. Kotle: Havran Nový, I. Klášterský, 1925 (PRM-757418); **Strážovské vrchy,** Trenčín**,** Suľovské skaly, ad rupes calcareas arenosasque, J. Suza, 1922/06/03 (PRM-645106); **Branisko**, Lipovec (in valle Lipovecká dolina), dolom., J. Suza, 1938 (PRM-783790, 783770); ibid., Rudník, Rajtopiky, J. Suza, 1938 (PRM-783867), F. Hazslinszky (PRM-757433); Trenčín, Záskalie, Manínská úžina, J. Suza, 1922 (PRM-757901, 757139); Trenčín, TrenčianskeTeplice, Žihlavník, J. Suza, 1922 (PRM-757420); **Chočské vrchy,**Val. Dubová, Z. Černohorský, 1931 (PRM-757902); **Veľká Fatra**, Dedošovská dolina, M. Svrček, Z. Pouzar, F. Kotlaba 1953 (PRM-757513); 1954 (PRM-756937, 756959, 756960, 757232, 757236, 757432, 757436, 757478, 758121, 758122, 758123, 758179, 758183, 758229, 783741, 783884); 1957 (PRM-757896); **Malá Fatra,** Strečno, Z. Černohorský, 1931 (PRM-758160); **Vysoké Tatry**, in monte Jámky, ad rup. calc., J. Suza, 1925 (PRM-783779); **Nízké Tatry**, Vernár, A. Vězda & V. Wirth, 1973/08 (STU); **Levočské vrchy, Plaveč** (Palocza Nor), F. Hazslinszky, (PRM-758256); Tatra Wanerschladat, Hazslinsky, (PRM-783715); **Rožňava**, Silická planina (Rozsnyó, Szilicei plató), V. Gyelnik, 1939 (PRM-757008, 757426, 757496, 757503, 758011, 757969); Jasov (Yaszo), Chyzer, 1863 (BP 77969).

Slovenia: Carniola, **Mojstrana**, M. Servít, 1931, (PRM-757084, 757114, 757142, 757446, 757657, 757942, 757983, 758079, 783667); Mojstrana, Aljažev dom, M. Servít, 1931 (PRM-756934, 756958, 783698, 756700, 757451, 757471, 757121, 757115, 783628); Mojstrana, Dovje, M. Servít, 1931 (PRM-757948, 783660, 757976); Dovje Mlince potok, Servít, 1931 (PRM-757973, 757024, 757927); Mojstrana, in valle Vrata, M. Servít, 1931 (PRM-757981, 757863, 757442, 757470); Mojstrana, Luknja, M. Servít, 1931 (PRM-757444); Triglavense, initia flum. Bistrica, Servít, 1931 (PRM-757469); Krain, **Idria**, südl. lehne den **Julenberges**, J. Glowacki, 1869 (PRM-757098, 757562, 757822); Idria, Wilder See, J. Glowacki, 1869 (PRM-757013, 757150); Vrh Kluč bei Idria, J. Glowacki, 1869 (PRM-758042, 758225); Stador bei **Čepovan** (litor.), J. Glowacki, 1873 (PRM-758019); **Mojstrana**, montes **Julijske Alpe**, Aljažev Dom, secus viam (2 km merid. ab Mojstrana), 650 m, J. Halda & Š. Haldová, 2000/06/25 (JPH/4328); Julijske Alpe, in declivibus vallis „dolina Triglavskih jezer" supra Veliko jezero, secus viam", 1830 m, J. Halda & Š. Haldová, 2000/06/23 (JPH/4318); Julijske Alpe, in declivibus vallis „Snežna Konta" in clivo montis Škrbina, secus viam ad „Planina Govnjač", 1850 m, J. Halda & Š. Haldová, 2000/06/21 (JPH/4325, JPH/4324); Julijske Alpe, inter „Koča pod Bogatinom" et „Koča pri sedmerih trigl. jezerih", secus viam", 1650 m, J. Halda & Š. Haldová, 2000/06/22 (JPH/4326); **Flitscher Klause**, J. Glowacki, 1873 (PRM-783793); Schönpas bei Görz, J. Glowacki, 1872/08/05 (M), 1873 (PRM-783712); Carniola, Vigann (Veltes), Steiner, 1909 (PRM-783678); Krain, am June des Nanos oberh. dorf Strae, J. Baumgartner, 1901 (PRM-757543); Krain: Kalkblöcke aus fume aus Nanos ober. Strane, Baumgartner, 1901 (PRM-783860); Lippica bei In, B. Veselský, (PRM-758189, 758050); Čaven, J. Glowacki, 1873, 1871 (PRM-757096, 757923); Cijak. quelle bei Hipp., J. Glowacki, 1870 (PRM-757916).

Spain: Balearen, Mallorca, Serra de Tramuntana: Pollenca, Mortitxet, an der Strasse C 710 bei km 10, R. Wirth & V. Wirth, 1998/04/30 (STU), Balearen, Mallorca: Alcudia, Lesesteinmauern beim Friedhof, R. Wirth & V. Wirt, 1998/05/03 (STU); ad occidentem versus ab urbe **Santander** (20 km), prope pagum Buenala, haud procul ad via ferrea, 40 m, J. Halda, 1998/04/04 (JPH/4333).

Sweden: in rupibus arcis Graborg, C. Stenhammar, (PRM-757306, 758188); Velcavskia in rupibus arcis Graborg, C. Stenhammar, (PRM-757619); **Ins. Gotland**, Visby, H. Magnusson, 1918 (PRM-757527), Visby, Snackgardied, H. Magnusson, 1918 (PRM-757305, 783864, 758213); Ins. Gotland, **Oija**,

Magnusson, 1918 (PRM-783721); Ins. Gotland, par. Oija, Burgsvik, on calcareous rock, H. Magnusson, 1918/07/05 (PRM-756953); Ins. Gotland, C. Stenhammar, (PRM-758056, 758014, 758037, 758082); **Ins. Öland**, Borgholm, C. Stenhammar, 1857 (PRM-757547); Ins. Öland**, Graborg**, C. Stenhammar, (PRM-757546); **Dalsland**: Gunnarsnäs, Rostoc, Skiffertjärn, H. Magnusson, 1923/06 (PRM-757213).

Switzerland: Jura, Schweiz. Jura, Basel, Aesch, Tiefental, G. Lettau, 1912 (PRM-757200); Schaffert, (PRM-757989); Münchenstein, Schaffert, (PRM-757615); Jura, Beinwil, G. Lettau, 1912 (PRM-783883); Ramsthal Baster, Kanton **Aargau**, Mumpf, Mumpferflue, im Wald, V. Wirth, 1990/10/09 (STU); **Jura**, Moutier Raimeux, geg. Locher rouge, G. Lettau, 1913 (PRM); bei Liertal Kant. **Basel** = lanch (Velten), J. Hepp, 1858 (PRM-783653); bei **Liertal** Kant. Basell, J. Hepp, 1858 (PRM-783646); Lägern, **Hütli** bei Zürich (Schweiz), J. Hepp, (PRM-783688, 758239, 757219, 783876, 758065, 783642); Mt. **Saleve**, J. Müller Argoviensis, 1838 (PRM-758134, 783675, 783676, 758063, 757054); Jura bei Dornach, Schaffert, (PRM-783751); Schweiz Jura, Büttenloch bei Ettlingen (Basel), G. Lettau, 1920 (PRM-783695); Schweiz Jura, Pfeffingen (Basel) Kleinenfeck, G. Lettau, 1913 (PRM-757551, 757596); Schweiz Jura, Soloth. Beimsvil., G. Lettau, 1912 (PRM-757525); Schweiz. Jura, Montier Raimeux, geog. Rocher rouge, G. Lettau, 1913 (PRM-757971); Schweiz. Jura, Soloth. Beinwil, G. Lettau, 1912 (PRM); Schweizer Jura, Ober. Belprahon (Montier), G. Lettau, 1903 (PRM-783702); Schweizer Jura, oberh. Belprahon (Montser), G. Lettau, 1913 (PRM-758190); Thuner See**, Stockhorn**, (PRM-757225, 783671, W-8493); mt. **Unterwalden**, Engelberg, A. Metzler, (W-1906-11150, PRM-758039); Schweiz, Nacutelsen am Gibet, 1863 (PRM-783647); Hagant, (PRM-756857); Meride Ane d'Arzo, Ticono, Maas Geesteranus, 1946 (PRM-757898); Helvetia, Meride, Ticino, Maas Geesteranus, 1946 (PRM-758061); Tremona San Agata, Ticino, Maas Geesteranus, 1946 (PRM-758137); Weissenstein, A. Metzler? (PRM-758203); Swyz, 1858 (PRM-758073).

Yugoslavia: Herceg Novi, Savina, M. Servít, 1929 (PRM-783901, 757166, 783848, 757953, 757951, 783707); Herceg Novi, Djurinič, M. Servít, 1929 (PRM-757378, 757924, 758023, 757468); Herceg Novi, Pločica, M. Servít, 1929 (PRM-757905, 757904, 757926); Herceg Novi, M. Servít, 1929 (PRM-757977, 757591, 757950, 758202); **Lovčen**, 3 km bei Ivanova Korita, M. Servít, 1929 (PRM-756308, 758103, 758240, 758243, (PRM-757300, 757970); Lovčen, **Jezerski**, M. Servít, 1929 (PRM-757099); Lovčen, **Ljubin potok**, 1929 (PRM-756945, 783764, 757440); Lovčen, **Mali Boštur**, M. Servít, 1929 (PRM-758053, 758238, 757082, 757105, 757113, 757120, 757138, 757141, 757963); Lovčen, sanatorium, M. Servít, 1929 (PRM-757095, 757103, 757371, 757917, 757919, 757992, 758022, 758025, 758040); Lovčen, **Trestenjak**, M. Servít, 1929 (PRM-757598, 758235, 757088, 757090, 757107, 757112, 758036, 758041); Lovčen, **Velki Boštur**, M. Servít, 1929 (PRM-756304, 758241, 756859, 757962); Lovčen, **Vetarni mlin**, M. Servít, 1929 (PRM-757956, 758652); Serbia, **Tara Planina**, Klisura Dervente, J. Suza, 1923/07 (PRM-645092, 645273, 645274, 757009, 757015); Serbia, Rlanj, Baba, Zimmermann, 1931 (PRM-757234, 783670); Serbia, Rlanj, Kamen, Zimmermann, 1931 (PRM-757242); **Montenegro, Ipek, Peklen**, J. Andrasovszky, 1916 (PRM-757228); Montenegro, Ipek, Sv. Sava, Andrasovszky, 1916 (PRM-758110).

Samples with an unclear locality: M-0024475, 0024476, PRM-756940, 757010, 757011, 757106, 757145, 757146, 757151, 757270, 757415, 758009, 758066, 758090, 758146, 75819, 783640, 783680, 783699, 783749, 783757, 783762, 783865, 1846 (PRM-783679), 1860 (PRM-757545), ad splusica Olesii, Eliza Pavolini, (PRM-757148); ad saxa calcarea in monte prope Lainek (Barnsch), (PRM-783879); Blaubeuren, Eggler, 1931 (PRM-758163); Häufig an Nagelfluh, (PRM-783743); Häufig an Nogchflah n. Kalbpel, (PRM-783711); Lisponnel, (PRM-783717); Marquartstein, Zschacke, (PRM-758002); Meladeni, Voussel, (PRM-757554); Pic du midi, L. Dufour, (PRM-758106); Pik on., (PRM-783716); prope Benize Coregree, (PRM-783625); Reculet, (PRM-783791).

V.-2. Extraeuropean distribution

China: Prov. **Yunnan** bor. occ., in montis Yao schan prope vicum Ganhaidse ad urbem Lidjiang („Litiang") regione frigide temperata, H. Handel Mazzetti, 1915/06/13 (WU-2730, W), Yunnan, Yao shan, Gankaidse, Lidjiang, H. Handel Mazzetti, (PRM-783905).

Libanon, I. Reichert, 1934 (PRM-757954, 757509, 758158).

Palestina: Haifa, I. Reichert, 1930 (PRM-757023, 757602); Haifa, Seglat el Arteem, I. Reichert, 1923 (PRM-758074); Jerusalém, I. Reichert, 1934 (PRM-756866).

Tunisia: Kairouan dist., Ousselatia WNW von Kairouan, Macchia, E. Klotz, 1996/03 (STU).

Turkey: Trapezunt, Ordu, H. Handel Mazzetti, 1907 (PRM-783744); **Kurdistania**, Bervari ad pag. Detrok orient. vers. ad urbe Seert, F. Nábělek, 1910 (PRM-783787); **Bichinia**, Osmanköj, Göksyu, I. Györffy, 1918 (PRM-758254); Pissuri auf **Cypern**, Unger, (PRM-758107).

U. S.A.: Limestone, Gunpowder River, Baltimore Co Md., Ch. C. Plitt, 1914 (PRM-757497).

V.-3. Commented list of synonyms

For well - arranging of the following taxa and simplified characteristic, the differences are put in the table of characters.

By the study of types and number of fresh samples I concluded that some of the described taxa is necessary to consider morphological deviation of the thallus. Characters described in this taxon are not valid enough to accurately characterize particular taxa.

V.-3.1. Characters

In his descriptions (*Protobagliettoa alocyza, P. erumpens, P. exesa, P. kutakiana, P. lactea, Verrucaria bosniaca, V. cazzae, V. dalmatica, V. grummanni, V. gyelnikii, V. limborioides, V. parmigera, V. parmigerella, V. quarnerica, V. steineri, V. subconcentrica* and *V. suzaeana)* Servít centred the largest number of characters (see the table p. 20).

Almost in all species, he gives colour of the thallus. This information is in some cases somewhat misleading (*P. alocyza, V. gyelnikii* – fresh pink, *P. kutakiana* - dirty grey and in the species *V. subconcentrica,* the colour is not given at all), since the prevailing colour of the thallus in the herbarium samples is white. Another, precisely observed characters, the surface and the thallus colour (thallus smooth, glossy, matt, rough, continuously pitted after dying out ascomata, and the thallus divided by cracks into parts - thallioli). In this species, the colour of the thallus can change under the influence of habitat conditions (see the chapter Morphology). The thallus can or does not have to be bordered by prothallus link of different colour (grey, brown, black, light, dark). This character is then precisely presented and in some species lacks (*P. exesa, P. lactea, V. bosniaca, V. dalmatica, V. gyelnikii, V. steineri* and *V. suzaeana*). The often used character are also dark spots or hyphae on the thallus surface. Such spots can easily be explained. If the cortex layer is in particular place damaged, it is very quickly colonized by heterogenous parasitic hyphae and then dies out. The died out hyphae get black, create dark spots of different shape on the thallus. Servít in some descriptions presented that the thallus was died out.

Another character used to distinguish species is the thickness of the layer and character of the hyphae of the hypothallus (noted in the species *P. alocyza, P. exesa, V. bosniaca, V. cazzae, V. grummanni, V. parmigera* and *V. suzaeana*, not in *P. erumpens, P. kutakiana, P. lactea, V. dalmatica, V. gyelnikii, V. limborioides, V. marmorea, V. parmigerella, V. quarnerica, V. steineri* and *V. subconcentrica*). Macrosphaeroids were observed in all species (size, number, the way they develop, shape).

The density of ascomata expressed by number, Servít presents in the species *P. alocyza, P. erumpens, P. exesa, P. kutakiana* and *P. lactea*, terms such as densely, densely and regularly, not that densely, occasionally to slightly dense or freely scattered he presents in the species *V. dalmatica, V. grummanni, V. gyelnikii, V. parmigera, V. steineri, V. subconcentrica* and *V. suzaeana*, he does not mention in *V. bosniaca, V. cazzae, V. limborioides, V. marmorea, V. parmigerella* and *V. quarnerica.*

The colour of excipulum (in the upper and lower part of the ascoma: colourless, light, dark, brownish, brown and black), he presents in the species *P. alocyza, P. exesa,*

P. lactea, V. bosniaca, V. dalmatica, V. grummanni, V. gyelnikii, V. parmigera, V. subconcentrica and *V. suzaeana*, not in *P. erumpens, P. kutakiana, V. cazzae, V. limborioides, V. marmorea, V. parmigerella, V. quarnerica* and *V. steineri*. The size of perithecium is expressed by number in all the species except of *V. dalmatica* a *V. limborioides*. The size of involucrellum is given in all species. The size of periphyses is aso given in all the species with the exception of *V. quarnerica*. Their size then is not constant. They probably weren't measured precisely in the area of hypoperifysium (in the upper part of ascoma, where the excipulum got thicker - Servít 1953). The presence, the size of asci and the size of spores in them presents in the species *P. alocyza, P. erumpens, P. exesa, P. lactea, V. bosniaca, V. cazzae, V. dalmatica, V. grummanni, V. gyelnikii, V. limborioides, V. parmigera, V. parmigerella, V. subconcentrica* and *V. suzaeana*, does not mention in *P. kutakiana, V. marmorea, V. quarnerica* and *V. steineri*.

P. lactea, V. bosniaca, V. dalmatica, V. grummanni, V. gyelnikii, V. parmigera, V. subconcentrica and *V. suzaeana*, not in *P. erumpens, P. kutakiana, V. cazzae, V. limborioides, V. marmorea, V. parmigerella, V. quarnerica* and *V. steineri*. The size of perithecium is expressed by number in all the species except of *V. dalmatica* a *V. limborioides*. The size of involucrellum is given in all species. The size of periphyses is aso given in all the species with the exception of *V. quarnerica*. Their size then is not constant. They probably weren't measured precisely in the area of hypoperifysium (in the upper part of ascoma, where the excipulum got thicker - Servít 1953). The presence, the size of asci and the size of spores in them presents in the species *P. alocyza, P. erumpens, P. exesa, P. lactea, V. bosniaca, V. cazzae, V. dalmatica, V. grummanni, V. gyelnikii, V. limborioides, V. parmigera, V. parmigerella, V. subconcentrica* and *V. suzaeana*, does not mention in *P. kutakiana, V. marmorea, V. quarnerica* and *V. steineri*.

V.-3.2. Characters of varieties and forms

Descriptions of varieties and forms are much simpler than in any other species. Unfortunately, they are often very universal and it is not possible to precisely determine the characters, by which Servít probably wanted to define new taxa. Out of many descriptions of the following taxa it is clear, that there is not a system which Servít systematically followed when describing new subspecies items. Thus there is no reason to name the used characters and names of taxa. The characters used in the descriptions are commented in the note of each of them. To make it well - arranged, these taxa are given in alphabetical order.

V.-3.3. List of synonyms

Limboria sphinctrina Duf.

Fr. Lich. Eur. Ref. **465** (1831); *Baglietoa sphinctrina* (Duf.) Körber, *Syst. Lich. Germ*: **375**: (1855); type: [Germany] Mittenwald in Bayern, A. Krempelhuber – not seen).

The original description

Thallus broadly spread, amylaceous, immersed, dirty white, prothallus indistinct. Perithecia small, broadly globose with lid-like involucrellum with fissures radiating from the ostiole. Ascospores simple, large, ellipsoid with an oil drop, 3-3,5x longer than wide. Asci clavate with eight spores in biseriate position, hyaline, yellowish.

Note: It was not possible to find the type specimen with a diagnosis corresponding with a description of the species *V. baldensis*.

Protobagliettoa lactea (Arnold) Servít var. *ochracea* Servít

Rozp. Čs. Akad. Věd, **65(3)**: 35 (1955); type: [Italy] Genova, Valetta di Granardo, F. Baglietto, (**PRM-757631** – lectotypus!).

The original description

Thallus scrobiculate, ochraceous. Excipulum at the beginning hemisphaerical. Asci never in mature stage.

Note: Involucrellum corresponds with the species *V. baldensis* in size. Mentioned colour of the thallus is not clear. It is probably damaged (small specimen) or originated from shaded habitat.

Photo 23 - PRM-757631 – lectotypus.

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *caesia* (Arnold) Servít

Beih. Bot. Cbl. **59**: 158, (1939); type: [Germany], Eichstät, Kunstein, F. Arnold in Arn. 311 sub *V. calciseda* f. *caesia* (**PRM-758654** – lectotypus!).

The original description

Thallus plane, sometimes bordered by link of black prothallus. Macrosphaeroids usually 20 µm in diam. Ascomata densely covering the thallus, involucrellum 250 µm in diam., conspiciously emerged from substratum. Periphyses usually 45 µm long, 3,5 µm thick.

Note: Mentioned characters do not differ from the type specimen including an involucrellum and accords with the species *V. baldensis*. Longer periphyses can correspond with old ascoma (see the chapter Ontogenesis).

Photo 25 - PRM-758654 – lectotypus.

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *istriana* Servít

Beih. Bot. Cbl. **59**: 157 (1939); type: [Croatia], Istria, Pula, Pt. Christo, J. Hruby, (**PRM-756855** – holotypus!).

The original description

Thallus white or bluish white, smooth or partly matt, plane or scrobiculate of dead ascomata. Cortex layer cartilagineous, 8-35 µm thick. Photobiont part of medullar layer continuous, photobiont cells usually 10 µm in diam. Medullar hyphae branched, 1,2-2 µm thick, irregularly inflate, 3-6 µm long. The last hyphal cell to 6 µm broad, oblong or sphaeroidal to nearly subulate. Hyphae of the lower part of hypothallus branched, 1-2 µm thick, nearly cylindrical cells to 8 µm long, macrosphaeroids always sphaeroidal, 8 µm in diam.

Ascomata densely covering the thallus, involucrellum 100-150 µm in diam., conspiciously emerged from thallus, glossy, with fissures, 20 µm thick. Young perithecium in vertical section transversaly ellipsoidal, mature vertically ellipsoidal, usually 300 µm broad and 320 µm height.

Note: In my measurements, the size of involucrellum is the same as in type specimen of *V. baldensis* (200 µm).

Drawing tab. II/2 (Servít 1939, p. 157), photo 24: PRM-756855 – holotypus.

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *pseudointerrupta* (Servít) Servít f. *arbensis* Servít

Beih. Bot. Cbl. **59**: 158, (1939); type: [Croatia] Ins. Arbe (Rab), Cristoforo, 50 m, J. Kümmerle, (**BP** – holotypus!, **PRM-756854** – isotypus!).

The original description

Hyphae of hypothallus cylindrical, tight, nearly all cells strongly inflate, acicular, macrosphaeroidal.

Note: The thallus and the size of the involucrellum correspond with *V. baldensis*.

Photos 26, 27 - BP – holotypus, PRM-756854 – isotypus.

Verrucaria baldensis A. Massal. **var.** ***canici*** **Servít**

Beih. Bot. Cbl. **59**: 135 (1939); type: [Croatia], Senjsko Bilo, Sněžnica, Zukalj, 1000 m, J. Čanic, (**PRM-757322** – holotypus!).

The original description

Thallus white, glassy smooth. Hypothallus penetrates to 2 µm of the substratum, macrosphaeroids common, 15-20 µm broad. Involucrellum glossy, black. Periphyses usually 40 µm long, in lower part 4 µm, in upper part 1-2 µm thick. Mature asci not present. Hymenium J+ bluish, later yellowish.

Note: It is not clear what made Servít separate this variety. The characters listed in the description do not differ from the type specimen of *V. baldensis*.

Photo 28: PRM-757322 – holotypus.

Verrucaria baldensis A. Massal. **var.** ***canici*** **Servít f.** ***bakonyensis*** **Servít**

Beih. Bot. Cbl. **59**: 135 (1939); type: [Hungary], Bakony, Penzeskut, Gerenceszoros, V. Gyelnik, (**PRM-756851** – lectotypus!).

The original description

Thallus with brown-black star shaped or arboreal spots.

Note: Dark spots on the thallus of type specimen of *V. baldensis* don't belong to hyphae of the thallus. The type specimen of this form do not has any stellar spots on the thallus. Small dark spots are degradating parts of the thallus.

Photo 29: PRM-756851 – isotypus.

Verrucaria baldensis **A. Massal. var.** ***canici*** **Servít f.** ***incavatula*** **Servít**

Beih. Bot. Cbl. **59**: 135, (1939); type: [Hungary] Szörény, Alte Roll, Csiklova, 550 m, G. Timkó, (**PRM-757475** – holotypus!).

The original description

Thallus grayish, scrobiculate of dead ascomata. Involucrellum usually 240 µm in diam., perithecia usually 340 µm, asci 70 µm long, 22 µm broad. Ascospores ellipsoid or usually globose, 8-21 µm long, 8-9 µm broad. Hymenium J+ bluish, later asci yellowish.

Note: Thallus and ascomata of this form correspond with type specimen of *V. baldensis*.

Photo 30: PRM-757475 – holotypus.

Verrucaria baldensis **A. Massal. var.** ***cretzoiui*** **Servít**

Beih. Bot. Cbl. **59**: 132 (1939), **fig. p. 133**; type: [Romania], Severin, Domogled, Jeralace, P. Cretzoiu, (**PRM-757354** – holotypus!).

The original description

Thallus whitish, plane or scrobiculate, smooth or partly subfarinose. Cortex layer 15-25 µm thick, from densely intricated hyphae, cells 2-4 µm long and broad, hyphae brownish. Clusters of photobiont cells 30-40 µm in diam., nearly continuous or ± separated. Photobiont cells 5-8(15) µm in diam., covered by hyphae 0,6-5 µm thick. Hyphae of hypothallus sometimes cylindrical, 2-4 µm thick, main part from cells are likely to inflate, oval, subconical, fusiform, 4-5 µm thick and usually 20 µm long. Macrosphaeroids common, 12-16 µm in diam., often conically elongated.

Ascomata not dense on the thallus. Involucrellum 100-200 µm in diam., convex, emerging the thallus, 15-20 µm thick, on margins downwards. Excipulum colourless. Perithecium hemisphaeroidal, elongated in ostiolum, usually 300 µm high and 280 µm broad, at the beginning nearly colourless, around ostiolum brown only, later dark on the base, usually (in old ascomata) dark brown spots, from hyphae 3-4 µm thick. Periphyses usually 25 µm long, ended by short globose cell, 6-9 µm long, 6-8 µm broad. Asci oval, 40-75 µm long, 12-17µm broad.

Ascospores 12-20 µm long, 8-15 µm broad, oval, ellipsoid or globose. Hymenium J+ bluish, later colourless.

Note: Thallus and ascomata of this form correspond with the type specimen of *V. baldensis*. Servít did not mention the reason for separating the variety.

Drawing II/4 (Servít 1939, p. 133), photo 31: PRM-757354 – holotypus.

Verrucaria baldensis A. Massal. var. *spilomatica* A. Massal.

Sched Crit. Lich. Ital. **I**.: 30, n. 9 (1855); type: [Italy], ad saxa oolitica prov. Veronensis in oppido Velo (Covoli), A. Massalongo, (**VER** – lectotypus!, **M-0024475**,**M-0024476** – isolectotypus!).

The original description

Thallus milk or pale, with brown star shaped or arboreal spots.

Note: Dark spots do not belong to the thallus and the variety does not differ in other characters from the type specimen of *V. baldensis*.

Photos 33: VER – lectotypus, M-0024475; 32, 34: M-0024476 – isolectotypus**.**

Verrucaria bosniaca Servít

Beih. Bot. Cbl. **59**: 151 (1939), **fig. p. 152**; type: [Bosnia], Sarajevo, Trebevič, G. Beck in Beck: Pl. Bosn. et Herc. 136, sub *V. calciseda*, (**W-3792** – holotypus!, **PRM-756856** – isotypus!).

The original description

Thallus white or whitish, slightly emerging, smooth, plane or a little pitted. Cortex layer 30-50 µm thick, from continual hyphae, cells 4 µm broad, 4-6 µm long, lightly brown in upper part. The part of medullar layer with photobiont cells 40-60 µm thick, clusters of cells separated, photobiont cells 4-8 µm in diam., densely covered by hyphae. Hypothallus always 800 µm thick. The upper part densely branched, hemisphaeroidal or oval cells, 1-4 µm broad, 1-8 µm long. The bottom part of hypothallus is made by inflate cells, 1-6 µm broad, 30 µm long. Macrosphaeroids common, 20 µm in diam. Ascomata not densely positioned, involucrellum convex, 200-300 µm broad, irregularly opening, central part 60 µm thick, curved downwards at margins. Perithecium sphaeroidal 250-300 µm in diam., the top is elongated to a narrow column, young in lower part brownish, in upper part colourless, the bottom part is brown in mature stage, upper part pale. Cells of upper part 3 µm broad, always 8 µm long, in lower part with thick wall, 4-5 µm in diam. Excipulum thin, colourless or partly brownish. Periphyses always 35 µm long, clearly articulated, thicker at the base. Asci cylindrical or clavate. Ascospores always well evolved, 15-20 µm long, 7-10 µm broad.

The species is characterized by large ascomata (as *V. suzaeana*) with distinctively formed ostiolum, long hyphae of hypothallus and large macrosphaeroids.

Note: Thick hypothallus and high number of macrosphaeroidal cells show in optimal physiological state of the thallus. The other mentioned characters are characteristic for *V. baldensis*.

Drawing tab. II/7 (Servít 1939, p. 152), photos 35, 36: W-3792 – holotypus, PRM-756856 – isotypus.

Verrucaria bosniaca Servít f. *incavata* Servít

Beih. Bot. Cbl. **59**: 153 (1939); type: [Switzerland], Hagant, Schaer 104, (**PRM-756857** – holotypus!).

The original description

Thalus surface scrobiculate. Hyphae of hypothallus inflate.

Note: A scrobiculate surface of thallus or different shape of macrosphaeroidal cells can not be taken for serious characters for new taxon. The type specimen of this form do not differ of *V. baldensis*.

Photo 37: PRM-756857 – holotypus.

Verrucaria bosniaca Servít f. *sinaiensis* Servít

Beih. Bot. Cbl. **59**: 153 (1939); type: [Romania], Prahova, Bucegi, Sinaia, P. Cretzoiu, (**PRM-756823** – holotypus!).

The original description

The surface of the thallus scrobiculate of dead ascomata. Thallus white or slightly pink, separated and limited of black prothallus.

Note: The type specimen of this form do not differ from *V. baldensis*.

Photo 38: PRM-756823 – holotypus.

Verrucaria bosniaca Servít var. *cretzoiuana* Servít

Beih. Bot. Cbl. **59**: 153, (1939); type: [Romania] Muscel, Piatra Craiului, 900-1000 m, P. Cretzoiu in Cretzoiu: Lich. Rom. Exs. 1 sub *V. parmigera* (**PRM-757416** – holotypus!, **W-3399** – isotypus!).

The original description

Thallus surface rough, partially roughly farinose or partly entirely smooth. Hyphae of hypothallus inflate. Density of ascomata is bigger than *V. bosniaca*, large and small ascomata together mixed, perithecia ± clearly elongated in neck.

Note: In the description of *V. bosniaca,* the density is not mentioned. It does not differ in other characters from *V. baldensis*.

Photo 39: PRM-757416 – holotypus; 40: W-3399 – isotypus.

Verrucaria bosniaca Servít var. *lovcenensis* Servít

Beih. Bot. Cbl. **59**: 153 (1939), **fig. p. 154**; type: [Yugoslavia], Lovčen, Velki Boštur, 1350 m, M. Servít, (**PRM-756859** – holotypus!).

The original description

Thallus white, smooth, clearly emerged from substrata, sometimes defined by black prothallus. Cortex layer continuous, without distinct structure, 40-50 µm thick. Photobiont cells 6-10 µm broad, in vertically elongated clusters. Photobiont layer 100 µm thick. Medullar layer of the same thickness, from branched, anastomosed and shortly articulated hyphae, 1,5-2,5 µm thick. In lower part of hypothallus hyphae densely positioned, unbranched 0,8-2,5 (4) µmthick, hyphae in septa a bit narrowed. Spathulated cells rare, 20 µm long, 6 µm broad. Macrosphaeroids common to rare. Ascomata not densely positioned. Involucrellum 250-300 µm broad, plane at first, later a bit convex, emerging the thallus, sometimes concave, unclearly fissured, central part 30 µm thick, thicker on margins. Perithecium globose, usually 300 µmin diam., at the beginning colourless, later uniformely brownish, from row of cells 6 µm broad, 1 µm thick and 6 µm long. Excipulum 15 µm thick, colourless or slightly brownish of hyphae 2 µm thick. Asci cylindrical or clavate, 60-80 µm long, 8-12 µm broad.

Note: Servít did not present the differences of the variety in the original description. The study of the type specimen did not show differences in the characters typical for *V. baldensis*.

Drawing tab. II/8 (Servít 1939, p. 154), photo 41: foto: PRM-756859 – holotypus.

Verrucaria bosniaca Servít var. *lovcenensis* Servít f. *albae* Servít

Beih. Bot. Cbl. **59**: 154 (1939); type: [Italy], prov. Veronensis, mt. Alba, A. Massalongo in Anzi 373 sub *V. calciseda*, (**M-0024473** – holotypus!, **PRM-756868** – isotypus!).

The original description

Thallus a bit emerged, whitish, scrobiculate of dead ascomata. Ascomata densely positioned.

Note: Servít mentioned an epilithic thallus in description. The type specimen has got clearly endolitic thallus similar as in other taxa, the same as in the type specimen of *V. baldensis*.

Photos 42, 43: M-0024473 – holotypus, PRM-756868 – isotypus.

Verrucaria bosniaca Servít var. *lovcenensis* Servít f. *plumbea* Servít

Beih. Bot. Cbl. **59**: 154, (1939); type: [Yugoslavia], Lovčen, Vetarni mlin, 1400 m, 1929, M. Servít (**PRM-758652** – holotypus!).

The original description

Thallus lead-grey coloured, faintly emerged.

Note: The colour and other microscopic characters of the type specimen correspond with *V. baldensis*.

Photos 44, 45: PRM-758652 – holotypus.

Verrucaria bosniaca Servít var. *mirovensis* Servít

Beih. Bot. Cbl. **59**: 153, (1939); type: [Croatia], Velebit, Alan Mirovo, 1340 m, M. Servít (**PRM-758653** – holotypus!).

The original description

Thallus delimited of black prothallus, scrobiculate, depressions usually to 2,5 µm deep. Hypothallus hyphae closely intricated, cylindrical. Macrosphaeroids not common. Perithecia ± elongated to a neck.

Note: *V. baldensis* forms very often a black protallus, it is not acceptable as sufficient character for making a new variety. It does not differ in other characters in description from diagnose of *V. baldensis*.

Photo 46: PRM-758653 – holotypus.

Verrucaria bosniaca Servít var. *romanica* Servít

Beih. Bot. Cbl. **59**: 153 (1939); type: [Romania], Bucegi, Sfanta Ana, P. Cretzoiu, (**PRM-757280** – holotypus!).

The original description

Thallus minute, convex, scrobiculate, depressions deeply separated. Sometimes present a dark prothallus. Hyphae of hypothallus often inflate.

Note: Servít did not mention clear reasons for separating new variety in his description. We can see pits after dead ascomata in many others Servít's new descriptions. This small type specimen accords with *V. baldensis*.

Photo 47: PRM-757280 – holotypus.

Verrucaria calciseda DC. f. *alocyza* Arnold

Flora **44**: 537 (1858), **68**: 79 (1885); type: [Germany], Bavaria, Eichstätt, Kunstein, F. Arnold in Arnold 310 (**PRM** – lectotypus!, **PRM** – isolectotypus!, **W** - isolectotypus!); *Verrucaria parmigera* J. Steiner var. *alocyza* (Arnold) J. Steiner *Verh. Zool.- Bot. Ges. Wien* **61**: 35 (1921); *Protobagliettoa alocyza* (Arnold) Servít, *Rozp. Čs. Akad. Věd*, **65(3)**: 31 (1955); *Protobagliettoa parmigera* (J. Steiner) Servít f. *alocyza* (Arnold) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963).

The original description

Dried thallus faintly cretaceous (fresh pink?), smooth, clearly emerging from substrata, delimited by black prothallus. Cortex layer 15-60 µm thick, cartilagineous from hyphae densely intricated, nearly colourless, lower hyphae in upper part brownish, sometimes with delicate pits, visible by eye as dots or sometimes arboreal black spots, in upper part of cortex layer. Photobiont part of medullar layer 60-100 µm height, emerge, clusters of cells vertically elongated, live-green, hyphae pervade not dense inter clusters, hyphae 1-2 µm broad. Hypothallus penetrate usually 600 µm deep, in upper part from densely branched and anastomosed hyphae to 2 µm thick, in lower part from hyphae not so much branched, closely bordered, cylindrical hyphae, 10-14 µm long, 2-3 µm thick and inflate. Macrosphaeroids rare, 10-16 µm in diam. A density reachs to 500 in central part of the thallus. Exothecium to 22 µm broad, usually clearly convex and often deformed. Involucrellum 200-250 µm in diam., sometimes to

300 μm broad, always clearly convex and often ± deformed. Perithecium usually 250 to 270 μm broad, in upper part elonged to thick neck, younger faintly yellow, later brown, in lower part not dark, it is darker in the upper part. Periphyses 25 μm long, 4 μm thick, clavate, asci not evolved to mature stage. Hymenium J+ bluish, (later yellowish). Excipulum in upper part sometimes broadly-neck elongated, first faintly brownish, later dark brown.

Note: Servít mentioned the pink thallus in fresh material in the description. The found lectotype is more than 140 year old and it is not possible to prove the origin of the colour of the thallus. The shape and structure of the involucrellum eliminated possibility of belonging to *V. marmorea*, one of the studied species of this thallus colour. Other characters mentioned in the description and type specimen show in *V. baldensis*.

Drawing II/6 (Servít 1939, p. 145), photos 48, 49: PRM – lectotypus.

Verrucaria calciseda DC. f. *insculptoides* J. Steiner

Verh. Zool.-Bot. Ges. Wien **61**: 37 (1911); *Verrucaria baldensis* A. Massal. var. *insculptoides* (J. Steiner) Servít, *Beih. Bot. Cbl.* **59**: 134 (1939); type: [Switzerland], Unterwalden, Engelberg, A. Metzler, sub *V. baldensis*, (**W-1903-11150** – holotypus!).

The original description

Thallus minute, light, scrobiculate. Macrosphaeroids to 12 μm in diam. Ascomata densely positioned, visible part of involucrellum 100-200 μm in diam.

Note: Servít (1939): „The original desription presents two different species in one sample. The bigger ascomata belong to *V. subconcentrica* var. *metzleri*. Sterile cartilagineous, smooth thalli belong to other lichen resembling *V. steineri* var. *insculpta*. It is very difficult to decide what of that thalli is Steiner's f. *insculptoides*. He has mentioned in var. *cretzoiui*, it is common and without involucrellum on microscopic section. It is absent also in others sections. That samples are, in my opinion, Steiner's type specimens for his new forms of *V. calciseda*". Studied sample accords with *V. baldensis* as for the size of involucrellum. It does not not surely belongs to *V. parmigerella*, characteristic by smaller involucrellum and darker thallus.

Photo 50: W-1903-11150 – holotypus.

Verrucaria calciseda DC. var. *lactea* Arnold

Verh. Zool.-Bot. Ges. Wien **20**: 463 (1870); type: [Germany] Bavaria, inter Wasserzell et Eichstätt, calc., 1866, F. Arnold (**M-0024499** – lectotypus!, **W-9427, PRM-757593** – isolectotypus!); *V. steineri* var. *lactea*, *Beih. Bot. Cbl.* **59**: 124, (1939), *Protobagliettoa lactea* (Arnold) Servít, *Rozp. Čs. Akad. Věd*, **65(3)**: 35 (1955); *Protobagliettoa steineri* (Kušan) Servít var. *lactea* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963).

The original description

Thallus slightly emerged, whitish, scrobiculate, a surface is smooth or a bit rough. Cortex layer 20-30 μm high, cartilagineous and colourless, hyphae to 1 μm in diam. Photobiont part of medullar layer usually 80 μm high, emerged, cells 7-15 μm in diam., in globose or vertically elongated clusters. Hyphae of hypothallus 0,8-2 μm broad, mostly cylindrical, usually 15 μm long, flattened. Macrosphaeroids usually 20 μm in diam. Density 800. Exothecium to 180 μm broad, plane, faintly covered by thallus. Exipulum globose, in upper part conical, colourless, ca 300 μm broad, usually 340 μm high. Involucrellum 200-250 μm broad, convex. Periphyses usually 25 μm long. Asci cylindrical to clavate75-80 μm long, 22-25 μm broad, a wall in upper part 2 μm thick, usually not evolved in mature stage. Ascospores rare, in biseriate position, oval to ellipsoidal, 18-22 μm long, 9-11 μm broad, the wall of ascospores 0,4 μm thick. J+ nucleus blue, later colourless, ascoplasma yellow.

Note: Servít presented in his description a note for the variety of smaller exothecium and double value of dense of ascomata than in *P. steineri*. The density was not presented in description of *V. steineri* and Servít did not study a type specimen of this Steiner's species. For this

reason, his note is for differ a variety supposition only. In my measurements width of exothecium depends on state of ascomatal ontogenesis. The type specimen of this variety accords clearly (also in Servít's diagnose) to *V. baldensis*.

Photos 51, 52, 53: M-0024499 – lectotypus, PRM-757593 – isolectotypus, W-9427 – isolectotypus, W - isolectotypus.

Verrucaria cazzae Zahlbr. f. *dealbata* Servít

Hedwigia **71**: 226 (1931), fig. 1; type: [Croatia], Dubrovnik, Lapad, Mali Petka, 40-90 m, M. Servít (**PRM-644842** – holotypus!)

The original description

Thallus whitish, around ascomata peach coloured only.

Note: Thallus and ascomata as that of *V. baldensis*. Red crystals not observed in cortex layer.

Drawing tab. II/10 (Servít 1931, p. 227), photo 54: PRM-644842 – holotypus.

Verrucaria cazzae Zahlbr. var. *graeca* Servít

Beih. Bot. Cbl. **55**: 251, (1936); type: [Greece], Ins. Levkas, Megalos Rahi, 350 m, 1929, Th. Just, (**W** – holotypus!). *V. bagliettoaeformis* (Hazsl.) Servít var. *graeca* Servít, *Beih. Bot. Cbl.* **59**: 158 (1939), *Protobagliettoa graeca* Servít, *Rozp. Čs. Akad. Věd*, **65(3)**: 34, (1955).

The original description

Thallus slightly emerged, broadly spread, whitish, scrobiculate, purpurely coloured. Surface of the thallus plane, smooth. Cortex layer 15-40 µm high, colourless, cartilagineous, inner structures not visible. Photobiont part of medullar layer 40-60 µm high, emerged. Photobiont cells live-green, 7-16 µm in diam., in clusters to 40 µm. Sometimes thallus pressed, purpur, cortex layer penetrate the medullar layer, hyphae densely pressed, purpurely coloured, 4-6 µm broad, globose or oval 4-8 µm long. Hypothallus usually penetrate 1 µm deep to substrata, hyphae over 1-2 µm broad, globose or oval 3-4 µm long, densely branched. The lower part of hypothallus is formed by larger hyphae, not so much branched and closed, usually 4 µm broad, cylindrical, 5-10 µm long, making small bunches. Macrosphaeroids rare, usually 8 µm in diam. Density 550. Exothecium to 180 µm broad, convex, faintly glossy, nearly covered by thallus, often concave. Excipulum first colourless, hemisphaeroidal, later from top to base darker to brown, usually 400 µm high and 350 µm broad. Involucrellum 150-200 µm in diam., a bit convex, glossy, not emerge over the thallus, often plane and ± clearly cracking, thin, at margin from differentiated hyphae, 4 µm thick, brown. Young perithecium colourless, nearly globose, later at the top and base with brown spots, usually 350 µm high and broad. Periphyses usually 35 µm long, apical cells nearly globose. Asci not evolved to mature stage.

Note: Microscopic sections of the type specimen show (see also macrophoto) red-brown spots mentioned also in Servít's description do not have got continuity with thallus (a cortex layer does not contain red crystals) and they are caused by colour of the substratum. The red colouring of limestone is not so unusual as I can show on several samples from Paklenica National Park in Croatia. The proper thallus of the sample is white (grey), with size of an involucrellum corresponds with *V. baldensis*.

Drawing tab. III/1 (Servít 1939, p. 158), photo 57: W - holotypus.

Verrucaria dalmatica Servít

Beih. Bot. Cbl. **55**: 252 (1936); type: [Croatia], Zadar, Mts. Bukovica, Oreljak, 350 m, 1906, M. Servít (**PRM-756698** – holotypus!, **PRM-644909, PRM-756965** – isotypus!).

The original description

Thallus white, matt, scrobiculate, depressions shallow. Cortex layer 10-20 µm thick, colourless, from unclearly differentiated hyphae as in medullar layer, 50-80 µm thick. Photobiont cells to 10 µm broad, rarely to 15 µm, clusters vertically elongated. Medullar layer

40-50 µm high, of densely anastomosed and branched hyphae, 1 µm broad, 3-5 µm long. Hyphae of hypothallus 1-4 µm thick, subcylindric 8-12 µm long, partly inflate, 5-10 µm broad, 6-12 µm long. Macrosphaeroids common to 15 µm in diam. Ascomata visible as dots 100 µm broad densely positioned. Involucrellum 100-200 µm broad, plane or convex, matt, not emerging over thallus surface, unclearly cracking, to 40 µm thick, on margins narrowly bent downwards. Perithecium at the beginning colourless, later on base with brown-black spots, in lower part flattened, over ostiolum thicker, 250 µm broad, 150-200 µm high. Excipulum colourless, only in old ascomata brownish. Under margin of involucrellum colourless hyphae, parallelly positioned, densely intricated, hyphae 4 µm thick, 8 µm long. Periphyses 25 µm long, thicker. Asci cylindrical, 50 µm long, 15 µm broad, with thicker wall in the upper part, spores in biseriate position, oval or nearly globose, 7-10 µm long, 6-7,5 µm broad.

Note: The type specimen accord with *V. baldensis* in its characters.
Drawing tab. II/11 (Servít 1939, p. 155), photos 55, 56, 58: PRM-756698 – holotypus, PRM-644909 – isotypus, PRM-756965 – isotypus.

Verrucaria grummanni Servít

Beih. Bot. Cbl. **59**: 129 (1939), **): fig. p. 130**; type: [Germany], Bavaria, Königsee, V. J. Grummann (**PRM-757278** – holotypus!).

The original description

Thallus plane, smooth, whitish, sometimes delimited by black prothallus. Cortex layer 40-60 µm thick, from densely intricated and colourless hyphae. Photobiont part of medullar layer thicker, photobiont cells 4-8 µm in diam., in clusters, covered by intricated hyphae only, the same as in cortex layer. Hypothallus penetrate 2,5 µm into the substrata, hyphae in lower part usually brown. In upper part hyphae 1-2 µm thick and 3-5 µm long, in lower part 4 µm thick and usually 24 µm, (rarely 28 µm) long, branched, articulate, cylindrical, sometimes inregular, usually to 8 µm inflate. Macrosphaeroids rare, to 10 µm in diam.

Ascomata not dense. Visible part of involucrellum to 250 µm broad, slightly emerged surface of thallus, convex, unclearly cracked. In vertical section involucrellum 260-280 µm broad, central part 40 µm thick, on margin downwards. Perithecium in lower part brown, upper part nearly colourless, globose, usually 300 µm in diam., in neck part broader and longer, nearly cylindrical elongated, later in lower part 200-260 µm broad only; entire perithecium 280-320 µm high. Excipulum colourless. Periphyses usually 40 µm long, a bit curved, 2,5-3 µm thick. Asci clavate, at the top with thicker wall, 70-80 µm long, 8-10 µm broad, spores in uniseriate or biseriate position, 20-22 µm long, 8-12 µm broad. Hymenium J+ faintly blue, later yellowish.

Note: Servít presented a note in his description for this species longer, broader and pale neck of perithecium than *V. suzaeana*. In my opinion, shape and colour of excipulum depends on ontogenetic age of the ascoma. The type specimen accords with other characters of *V. baldensis*.
Drawing tab. II/12 (Servít 1939, p. 130), photo 59: PRM-757278 – holotypus.

Verrucaria gyelnikii Servít

Beih. Bot. Cbl. **59**: 126 (1939); type: [Hungary], Zala, Tihany, Akasztóhegy, 150-200 m, V. Gyelnik, (**BP** – holotypus!, **PRM-757201** – isotypus!); *Protobagliettoa gyelnikii* (Servít) Servít ex Nowak et Tobol., *Porosty polskie*: 1118 (1975).

The original description

Thallus whitish (fresh pink?), plane or slightly scrobiculate, smooth or farinose, gently emerging. Cortex layer 20-30 µm thick, mainly from vertically positioned hyphae, hyphae of the same length and thickness, densely intricated. Photobiont part of medullar layer 60 µm thick, clusters of cells separated. Photobiont cells 4-10 µm in diam., sometimes distributed in horizontal rows. Hyphae inter clusters densely intricated, cells 2-4 µm long and broad. In

bottom part hyphae of hypothallus rare and articulated; 18 µm long and 4 µm thick, from the main part thinner 1,5-2 µm. Macrosphaeroids rare, usually 15 µm long, sometimes to 20 µm in diam.

Ascomata densely distributed. Involucrellum plane or convex, a bit emerging over the thallus surface, unclearly fissured, visible part to 150 µm broad, in central part to 20 µm thick, on margin not bent downwards, 220 µm in diam. Perithecium globose or flattened on base. Top of the ascoma shortly elongated, always 220 µm broad and 190 µm high, first colourless, later the bottom dark, on upper part pale brown. Excipulum nearly entirely colourless. Periphyses always 30 µm long, thin. Asci clavate, spores uni or biseriate positioned, 16-21 µm long, 9-11 µm broad. Hymenium J+ bluish, later colourless.

Note: Servít presented involucrellum to150 µm in diam. in his description. Involucrellum of type specimen however reaches to 200 µm. It is different from *V. dalmatica* also in bigger spores and involucrellum not bent downwards on margins. It corresponds with other characters of *V. baldensis*.

Photos 60, 61: BP – holotypus, PRM-757201 – isotypus.

Verrucaria gyelnikii Servít f. *alanensis* Servít

Beih. Bot. Cbl. **59**: 127 (1939); type: [Croatia], Velebit, Alan, 1340 m, M. Servít, (**PRM-756865** – holotypus!).

The original description

Thallus delicately dotted. Macrosphaeroids 15-20 µm in diam. Ascomata regularly and densely distributed on thallus, involucrellum 150 µm in diam. Perithecium nearly colourless.

Note: Interesting example of thallus with maturing ascomata. In central part of the sample, there are several ascomata with nearly developed involucrellum. Mentioned involllucrellum in description (150 µm) belongs to young ascomata without ascospores. Thallus is not dark as in *V. parmigerella*, and also has smaller involucrellum. Cortex layer without dark hyphae (crystals). I think, for that reason, the lichen accords with its characters of *V. baldensis*.

Photo 62: PRM-756865 - holotypus.

Verrucaria gyelnikii Servít f. *obscurata* Servít

Beih. Bot. Cbl. **59**: 126 (1939); type: [Moravia], Brno, Hády, 450 m, J. Suza, (**PRM-756702** – holotypus!, **PRM-783882** – isotypus!) *Protobaglietoa obscurata* (Servít) Servít, *Rozp. Čs. Akad. Věd*, **65(3)**: 35 (1955), fig. 14, tab. II.

The original description

Thallus slightly emerging, whitish, plane, surface smooth, sometimes delimited of black prothallus, minutely and densely dotted with brown-black arboreal spots originating from cortex layer. Cortex layer 20-50 µm high, cartilagineous, colourless, hyphae densely intricated, cells 1-2 µm high, 1 µm broad. Hyphae of black-brown spots to 2 µm broad. Photobiont part of medullar layer to 80 µm high, endolitic, clusters broad, vertically elongated. Hyphae of hypothallus 0,7-3 µm broad, cells cylindrical or flattened usually 20 µm long. Macrosphaeroids common, usually 15 µm in diam. Density 500-700. Exothecium 150 µm broad, later convex and covered by thallus. Excipulum hemisphaerical, flattened inside, in upper part in short neck perforated, usually 280 µm broad, black-brown. Involucrellum usually 280 µm broad, periphyses 20 µm long, asci 50-60 µm high, 15-18 µm broad. Ascospores ellipsoidal or oval 16-18 µm long, 7-9 µm broad. Nucleus J+ blue, later red.

Note: Servít considered dark spots and dots in thallus (coloured hyphae) an important character and supposed their separation. Brown-black spots are always formed in depressions after die off ascomata (see macrophoto of type specimen). In my opinion, from microscopic study they are allochtonous epiphytic hyphae colonizing the damaged parts of the thallus. Doppelbaur (1959) mentioned also similar conclusion in *P. parmigera*. They can be also dead

hyphae from the cortex layer around depressions. Other characters show classification with *V. baldensis*.

Drawing tab. III/2 (Servít 1955, p. 33), photos 63, 64: PRM-756702 - holotypus, PRM-783882 - isotypus.

Verrucaria gyelnikii Servít var. *velebitica* Servít f. *sulcata* Servít

Beih. Bot. Cbl. **59**: 127, (1939); type: [Croatia], Velebit, Alan Mirovo, 1350 m, M. Servít (**PRM-756701** – holotypus!).

The original description

Thallus separated from deep colourless grooves.

Note: By colourless furrows in description Servít probably meant surface of a thallus, not dark prothallus. Ornamental wrinkled thallus surface is surely caused by different character of the substratum. I can support similar samples with unusual structure of the thallus from my own herbarium. The microscopic structures of a thallus and ascomata are the same as in *V. baldensis*.

Photo 65: PRM-756701 – holotypus.

Verrucaria inaequata (Servít) Servít f. *helvetica* Servít

Beih. Bot. Cbl. **59**: 128 (1939); type: Flagey: Lich. Franche Comté 290, [France], Rochers calcaires á Arguel, prés Besançon, (**M** – lectotypus!).

The original description

Thallus nearly plane, clearly emerging from substrata. Involucrellum to 300 μm broad, perithecium 250 μm wide and high.

Note: Servít did not mention accurate character for differentiation of new taxon. Thallus and ascomata correspond with those of *V. baldensis*.

Photo 66: M – lectotypus.

Verrucaria inaequata (Servít) Servít var. *berchtesgadensis* Servít

Beih. Bot. Cbl. **59**: 129, (1939); type: [Germany] Bavaria, Berchtesgaden, Scharitzkehl, 1850, O. Sendtner, sub *V. calciseda* (**WU** – holotypus!, **PRM-757505** – isotypus!).

The original description

Thallus scrobiculate, hypothallus of filiform hyphae penetrate deep to substratum. Macrosphaeroids rare, 12-16 μm in diam. Perithecium colourless on the top, in ostiolum clearly elongated, 250-260 μm broad. Involucrellum 250-260 μm in diam. Periphyses 30-40 μm long, 3-4 μm thick. Asci clavate, 60 μm long, 20 μm broad, spores 15-18 (20) μm long, 8-9 (10) μm broad.

Note: The type specimen is in accordance with its characters on thallus and ascomata to *V. baldensis*

Photos 68: WU – holotypus; 67: PRM-757505 – isotypus.

Verrucaria inaequata Servít var. *kuemmerleana* Servít

Beih. Bot. Cbl. **59**: 129, (1939); type: [Croatia], Arbe (Rab), Cristoforo, 50 m, J. Kümmerle, sub *V. sphinctrina* f. *baldensis* (**BP** – holotypus!).

The original description

Thallus separated to small minute convex parts (thalioli) by grooves and delimited by black prothallus. Macrosphaeroids usually 20 μm in diam. Involucrellum 200-250 μm broad. Periphyses usually 45 μm long, 4 μm thick. Asci not developed to mature stage.

Note: A lot of samples of *V. baldensis* produced a dark prothallus. Servít mentioned fragmented thallus to small parts in his description. In my opinion, they are several independent small thalli on one small habitat. We do not have any other character in description to separate this new variety. The type specimen of this variety accords with *V. baldensis*. The same character

was used by Servít for making new taxon *V. parmigera* J. Steiner var. *lapadensis* Servít f. *subcomposita* Servít.

Photo 69: BP – holotypus.

Verrucaria inaequata (Servít) Servít var. *transsilvanica* Servít

Beih. Bot. Cbl. **59**: 129, (1939); type: [Romania] Transsilvania, Herculanesfürdö, Domugled, rivulum Cserna, V. Gyelnik (**PRM-757482** – lectotypus!, **PRM-757494** – isolectotypus!).

The original description

Thallus whitish, plane with smooth surface. Macrosphaeroids 15-22 µm in diam. Involucrellum is of the same size as a perithecium, usually 250 µm in diam. Periphyses usually 30 µm long, 3-4 µm broad. Spores 18-21 µm long, 9-11 µm broad. Hymenium J+ bluish, later pink.

Note: It is not completely evident why Servít separated this new variety. It does not differ in any characters (microscopic and macroscopic) in description from *V. baldensis.*

Photos 70, 71: PRM-757494 – lectotypus, PRM-757482 – isolectotypus.

Verrucaria inaequata (Servít) Servít var. *transsilvanica* Servít f. *expallens* Servít

Beih. Bot. Cbl. **59**: 129 (1939); type: [Austria], Baden, R. Wettstein, (**WU-00-68/8** – holotypus!, **PRM-757250** – isotypus!).

The original description

Thallus scrobiculate and rough and subfarinose or gently surface or gently granular. The visible part of involucrellum 100-150 µm broad.

Note: The type specimen belongs with its characters to *V. baldensis.*The size of involucrellum in description (150 µm) is mistaken and the correct size in type specimen is 200-250 µm in diam.

Photos 72, 73: WU-00-68/8 – holotypus, PRM-757250 – isotypus.

Verrucaria inaequata (Servít) Servít var. *triglavensis* Servít

Beih. Bot. Cbl. **59**: 129 (1939), fig. 9 p. 129; type: [Slovenia], Carniola, Mojstrana, Aljažev dom, 1400 m, M. Servít (**PRM-756700** – holotypus!).

The original description

Thallus scrobiculate or nearly smooth. Macrosphaeroids usually 15 µm in diam., cortex layer 20-40 µm thick, from relaxed and branched hyphae, 3-4 µm thick and 4-6 µm long. Photobiont cells usually 10 µm in diam. in clusters 40-60 µm broad and long. Involucrellum usually 340 µm in diam., broader than perithecium. Mature asci not present.

Note: The type specimen and indications in description accord with *V. baldensis.* The description summarise only common information characteristic for most of endolitic calcicolous species.

Drawing tab. II/5 (Servít 1939, p. 129), photo 76: PRM-756700 – holotypus.

Verrucaria parmigera J. Steiner

Verh. Zool.- Bot. Ges. Wien **61**: 34 (1911), type: [Belgium], Spa, W. Nylander (**PRM-758127** – lectotypus!); *Protobagliettoa parmigera* (J. Steiner) Servít, *Rozp. Čs. Akad. Věd*, **65(3)**: 31, (1955); *Bagliettoa parmigera* (J. Steiner) Vězda et Poelt, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, **1981**: 363.

The original description

Thallus endolitic, slightly emergent, whitish, plane scrobiculate, smooth, continuous. Black prothallus not present. Cortex layer 30-40 µm thick with colourless hyphae. Photobiont cells in clusters always 60 µm high and 25 µm broad or clusters in continuous layer 50-60 µm high. Cells 4-12 µm in diam., covered by colourless hyphae. Hypothallus not deep, hyphae very

branched, irregularly screwed, usually cylindrical, 1-4 µm thick, always 22 µm long. Macrosphaeroids rare, to 20 µm in diam. Ascomata densely and regularly distributed. Involucrellum 200-220 (240) µm in diam., plane, not emerging the surface of the thallus, often on glossy magin of thallus and downwards on margins. A young perithecium has got the bottom part dark, later pale brown, usually in lower part entirely dark. At the base is flattened and conical elongated to the top, 220-240 µm broad, 180-240 µm high. Excipulum colourless, the bottom is dark only. Periphyses always 28 µm long. Asci clavate to 50 µm long, not present in mature stage.

Note: Steiner differentiated this new species in note of description from *V. sphinctrina* by light excipulum. Unfortunatelly the holotype specimen is lost and it has not been found in WU. I have made a lectotypus of small part of type specimen from Servít's herbarium (PRM). This sample corresponds with mentioned description. The colour of the excipulum is the same as in other studied taxa. Young peritecium has colourless excipulum, in mature stage usually darker. We can see all spectrum of pale to dark excipulum in one thallus. This physiologic variation depends only on ontogenetic state of ascoma. The type specimen accord with its characters with *V. baldensis*.

Drawing tab. III/3, 9 (Servít 1939, p. 141, Kušan 1930, p. 27), photo 74: PRM-758127 – lectotypus.

Verrucaria parmigera J. Steiner f. *geographica* J. Steiner

Beih. Bot. Cbl. **59**: 143, (1939); type: [Moravia], Mor. Kras, Macocha, M. Servít (**PRM-645238** – holotypus!, **PRM-757244** – isotypus!).

The original description

Thallus plane, smooth, with black prothallus.

Note: *V. parmigera* is characterized in description by absence of dark prothallus. Why did Servít add lichen with dark prothallus to that species? The other characters did not show any new quality of a new form. Dark prothallus was used by Servít in several species: *Verrucaria bosniaca* Servít f. *sinaiensis* Servít, *Verrucaria inaequata* Servít var. *kuemmerleana* Servít, *Verrucaria parmigera* J. Steiner var. *bohemica* Servít, *Verrucaria steineri* Kušan var. *composita* Servít a *Verrucaria steineri* Kušan var. *lactea* (Arnold) Servít f. *geographica* Servít.

Photos 77: PRM-645238 – holotypus; 75: PRM-757244 – isotypus.

Verrucaria parmigera f. *nigroaureolata* Servít

Hedwigia **71**: 230 (1931); *V. subconcentrica* (J. Steiner) Servít var. *nigroaureolata* (Zahlbr.) Servít, *Beih. Bot. Cbl.* **59**: 161, (1939), fig. p. 162, type: [Croatia], Velebit, Mirovo, 1340 m, M. Servít (**PRM-757913** – holotypus!).

The original description

Thallus endolitic, whitish, scrobiculate with some depressions and delimited of black prothallus. Cortex layer usually 40 µm thick, of densely intricated hyphae, cells to 4 µm broad. Photobiont part of medullar layer 80 µm high, cells 6-12 µm broad, coagulated, in not regular clusters covered by densely branched hyphae, cells usually 8 µm long. Hyphae of hypothallus 2-4 µm thick, cells nearly cylindrical, 3-12 µm long. Macrosphaeroids ± 20 µm broad. Ascomata irregularly positioned. Involucrellum 200-250 µm in diam., convex, glossy, usually delimited by black margin unclearly cracking, downwards on margin, with separated excipulum and perithecium. Excipulum in the upper part brown-black, in lower part colourless like perithecium. The perithecial base is flattened, elongated at the top, usually 300 µm broad, 200 µm high. Periphyses 28 µm long, 4 µm thick, partly subclavate. Asci 40 µm long, 13 µm broad without spores.

Note: Thallus and ascomata clearly correspond with *V. baldensis*.

Drawing tab. II/9 (Servít 1939, p. 162), photo 78: PRM-757913 – holotypus.

Verrucaria parmigera J. Steiner var. *adriatica* Servít

Beih. Bot. Cbl. **59**: 147 (1939); type: [Croatia], Kupari, 20 m, R. Dvořák (PRM – holotypus!).

The original description

Thallus scrobiculate. Ascomata densely positioned, involucrellum 280-290 µm broad, excipulum black at the base.

Note: The type specimen and description correspond with *V. baldensis*. Depressions in thallus are caused by dead and degradation of ascomata (see macrophoto of the holotypus). The colour of the excipulum is variable.

Drawing tab. III/11 (Servít 1939, p. 147), photo 79: PRM-645283 - holotypus.

Verrucaria parmigera J. Steiner var. *bohemica* Servít

Beih. Bot. Cbl. **59**: 143, (1939), fig. p. 143; type: [Czech Rep.], Beroun, Sv. Jan, 1925, 400 m, M. Servít, (**PRM-757221** – holotypus!); *Protobagliettoa parmigera* J. Steiner var. *bohemica* (Servít) Nowak et Tobol., *Porosty polskie*: 1119 (1975).

The original description

The fresh thallus pink, dried whitish, rough, separated and delimited with black prothallus. Cortex layer 10-25 µm thick. Photobiont part of medullar layer 50-70 µm thick, cells 5-10 µm in diam. Medullar layer of densely intricated hyphae, cells 1-6 µm long, 1 µm thick. Hypothallus usually to 800 µm deep, cells cylindrical, 4 µm thick, usually to 20 µm long, in bottom closed, branched, sometimes form to bunches as in *V. bagliettoaeformis*. Macrosphaeroids to 20 µm in diam. Ascomata bigger and small together, involucrellum convex or usually deformed, strongly cracking, to 240 µm in diam. Perithecium globose, in lower part with brown spots, upper part pale, to 240 µm broad and high, cells 3-6 µm broad, 6-10 µm long. Excipulum colourless. Periphyses to 25 µm long, mature asci not present.

Note: The type specimen and indications in description accord in all details with *V. baldensis*.

Drawing tab. III/12 (Servít 1939, p. 143), photo 80: PRM-757221 – holotypus.

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner

Verh. Zool.- Bot. Ges. Wien **61**: 35 (1911), type: [Italy] Rojatal, Ventimiglio, San Michele, J. Brunnthaler & O. Porsch (**PRM-758067** – lectotypus in Servít 1939, p. 147-148!); *Protobagliettoa parmigera* (J. Steiner) Servít f. *calcivoroides* (J. Steiner) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963).

The original description

Thallus not plane, scrobiculate by dead ascomata, or deeply foveolate, emerging as in *V. calciseda* f. *calcivora*, Macrosphaeroids to 15 µm in diam. Spores (Steiner 1911) 12,5-19(23) x 7,5-9(11).

Note: The type specimen (WU) got probably lost. Servít (1939) selected a lectotypus. That sample clearly accords with *V. baldensis*.

Photo 81: PRM-758067 – lectotypus.

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner f. *arnoldiana* Servít

Beih. Bot. Cbl. **59**: 148, (1939); type: [Germany], Bavaria, München, Irschenhausen, F. Arnold (**PRM-758185** – lectotypus!); *Protobagliettoa parmigera* (J. Steiner) Servít f. *arnoldiana* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963).

The original description

Thallus deeply scrobiculate, whitish, slightly emergent. Hypothallus does not penetrate deeply to substratum. Macrosphaeroids to 16 µm, sometimes to 20 µm in diam. Mature perithecia uniformely brown-black, excipulum usually not brown-black on base. Periphyses clavate, usually 40 µm long, 3 µm thick. Spores not present. Hymenium J+ pale bluish, later yellowish.

Note: The taxon differs with colour of excipulum only. This character is variable. The thallus and an involucrellum are the same type as in *V. baldensis*.
Photo 82: PRM-758185 – lectotypus.

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner f. *biokovensis* Servít

Beih. Bot. Cbl. **59**: 148, (1939); type: [Croatia], Mts. Biokovo planina, Duare Brela, 1300 m, 1911, J. Baumgartner, (**WU** – holotypus!, **PRM-757239** – isotypus!).

The original description

The visible part of involucrellum to 150-200 μm broad. Asci clavate, 55 μm long, 10 μm broad.

Note: The type specimen and description accord with *V. baldensis*.
Photo 83: WU – holotypus; 84: PRM-757239 – isotypus.

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner f. *elegans* Servít

Beih. Bot. Cbl. **59**: 148, (1939); type: [Yugoslavia], Lovčen, Mali Boštur, 1230 m, M. Servít (**PRM-758238** – holotypus!, **M** – isotypus!).

The original description

Thallus pale pink, delimited by black prothallus.

Note: The studied type specimen was white. The fresh specimen would to be pink, the red crystals in cortex were absented. Ascomata and involucrellum accord with *V. baldensis*.
Photos 85: PRM-758238 – holotypus.

Verrucaria parmigera J. Steiner var. *calcivoroides* J. Steiner f. *kierkiensis* Servít

Beih. Bot. Cbl. **59**: 148, (1939); type: [Greece] Ins. Samos, Kierki, 1200 m, K. Rechinger (**PRM-758178** – holotypus!).

The original description

Thallus endolitic, scrobiculate. Ascomata gold-black (glossy black?) coloured.

Note: It is possible to see a glossy involucrellum in other samples. Its appearance is changing with age. The size and structure accord with *V. baldensis*.
Photo 86: PRM-758178 – holotypus.

Verrucaria parmigera J. Steiner var. *circumarata* Steiner

Verh. Zool.- Bot. Ges. Wien **61**: 35 (1911); type: [Italy], Roja tal, Ventimiglia, Breglio, 37 m, J. Brunnthaler & O. Porsch (**WU-00-68/11** – holotypus!, **PRM-757212** – isotypus!); *Protobagliettoa parmigera* (J. Steiner) Servít f. *circumarata* (J. Steiner) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963).

The original description

Thallus whitish or ashy with smooth to slightly glassy surface, pits relatively deep, partly convex, 2-5 μm broadly separated. Depressions colourless or with black prothallus. Cortex layer 20-50 μm thick. Photobiont part of medullar layer to 100 μm high, cells 4-8 μm in diam., in oval clusters densely coagulated. The upper part of hypothallus of densely intricated and branched hyphae, cells 2-12 μm long, 0,8-3 μm thick. The bottom part penetrates usually 1,5 μm into substratum, hyphae of different thickness 0,6-4 μm, irregularly inflate and often thin, cylindrical. Macrosphaeroids 10-15 μm in diam., in lower part common. Ascomata irregularly positioned, involucrellum 200 μm in diam., small, convex, usually flattened at the top, umbonate. Young perithecium brownish, in upper part elongated to colourless neck, later with brownish spots, nearly globose.

Note: In description of the new taxon only generally known characters were noted. The type

specimen and description accord with *V. baldensis.*
Photos 87, 88: WU-00-68/11 – holotypus, PRM-757212 – isotypus.

Verrucaria parmigera J. Steiner var. *dvorakii* Servít

Beih. Bot. Cbl. **59**: 150, (1939); type: [Croatia], Dubrovnik, Čelopeči, 20 m, R. Dvořák (**PRM-758245** – holotypus!, **PRM-645237** – isotypus!).

The original description

Thallus white, 2-4 µm high, usually dark coloured, interrupted, not continuous. Cortex layer 30-40 µm thick, photobiont part of medullar layer 70-90 µm high, clusters of cells vertically elongated. Hypothallus 500 µm, penetrates deep to substratum by branched hyphae, 1,5-3 µm thick, shortly articulated, cylindrical or slightly inflate. Macrosphaeroids rare, 8-12 µm in diam. Involucrellum 220-240 µm broad, perithecium nearly globose, in upper part first colourless.

Note: It was not possible to support the size of macrosphaeroidal cells by description. It was studied in that sample macrosphaeroidal cells to 20 µm in diam. Their occurence is clearly conditioned by physiological state of lichens. In medullar layer of thallus in optimal development is always possible to see macrosphaeroidal cells. The type specimen accords with *V. baldensis.*
Photos 89, 90: PRM-758245 – holotypus, PRM-645237 – isotypus.

Verrucaria parmigera J. Steiner var. *forissi* Servít

Beih. Bot. Cbl. **59**: 148, (1939); type: [Hungary], Bükk, Bányahegy Kökapu, 800 m, 1924/07/08, F. Fóriss sub *V. sphinctrina* f. *baldensis* (**PRM-758651** – holotypus!).

The original description

Thallus white, rough, scrobiculate with colourless depressions, delimited by black prothallus and emerged form substratum. Hypothallus does not penetrate deeply to the substratum, in upper part from septated, short, hemisphaerical or oval cells, 3-6 µm long, 3-5 µm broad. Macrosphaeroids usually 16 µm in diam. Ascomata regularly positioned in basal part of alveoli. Perithecium uniformely dark, excipulum often dark, too. Periphyses usually 35 µm long, 3 µm thick. Mature asci not present. Hymenium J+ pale bluish, later yellowish.

Note: The description does not include a size of peritecium or involucrellum. Involucrellum of most ascomata of tyte specimen reaches over 250 µm in diam. The thallus corresponds with *V. baldensis,* too.
Photo 91: PRM-758651 – holotypus.

Verrucaria parmigera J. Steiner var. *gyelnikiana* Servít

Beih. Bot. Cbl. **59**: 143, (1939), **fig. p. 144,** type: [Hungary] Pilishegy, Legénybarlang, 500 m, V. Gyelnik (**PRM-758181** – holotypus!).

The original description

Thallus broadly expanded, whitish (fresh pink?) uniform, partly emerging, macrosphaeroids to 15 µm broad. Ascomata mainly in central part of the thallus, not densely distributed. The upper part of perithecium nearly colourless, basal part with brown spots. Margin of involucrellum clearly separated from excipulum. Periphyses usually 30 µm long, 4 µm thick, subclavate. Hymenium J+ bluish, later colourless, asci yellowish.

Note: Servít mentioned the difference in straggle ascomata but without numeric value of the dense in his description.
Drawing tab. III/10 (Servít 1939, p. 144), photo 92: PRM-758181 – holotypus.

Verrucaria parmigera J. Steiner var. *hazslinszkyi* Servít

Beih. Bot. Cbl. **59**: 146 (1939); type: [Slovakia], Lipovce (in sched.: „Lipócz", F. Hazslinszky sub *V. rupestris*, (**PRM-756860** – holotypus!).

The original description

Thallus whitish, clearly emerging, plane and smooth. Cortex layer 25-35 µm thick, cartilagineous. Photobiont part of medullar layer interrupted, cells 7-11 µm in diam. Hyphae of hypothallus densely anastomosed, macrosphaeroids 8-12 µm broad.

Ascomata not densely distributed, involucrellum convex, usually unregularly hemisphaerical. Excipulum back usually on base of perithecium. Periphyses usually 45 µm long, 3-4 µm thick. Hymenium J+ bluish, later yellowish. Mature asci not present.

Note: Any of the mentioned characters in descriptions did not show differences from other taxa. The convex involucrellum is common for older ascomata.

Photo 93: PRM-756860 – holotypus.

Verrucaria parmigera J. Steiner var. *hilitzeri* Servít

Beih. Bot. Cbl. **59**: 146, (1939); type: [France], La Valette, A. Hilitzer (**PRM-758253** – holotypus!).

The original description

Thallus slightly emerging, whitish, smooth, scrobiculate of dead ascomata. Cortex layer 15-40 µm thick, cartilagineous, colourless. Photobiont part of medullar layer to 90 µm high, nearly continuous, cells 4-10 µm broad, often in vertical position. Upper part of hypothallus of hyphae densely intricated, strongly branched, 0,8-2,0 µm thick, shortly articulated. Lower part of hypothallus usually penetrates 0,8 µm deep, hyphae slightly branched, usually 6 µm thick, usually thin, septated, short cells 4-8 µm or long to 25 µm. No macrosphaeroids to 8 µm in diam. Ascomata densely positioned, bigger and small mixed, visible part of involucrellum 200 µm broad, not convex, unclearly radiate separated, sometimes subumbonate. In vertical section involucrellum to 240 µm broad, in the central part 40 µm thick, on margin bent downwards. Excipulum colourless. Perithecium nearly globose, 250-260 µm broad and high, without a neck, brown-black, upper part paler only, cells 5-6 µm broad, 6-8 µm long. Periphyses thin, usually 28 µm long, an apical cell 4 µm thick. Mature asci not present. Hymenium J+ bluish.

Note: The type specimen and description accord with *V. baldensis*.

Photo 94: PRM-758253 – holotypus.

Verrucaria parmigera J. Steiner var. *lapadensis* Servít

Beih. Bot. Cbl. **59**: 149, (1939), fig. p. 149, type: [Croatia], Dubrovnik, Lapad, Mali Petka, 60-90 m, M. Servít (**PRM-758246** – holotypus!).

The original description

Thallus whitish, smooth, scrobiculate by dead ascomata, usually with black prothallus on margins. Photobiont part of medullar layer 50 to 80 µm high, hyphae densely intricated, shortly articulated 12 µm broad, coagulated to difused clusters. Hyphae of hypothallus partly cylindrical 0,6-3 µm thick, 3-8 µm long, usually inflate, 6-8 µm thick, to 20 µm long. Macrosphaeroids 8-16 µm in diam., often to 12 µm, commonly moniliform. Ascomata densely distributed. Visible part of involucrellum 200-220 µm in diam., first plane, later convex and emerging the thallus, clearly radially cracking, 240-280 µm broad, central part to 30 µm thick, bent downwards on margin. Perithecium globose 200-250 µm, first in lower part brownish, mature black-brown or with black-brown spots, upper cells vertically elongated, 4-5 µm thick, lower polygonal, 5-7 µm in diam. Excipulum uniformely brownish around perithecium pale brown, darker from top to bottom. Periphyses usually to 3,5 µm thick, clavate, comonly tipped at ends, not evolved to mature stage. Hymenium J+ bluish, later nearly colourless, asci yellowish.

Note: Macrosphaeroidal cells often form long chains (see microphoto in General part). The thallus and ascomata do not differ from *V. baldensis*.
Drawing tab. III/14 (Servít 1939, p. 149), photo 96: PRM-758246 – holotypus.

Verrucaria parmigera J. Steiner var. *lapadensis* Servít f. *subcomposita* Servít

Beih. Bot. Cbl. **59**: 150, (1939); type: [Yugoslavia], Lovčen, Trestenjak, 1550 m, M. Servít (**PRM-758235** – holotypus!).

The original description

Minute thalli (thalioli) slightly convex, scrobiculate, depressiond colourless or separated by black prothallus. Macrosphaeroids usually 22 µm in diam.

Note: The small sample accords with structure of thallus and ascomata with *V. baldensis*.
Photo 95: PRM-758235 – holotypus.

Verrucaria parmigera J. Steiner var. *sinensis* Zahlbr.

Catal. Lich. Univ. **8**: 26 (1931); *V. subconcentrica* (J. Steiner) Servít var. *sinensis* (Zahlbr.) Servít, *Beih. Bot. Cbl.* **59**: 165 (1939); type: [China], Yunnan, Yao schan, Ganhaidse, Lidjiang (Likinang), 3825 m (Handel Mazzetti sub *V. parmigera* var. *sinensis*, (**WU-2730** – holotypus!, **PRM-783905** – isotypus)

The original description

Thallus whitish, emerging, scrobiculated dead ascomata. Cortex layer 20-40 µm thick, of thin, relax hyphae. Photobiont cells 6-8 µm in diam. Photobiont part of medullar layer 40-70 µm high, interrupted. Clusters often vertically elongated. Hypothallus usually 400 µm deep in substratum. Hyphae of hypothallus partly branched, shortly articulated, densely intricated, a bit anastomosed, 1-4 µm thick, hyphae often inflate in central part, 5-20 µm long. Macrosphaeroids common, 12-20 µm in diam., faintly moniliform or subbotryose.

Ascomata densely distributed, mixed bigger with smaller, visible part of an involucrellum 200-250 µm, plane or slightly convex. Involucrellum in vertical section 280-300 µm broad, central part thin, thicker on margins, downwards. Perithecium in upper part shortly elongated in neck, on base flattened, usually 280 µm broad, 280-300 µm high, carbonaceous, in upper part sometimes pale. Excipulum colourless or in uper part black or entirely black. Periphyses usually 40 µm long, thicker on base and articulated. Asci clavate, not developed in mature stage.

Note: Servít (1939) specified *V. subconcentrica* for closed species, which differs in bigger ascomata. My study did not confirm that conclusion. The type specimen accords with the size of ascomata and thallus structure with *V. baldensis*.
Drawing tab. III/15 (Servít 1939, p. 165), photo 97: WU-2730 - holotypus.

Verrucaria parmigera J. Steiner var. *subrosea* (Servít) Servít

Beih. Bot. Cbl. **59**: 144, (1939); type: [Croatia], Dubrovnik, Lapad, Mali Petka, 40-90 m, M. Servít (**PRM-756705** – holotypus!); *V. subrosea* Servít, *Rabenh. Krypt. Fl.* **9 I/1**: 107 (1934).

The original description

Thallus plane, smooth, clearly emerging, pale pink, usually delimited with black prothallus. Cortex layer 10-50 µm high, colourless, of hyphae unclearly connectioned. Photobiont part of medullar layer 40-100 µm thick, of densely intricated hyphae in usually vertical orientation, cells 1,5-2 µm thick, 3-12 µm long. Photobiont cells 4-12 µm in diam. in uniform clusters. Medullar layer of the same type of hyphae, clearly differentiated from hypothallus. Hyphae of hypothallus usually 0,8 µm deep to substratum, branched or not, cells cylindrical, oval, unclearly ellipsoid or nearly globose, 3-8 µm thick, 4-20 µm long, or conical, 6 µm thick, 10 µm long, or hyphae filiform. Macrosphaeroids usually common, 16 µm in diam. Ascomata densely distributed. Excipulum 190 µm high, 300 µm broad, pale on the inner part, outside

black-brown. Involucrellum 200-300 µm in diam., convex, ± regularly radially cracking, central part 20-40 µm, on margins 50 µm thick, flattened. Margins of excipulum thick, branched, violet-black hyphae. Excipulum darker from top to bottom, brown-black on base. Perithecium globose, in upper part elongated, 200-300 µm high, 200-290 µm broad, colourless at the beginning, later violet-blackish on the top, bottom part brown, all black in old ascomata, upper part from hyphae in plectoprosenchymatal distribution, 6-11 µm long, 4-5 µm broad, in lower part cells 6-8 µm long, 5-8 µm broad. Periphyses in upper third of ascoma usually 30 µm long, 3,5 µm thick, shortly clavate, with subglobose last cell, 4 µm in diam. Hypotecium colourless, usually 25 µm high, asci clavate. Spores not seen. Hymenium J+ bluish, later colourless.

Note: The type specimen and description corresponds with *V. baldensis*.
Drawing tab. III/16 (Servít 1939, p. 144), photo 98: PRM-756705 – holotypus.

Verrucaria pinguis J. Steiner f. *dealbata* J. Steiner

Verh. Zool.- Bot. Ges. Wien **69**: 101. (1919); *Verrucaria bagliettoaeformis* (Hazsl.) Servít var. *dealbata* (J. Steiner) Servít, *Beih. Bot. Cbl.* **59**: 158 (1939); type: [Greece], Mykene, A. Ginzberger, (**WU-00-68/5** – holotypus!, **PRM-756852** – isotypus!).

The original description

Thallus plane with rough surface, whitish. Macrosphaeroids in hypothallus 8-10 µm in diam.

Note: Any of the mentioned characters in descriptions did not show any differences from other taxa. The size of macrosphaeroidal cells is comon for all the taxa studied. The type specimen accords with *V. baldensis*.
Photos 100: WU-00-68/5 – holotypus; 99: PRM-756852 – isotypus.

Verrucaria serbica Servít

Beih. Bot. Cbl. **55**: 258 (1936); *Verrucaria baldensis* A. Massal. var. *serbica* Servít, *Beih. Bot. Cbl.* **59**: 132 (1939); type: [Yugoslavia], Serbia or., Tara planina, Klisura Dervente, 250-300 m, J. Suza, (**PRM-645092** – holotypus!).

The original description

Ascomata not dense, unregularly distributed. Involucrellum 200-250 µm in diam., flattened. Some involucrellums of old ascomata can exceed the thallus. Perithecium flattened, globose or nearly fig-shaped, elongated in ostiolum, usually 360 µm broad and 250 µm high, in basal part brown-black, in upper part pale or colourless. Asci clavate, clearly stalked, 60-65 µm long, 15-18 µm broad, spores in biseriate position, globose, oval or ellipsoidal, narrowed at ends with oil drops, 10-22 (32) µm long, 7-10 (13) µm broad. Hymenium J+ slightly bluish, later yellowish.

Exsicc.: Anzi 373 (BP), Arn. 309 (M), Trevis. 188 (M)

Note: The type specimen by the structure of a thallus and ascomata accord with *V. baldensis*.
Photo 101: PRM-645092 – holotypus.

Verrucaria sphinctrina Ach. f. *gallica* Servít

Beih. Bot. Cbl. 59: 120 (1939); type: [France], Nice, Ville Franche, Cime de Vinaigrier, 300 m, J. Suza, (**PRM-645317** – holotypus!); *Polyblastia sphinctrina* (Duf.) Servít f. *gallica* (Servít) Servít, *Preslia*, 24: 381 (1952).

The original description

Ascomata densely positioned, involucrellum 250 µm broad, convex.

Note: The type specimen and description accord with *V. baldensis*.
Photo 102: PRM-645317 – holotypus.

Verrucaria sphinctrina Ach. var. *lojkae* Servít

Beih. Bot. Cbl. **59**: 122 (1939); type: [Austria], Mödling, Maaberg, H. Lojka, 1868 (**BP** – holotypus!, **PRM-783798** – isotypus!); *Polyblastia sphinctrina* (Duf.) Servít f. *lojkae* (Servít) Servít, *Preslia*, **24**: 381 (1952).

The original description

Thallus not plane, emersed from substratum, cretaceous white, sometimes with black prothallus. Excipulum brown to black.

Note: Servít mentioned a possibility of dead thallus in note in his description. In my opinion (a size of involucrellum, ascomata, structure of a thallus) it corresponds to *V. baldensis*.

Photo 103: BP – holotypus, PRM-783798 – isotypus.

Verrucaria sphinctrinella Zschacke f. *pseudointerrupta* Servít

Beih. Bot. Cbl. **55**: 260, (1936); *Verrucaria bagliettoaeformis* (Hazsl.) Servít var. *pseudointerrupta* (Servít) Servít, *Beih. Bot. Cbl.* **59**: 158, (1939); type: [Croatia], Dubrovnik, Lapad, Villa Gondola, 50 m, A. Latzel (**PRM-757046** – holotypus!, **PRM-645337** – isotypus!).

The original description

Thallus interrupted, bluish to whitish with glassy smooth surface. Cortex layer 5-30 µm thick, cartilagineous, colourless. Photobiont cells 6-8 µm in diam., in small clusters. Photobiont part of medullar layer 40 µm thick of densely branched hyphae. Hyphae of the hypothallus thin, cylindrical, usually 3,5 µm thick, sometimes fusiform, 8 µm thick, 12 µm long and from macrospheroidal cells 8-16 (20) µm broad, formed rhizinoid filaments. Involucrellum 150-200 µm in diam., later clearly emerging the thallus, glossy, without radial cracking, usually deformed. Excipulum thin and dark. Perithecium at first on base, later all regularly dark, rarely pale.

Note: Similarly coloured thalli is posslible to find in shaded habitats (fissures in rocks, overhangs or walls). The cortex layer is in that samples thinner and green colour of photobiont cells can display more. There haven't been found any crystals in the cortex layer. The size of involucrellum and ascomata corresponds with *V. baldensis*.

Photos 104, 105: PRM-757046 – holotypus, PRM-645337 – isotypus.

Verrucaria sphinctrinella Zschacke var. *alocizoides* (J. Steiner) Servít f. *domogledensis* Servít

Beih. Bot. Cbl. **59**: 140, (1939); type: [Romania], Severin, Domogled, Crucea Alba, 500 m, P. Cretzoiu, (**PRM-757733** – holotypus!).

The original description

The upper part of the cortex layer of green hyphae, interrupted, thallus whitish with dots and black lines as in f. *herculana*.

Note: The green hyphae in cortex layer has not been found. Described part of sample has probably died out. Several ascomata on the margin of the sample belong to *V. baldensis*.

Photo 106: PRM-757733 – holotypus.

Verrucaria steineri Kušan

Acta Bot. Inst. Bot. Univ. Zagreb **5**: 28, (1930) fig. 1B, p. 27, type: [Croatia], Ins. Krk, Malinska, F. Kušan – not seen; *Protobagliettoa steineri* (Kušan) Servít ex Nowak et Tobol., *Porosty polskie*: 1119 (1975); *Bagliettoa steineri* (Kušan) Vězda, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, **1981**: 363.

The original description

Thallus white, not glossy, smooth or farinose. Cortex layer colourless, 15-40 µm thick, of densely branched hyphae. Photobiont cells always 10 µm, rarely 14 µm in diam., in clusters, hyphae 1,5 µm thick, densely branched and with cells 3 µm long with septa. Photobiont part of medullar layer always 150 µm thick. Medullar layer 50-150 µm thick, always 2 µm thick.

Hyphae in lower part of hypothallus or nearly cylindrical, 1 µm thick, cells 8-12 µm long, or inflate, always 8 µm thick and 30 µm long, macrosphaeroids to 20 µm long, common.

Involucrellum 250-300 µm broad, plane, later clearly convex, radially cracking, to 25 µm thick, on margins downwards. Perithecium hemisphaerical or elongated in ostiolum, 350 µm high and broad, on top and sides 18 µm thick, the bottom part 30 µm thick, colourless, dark. Periphyses always 50 µm long, 3 µm thick, asci cylindrical or clavate, with thicker wall in upper part, spores usually always evoluted, in biseriate position, ellipsoidal, sometimes nearly globose, 13-22 (26) µm long, 8-11 (15) µm broad. Hymenium J+ bluish, later pale red or colourless, asci yellowish.

Note: Kušan (1930) noted larger involucrellun in *V. sphinctrina* (Ach.) Duf. and *Baglietoa sphinctrina* (Ach.) Körb. with fissures visible without lens. He has made a new taxon for lichens with small involucrellum. Further his character is always a colourless excipulum in *V. parmigera* and *V. steineri*.

Drawing tab. III/4, 13 (Servít 1939, p. 123, Kušan 1930, p. 27).

Verrucaria steineri Kušan f. *scrobicularis* Servít

Beih. Bot. Cbl. **59**: 124 (1939); type: [Slovenia], Schönpas bei Görz, 1872/08/05, J. Glowacki (**M** – lectotypus!, **PRM-783743** – isolectotypus!).

The original description

Thallus deeply scrobiculate. Involucrellum 250-300 µm broad.

Note: The type specimen with colour of thallus (grey), size of ascomata and involucrellum accord with *V. baldensis*.

Photos 108, 109: M – holotypus, PRM-783743 – isolectotypus.

Verrucaria steineri Kušan f. *turgescens* Servít

Beih. Bot. Cbl. **59**: 124 (1939); type: [Croatia], Kupari, R. Dvořák (**PRM-783686** – holotypus!).

The original description

Thallus slightly emerging with irregular, rough, verruculous or granular surface. Involucrellum 250-300 µm in diam. Periphyses 30 µm long, 3 µm thick. Spores 20-24 µm long, 10-13 (15) µm broad.

Note: The type specimen clearly belongs to *V. baldensis*.

Photo 107: PRM-783686 - holotypus.

Verrucaria steineri Kušan var. *composita* Servít

Beih. Bot. Cbl. **59**: 124 (1939); type: [Germany], Bavaria Eichstätt, Hirschpark - Wasserzell, F. Arnold (**WU** – holotypus!, **PRM-783750** – isotypus!); *Protobaglietoa steineri* (Kušan) Servít var. *composita* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963).

The original description

Black prothallus separates thallus into several parts (thallioli). Thallus convex, smooth, cartilagineous. Spores usually not evoluted, 14-18 µm long, 9-10 µm broad.

Note: Servít noted differences in thallus of *V. baldensis* var. *insculpta* and *V. steineri* var. *composita* in description. It means Servít was able to determine his taxa in sterile stages by characters of the thallus. The type specimen (by ascomata with involucrellum and thallus) accords with *V. baldensis*.

Photos 111: WU – holotypus; 110: PRM-783750 – isotypus.

Verrucaria steineri Kušan var. *croatica* Servít

Beih. Bot. Cbl. **59**: 125, (1939); type: [Croatia] Primorje, Jablanac, Dundovic selo, 330 m, M. Servít (**PRM-757610** – holotypus!, **PRM-757620** – isotypus!); *Protobagliettoa steineri* (Kušan) Servít f. *croatica* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963).

The original description

Thallus usually deeply scrobiculate. Hypothallus penetrates deeply to substratum, hyphae densely positioned, unbranched, 1-3 µm thick, shortly articulated. Macrosphaeroids 8-10 µm broad or not present.

Note: Mentioned type specimens belong to *V. baldensis*.

Photos 112, 113: PRM-757610 – holotypus, PRM-757620 – isotypus.

Verrucaria steineri Kušan var. *lactea* (Arnold) Servít f. *britanica* Servít

Beih. Bot. Cbl. **59**: 124, (1939); type: [England], Great Orme's Head, Caernarvonshire, W. Leighton sub *V. immersa* Hoffm. (**WU-00-68/3** – holotypus!, **PRM-757594** – isotypus!, **PRM-757595** – isotypus!); *Protobagliettoa steineri* (Kušan) Servít f. *britanica* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963).

The original description

Thallus plane, smooth, slightly emerged. Ascomata densely positioned, involucrellum to 200 µm in diam.

Note: A herbarium specimen of the holotype accords with the size of the involucrellum and ascomata with *V. baldensis*.

Photos 115: WU-00-68/3 – holotypus; 114: PRM-757594 – isotypus.

Verrucaria steineri Kušan var. *lactea* (Arnold) Servít f. *geographica* Servít

Beih. Bot. Cbl. **59**: 124, (1939); type: [Greece] Amorgos, Landago, K. Rechinger (**PRM-757606** – holotypus!, **PRM-757605** – isotypus!).

The original description

Thallus scrobiculate, rough, separated by black prothallus. Involucrellum usually 260 µm wide. Spores 22-24 (27) µm long, 10-12 µm wide.

Note: Type herbarium specimens accord with the size of involucrellum and ascomata with *V. baldensis*.

Photos 116, 117: PRM-757606 – holotypus, PRM-757605 – isotypus.

Verrucaria steineri (Kušan) var. *mittenwaldensis* Servít

Beih. Bot. Cbl. **59**: 124 (1939); type: [Germany], Bavaria, Mittenwald, A. Krempelhuber sub *V. calciseda* f. *limborioides* (**M-0024472** – holotypus!, **PRM-756302** – isotypus!); *Protobagliettoa steineri* (Kušan) Servít var. *mittenwaldensis* (Servít) Grummann, *Katalogus Lichenum Germaniae*, 16 (1963).

The original description

Thallus scrobiculate, ashed. Involucrellum usually convex, emerging, 200-250 µm broad. Spores 16-21 µm long, 10-12 µm broad. Hymenium J+ slightly bluish, later redish.

Note: Servít noted a similar taxon *V. sphinctrina* f. *gallica* in his description. He did not explain which characters. The studied specimen do not differ from *V. baldensis*.

Photos 118, 119: M-0024472 – holotypus, PRM-756302 – isotypus.

Verrucaria subconcentrica (J. Steiner) Servít

Beih. Bot. Cbl. **59**: 160, (1939), fig. p. 160, type: [Corfu], Mt. Deca, K. Eggerth, (**WU-00-68/2** – holotypus!, **PRM-757907** – isotypus!). *Verrucaria parmigera* J. Steiner f. *subconcentrica* J. Steiner, *Verh. Zool.-Bot. Ges. Wien* **61**: 35 (1911).

The original description

Thallus emerging, slightly scrobiculated, sometimes limited by black prothallus. Cortex

layer very thin, the bottom part of branched hyphae, 2-3 µm thick, shortly articulated. Photobiont's cells usually 10 µm broad, in clusters 40 µm in diam. Photobiont part of medullar layer interrupted. Medullar layer of densely branched hyphae, cells 2 µm thick, 4 µm long. Hypothallus of densely branched hyphae, rarely cylindrical, usually oval, 2-4 µm thick, 14 µm long, triangle-shaped, or slightly inflate, usually 6 µm broad. Macrosphaeroids 12-16 µm broad.

Ascomata densely positioned. Involucrellum 150-200 µm in diam., plane with black rimon margins downwards. The rim (aureola) of black hyphae, 4 µm thick, formed in involucrellum. Perithecium hemisphaerical, 220 µm in diam., broader than involucrellum, young with brown spots, later ± brown, cells angular, 8 µm broad. Young excipulum colourless, later blackish, often concreeting with perithecium. Periphyses 20 µm long, asci clavate, 25-30 µm long, 10 µm broad. Spores not seen.

Note: The holotype has a high value of density. The colour of the thallus and size of the involucrellum are the same as in *V. baldensis*.

Drawing tab. III/6 (Servít 1939, p. 160), photos 121, 122: WU-00-68/2 – holotypus, PRM-757907 – isotypus.

Verrucaria subconcentrica (J. Steiner) Servít f. *exesa* Servít

Beih. Bot. Cbl. **59**: 161, (1939), *Protobaglietoa exesa* (Servít) Servít, *Rozp. Čs. Akad. Věd*, **65(3)**: 32, (1955), type: [Yugoslavia] Herceg Novi, Djurinič, 200 m, 1929, M. Servít (**PRM-757468** – holotypus!).

The original description

Thallus slightly emergent, dirty white, deeply scrobiculate, broadly spread, with smooth surface and interrupted by black prothallus. Shallow depressions colourless or with dark margin, usually 2-3 µm broad. Cortex layer 15-35 µm high, cartilagineous, colourless, sometimes of darker hyphae, hyphae densely intricated, cells to 0,8 µm in diam. Photobiont part of medullar layer 50-80 µm high, hyphae densely branched, shortly articulated, 0,8 µm broad. Clusters of photobiont cells of different shape, horizontaly elongated, cells live-green, 5-14 µm in diam. Hypothallus deeply penetrate the substratum, hyphae 0,6-2 µm broad, cylindrical, usually 12 µm long. Macrosphaeroids (celulae globosae) common, usually 15 µm in diam. A dense of ascomata to 200. Exothecium to 180 µm broad, convex, slightly covered by thallus. Excipulum to 300 µm broad, flattened in bottom part, black-brown. Involucrellum to 220 µmbroad. Excipulum (chlamys) dark in mature ascomata. Periphyses 30 µm long, inner part 0,8 µm broad. Asci not evoluted to mature stage.

Note: Servít mentioned differenties for *Pr. subconcentrica* (= *V. subconcentrica*) "higher value of a density, bigger excipulum, longer periphyses and thallus appearance" in his description. The thallus of the type specimen was not been clearly dead. The most of ascomata have died out, it is possible to see the rest of them as shallow depressions. The colour of the thallus and size of the involucrellum are the same as in *V. baldensis*.

Photo 123: PRM-757468 – holotypus.

Verrucaria subconcentrica (J. Steiner) Servít f. *punctatissima* Černohorský

Stud. Bot. Čech., **5**: 148-155, (1942); type: [Czech Republic] Velká Hora u Karlštejna (nad vodopády), 1941, Z. Černohorský (**PRM-783882** – holotypus!).

The original description

Thallus dirty whitish to ochraceous, scrobicularis, delimited and interrupted by prothallus. Ascomata densely set, well visible without magnifying glass. Involucrellum 180-210 µm broad, ascomata 200-300 µm broad and 200-240 µm high.

Note: The grey colour of the thallus and the size of the involucrellum are clearly the same as in *V. baldensis*. Many of the ascomata on the type specimen are already died out.

Photo 124: PRM-783882 – holotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *eumacrosphaeroidea* Servít

Beih. Bot. Cbl. **59**: 166, (1939); type: [Romania], Domugled, V. Gyelnik, (**PRM-757978** – holotypus!).

The original description

Thallus greyish or whitish with rough surface. Cortex layer 20-30 µm thick, hyphae brown (heterogenous?), somewhere dotted. Macrosphaeroids usually 30 µm in diam. Ascomata of different dense, involucrellum 200 µm broad, convex. Perithecium of the same colour (brown) as excipulum. Asci not evoluted to maturity. Hymenium J+ bluish, later yellowish.

Note: Servít did not mention small density of ascomata in his description. The colour of the thallus and the size of involucrellum are the same as in *V. baldensis*.

Photo 120: PRM-757978 – holotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *euthallina* Servít

Beih. Bot. Cbl. **59**: 164 (1939), fig. p. 164; type: [Croatia], Zadar (Zara), Punta Amica, 10 m, M. Servít (**PRM-757293** – holotypus!).

The original description

Thallus emerging, white with plane surface, smooth, sometimes delimited by black prothallus. Cortex layer 5-60 µm thick, photobiont part of medullar layer 40-100 µm high, cells 8-16 µm broad, hyphae densely intricated and 0,6 µm thick. Hyphae of hypothallus densely branched, 0,5-4 µm thick, cylindrical, to 16 µm long, or inflate, rarely of acicularly shaped 16 µm long, 8 µm broad. Macrosphaeroids to 20 µm in diam. Ascomata densely positioned. Involucrellum 150-200 µm in diam., emerging over thallus, central part 40 µm thick. Excipulum in upper part brownish, hyphae 2 µm thick, with loosen base. Perithecium nearly globose or tranversely ellipsoidal, to 400 µm broad, 300 µm high, young colourless, later in upper part dark, cells 4-6 µm broad, 4-10 µm long, later bottom part brown, upper with black-brown spots. Asci 55 µm long, 8-10 µm broad, spores not seen.

Note: The thallus and size of the involucrellum belong to *V. baldensis*.

Drawing tab. III/7 (Servít 1939, p. 164), photo 125: PRM-757293 – holotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *euthallina* Servít f. *asperella* Servít

Beih. Bot. Cbl. **59**: 164, (1939); type: [Slovakia], Slovenské Krušnohoří, Malá Stožka, J. Suza (**PRM-757935** – holotypus!).

The original description

Thallus rough.

Note: The type specimen does not differ from the previous taxon by the thallus surface (see macrophotos). Microscopic characters are the same in both taxa and belong to *V. baldensis*.

Photo 126: PRM-757935 – holotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *metzleri* Servít

Beih. Bot. Cbl. **59**: 166, (1939); type: [Switzerland], Unterwalden, Engelburg, A. Metzler sub *V. baldensis* A. Massal. (**W-1903-11150** – holotypus!, **PRM-758039** – isotypus!).

The original description

Thallioli small, convex, interrupted by deep grooves. Macrosphaeroids 10-20 µm in diam. Excipulum nearly colourless.

Note: Thalli with larger ascomata belong to described taxon by the Servít's note in the description. By the size of ascomata and involucrellum belong to *V. baldensis*. Thallus is not coloured in all surface regularly (see macrophoto). In my opinion this is caused by shaded and wet conditions in its habitat.

Photos 128: W-1903-11150 – holotypus; 127: PRM-758039 – isotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *nigroaureolata* (Servít) Servít f. *limitata* Servít

Beih. Bot. Cbl. **59**: 162, (1939); type: [Slovenia], Idria, Kluč, 850 m, J. Glowacki (**PRM-758042** – lectotypus!).

The original description

Thallus dark, grayish, rough delimited by black prothallus. A rim on margin well evoluted.

Note: Thallus and ascomata belong to *V. baldensis*.

Photo 129: PRM-758042 – lectotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *nigroaureolata* (Servít) Servít f. *rauca* Servít

Beih. Bot. Cbl. **59**: 162, (1939); type: [Germany], Eichstätt, Kunstein, F. Arnold, sub *Limboria sphinctrina* (**PRM-758020** – lectotypus!).

The original description

Thallus grayish, rough without prothallus.

Note: Prothallus is not formed really on a small lectotype specimen. With other characters (the size of involucrellum and thallus) sample does not differ from *V. baldensis*.

Photo 130: PRM-758020 – lectotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *petkae* Servít

Beih. Bot. Cbl. **59**: 162 (1939); type: [Croatia], Dubrovnik, Lapad, Mali Petka, 40-90 m, M. Servít sub *V. parmigera* f. *nigroaureolata* (**PRM-756699** – holotypus!).

The original description

Thallus emerging, white or greyish, sometimes scrobicularis and delimited with black prothallus. Cortex layer 10-25 µm thick. Photobiont cells 7-10 µm broad, sometimes to 15 µm in diam. Involucrellum 100-200 µm broad, convex, emerging over thallus. A black rim on base of mature ascomacontinue as black excipulum. Perithecium 250-300 µm in diam.

Note: The thallus, ascomata and size of the involucrellum accord with *V. baldensis*.

Photo 131: PRM-756699 – holotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *saxivora* Servít

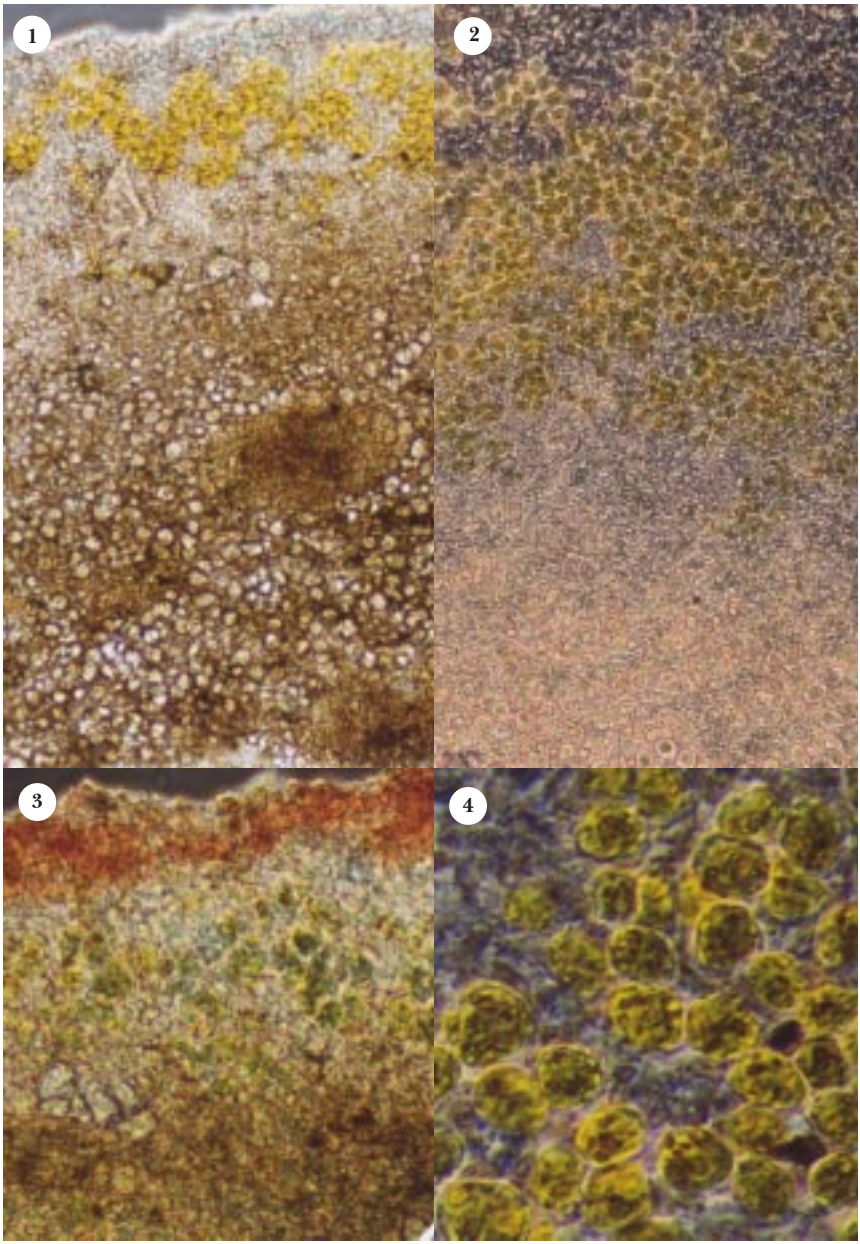
Beih. Bot. Cbl. **59**: 163, (1939); type: [Slovenia], Dovje, Mlince potok, 900 m, M. Servít (**PRM-757973** – holotypus!).

The original description

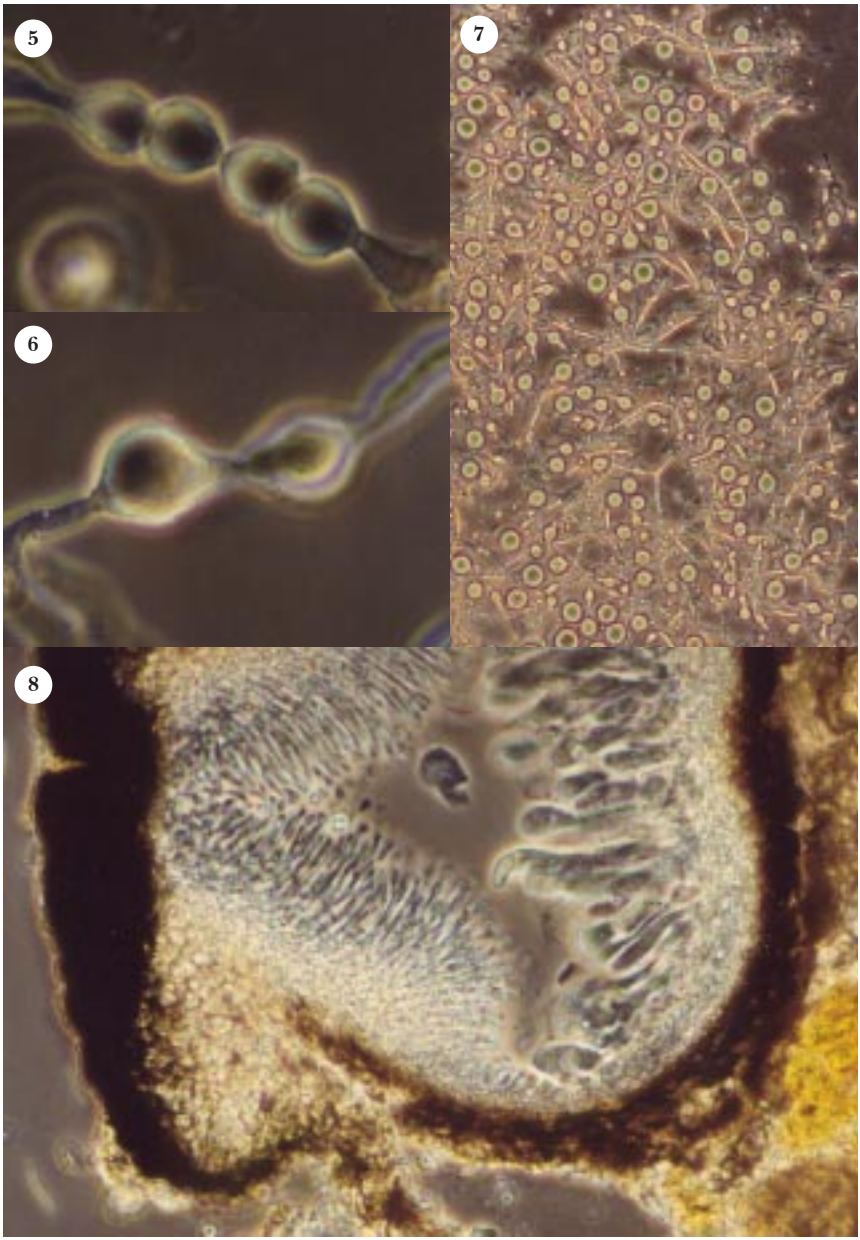
Thallus whitish, scrobicularis. Cortex layer 10-20 µm thick. Photobiont part of medullar layer thin, cells 8-12 µm in diam. Ascomata densely positioned, involucrellum 150-200 µm broad, plane or convex in mature ascomata, emerging over the thallus. Periphyses articulated, apex cell to 6 µm long, 5 µm broad. Asci not evoluted to mature stage. Hymenium J+ bluish, later yellowish.

Note: Servít mentioned short periphyses with globose, 10 µm long, 6 µm broad cell at the top in a note below his description. In my opinion that character does not have any taxonomic value. I have studied a lot of microscopic sections with clearly articulated periphyses with oblong cell on the top as Servít described. The others perifhyses were ended by longer cell and the same thickness as hypha is formed. In some other cases it possible to decide if periphyses were articulated or not.

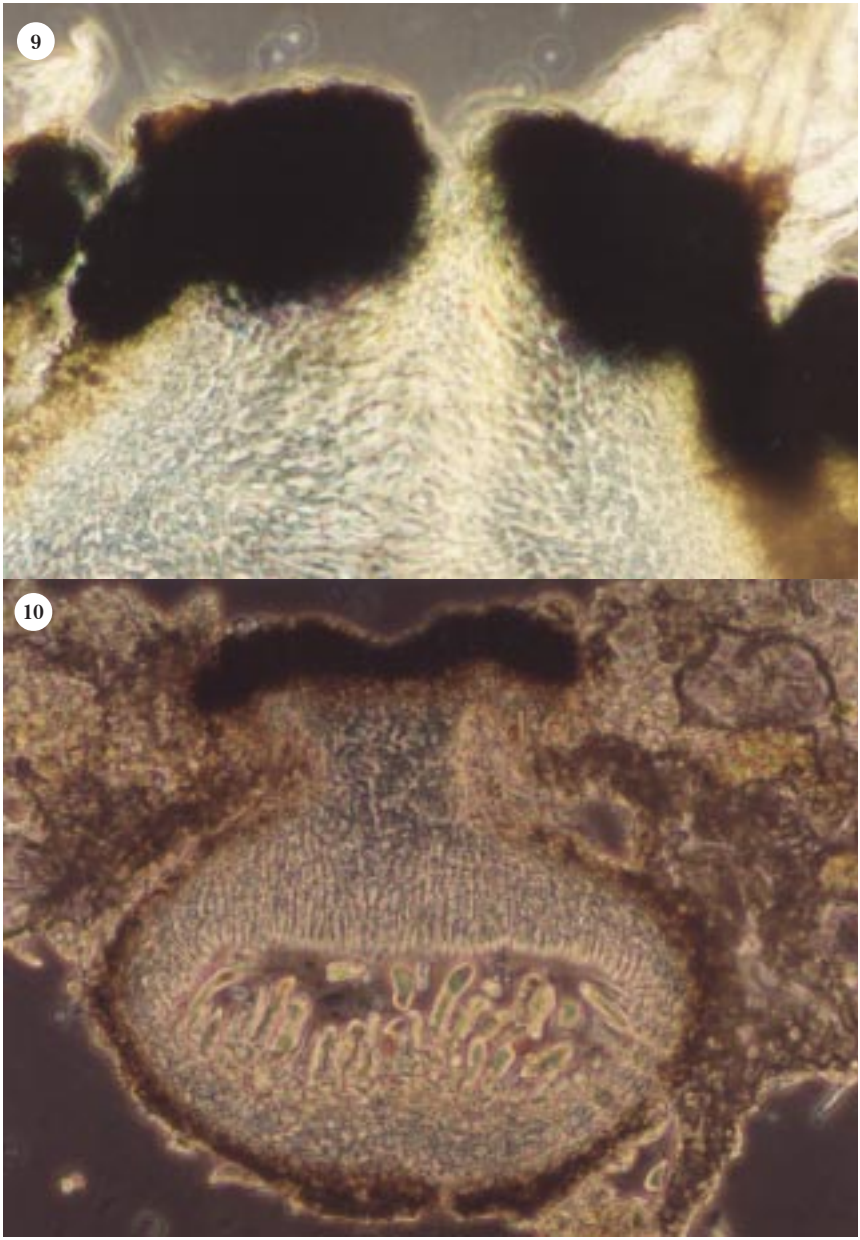
Drawing tab. III/5 (Servít 1939, p. 163), photo 132: PRM-757973 – holotypus.



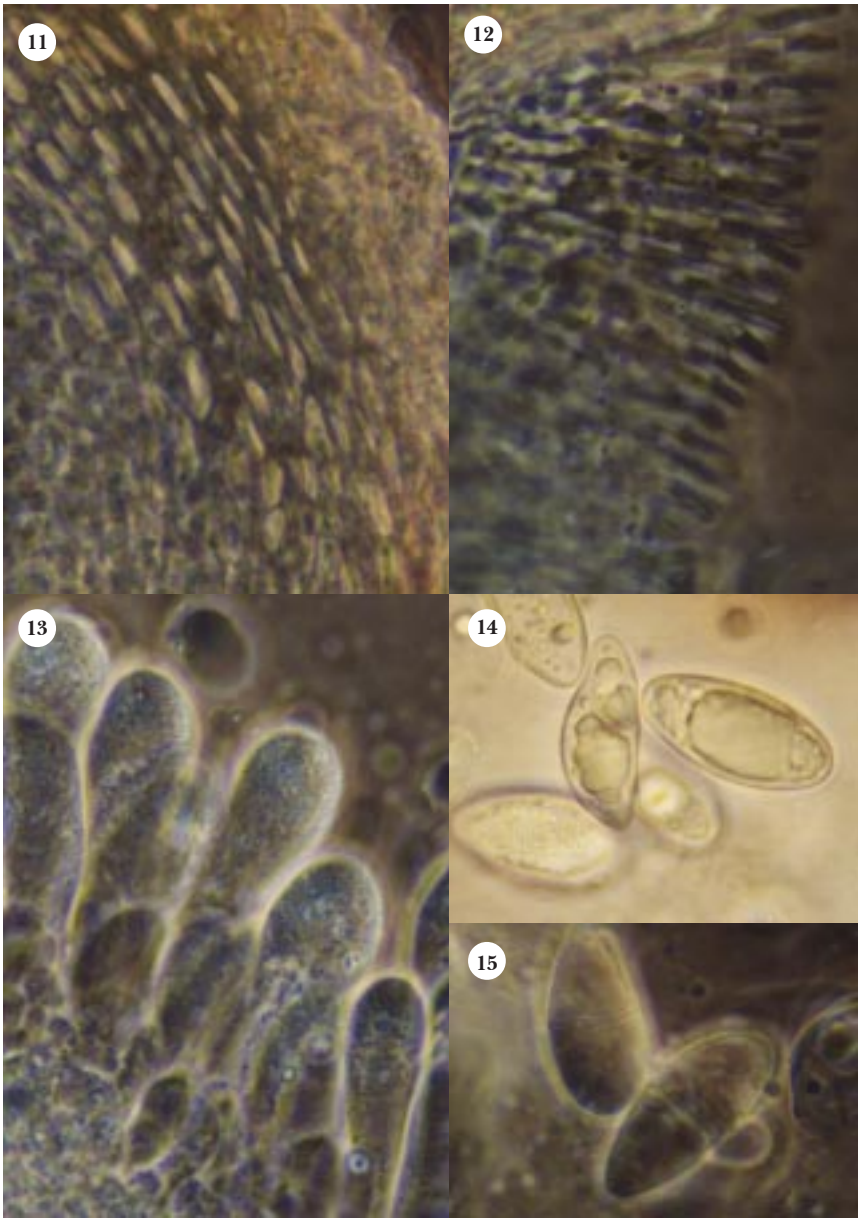
1. Vertical section of thallus (*V. parmigerella)*, magn.: 200 x, **2.** *V. baldensis*, magn.: 200 x , **3.** *V. marmorea*, magn.: 400 x, 4. Photobiont - *Trebouxia* (*V. baldensis)*, magn.: 1000 x.



5, 6. Macrosphaeroidal cells (*V. baldensis*), magn.: 1000 x, **7.** magn.: 200 x, **8.** Vertical section of ascocarp (*V. baldensis*), magn.: 400 x,

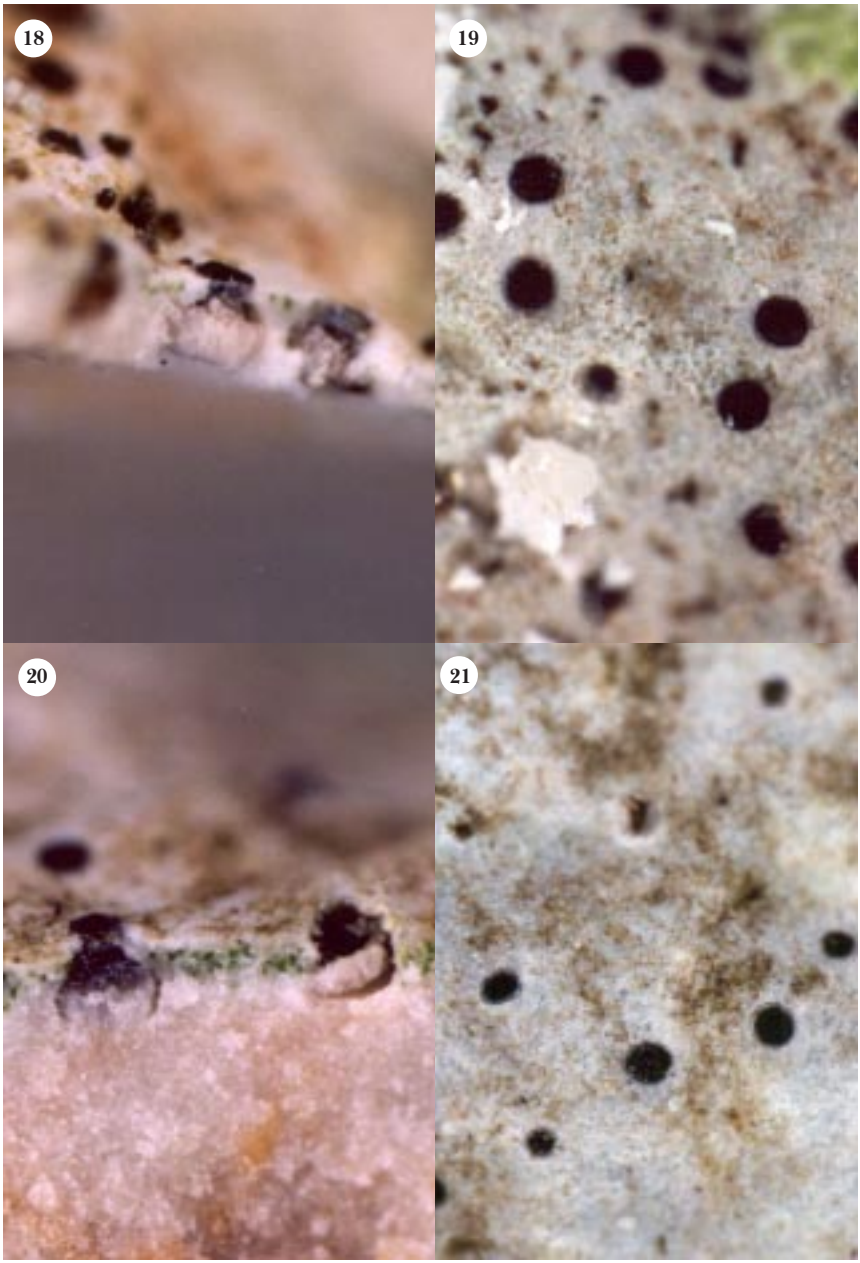


9. Vertical section of involucrellum (*V. marmorea*), magn.: 400 x,
10. Vertical section of ascocarp (*V. parmigerella*), magn.: 400 x.

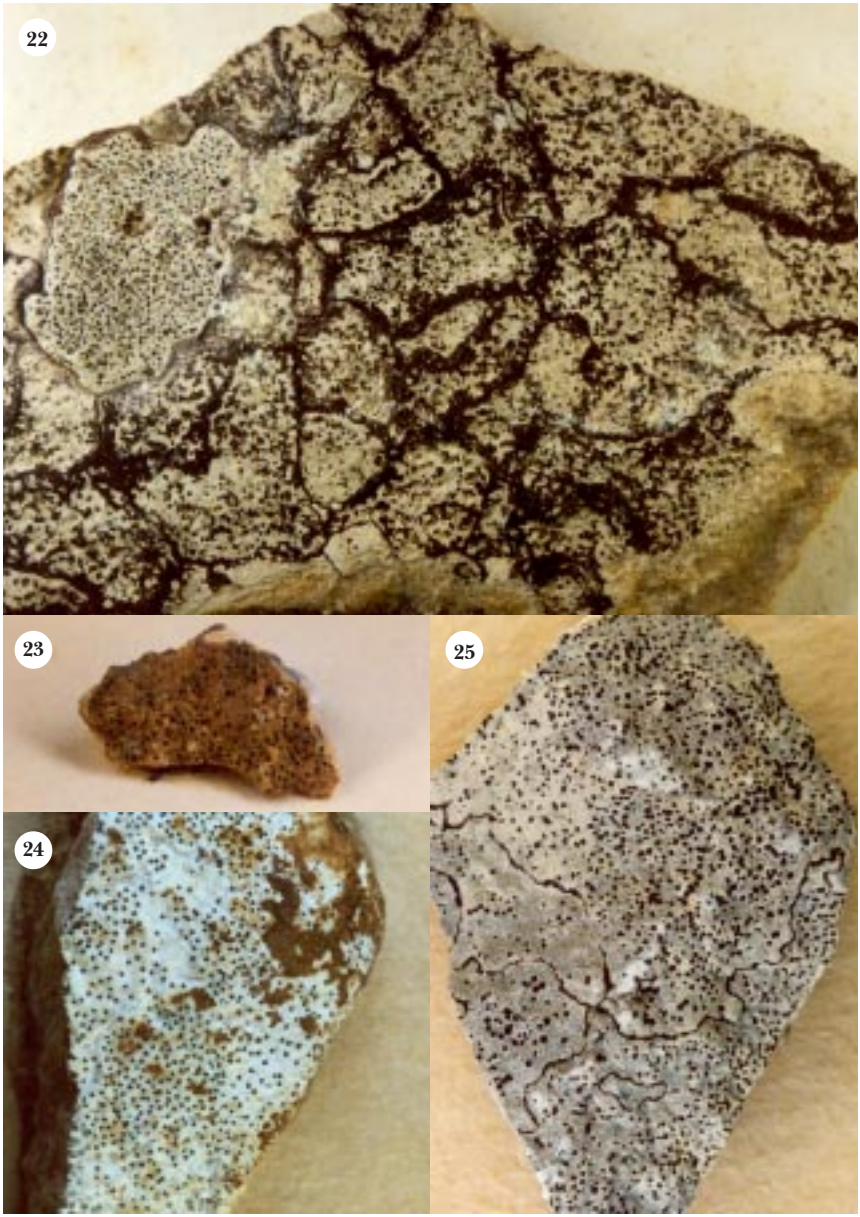


11. Vertical section of excipulum (*V. baldensis*) magn.: 1000**, 12.** Periphyses (*V. baldensis*), magn.: 1000 x, **13.** Growing asci (*V. baldensis*), magn.: 1000 x, **14.** Ascospores (*V. baldensis*), magn.: 1000 x, **15.** Ascospores (*V. parmigerella*), magn.: 1000 x.

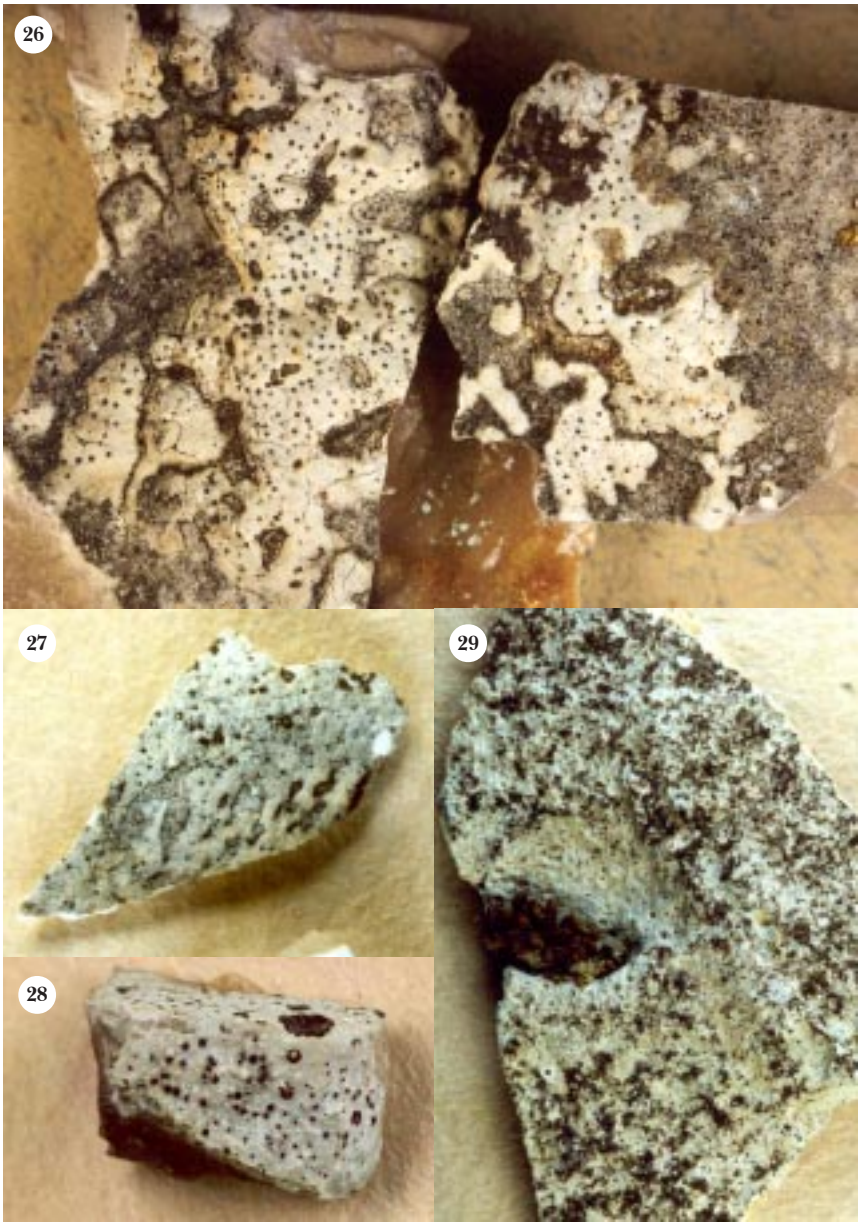
16. *V. baldensis*, magn. 4:1. **17.** *V. baldensis* (up) and *V. parmigerella* (down), magn. 4:1.



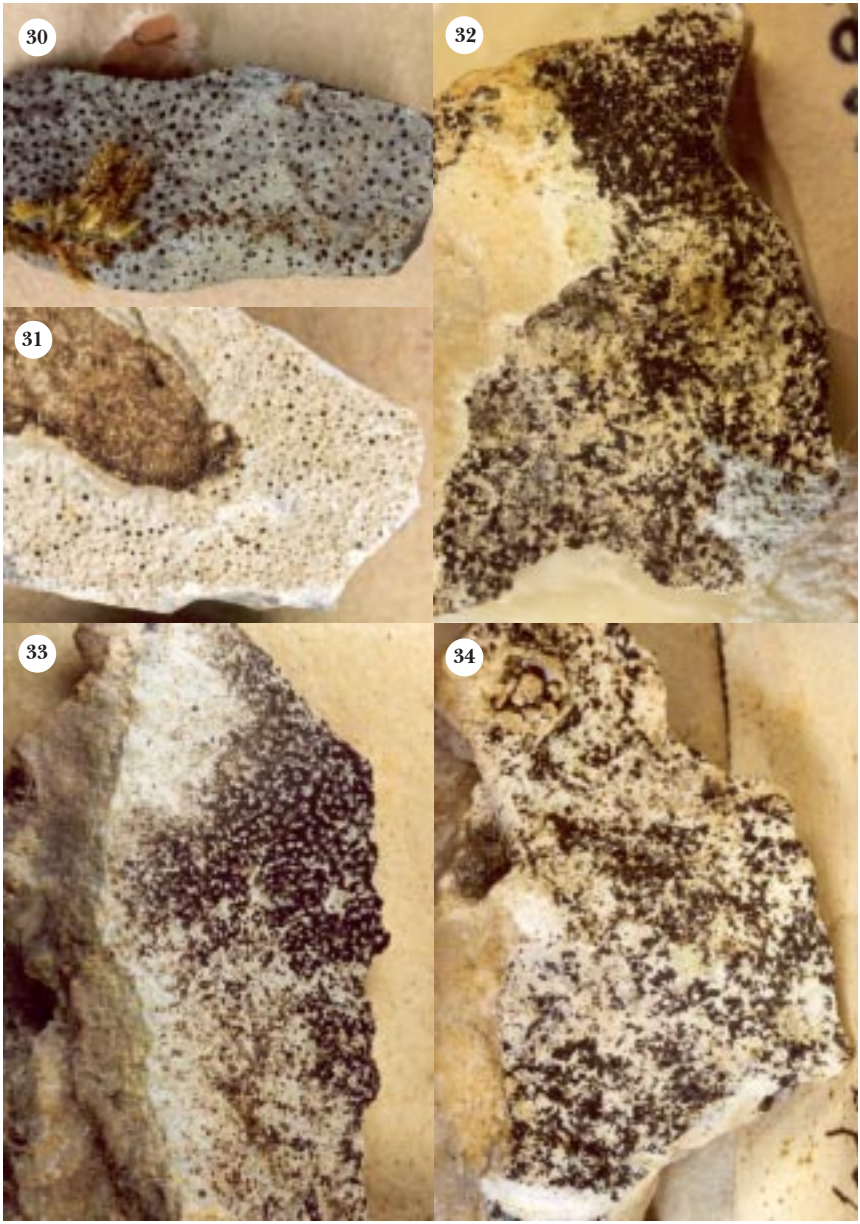
18, 19. *V. baldensis*, magn. 30:1, **20, 21.** *V. parmigerella*, magn. 30:1.



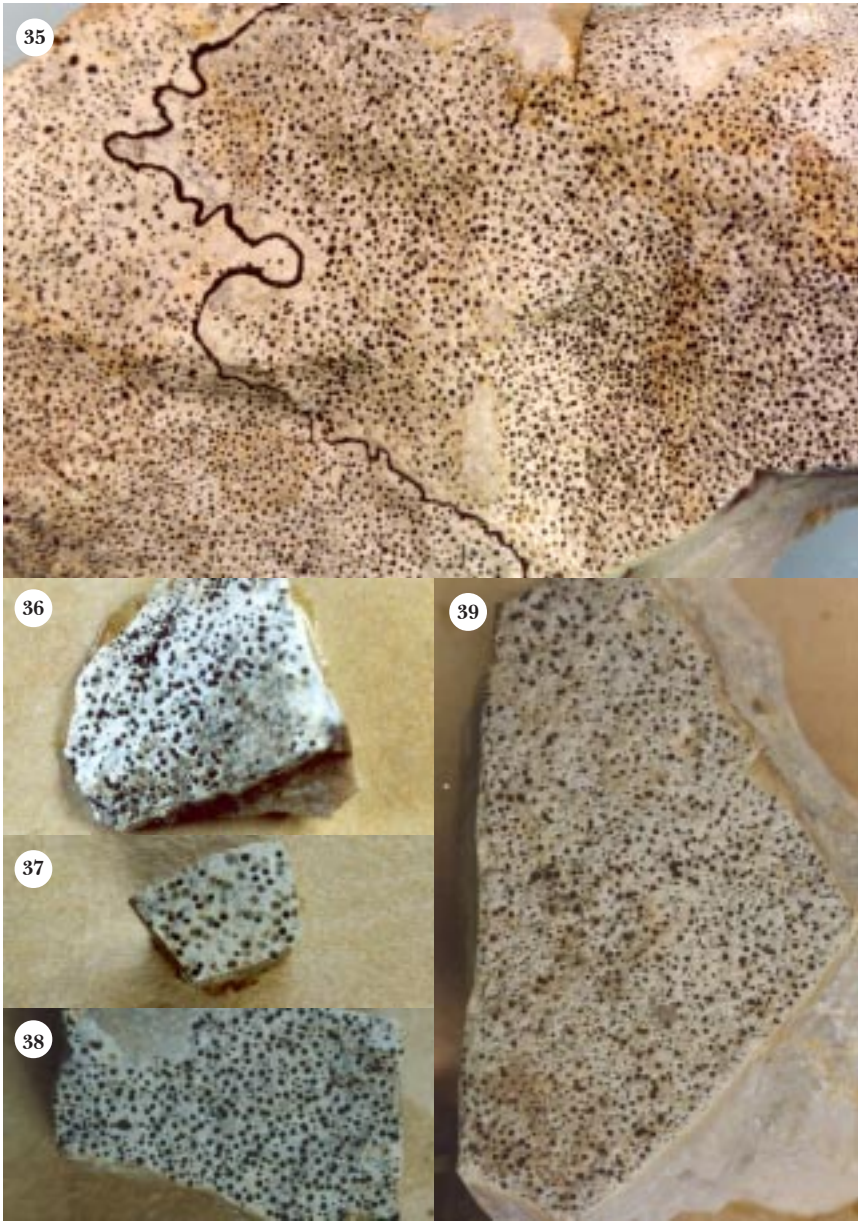
22. *V. baldensis* - VER – lectotypus. **23.** *Protobagliettoa lactea* var. *ochracea* - PRM-757631 – lectotypus. **24.** *V. bagliettoaeformis* var. *istriana* - PRM-756855 – holotypus. **25.** *V. bagliettoaeformis* var. *caesia* - PRM-758654 – lectotypus.



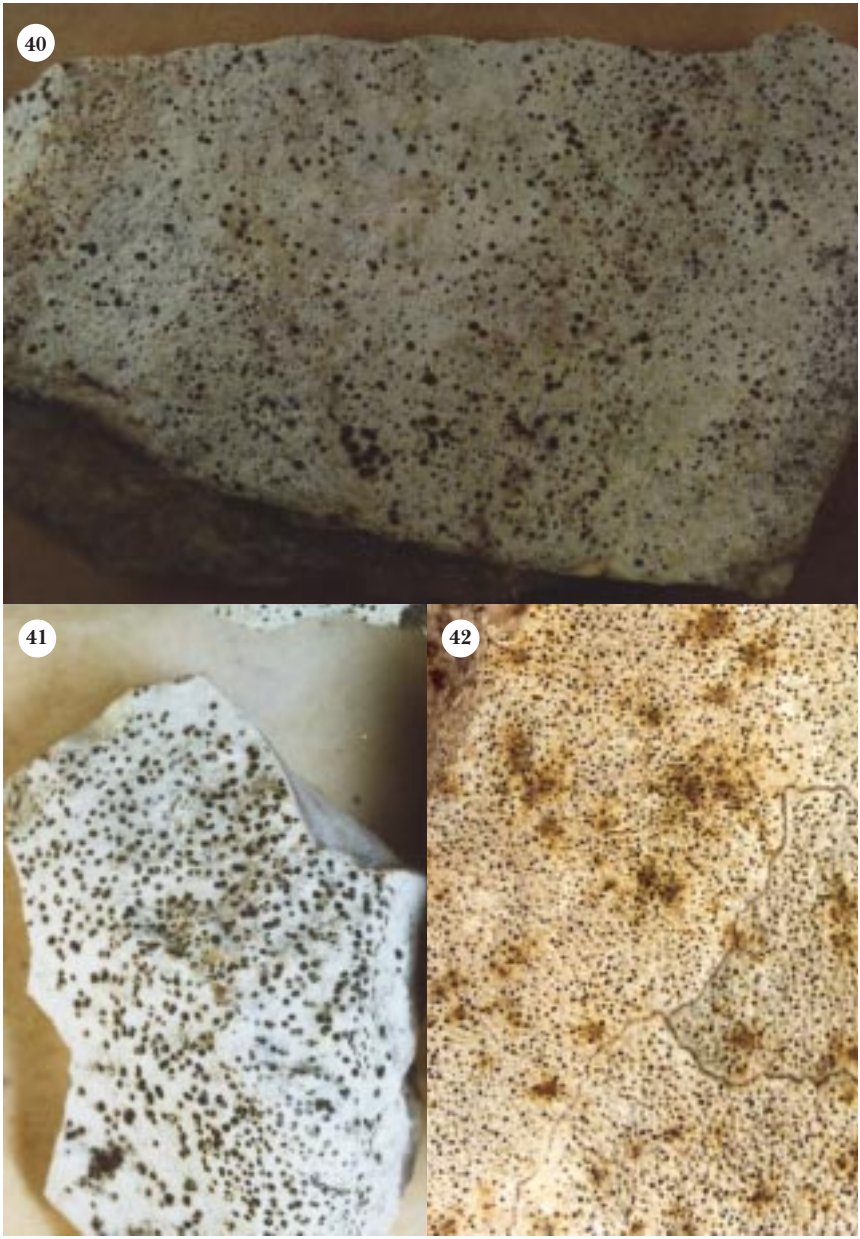
26, 27. *V. bagliettoaeformis* var. *pseudointerrupta* f. *arbensis*: **26.** BP – holotypus. **27.** PRM-756854 – isotypus. **28.** *V. baldensis* var. *canici* - PRM-757322 – holotypus. **29.** *V. baldensis* var. *canici* f. *bakonyensis* - PRM-756851 – lectotypus.



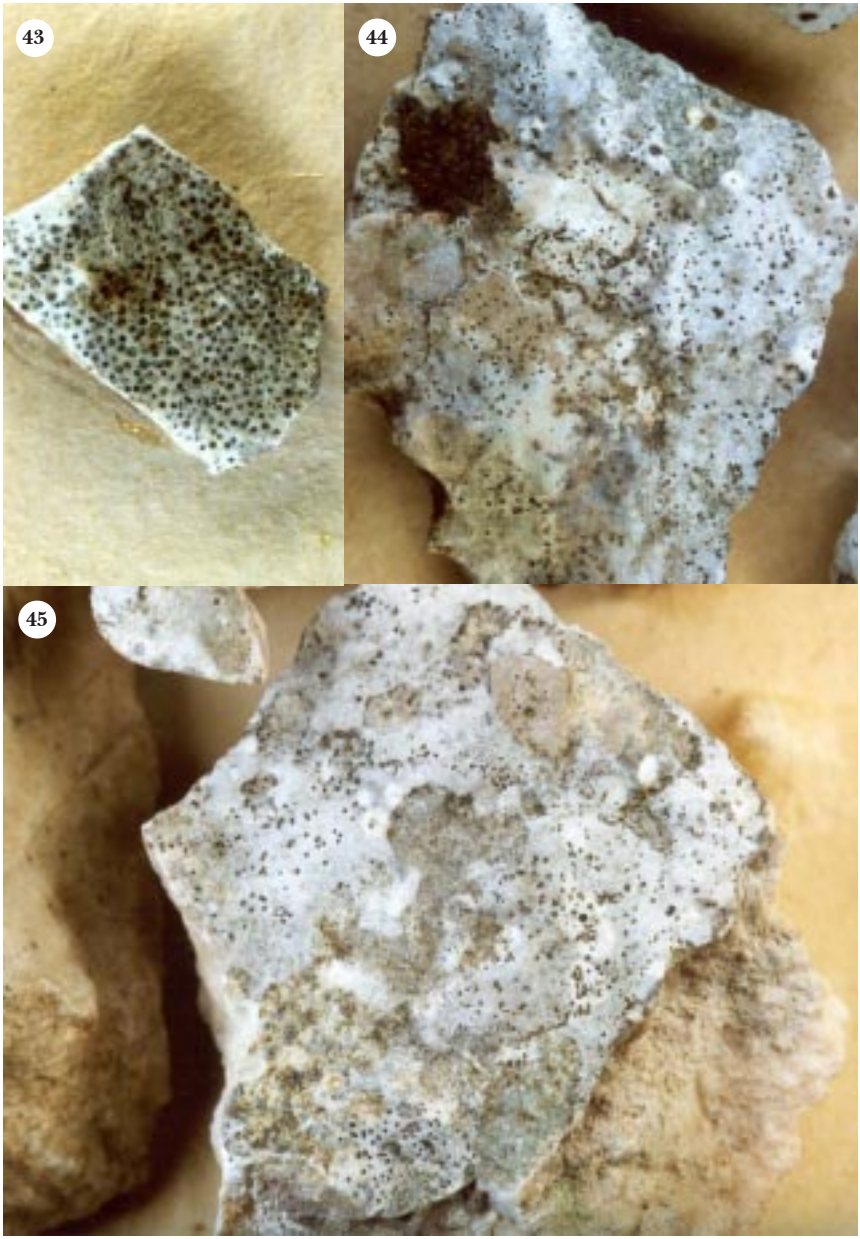
30. *V. baldensis* var. *canici* f. *incavatula* - PRM-757475 – holotypus. **31.** *V. baldensis* var. *cretzoiui* - PRM-757354 – holotypus. **32-34.** *V. baldensis* var. *spilomatica*. **32.** M-0024475. **33.** isolectotypus, VER – lectotypus. **34.** M-0024476 – isolectotypus.



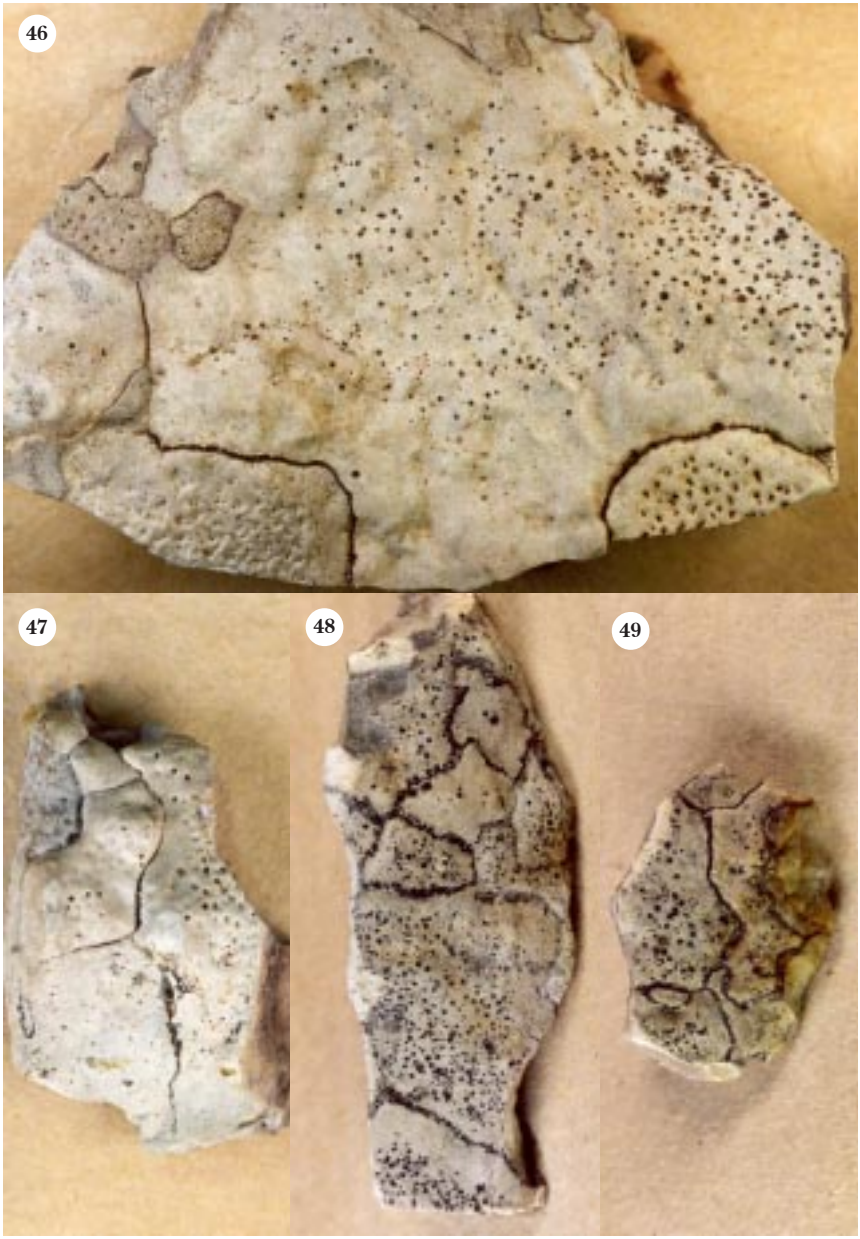
35, 36. *V. bosniaca.* **35.** W-3792 – holotypus. **36.** PRM-756856 – isotypus. **37.** *V. bosniaca* f. *incavata* - PRM-756857 – holotypus. **38.** *V. bosniaca* f. *sinaiensis* - PRM-756823 – holotypus. **39.** *V. bosniaca* var. *cretzoiuana* - PRM-757416 – holotypus.



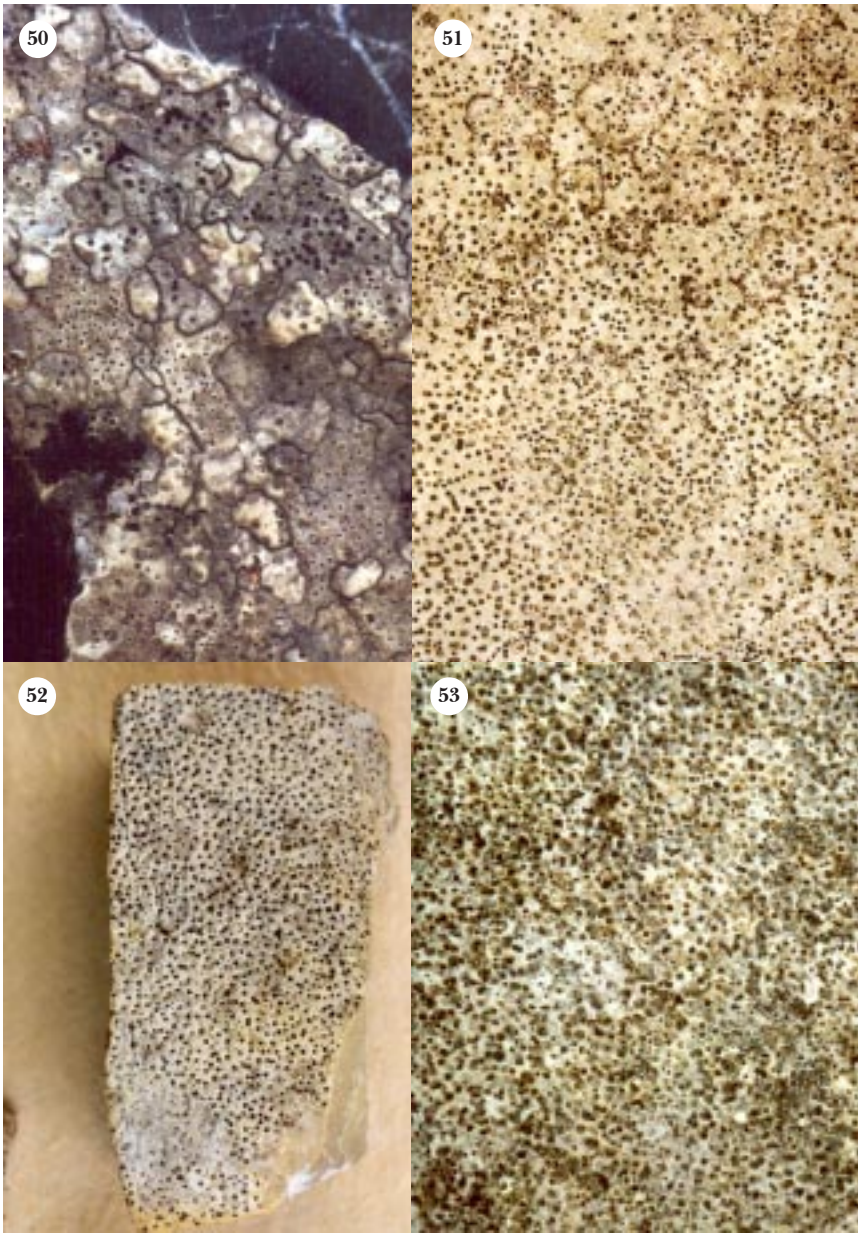
40. *V. bosniaca* var. *cretzoiuana* - W-3399 – isotypus. **41.** *V. bosniaca* var. *lovcenensis* - PRM-756859 – holotypus. **42.** *V. bosniaca* var. *lovcenensis* f. *albae* - M-0024473 – holotypus.



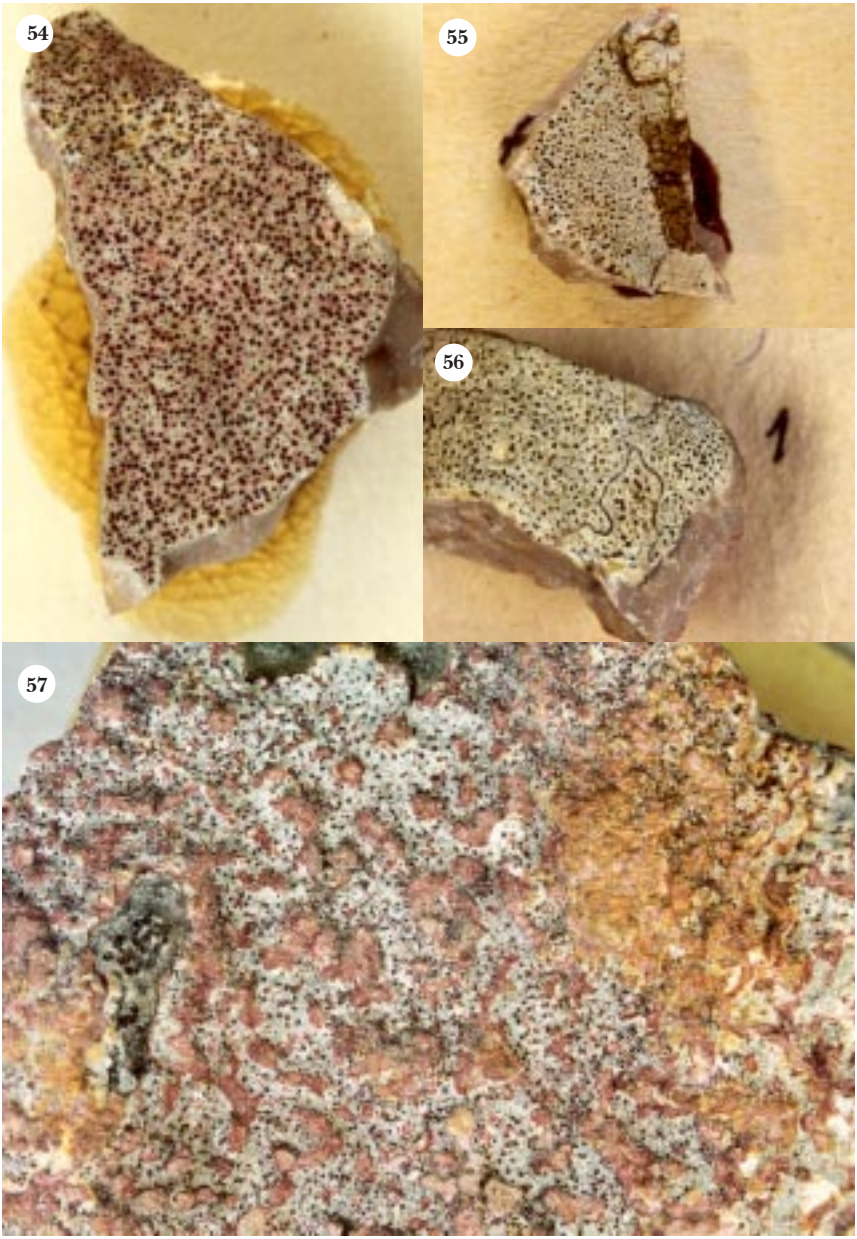
43. *V. bosniaca* var. *lovcenensis* f. *albae* - PRM-756868 – isotypus. **44, 45.** *V. bosn.* var. *lovcen.* f. *plumbea*. 44. PRM-758652 – holotypus. 45. PRM-758652 – isotypus.



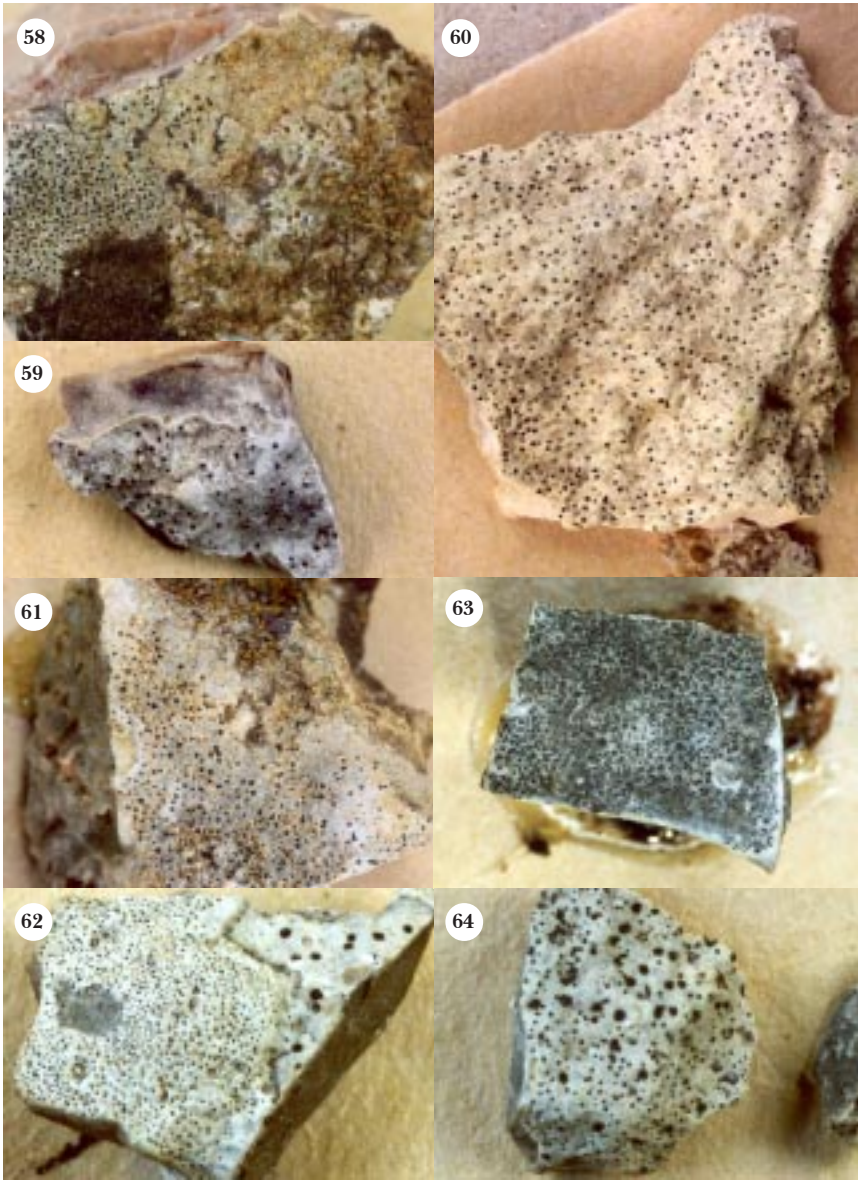
46. *V. bosniaca* var. *mirovensis* - PRM-758653 – holotypus. **47.** *V. bosniaca* var. *romanica* - PRM-757280 – holotypus. **48, 49.** *V. calciseda* f. *alocyza*. **48.** PRM – lectotypus. **49.** W - isolectotypus.



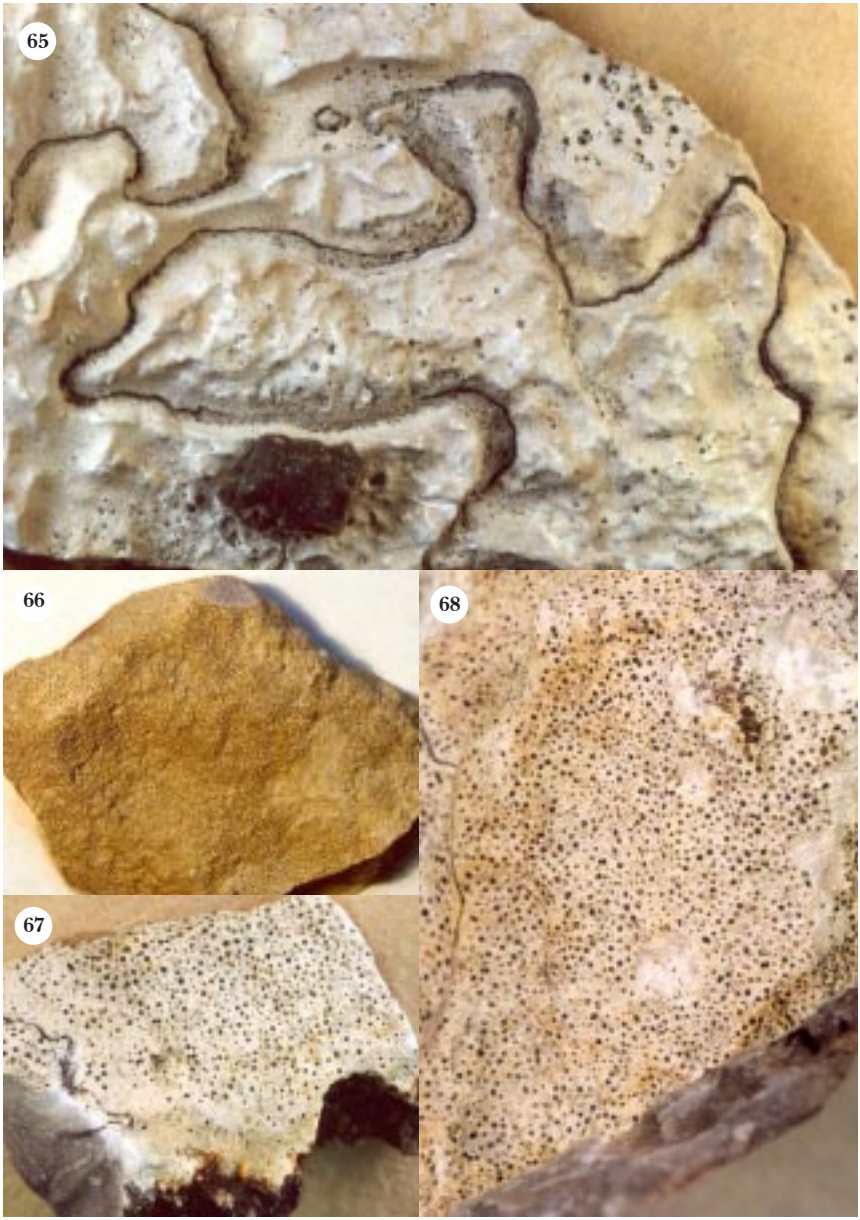
50. *V. calciseda* f. *insculptoides* - W-1903-11150 – holotypus. **51-53.** *V. calciseda* var. *lactea*. **51.** M-0024499 – lectotypus. **52.** PRM-757593 – isolectotypus. **53.** W-9427 – isolectotypus.



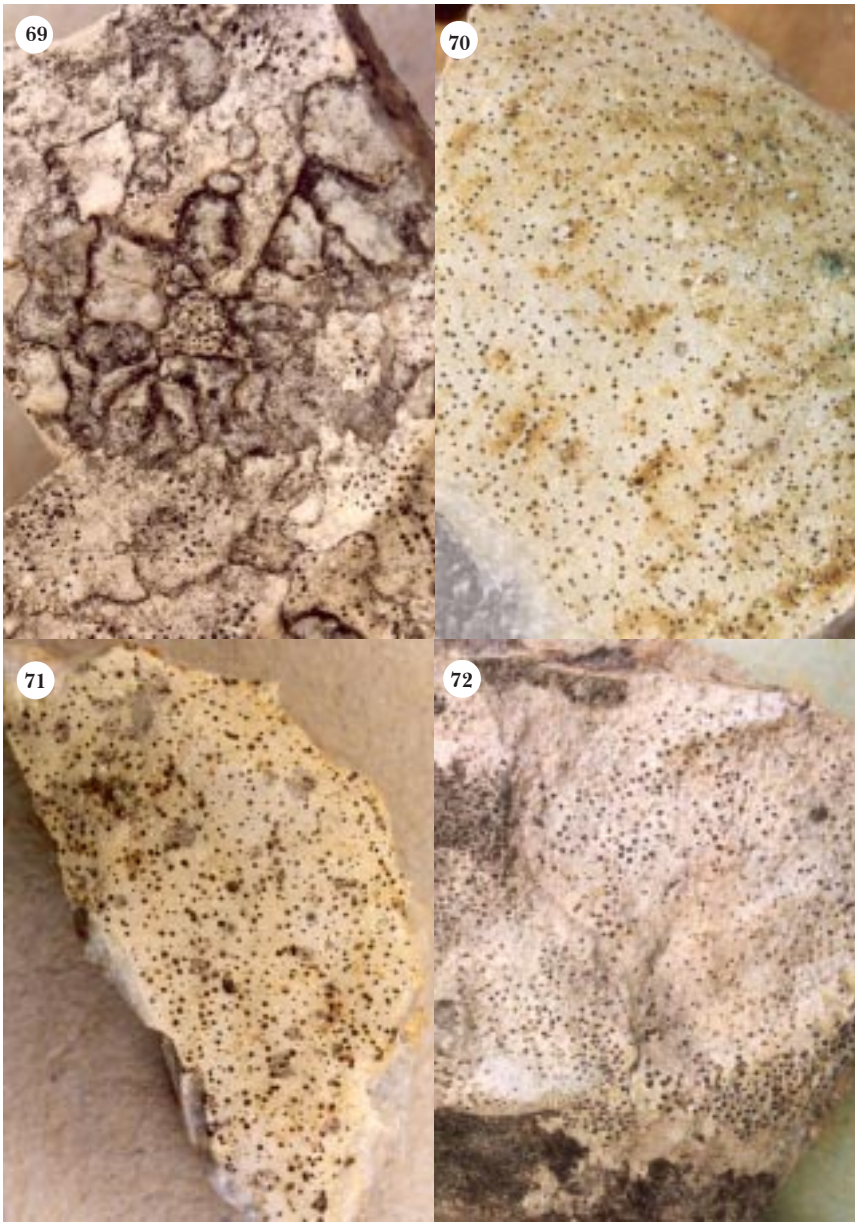
54. *V. cazzae* f. *dealbata* - PRM-644842 – holotypus. **55, 56.** *V. dalmatica*. **55.** PRM-756698 – holotypus. **56.** PRM-644909 – isotypus. **57.** *V. cazzae* var. *graeca* - W - holotypus.



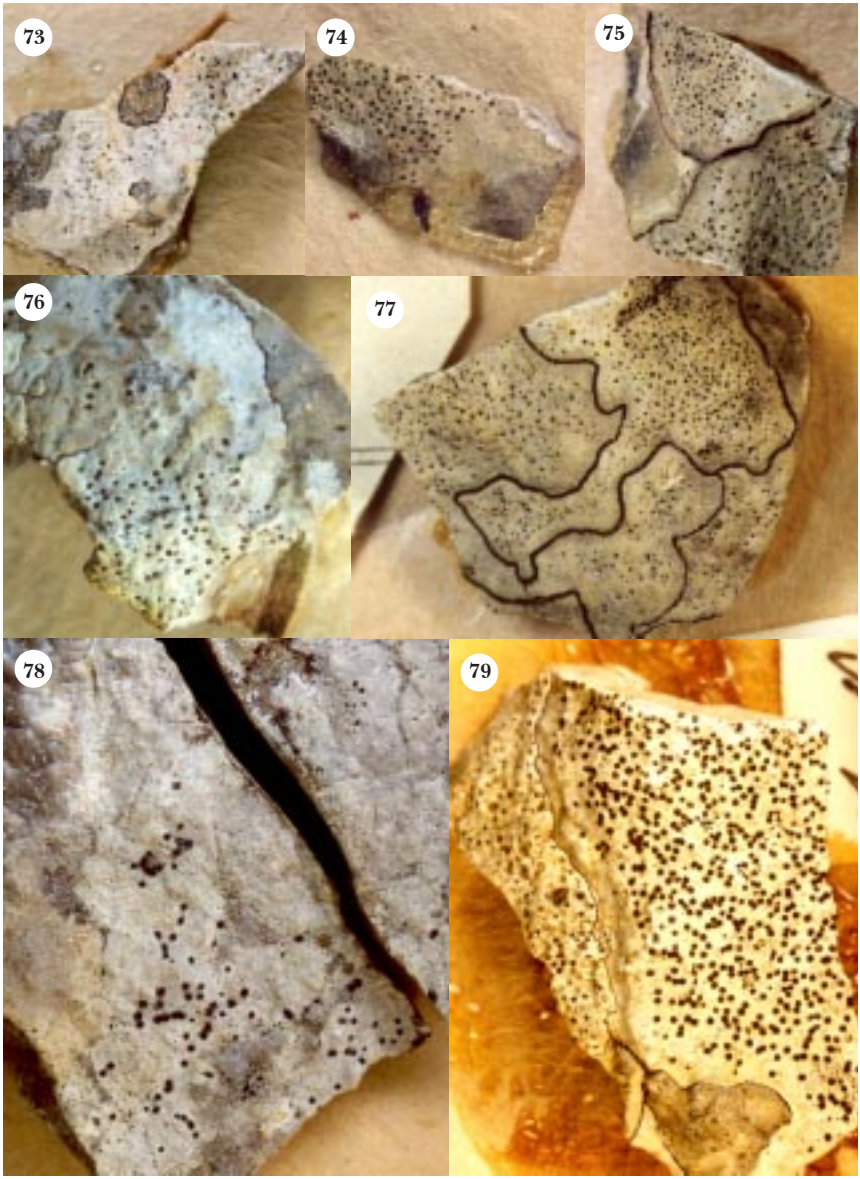
58. *V. dalmatica* - PRM-756965 – isotypus. **59.** *V. grummanni* - PRM-757278 – holotypus. **60, 61.** *V. gyelnikii* - BP – holotypus, PRM-757201 – isotypus. **62.** *V. gyelnikii* f. *alanensis* - PRM-756865 – holotypus. **63, 64.** *V. gyelnikii* f. *obscurata.* **63.** PRM-756702 – holotypus. **64.** PRM-783882 – isotypus.



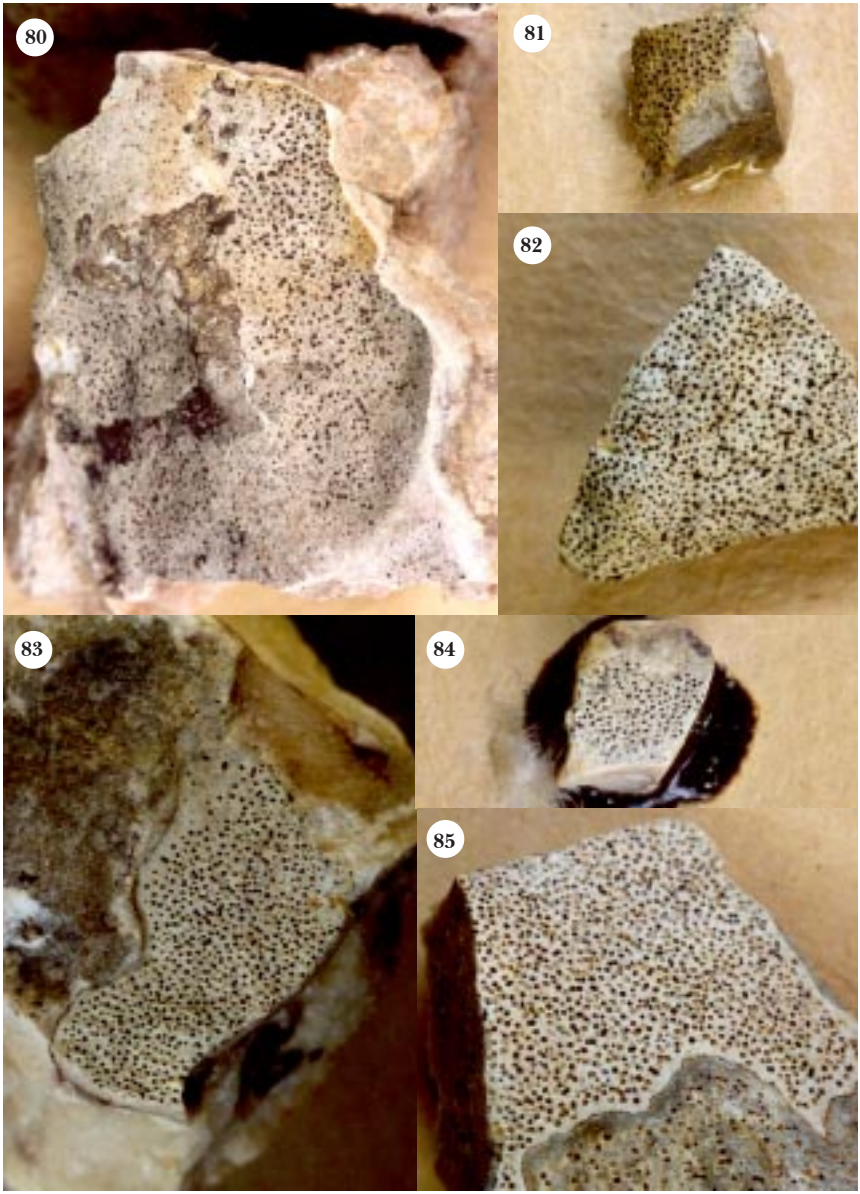
65. *V. gyeln.* var. *velebitica* f. *sulcata* - PRM-756701 – holotypus. **66.** *V. inaequata* f. *helvetica* - M – lectotypus, magn. 1:1. **67, 68.** *V. inaequata* var. *bercht.* **67.** PRM-757505 – isotypus. **68.** WU – holotypus.



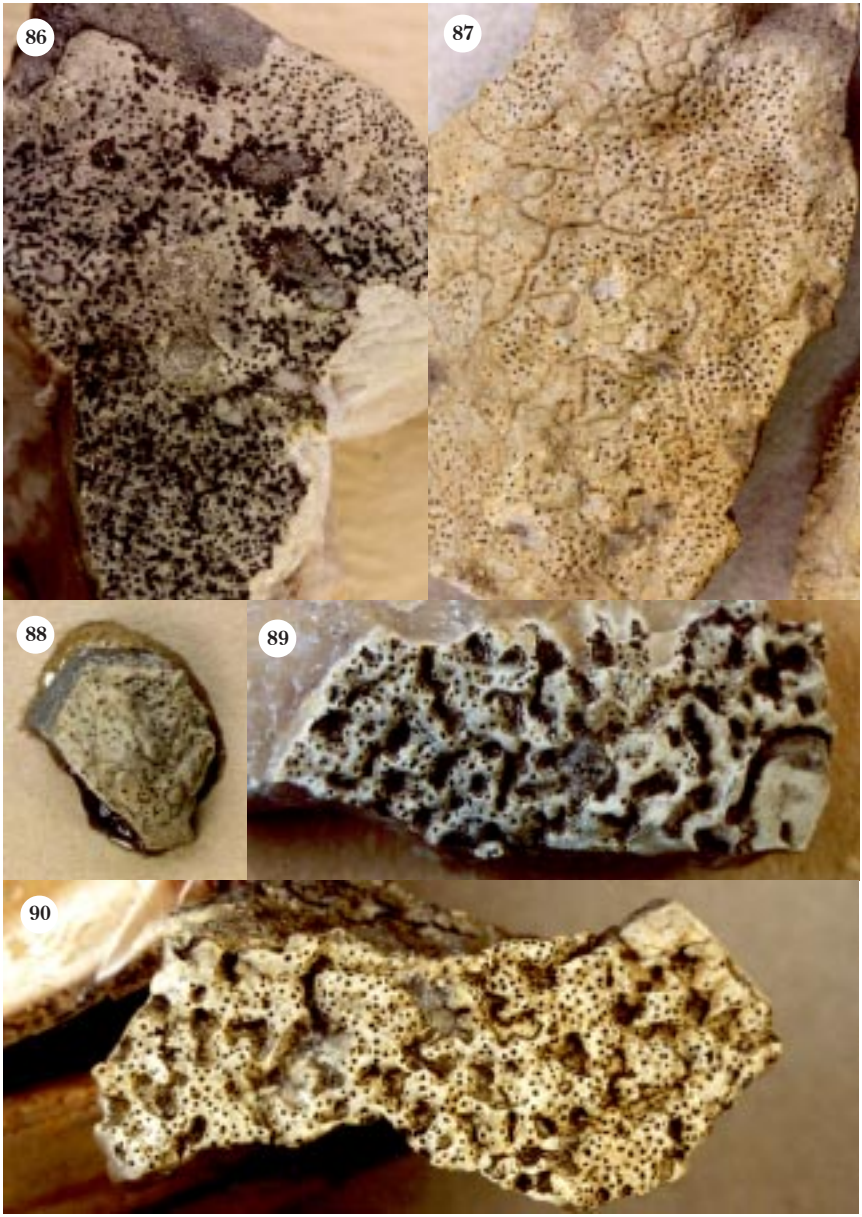
69. *V. inaequata* var. *kuemmerleana* - BP – holotypus. **70, 71.** *V. inaequata* var. *transsilvanica.* **70.** PRM-757482 – lectotypus. **71.** PRM-757494 – isolectotypus. **72.** *V. inaeq.* var. *transsilv.* f. *expallens* - WU-00-68/8 – holotypus.



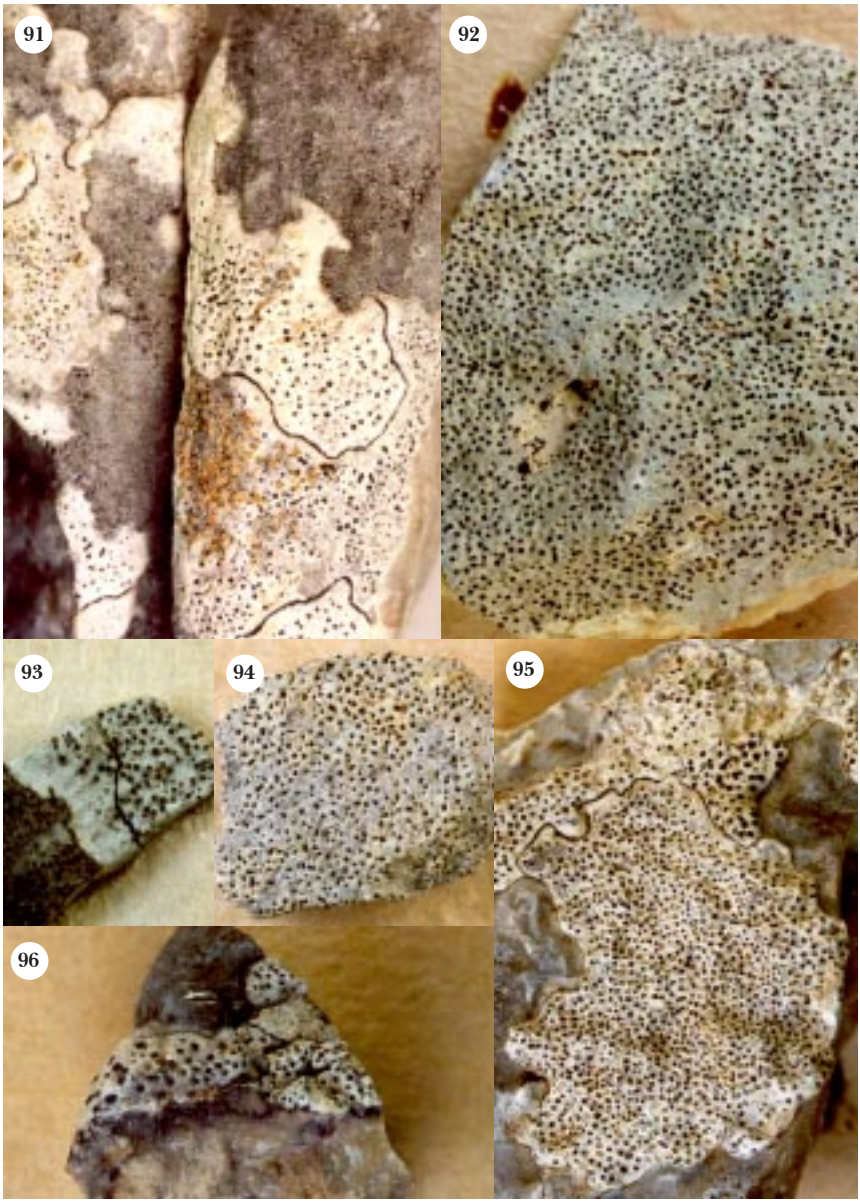
73. *V. inaeq.* var. *transsilv.* f. *expallens* - PRM-757250 – isotypus. **74.** *V. parmigera* - PRM-758127 – lectotypus. **75, 77.** *V. parmigera* f. *geographica*. **75.** PRM-757244 – isotypus. **77.** PRM-645238 – holotypus. **76.** *V. inaequata* var. *triglavensis* - PRM-756700 – holotypus. **78.** *V. parmigera* f. *nigroaureolata* - PRM-757913 – holotypus. **79.** *V. parmigera* var. *adriatica* - PRM-645283 – holotypus.



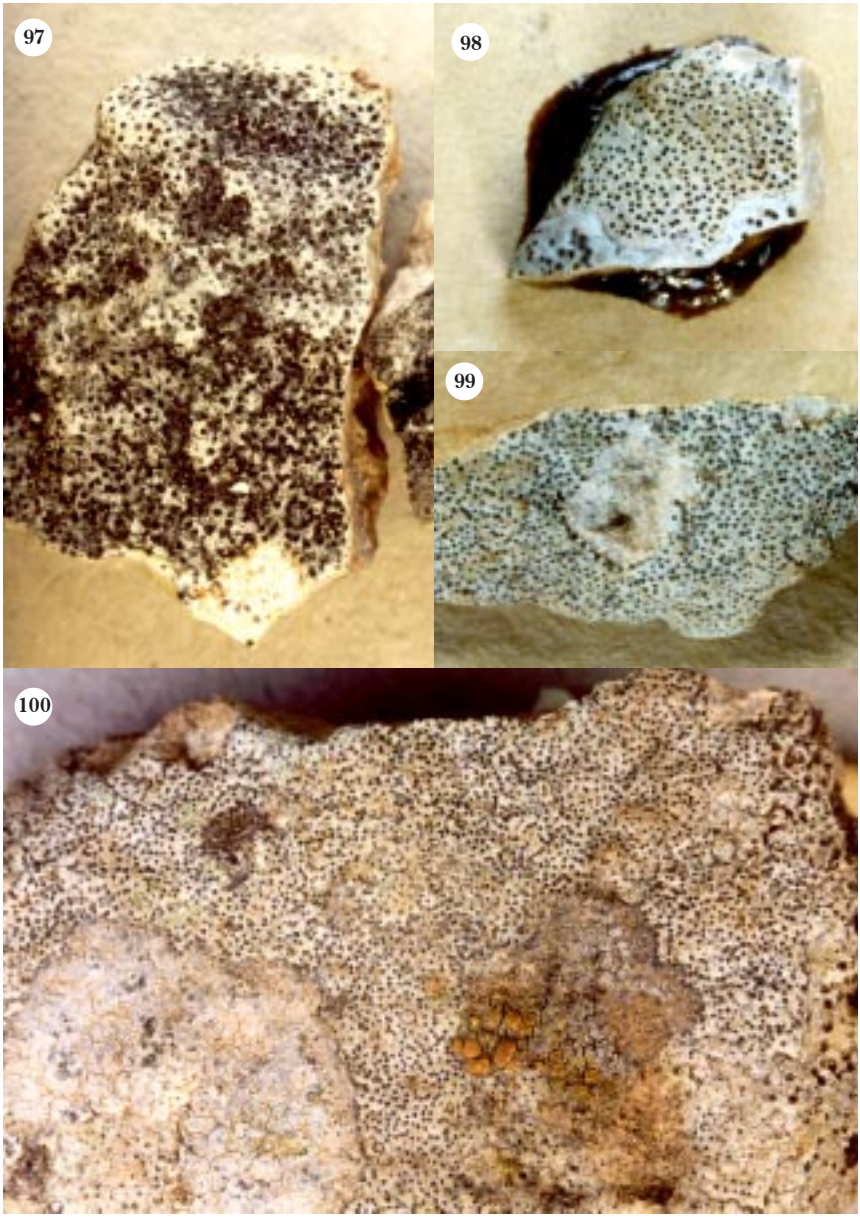
80. *V. parmigera* var. *bohemica* - PRM-757221 – holotypus. **81.** *V. parmigera* var. *calcivoroides* - PRM-758067 – lectotypus. **82.** *V. parm.* var. *calciv.* f. *arnoldiana* - PRM-758185 – lectotypus. **83, 84.** *V. parmigera* var. *calcivoroides* f. *biokovensis.* **83.** WU – holotypus. **84.** PRM-757239 – isotypus. **85.** *V. parmigera* var. *calciv.* f. *elegans* - PRM-758238 – holotypus.



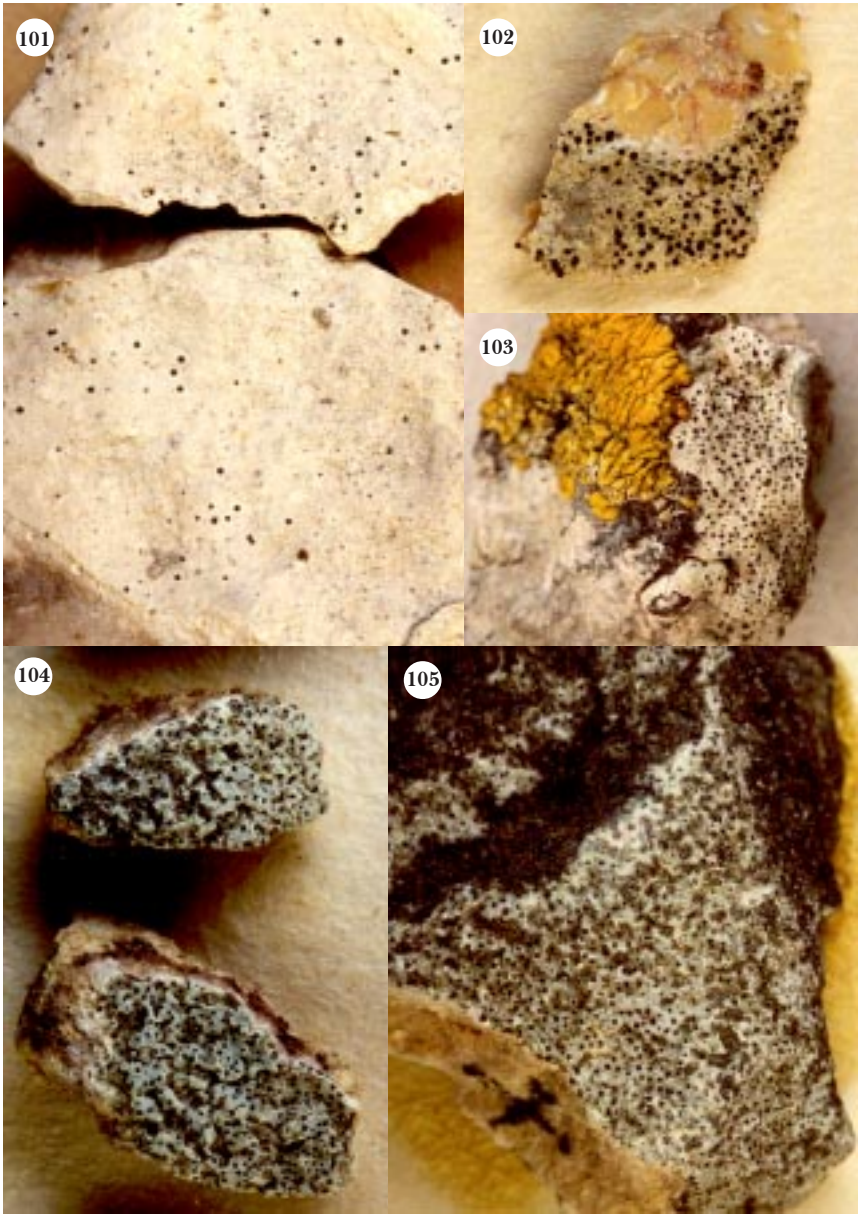
86. *V. parmigera* var. *calciv.* f. *kierkiensis* - PRM-758178 – holotypus. **87, 88.** *V. parm.* var. *circumarata*. **87.** WU-00-68/11 – holotypus. **88.** PRM-757212 – isotypus. **89, 90.** *V. parmigera* var. *dvorakii*. **89.** PRM-758245 – holotypus. **90.** PRM-645237 – isotypus.



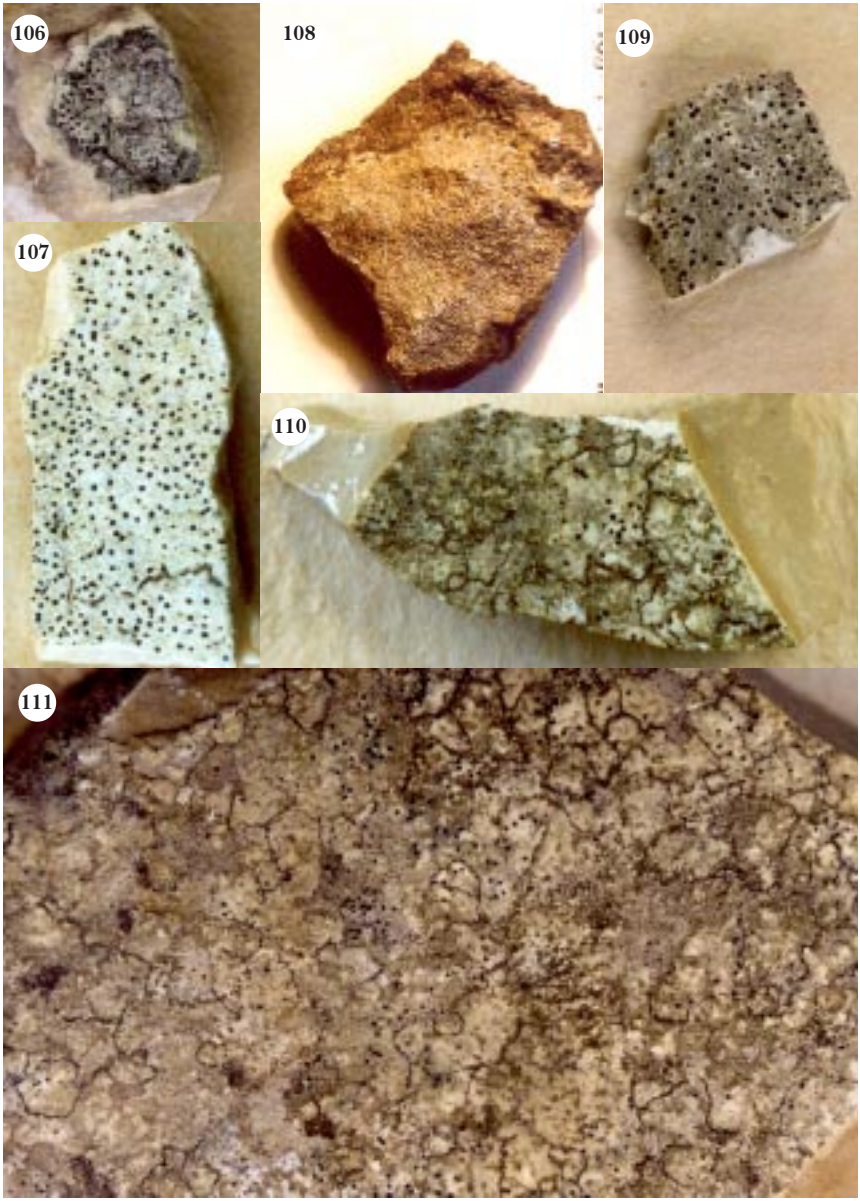
91. *V. parmigera* var. *forissi* - PRM-758651 – holotypus. **92.** *V. parmigera* var. *gyelnikiana* - PRM-758181 – holotypus. **93.** *V. parmigera* var. *hazslinszkyi* - PRM-756860 – holotypus. **94.** *V. parmigera* var. *hilitzeri* - PRM-758253 – holotypus. **95.** *V. parm.* var. *lap.* f. *subcomposita* - PRM-758235 – holotypus. **96.** *V. parmigera* var. *lapadensis* - PRM-758246 – holotypus.



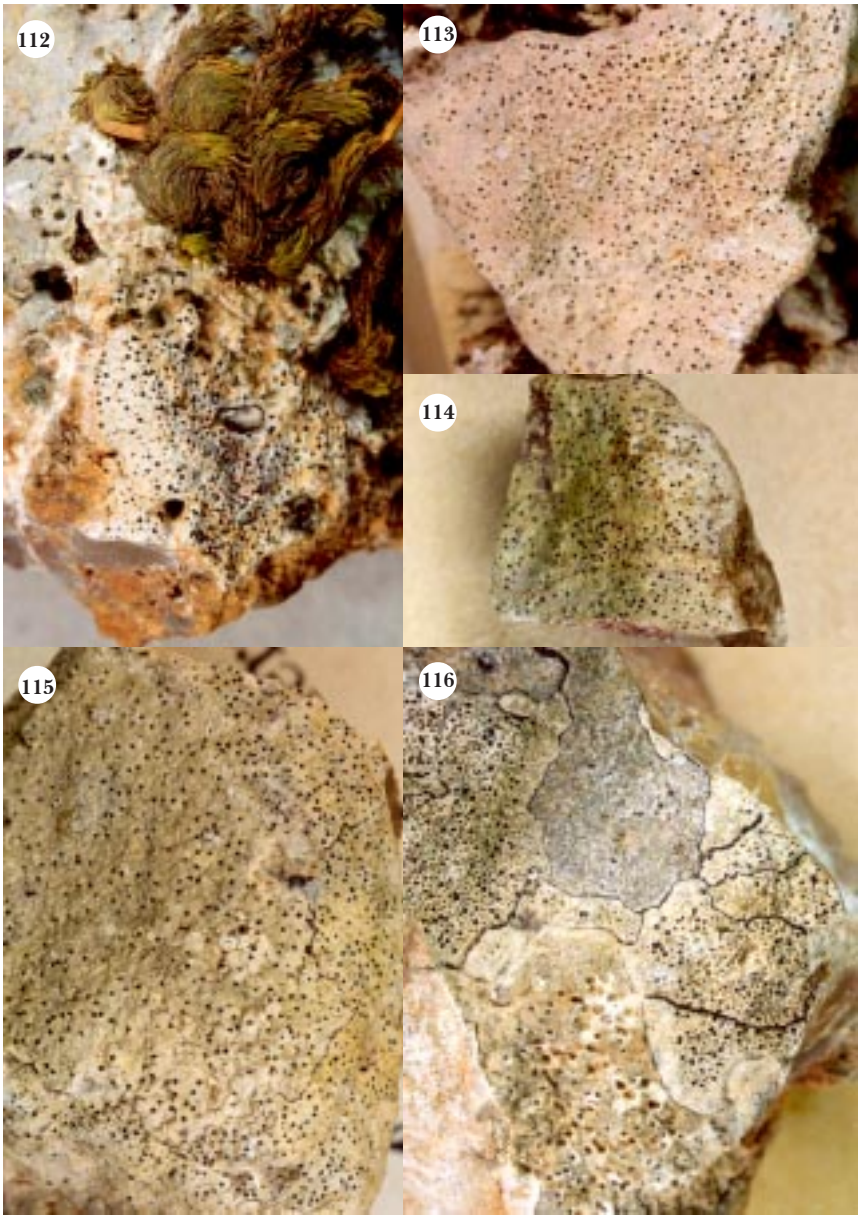
97. *V. parmigera* var. *sinensis* - WU-2730 – holotypus. **98.** *V. parmigera* var. *subrosea* - PRM-756705 – holotypus. **99, 100.** *V. pinguis* f. *dealbata.* **99.** PRM-756852 – isotypus. **100.** WU-00-68/5 – holotypus.



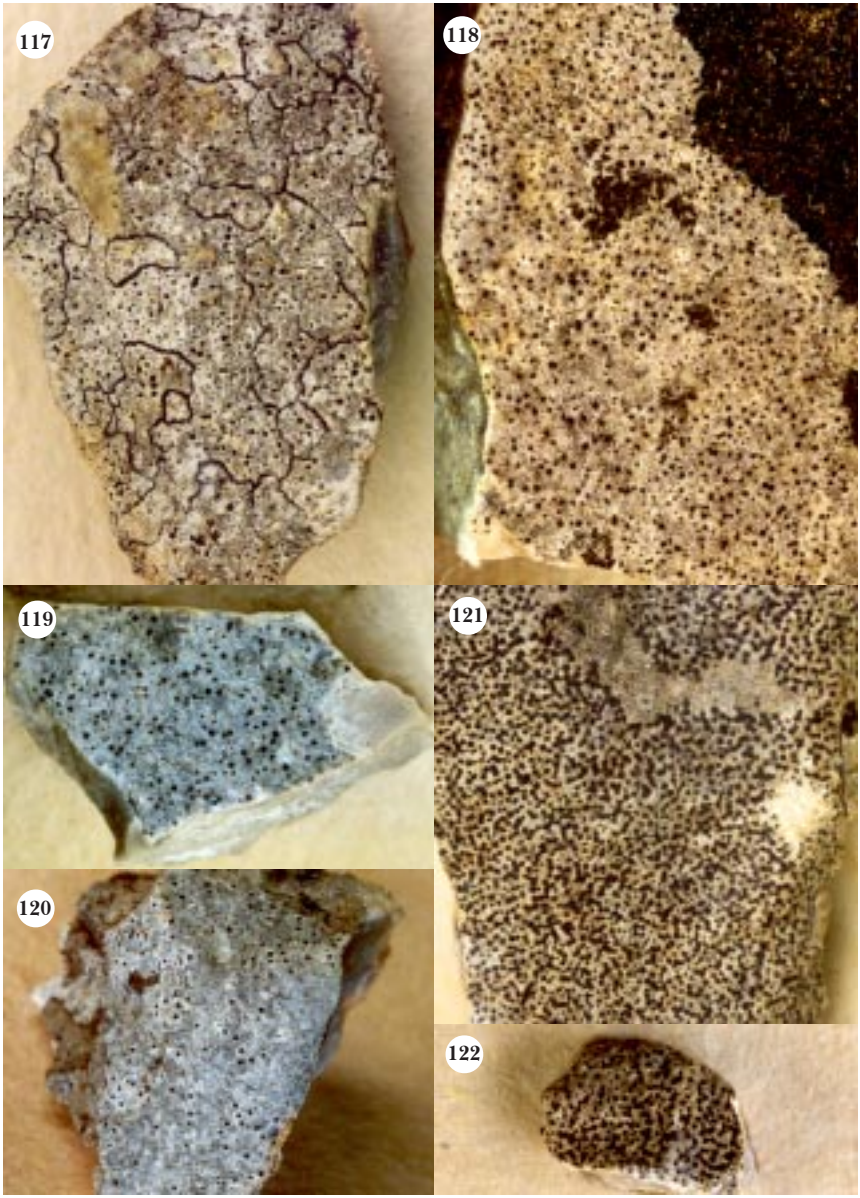
101. *V. serbica* - PRM-645092 – holotypus. **102.** *V. sphinctrina* f. *gallica* - PRM-645317 – holotypus. **103.** *V. sphinctrina* var. *lojkae* - BP – holotypus. **104, 105.** *V. sphinct.* f. *pseudo-interrupta.* **104.** PRM-757046 – holotypus. **105.** PRM-645337 – isotypus.



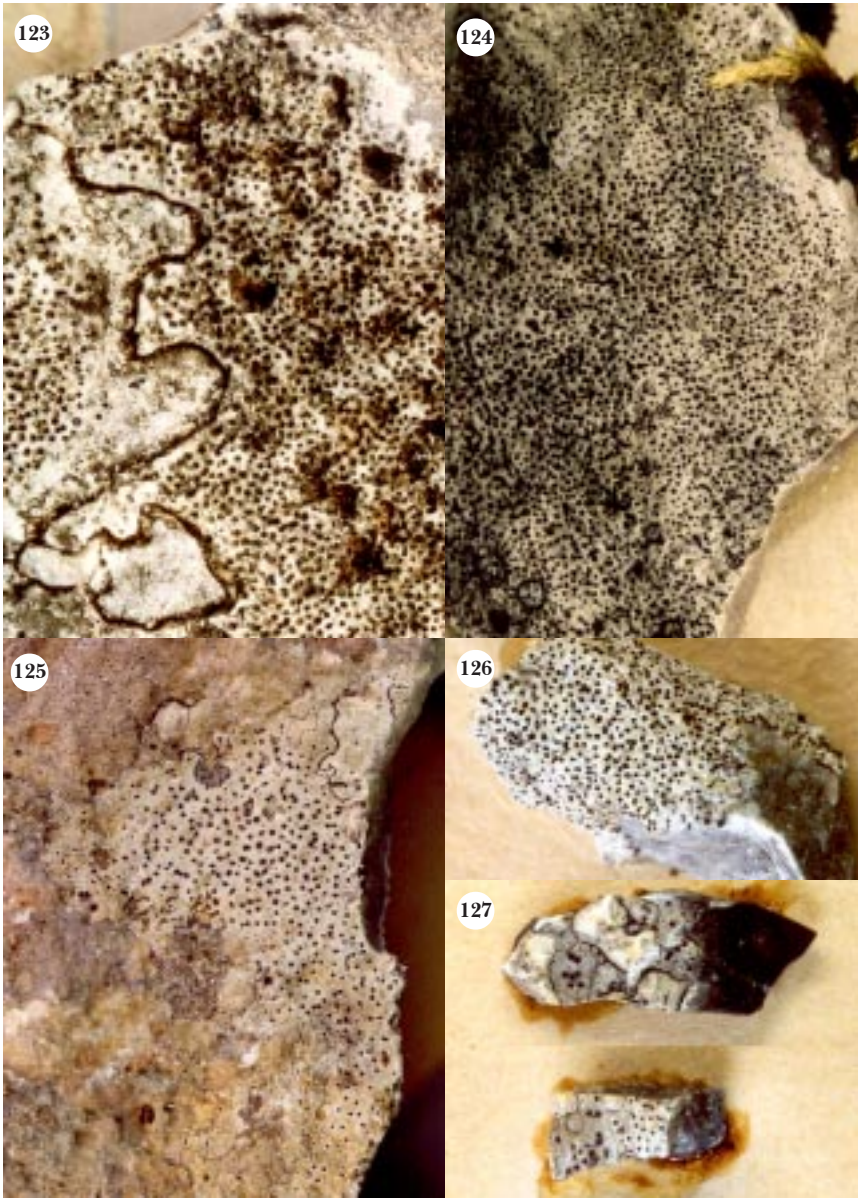
106. *V. sphinct.* var. *aloc.* f. *domogled.* - PRM-757733 – holotypus. **107.** *V. steineri* f. *turgescens* - PRM-783686 – holotypus. **108, 109.** *V. steineri* f. *scrobicularis.* **108.** M – lectotypus 1:1. **109.** PRM-783743 – isolectotypus. **110, 111.** *V. steineri* var. *composita.* **110.** PRM-783750 – isotypus. **111.** WU – holotypus.



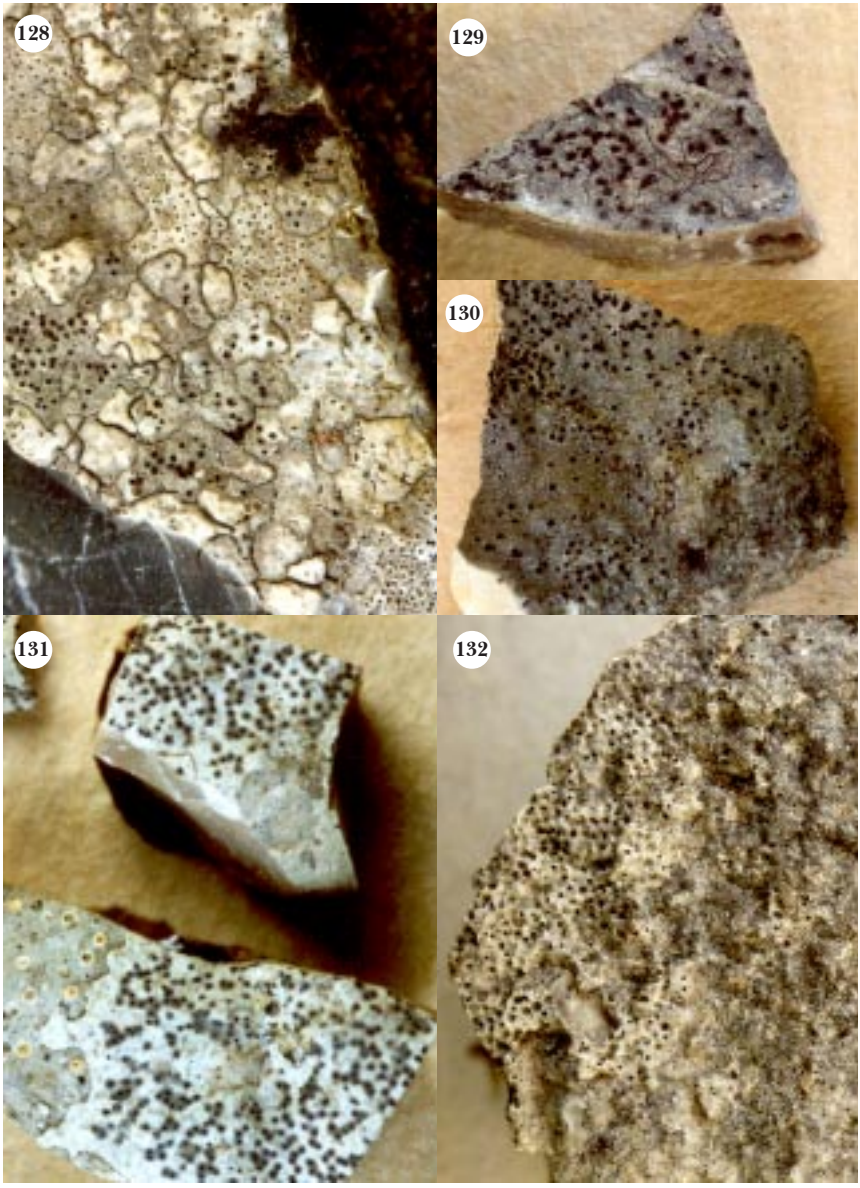
112, 113. *V. steineri* var. *croatica.* **112.** PRM-757610 – holotypus. **113.** PRM-757620 – isotypus. **114, 115.** *V. steineri* var. *lactea* f. *britanica.* **114.** PRM-757594 – isotypus. **115.** WU-00-68/3 – holotypus. **116.** *V. stein.* var. *lact.* f. *geographica* - PRM-757606 – holotypus.



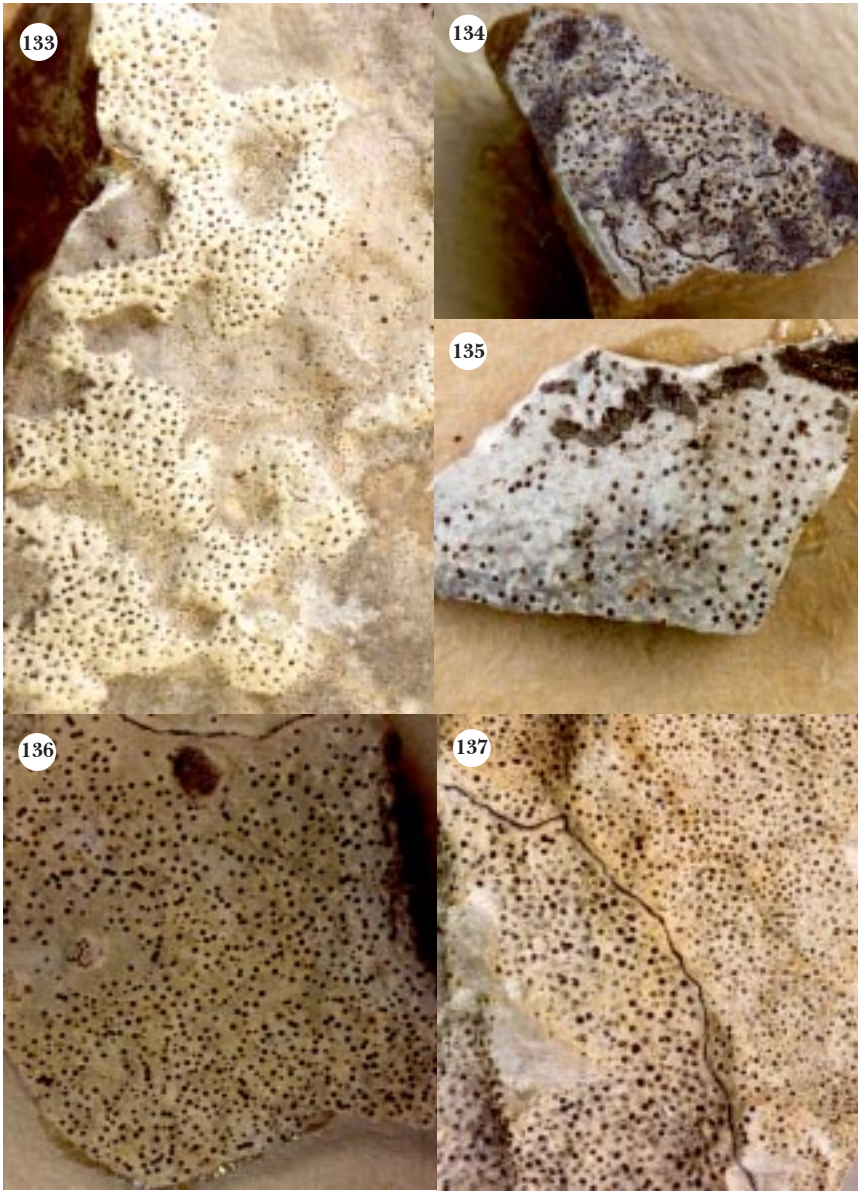
117. *V. steineri* var. *lactea* f. *geo.* - PRM-757605 – isotypus. **118, 119.** *V. steineri* var. *mittenwaldensis* **118.** M-0024472 – holotypus. **119.** PRM-756302 – isotypus. **120.** *V. subconc.* var. *eumacrosph.* - PRM-757978 – holotypus. **121, 122.** *V. subconcentrica* **121.** WU-00-68/2 – holotypus. **122.** PRM-757907 – isotypus.



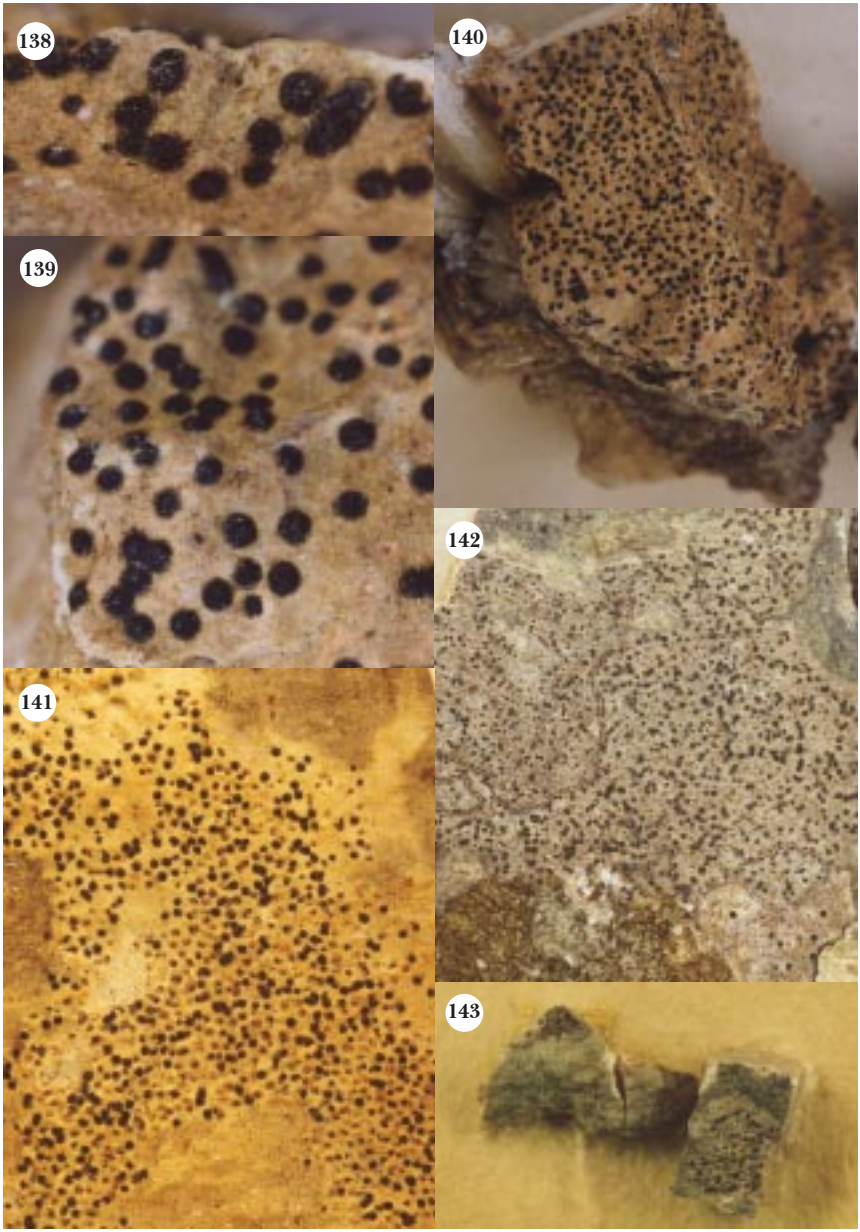
123. *V. subconcentrica* f. *exesa* - PRM-757468 – holotypus. **124.** *V. subconc.* f. *punctatissima* - PRM-783882 – holotypus. **125.** *V. subconcentrica* var. *euthallina* - PRM-757293 – holotypus. **126.** *V. subc.* var. *euthallina* f. *asperella* - PRM-757935 – holotypus. **127.** *V. subconcentrica* var. *metzleri* - PRM-758039 – isotypus.



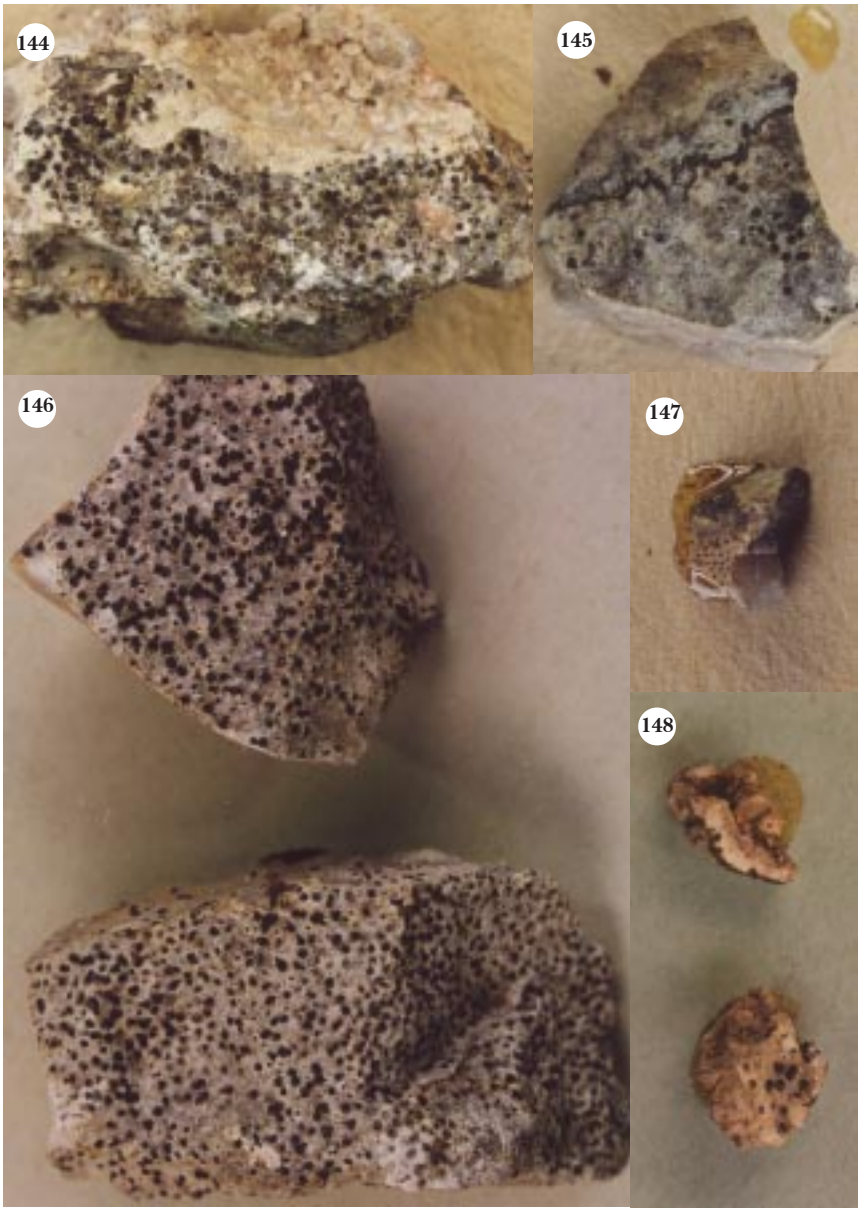
128. *V. subconcentrica* var. *metzleri* - W-1903-11150 – holotypus. **129.** *V. subc.* var. *nigroaur.* f. *limitata* PRM-758042 – lectotypus. **130.** *V. subc.* var. *nigroaureolata* f. *rauca* - PRM-758020 – lectotypus. **131.** *V. subconcentrica* var. *petkae* - PRM-756699 – holotypus. **132.** *V. subconcentrica* var. *saxivora* - PRM-757973 – holotypus.



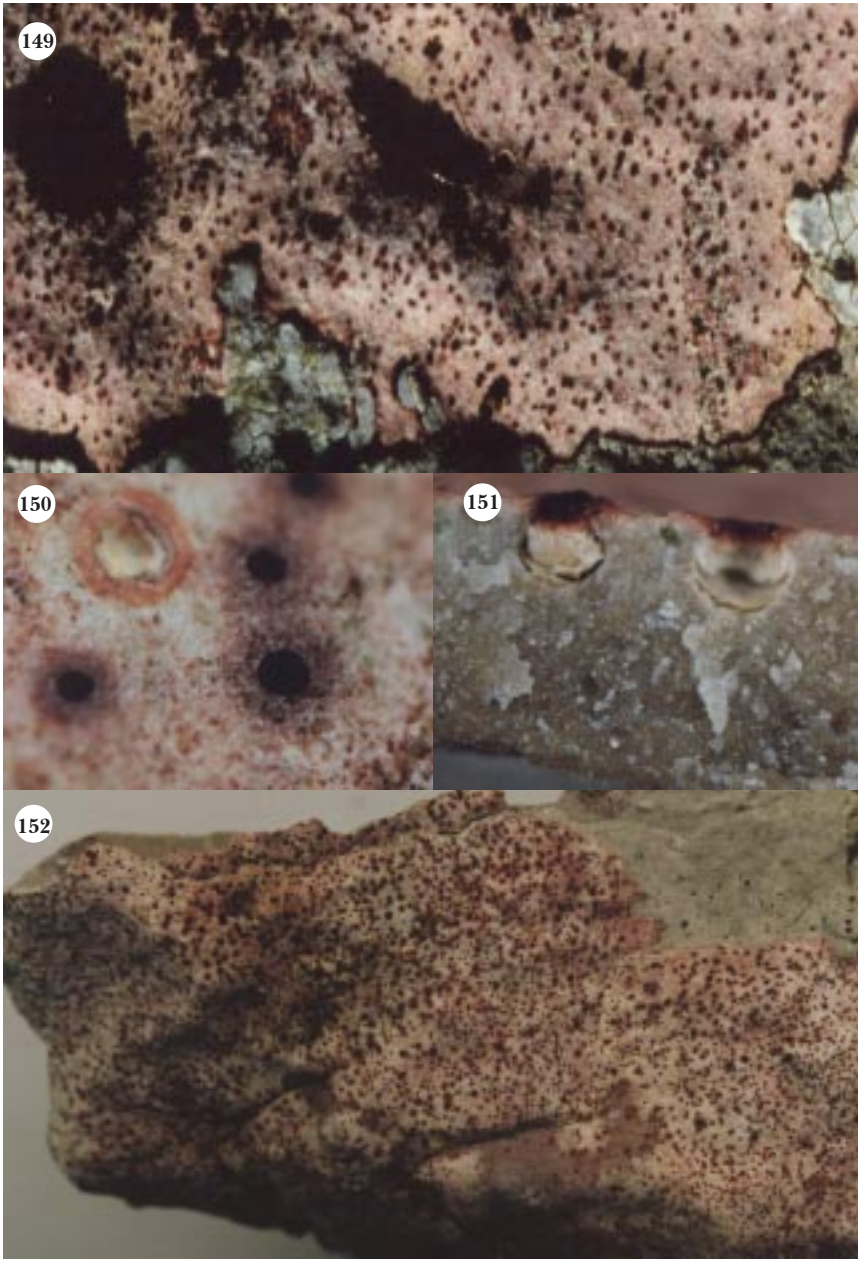
133. *V. subc.* var. *saxivora* f. *interruptoides* PRM-757925 – holotypus. **134.** *V. subconc.* var. *saxivora* f. *ninensis* - PRM-757922 – holotypus. **135.** *V. suzaeana* - PRM-757903 – holotypus. **136.** *V. suzaeana* f. *moravica* - W - holotypus. **137.** *V. suzaeana* var. *sendtneriana* - WU-00-68/1 – holotypus.



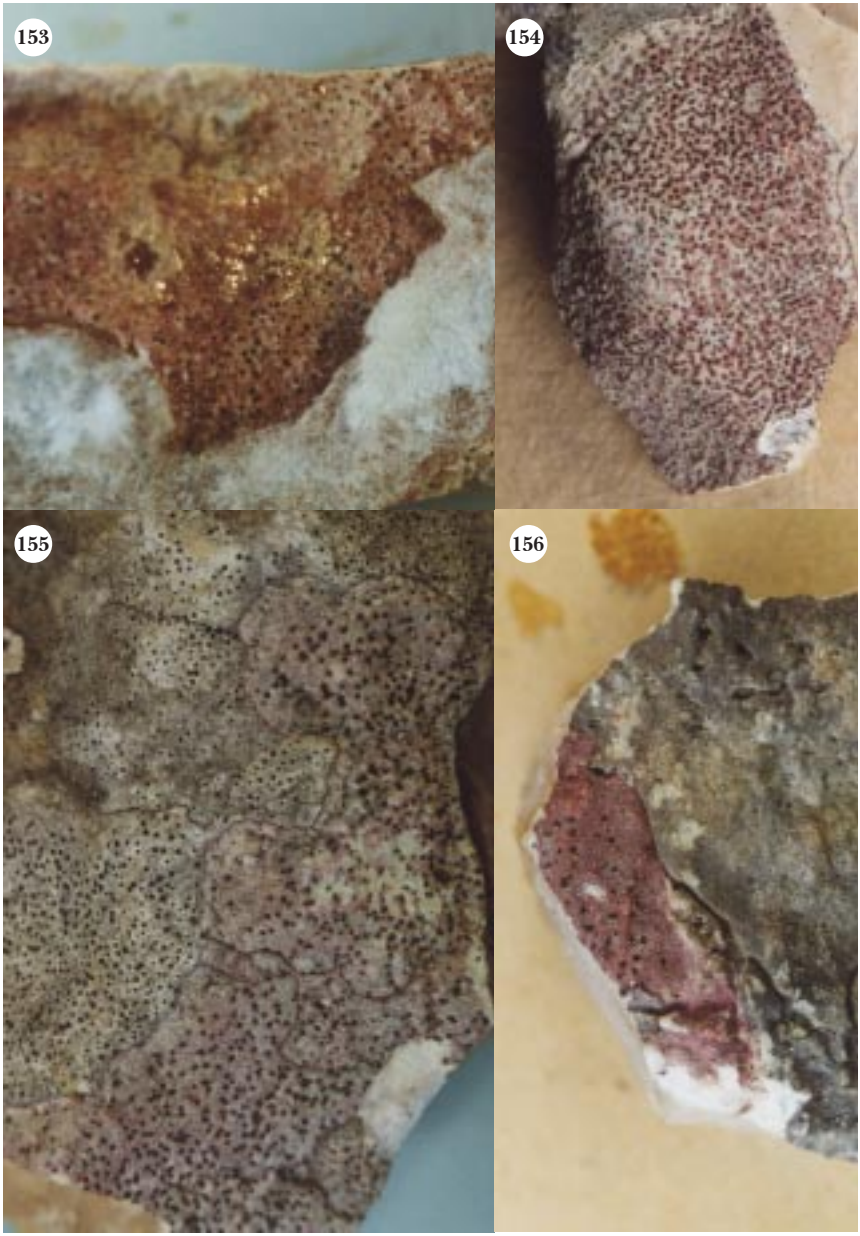
138-140. *Verrucaria limborioides* - VER – holotypus (138, 139 magn. 15:1). **141.** *V. ceracea* - W - holotypus. **142, 143.** *V. quarnerica* **142.** W-3421 – holotypus. **143.** PRM-756300 – isotypus.



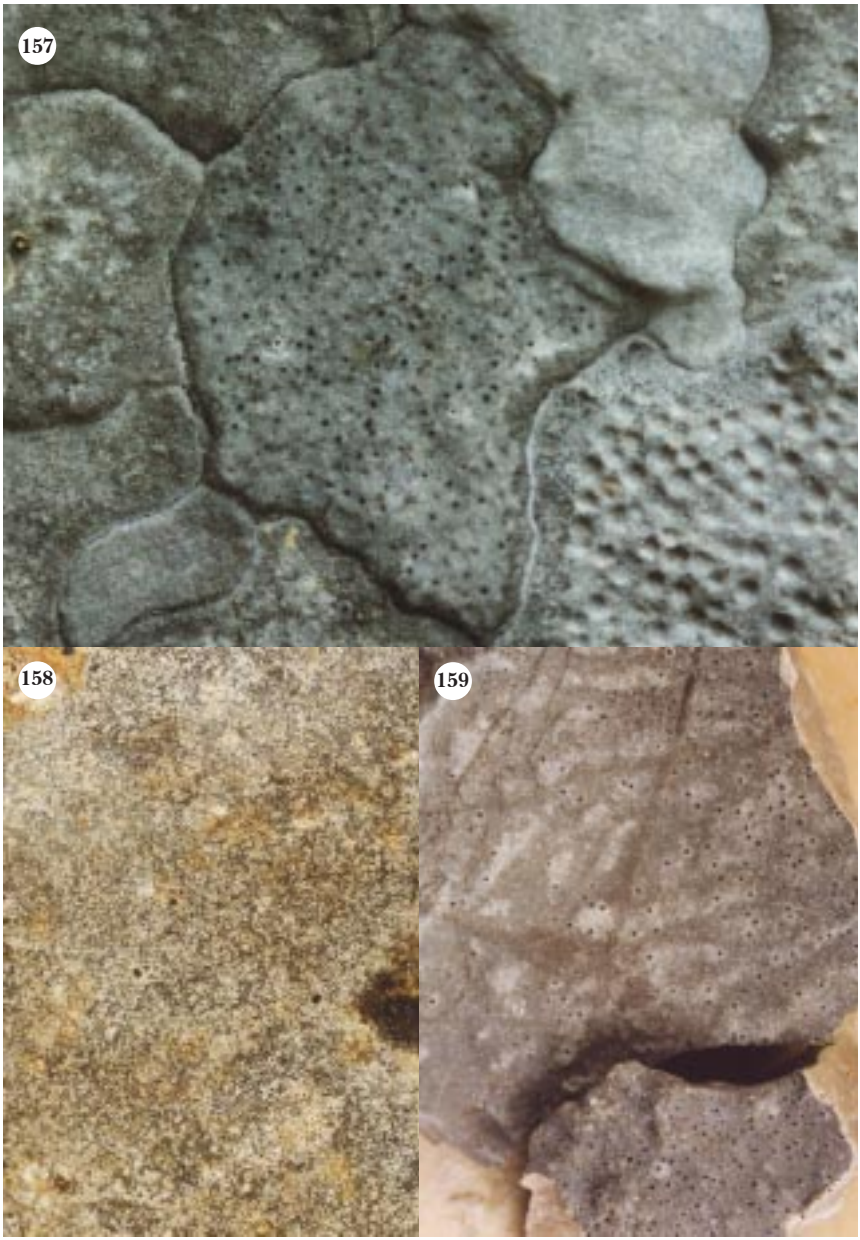
144, 148. *V. sphinctrina* f. *bavarica*. **144.** M-0024474 - holotypus. **148.** PRM-783792 - isotypus. **145.** *V. sphinctrina* var. *tiroliensis* - PRM-783778 – lectotypus. **146.** *V. sphinctrina* var. *calcivora* - PRM-783789 - holotypus. **147.** *V. subc.* var. *euthall.* f. *genovensis* - PRM-757313 – holotypus.



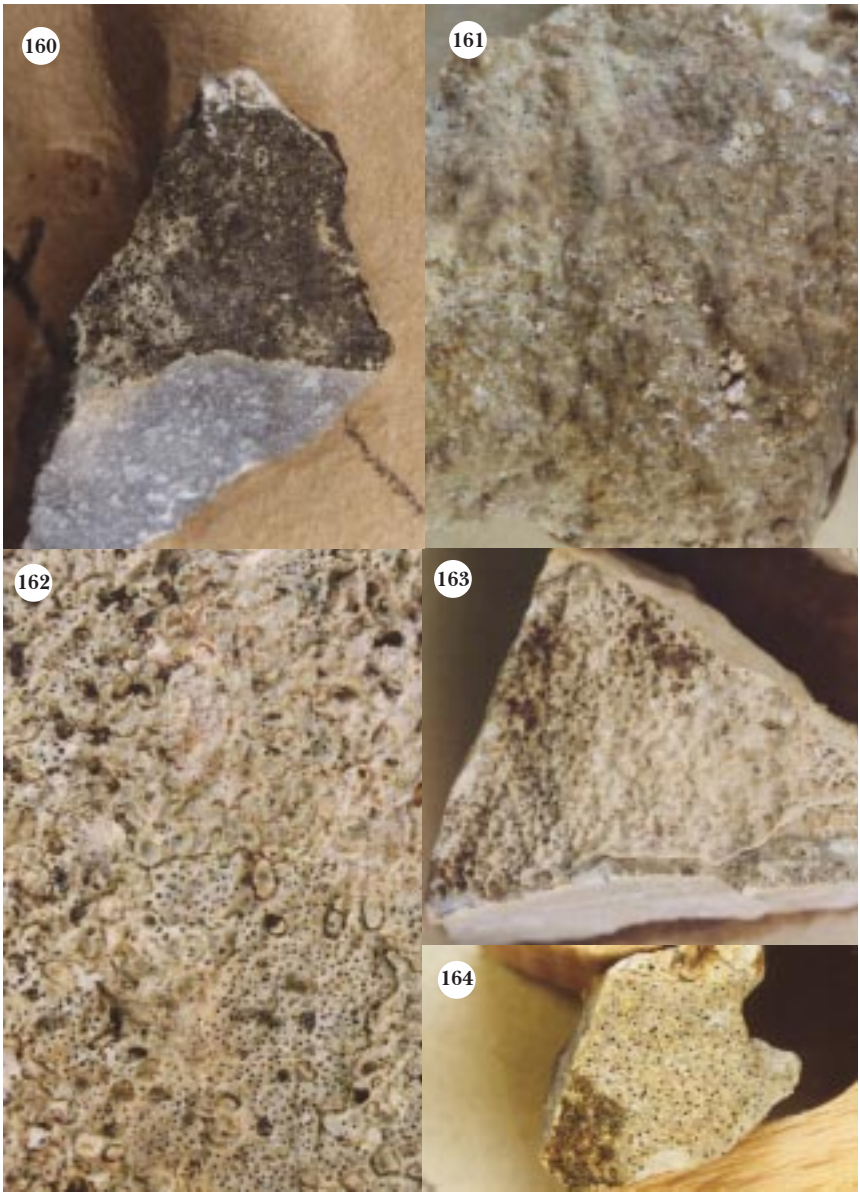
149. *V. marmorea.* **150.** *V. marmorea* - PRM-900619 – neotypus. **151, 152.** magn. 30:1



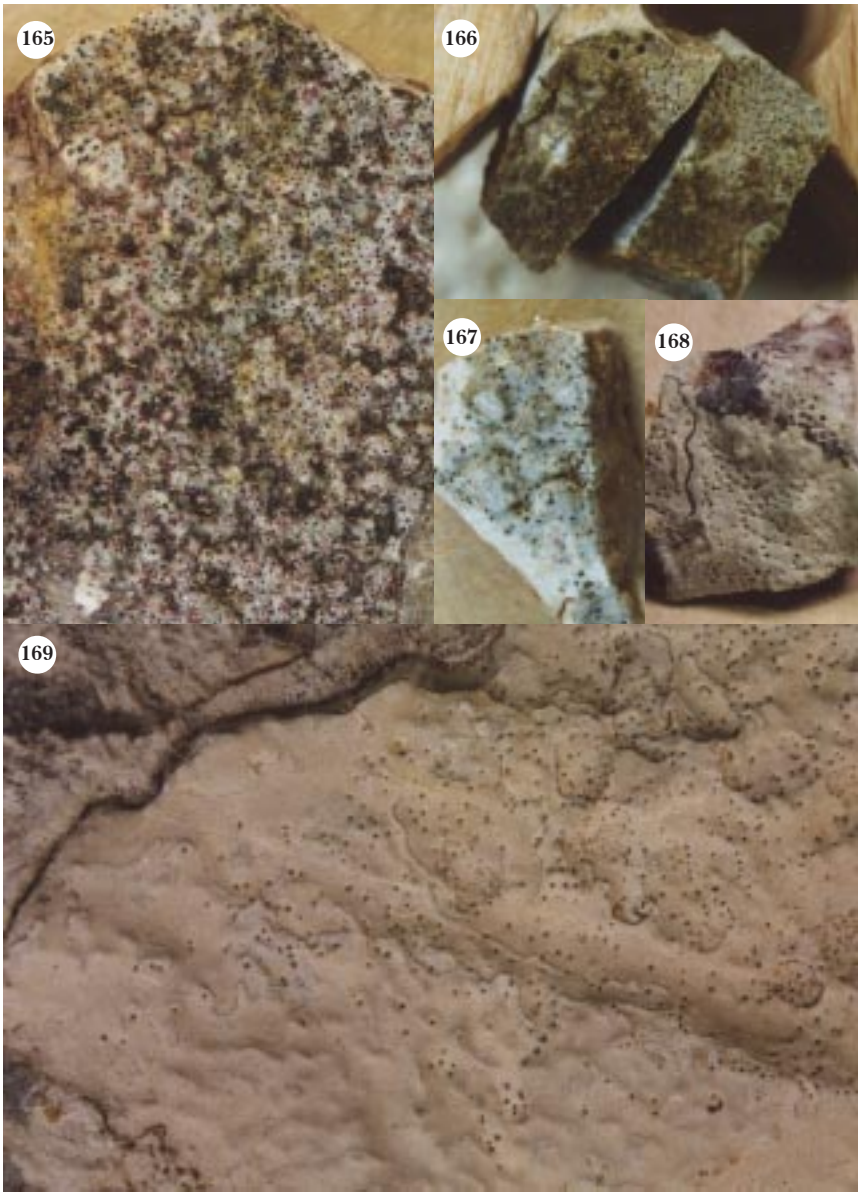
153. *V. cazzae* - W - lectotypus. **155.** *V. cazzae f. circumarata* - W-4447 – holotypus. **154, 156.** *V. cazzae* var. *pseudomarmorea* - PRM-757400 – holotypus, PRM-757389 – isotypus



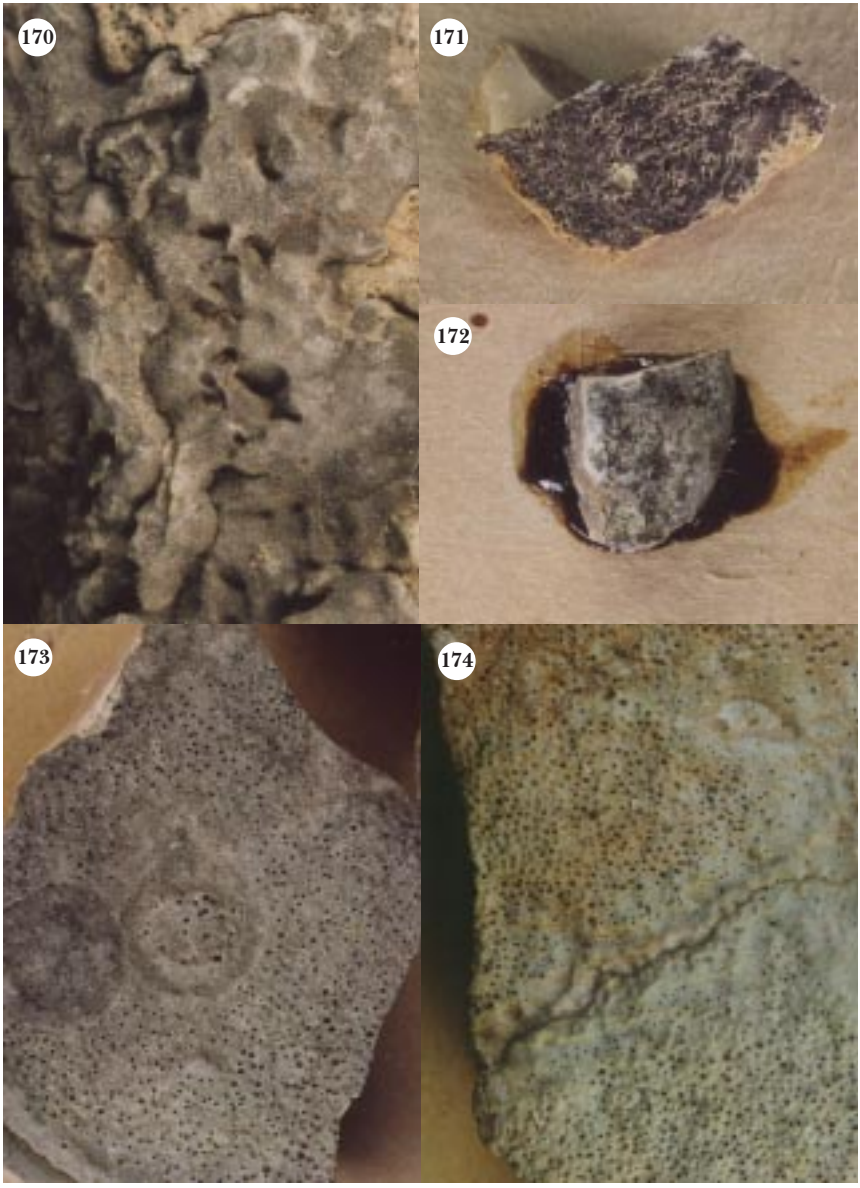
157. *V. parmigerella.* **158, 159.** *V. parmigerella* - W-1913-14275 – holotypus, PRM-757645 - isotypus.



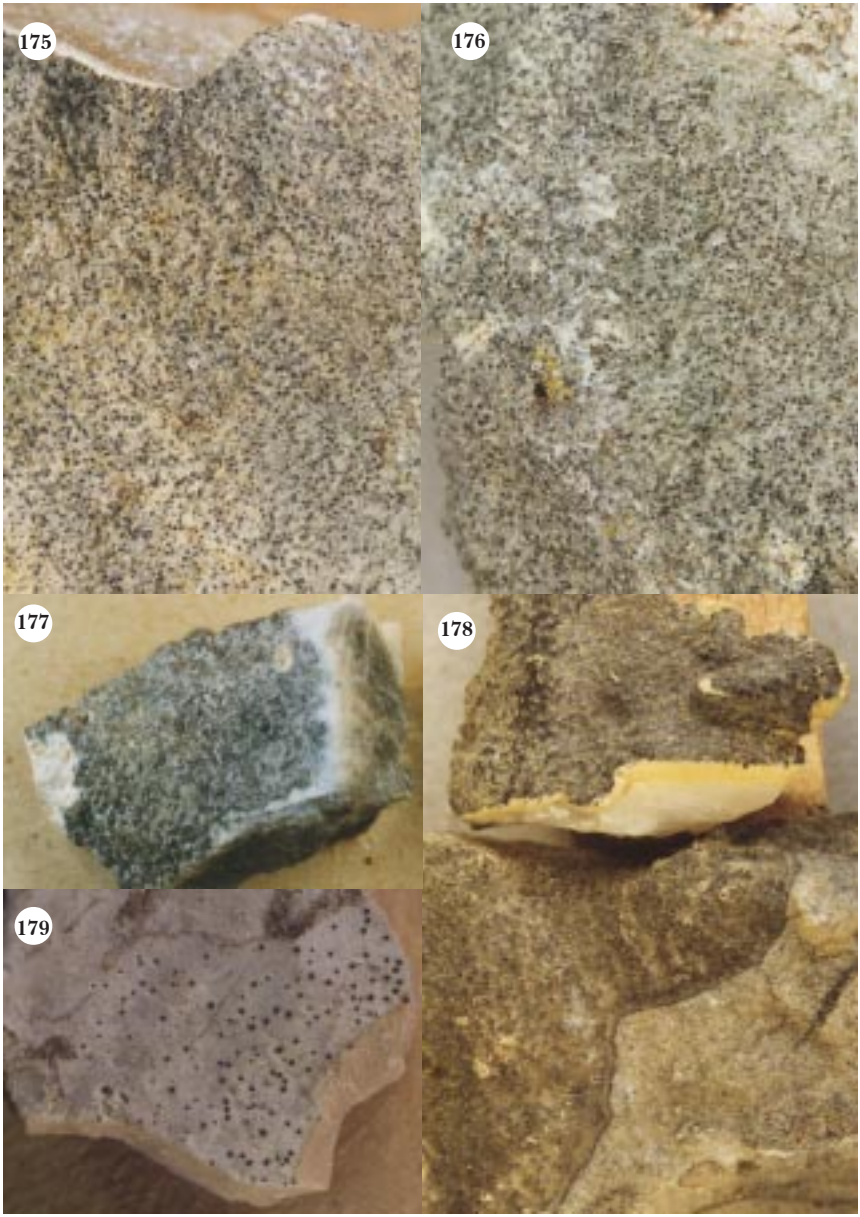
160. *Protobagliettoa kutakiana* - PRM-757515 – holotypus. **161.** *V. bagliett.* var. *erumpens* - PRM-756703 – holotypus. **162.** *V. bagliett.* f. *perarata* - WU-00-68/13 – holotypus. **163.** *V. bald.* var. *cretz.* f. *meridionalis* - PRM-757316 – holotypus. **164.** *V. baldensis* var. *rechingeri* - PRM-756704 – isotypus.



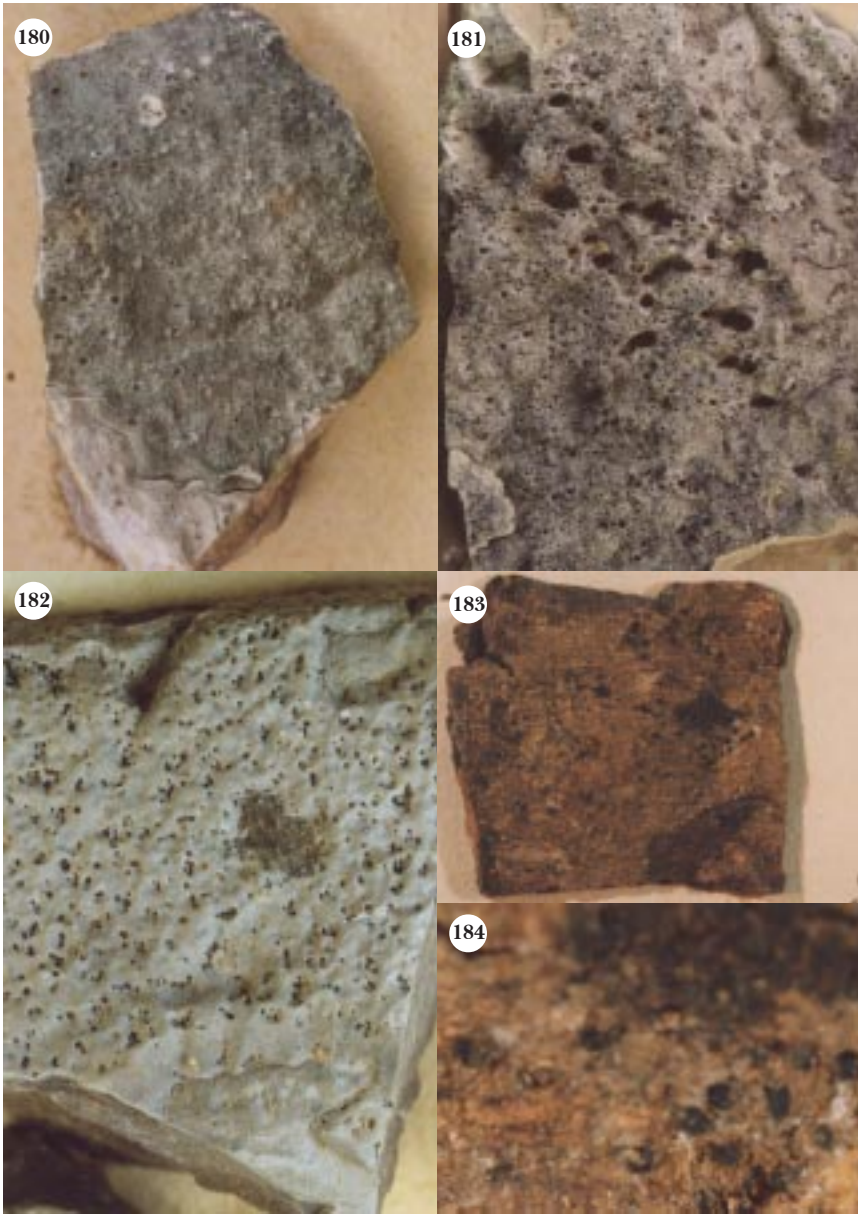
165. *V. bagl.* var. *gr.* f. *subinterrupta* - PRM-758044 – holotypus. **166.** *V. baldensis* var. *rechingeri* – isotypus, W - holotypus. **167.** *V. calciseda* f. *bagl.* - PRM-756873 – holotypus. **168.** *V. parmigera* var. *pieninensis* - PRM-757447 – holotypus. **169.** *V. gyelnikii* var. *velebitica* - PRM-756299 – holotypus.



170. *V. pinguis* f. *alocizoides* - PRM-757738 – lectotypus. **171.** *V. sph.* var. *elev.* f. *spermogonifera* - PRM-757767 – lectotypus. **172.** *V. sphinctrinella* var. *italica* - PRM-757748 – holotypus. **173.** *V. sphinctrinella* var. *elevata* - PRM-757796 – holotypus. **174.** *V. sphinctrinella* var. *expallida* - PRM-756862 – holotypus.



175, 176. *V. sphinct.* var. *parm.* f. *calcivorella* - PRM-757859 – isotypus, PRM-757860 – holotypus. **177.** *V. sphinct.* f. *herculana* - PRM-756861 – holotypus. **178.** *V. sphinct.* f. *loferensis* - WU-00-68/4 – holotypus. **179.** *V. sphinct.* var. *parm.* f. *pallida* - PRM-757724 – holotypus.



180. *V. sphinct.* var. *sphinct.* f. *viridis* - PRM-757713 – holotypus. **181.** *V. sphinct.* var. *thalassiformis* - PRM-757691 – holotypus. **182.** *V. steineri* var. *inaequata* - PRM-756693 – holotypus. **183, 184.** *V. sphinctrina* Ach. - H-ACH-709 – holotypus (184 - magn. 20:1).

Verrucaria subconcentrica (J. Steiner) Servít var. *saxivora* Servít f. *interruptoides* Servít

Beih. Bot. Cbl. **59**: 163, (1939); type: [Croatia], Velebit, Mirovo, 1340 m, M. Servít sub *V. interrupta* (**PRM-757925** – holotypus!).

The original description

Thallus convex, formed white spots on substratum, scrobicularis. Hyphae of hypothallus close, penetrated deep in substratum, macrosphaeroids rare, 15-20 µm broad. Perithecium in lower part slightly flattened or globose.

Note: The thallus, ascomata and size of the involucrellum accord to *V. baldensis*.

Photo 133: PRM-757925 – holotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *saxivora* Servít f. *ninensis* Servít

Beih. Bot. Cbl. **59**: 164, (1939); type: [Croatia], Nin, Sekanovič, 20 m, M. Servít (**PRM-757922** – holotypus!).

The original description

Thallus delimited and interrupted by black prothallus.

Note: The thallus, ascomata and size of the involucrellum accord with *V. baldensis*. We can see clearly identic thallus and ascomata without prothallus on the other part of the same sample.

Photo 134: PRM-757922 – holotypus.

Verrucaria suzaeana Servít

Beih. Bot. Cbl. **59**: 150, (1939), fig. p. 150, type: [Slovakia], Slovenský Ráj, Ztratená ad flum. Hnilec, 900 m, J. Suza (**PRM-757903** – holotypus!, **PRM-645277** – isotypus!).

The original description

Thallus whitish, smooth or subfarinose, scrobiculate with dispersed ascomata. Cortex layer 20-50 µm thick, colourless, hyphae densely branched, 3m broad. Photobiont part of medullar layer 60 µm high, clusters oval, positioned in one level. Medullar hyphae densely branched, thin, cells 1-6 µm long, 0,8-1,2 µm broad. Hypothallus always 600 µm deep. Hyphae of hypothallus densely intricated, cells 1-2 (4) µm broad and 1-8 (20) µm long. Macrosphaeroids 8-14 (16) µm broad. Ascomata dispersed. A visible part of the involucrellum 250-350 µm in diam., not emerging, convex, sometimes with visible fissures. Involucrellum plane, 240-400 µm broad, central part 40 µm thick, not bent downwards on margins. Young perithecium pot-shaped or fig-shaped, in upper part pale, later all with brown-black spots, 300-350 µm broad, 280-300 µm high. Excipulum in upper part brown. Periphyses always 25-30 µm long, asci clavate, not in mature stage. Hymenium I+ bluish, later yellowish.

Note: Servít mentioned wrong indications of the size of involucrellum in description. Involucrellum of ascomata in the type sample does not reach 300 µm in diam. It does not differ by structure of the thallus, too. It belongs to *V. baldensis*.

Drawing tab. III/8 (Servít 1939, p. 150), photos 135: PRM-757903 – holotypus.

Verrucaria suzaeana Servít f. *moravica* Servít

Beih. Bot. Cbl. **59**: 151, (1939); type: [Czech Rep.], In mont. Moraviae, Ch. Hochstetter, in R. et S. 48 sub *V. schraderi* (**W** – holotypus!, **PRM-757897** – isotypus!).

The original description

Thallus scrobiculate. All peritecium intensivelly brown without dark spots. Cells in upper part of perithecium 4 µm broad, 8-16 µm long, in lower part polygonated, 4-6 µm long and broad. Hymenium J+ bluish, later colourless, asci yellowish.

Note: The new taxon does not differ by description or type sample from *V. baldensis*.

Photo 136: W - holotypus.

***Verrucaria suzaeana* Servít var. *sendtneriana* Servít**

Beih. Bot. Cbl. **59**: 151, (1939); type: [Germany], Bavaria, Berchtesgaden, Scharitzkehl, O. Sendtner (**WU-00-68/1 –** holotypus!, **PRM-757900 –** isotypus!).

The original description

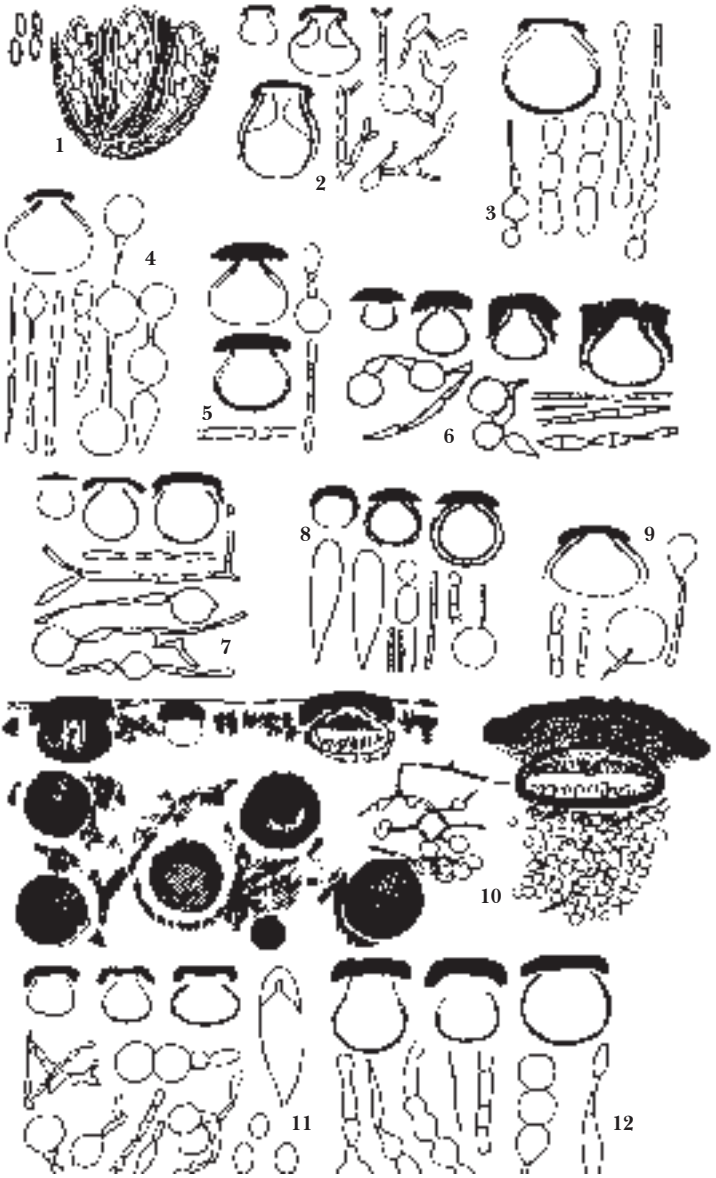
Thallus whitish or white delimited with black prothallus. Cortex layer 15-25 µm thick of dense hyphae in vertical orientation. Photobiont part of medullar layer usually 200 µm high, photobiont cells 4-6 µm broad, coagulated in oval clusters. Hypothallus usually 2,5 µm deep. Hyphae usually 6 µm thick, in lower part of hypothallus iregularly articulated, cells nearly cylindrical, 6-20 µm long, sometimes screwed or inflated. Involucrellum 250-300 µm broad with radially cracking, in central part 60 µm thick. Perithecium inflated on base, in upper part shortly conical, in lower part perithecium brown-black, 16 µm thick, in upper part colourless. Excipulum colourless, to 20 µm thick.

Note: The cortex layer of the thallus is formed of densely intricated hyphae made clearly different compact layer. Servít's indication of vertical orientation of that hyphae is mistaken. The construction of the thallus is usual, ascomata and the size of involucrellum accord with *V. baldensis*.

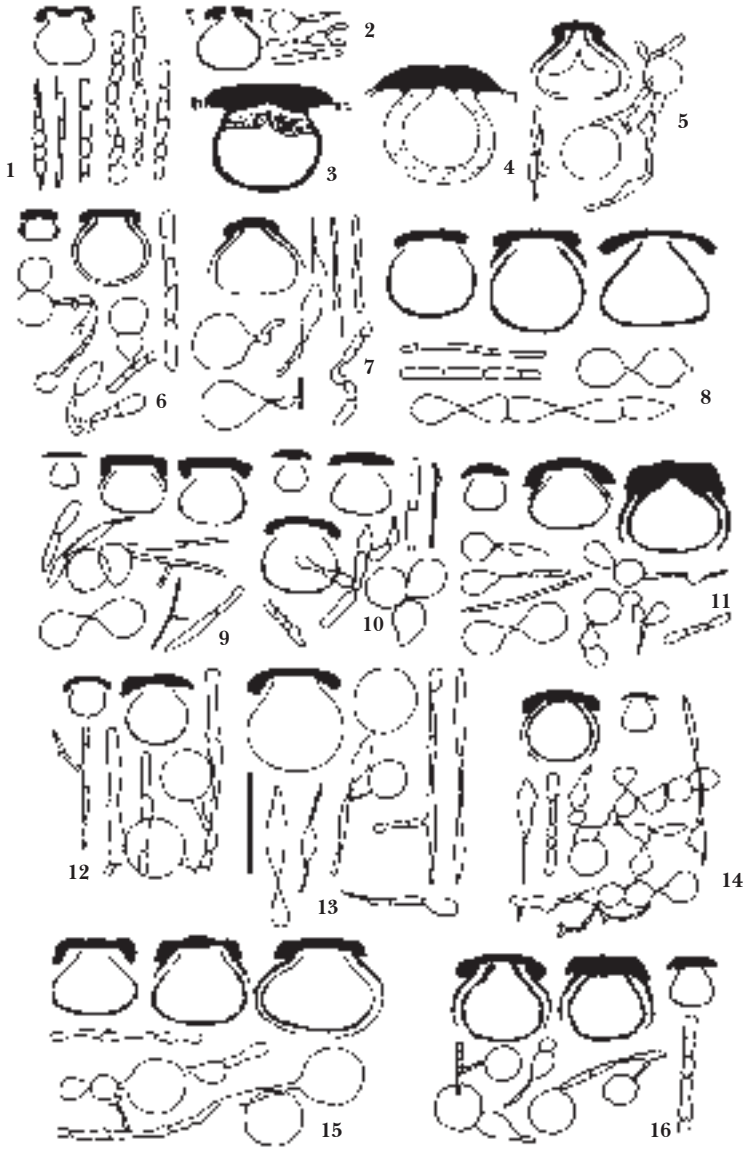
Photos 137: WU-00-68/1 – holotypus.

V.-4. Iconographia of type specimens

See pages 69 to 94 (photos) and 107 (drawings). The most of samples was photographed in the same magnification 1:3,5 (3,5 cm in photo accords with 1 cm of life size) by Zuiko lens 38/3,5 (Olympus). Several photos were taken in different magnification noted always under the photo.



Tab. II.: 1., 3. *V. baldensis*, **2.** *V. bagliettoaeformis* var. *istriana*, **4.** *V. baldensis* var. *cretzoiui*, **5.** *V. inaequata* var. *triglavensis*, **6.** *V. calciseda* f. *alocyza*, **7.** *V. bosniaca*, **8.** *V. bosniaca* var. *lovcenensis*, **9.** *V. parmigera* var. *nigroaureolata*, **10.** *V. cazzae* f. *dealbata*, **11.** *V. dalmatica*, **12.** *V. grummanni.*



Tab. III.: **1.** *V. cazzae* var. *graeca*, **2.** *V. gyelnikii* f. *obscurata*, **3.** *V. parmigera*, **4.** *V. steineri*, **5.** *V. subconcentrica* var. *saxivora*, **6.** *V. subconcentrica*, **7.** *V. subconcentrica* var. *euthallina*, **8.** *V. suzaeana*. **9.** *V. parmigera*, **10.** *V. parmigera* var. *gyelnikiana*, **11.** *V. parmigera* var. *adriatica*, **12.** *V. parmigera* var. *bohemica*, **13.** *V. steineri*, **14.** *V. parmigera* var. *lapadensis*, **15.** *V. parmigera* var. *sinensis*, **16.** *V. parmigera* var. *subrosea*.

VI. *Verrucaria limborioides* (A. Massal.) Clauzade & Roux

Bull. Soc. Bot. Centre-Ouest, **7:** 787, 1985; *Bagliettoa limborioides* A. Massal., *Mem. Lichenogr.*: **147**, fig. 168, tab. 25 (1853); type: [Italy], Vive sulle roccie calcaree nel Bosco Bagato presso Genova, F. Baglietto (**VER** – holotypus!); *Thrombium limborioides* (A. Massal.) Zschacke, *Rabenh. Krypt. Fl.* **9 (1/1)**: 563 (1934).

Synonyms: Two species (*V. ceracea* and *V. quarnerica*) and 4 varieties or forms were restricted to synonyms of the *V. limborioides* species. The revision did not justify their separation.

Verrucaria ceracea J. Steiner, *Verh. Zool.- Bot. Ges. Wien* 61: 33 (1911); type: W - holotypus!, W - isotypus!; *Bagliettoa ceracea* (J. Steiner) Jatta, *Cr. Fl. Ital.* 3: 921 (1911); *Verrucaria sphinctrina* Ach. f. *limborioides* Servít, *Beih. Bot. Cbl.* 59: 121 (1939); *Polyblastia sphinctrina* (Duf.) Servít f. *limborioides* (Servít) Servít, *Preslia*, 24: 181 (1952), (see p. 111).

Verrucaria quarnerica Zahlbr., *Österr. Bot. Zeitschr.* 68: 63 (1919); type: W-3421 – holotypus!, PRM-756300 – isotypus!, syn. nov.; *Bagliettoa quarnerica* (Zahlbr.) Vězda, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, 1981: 363, (see p. 111).

Verrucaria sphinctrina Ach. f. *bavarica* Servít *Beih. Bot. Cbl.* 59: 121 (1939); type: M-0024474 – holotypus!, PRM-783792 – isotypus!, syn. nov.; *Polyblastia sphinctrina* (Duf.) Servít f. *bavarica* (Servít) Servít, *Preslia*, 24: 381 (1952); *Bagliettoa sphinctrina* (Ach.) Körb. var. *bavarica* (Servít) J. Nowak & Tobolewski, *Porosty Polskie*: 1117 (1975), (see p. 112).

Verrucaria sphinctrina Ach. var. *calcivora* Servít, *Beih. Bot. Cbl.* 59: 120 (1939); type: PRM-783789 – holotypus!, syn. nov.; *Polyblastia sphinctrina* (Duf.) Servít f. *calcivora* Servít, *Preslia*, 24: 381 (1952), (see p. 112).

Verrucaria sphinctrina Ach. var. *tiroliensis* Servít, *Beih. Bot. Cbl.* 59: 122 (1939); type: PRM-783778 – lectotypus!, syn. nov.; *Polyblastia sphinctrina* (Duf.) Servít f. *tiroliensis* (Servít) Servít, *Preslia*, 24: 381 (1952); *Bagliettoa sphinctrina* (Duf.) Körber f. *tiroliensis* Servít, *Rozp. Čs. Akad. Věd*, 65(3): 36 (1955), (see p. 112).

Verrucaria subconcentrica (J. Steiner) Servít var. *euthallina* Servít f. *genovensis* Servít, *Beih. Bot. Cbl.* 59: 165 (1939); type: PRM-757313 – holotypus!, syn. nov, (see p. 112).

An original description of *Verrucaria limborioides* (A. Massal.) Clauzade & Roux

Crusta fere nulla, subamylacea, sordide albida. Sporidiis diam. long. 0,^{mm}0185, usque ad 0,^{mm}0244, transv. 0,^{mm} 0090 circiter.

Legit: Vive sulle roccie calcaree nel Bosco Bagato presso Genova (Baglietto).

Obsserv: É somigliantissima alla Verrucaria rupestris, dalla quale esternamente non si potrebbe distinguere che facendo uso di buone lenti.

Description

The thallus is continuous, usually of ochre to grey colour, matt (subfarinous). The cortical layer is approx. 25-30 µm thick, made of tangled hyphae, approx. 3-4 µm thick. In the lower part, there are cylindrical or oblong macrosphaeroids, usually 18 µm long, 6 µm wide. Photobiont cells in clews (25-40 µm in diam.), clews are ellipsoid, rounded, scattered, photobiont cells 6-12 µm in diam.

Ascospores are in great numbers mainly formed on the whole thallus surface, from up-above covered by archeous, coal-like, black, glossy, lid-like involucrellum, which a little overlaps the thallus, progresses by a downward bend on the edges. Involucrellum is 350-450 µm in diam. (almost twice as big than in the *V. baldensis* species), and is approx. 20-25 µm thick (in the central part). On the mature ascoma, the involucrellum star-shapely bursts by three or five cracks. On the walls of the died out ascomata, there is usually-close to ostiolum, a black ring left.

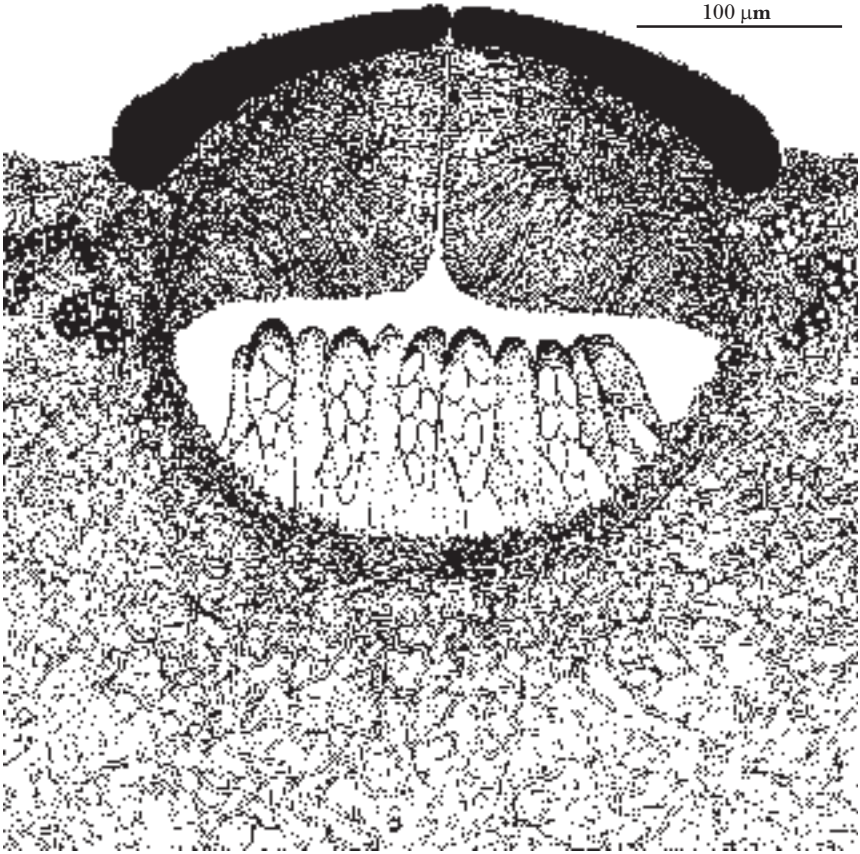
Perithecium is completely immersed, flately globular, in the central part usually 300-400 µm wide (bigger than in *V. baldensis*), excipulum (chlamys) colourless, when

maturing, the ascoma is getting darker. Mature perithecium, in its upper part, is not covered by thallus (only the involucrellum). Periphyses perennial, filiform, usually 5-30 μm long, 2-2, 5 μm thick, articulated, ended by a short clavate cell, non-branching. They continually cover the upper part of the perithecium wall up to ostiolum. Asci with eight spores, cylindrical, oblong or clavate, 30-60 μm long, 5-15 μm wide, narrowed on the base, in the widest apical part (20 μm) with a thick tholus, do not react with I. Hymenium I+ by blue to yellow colour.

Ascospores simple, 18-28 (16, 30) x 8-12 (14) μm (15) measurements, oblong to ellipsoid, in biseriate distribution. I did not observe neither pycnoconidioma nor pycnidia, when doing the observations.

Note: There are very few herbarium specimen of this species. If is available more fresh material, it would be suitable to study the species in a more detailed way.

Drawing tab. IV/1, A. B. Massalongo 1853, fig. 168, photos 138-140: VER – holotypus.



V. limborioides. Vertical section of ascocarp and thallus.

VI.-1. Geographic distribution in Europe

Austria: im Kaiserthall bei **Kufstein**, Tyrol, F. Arnold, 1856 (PRM-783778).
Croatia: Dubrovnik, Župa Dubrovačka, **Kupari**, R. Dvořák, 1918/03/16 (BRNM), **Čelopeči**, R. Dvořák, 1918/12/08 (BRNM), **Ins. Lošinj** (Lussin), Wegmauern am Fusse des Monte Osor (Ossero) gegen die Stadt Oser (Ossero), J. Baumgartner, 1914/04/10 (W-3421, PRM-756300); **Ins. Rab**, Dundo, J. Šmarda, 1932 (PRM-783789).
Germany: Oberbayerische Alpen, **Mittenwald**, A. Krempelhuber (M-0024474).
Italy: Bosco Bagato presso **Genova**, F. Baglietto (VER); Genova, F. Baglietto in Anzi Lich. It. Sup. 380, (W); Genova, L. Calechi (BP, PRM-757313).

VI.-2. Commented list of synonyms

Verrucaria ceracea J. Steiner

Verh. Zool.- Bot. Ges. Wien **61**: 33 (1911); type: [Italy], Genova, F. Baglietto in Anzi Lich. It. Sup. 380, (**W** – holotypus!, **W** - isotypus!); *Baglietoa ceracea* (J. Steiner) Jatta, *Cr. Fl. Ital.* **3:** 921 (1911); *Verrucaria sphinctrina* Ach. f. *limborioides* Servít, *Beih. Bot. Cbl.* **59**: 121 (1939); *Polyblastia sphinctrina* (Duf.) Servít f. *limborioides* Servít, *Preslia*, **24**: 181 (1952).

The original description

Thallus smooth, waxy ochre yellowish, without prothallus, macrosphaeroids usually present. Ascomata similar as in *V. baldensis*, involucrellum 400-450 µm in diam. radially cracking. Paraphyses nearly unvisible, thin, unbranched or slightly branched, of the same lenght as asci. Spores always well developed, eight in each ascus (90 x 22-28 µm), oval, 18-25(28) x 9-13(14) µm. Hymenium J+ bluish, later yellowish or faintly red. Pycnidiums not present.

Note: I have not seen paraphyses in any studied specimen. Servít was probably mistaken. The type sample accord with *V. limborioides* with others mentioned characters.
Photos 141: W - holotypus.

Verrucaria quarnerica Zahlbr.

Österr. Bot. Zeitschr. **68**: 63 (1919); type: [Croatia], Istria, Ins. Lošinj (Lusin), ad pedem montis Osor (Ossero), in vicinitate oppidi Osor (Ossero), secus viam ad saxa calcarea, 1914, J. Baumgartner, (**W-3421** – holotypus!, **PRM-756300** – isotypus!); *Baglietoa quarnerica* (Zahlbr.) Vězda, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, **1981**: 363.

The original description

Thallus ochre to grey-brown with spots, dark, continuous, separated to small parts by black prothallus. Cortex layer 8-20 µm thick of densely branched hyphae, upper cells hemisphaerical 4-6 µm broad, formed dispersed dark layer, a cover upper layer amorph, colourless. Photobiont part of medullar layer 50 µm thick; photobiont cells in dispersed globose or deformed clusters, cells 8-10 µm in diam. Medullar layer not clearly separated, hypothallus of loose and branched leptodermatical hyphae, to 1,5-2 µm broad with oil drops. Cells cylindrical, 6-8 µm long or oblong, 3 µm broad, or irregularly conical, 5-7 µm long, 2-3 µm broad, or hemisphaerical, 2-4 µm, rarely 7 µm in diam. Macrosphaeroids not present. Ascomata dense, small, to 200 µm broad, with black tops, dark, not emerging, plane. Involucrellum coal-like, covering a perithecium, open, in central part 30 µm thick, downwards on margins. Perithecium 160 µm broad, pale brown in upper part or colourless of hyphae in tangential orientation. Periphyses short and thin. Asci clavate, eight-spored in biserial distribution. Spores colourless, simple, oval or oblong (9)12-15 µm long, 5-6(8) µm broad.

Note: Zahlbruckner did not mention the size of an involucrellum in his description. The size accords with *V. limborioides*. The type sample is the same colour of the thallus, too.
Drawing tab. IV/2 (Servít 1939, p. 119), photos 142, 143: W-3421 – holotypus, PRM-756300 – isotypus.

Verrucaria sphinctrina Ach. f. *bavarica* Servít

Beih. Bot. Cbl. **59**: 121 (1939); type: [Germany], Bavaria, Mittenwald, Krempelhuber (**M-0024474** – holotypus!, **PRM-783792** – isotypus!); *Polyblastia sphinctrina* (Duf.) Servít f. *bavarica* (Servít) Servít, *Preslia*, **24**: 381 (1952); *Bagliettoa sphinctrina* (Ach.) Koerb. var. *bavarica* (Servít) J. Nowak & Tobolewski, *Porosty Polskie*: 1117 (1975).

The original description

Thallus whitish, macrosphaeroids 8-14 (16) µm in diam. Ascomata densely distributed. Excipulum usually 30 µm thick, whole brown-black. Hymenium J+ bluish, later colourless or slightly greenish, asci yellowish, 70 µm long, 20 µm broad, clavate. Spores ellipsoidal, 23-26 µm long, 10-12 µm broad.

Note: It is not possible to determine the original colour of the thallus. A part of type specimen is brown to ochre. Grey-green colour is probably caused of damaging the thallus. The size of involucrellum is twice bigger than in *V. baldensis*. For this character it was added to *V. limborioides*.

Drawing tab. IV/3 (Servít 1939, p. 122), photos 144: M-0024474 – holotypus, 148: PRM-783792 - isotypus.

Verrucaria sphinctrina Ach. var. *calcivora* Servít

Beih. Bot. Cbl. **59**: 120 (1939); type: [Croatia], Ins. Rab, Dundo, 60 m, J. Šmarda (**PRM-783789** – holotypus!); *Polyblastia sphinctrina* (Duf.) Servít f. *calcivora* (Servít) Servít, *Preslia*, **24**: 381 (1952).

The original description

Thallus scrobiculate, ascomata immersed, mixed small and large. Spores oval to globose, usually broadly lanceolate, 20-33 µm long, 10-15 µm broad. Hymenium J+ bluish, later red.

Note: Servít refered to paraphyses as hyphae in hymenium in his description. But, all the samples I have studied have only asci in hymenium. Colour of the thallus and size of ascomata and involucrellum accord with *V. limborioides*.

Photo 146: PRM-783789 - holotypus.

Verrucaria sphinctrina Ach. var. *tiroliensis* Servít

Beih. Bot. Cbl. **59**: 122 (1939); type: [Germany], Tirol, Kufstein, Kaisertal, F. Arnold, 1856 (**PRM-783778** – lectotypus!); *Polyblastia sphinctrina* (Duf.) Servít f. *tiroliensis* (Servít) Servít, *Preslia*, **24**: 381 (1952); *Bagliettoa sphinctrina* (Duf.) Körber f. *tiroliensis* Servít, *Rozp. Čs. Akad. Věd*, **65(3)**: 36 (1955).

The original description

Thallus slightly emerging, dirty whitish. Spores oval, 20-27 µm long, 15-20 µm broad. Periphyses usually 60 µm long, on base 4 µm, at the top 1 µm thick.

Note: The type specimen accords by size of an involucrellum to *V. limborioides*.

Photo 145: PRM-783778 - lectotypus.

Verrucaria subconcentrica (J. Steiner) Servít var. *euthallina* Servít f. *genovensis* Servít

Beih. Bot. Cbl. **59**: 165 (1939); type: [Italy], Genova, Caléchi sub *V. rupestris*, (**PRM-757313** – holotypus!).

The original description

Thallus ochre coloured.

Note: Servít noted it is a parallel form of *V. sphinctrina* f. *limborioides* from the same habitat. With the colour of thallus, size of ascomata and involucrellum accord with *V. limborioides*.

Photo 147: PRM-757313 – holotypus.

VI.-3. Iconographia of type specimens

See pages 95 to 96 (photos) and 113 (drawings).

Tab. IV.: **1.** *V. limborioides*, **2.** *V. quarnerica*, **3.** *V. sphinctrina* f. *bavarica.*

VII. *Verrucaria marmorea* (Scop.) Arnold

Verh. Zool.- Bot. Ges. Wien **32**: 147 (1882); *Lichen marmoreus* Scopoli, *Flora Carniolica* vol. 2: 367 (1772); type: [Slovenia], montes Julijske Alpe, in declivibus vallis „dolina Triglavskih jezer" supra Veliko jezero, secus viam, 1830 m, J. Halda, Š. Haldová, 2000/06/23 (PRM-900619 – neotypus, herb. J. Halda (JPH/4319) isoneotypus, here designated!).

Synonyms: The species *V. cazzae*, one of its varieties, and one of its forms were restricted to synonyms of the species *V. cazzae*. The revision did not justify their separation.

Verrucaria cazzae Zahlbr.; *Annal. Mycol.* 12: 335 (1914); type: W - lectotypus!, here designated, syn. nov.; - *Bagliettoa cazzae* (Zahlbr.) Vězda & Poelt, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, 1981: 363, (see p. 116).

Verrucaria cazzae Zahlbr. f. *circumarata* Zahlbr., *Annal. Mycol.* 12: 336 (1914), type: W-4447 – holotypus!, syn. nov., (see p. 116).

Verrucaria cazzae Zahlbr. var. *pseudomarmorea* Servít, *Beih. Bot. Cbl.* 59**: 118 (1939), fig. č. 2; type:** PRM-757400 – holotypus!, PRM-757389 – isotypus!, syn. nov., (see p. 117).

An original description of *Verrucaria marmorea* (Scop.) Arnold

Crusta inpalpabilis, Aurorae colore, profert, cotylas lapideas rubellas. – Habitat in rupibus calcariis.

Description

Endolitic thallus, crustose, evenly spread, of light peach-like colour, K+ blue green, fine, matt, continual, without soredia or isidia, on the edges bordered with a dark prothallus line. Cortex layer of the thallus is 20-40 µm thick, colourless, the most upper part of a striking purpur colour, 10-15 µm thick, of 4-5 µm thick hyphae, tangled, short - articulated. It contains clusters of big, red crystals (up to 1 µm), that react with KOH by colour and cause the typical tint of the thallus. The medullar layer with a meaningful layer made out of prolonged clews of photobiont cells, 80-120 µm thick, the photobiont cells 5 -13 µm long, vitally green, coagulated, making globular or oblong, surrounded by flattered, branching hyphae, that are 2,5-3 µm wide, create tiny little oil drops. Hyphae in the photobiont zone are parallely distributed. Under this layer, there is one of hypothallus 100-150 µm thick, made out of tangled hyphae, on which there forms macrosphaeroids. Hyphae of the

hypothallus are almost cylindrical, 1 –5 μm thick, septed, cells 5 –10 μm long, and a little pressed in septum. Macrosphaeroids are less created in the lower part of the medullar layer, are almost cylindrical, around ascomata meaningfully, mostly globular, 9-15 μm wide.

This species differs from *V. baldensis* and *V. parmigerella* in living shortly ascomata. In both the species, we can see ascomata in the same ontogenetical development that lasts several years, in contrast with this species, where we can, on a little part of thallus, observe ascomata almost in all ontogenetic states, from the beginning to the very end. Ascomata develop, mature and die out gradually and much quicker in the thallus (possibly during one season), than in other species. This way, it is more difficult to study ascomata in optimal developmental stage. Ascomata are completely

***V. marmorea*. Vertical section of ascocarp and thallus.**

immersed, 250-350 µm wide, part of involucrellum (to 100 µm in diam.), can be seen when being looked upon from up above. Involucrellum in developing ascomata 100-300 µm in diam. (50 measurements), slightly konvex, mostly flat, coal-like black, glossy with bent edge, with a pore in the centre, more massive then in the other studied species, 30-40 µm thick. From the start, they are integrated without cracks, gradually are arching upwards and chink - like bursts. During maturing of the ascoma, the involucrellum is breaking up gradually, and creates a black ring.

Excipulum (chlamys), 15 µm thick, out of colourless hyphae, upper part gets darker later, of parenchymatic build, cells in tangencial distribution, 4-6 µm wide. Perithecium bluntly conical, or transversally ellipsoid, 160 µm high and 150 µm wide, straight base, obligue ostiolum relatively wide, initially colourless, later, the tholus is getting dark, made out of hyphae 3 µm thick. Hymenium gelatinous, I+ blue, later getting yellow. Periphyses slightly clavate, articulated, 35 µm long, (in the widest part of ascoma to 60 µm), 2-3 µm thick. Ascospores cylindrical or oblong, 10-15 µm wide, 35-40 µm long. Ascospores do not differ in size from *V. baldensis*, *V. limborioides* and *V. parmigerella*, simple 10-12 (8) x 18-28 (16, 30) µm (50 measurements), oblong to ellipsoid, in biseriate distribution.

V. marmorea is found on limestone and dolomites around whole Europe. Often, it creates continual, distinct, purpur tinted coat on flat boulders and little rock gardens, where it is often distributed with species *V. baldensis, V. parmigerella, Protoblastenia rupestris, Clauzadea immersa, V. calciseda* and others.

Photos 150-152: PRM-900619 – neotypus.

VII.-1. Geographic distribution in Europe

Albania: lacus **Skadar**, 2000 m, J. J. Halda, 1996/07/17 (JPH/5316).

Bosnia: Čardak planina, ad rupes calc. montis Mliniště, R. Dvořák, 1917 (PRM-645007, 645029, 645020).

Croatia: Istria, ad occid. ab urbe **Rijeka** versus (30 km), secus viam supra pago Ičiči (sub Učka), 650 m, J. Halda, Š. Haldová, 2000/06/19 (JPH/4332); montes **Velebit, Paklenica national park**, „Furlanski virovi Samardinovac" , in silva secus viam ad „Ivine vodice", 750 m, J. Halda, 2000/09/03 (JPH/4428); in declivi petroso montis „Vlaški Grad", 1300 m, J. Halda, 2000/09/04 (JPH/4416); in fundo vallis „**Mala Paklenica**", 480 m, J. Halda, 2000/09/05 (JPH/4455); in fundo vallis „Mala Paklenica" prope caverna „Pozdrovača", 400 m, J. Halda, 2000/09/05 (JPH/4459); in fundo vallis „Mala Paklenica" secus viam sub caverna „Lucinka", 600 m, J. Halda, 2000/09/05 (JPH/4462); montis „**Sveto Brdo**", 1700 m, J. Halda, 2000/09/04 (JPH/4425); secus viam in „**Velka Paklenica** Katica mlin", 400 m, J. Halda, 2000/09/02 (JPH/4441); secus viam in „Velka Paklenica Markov mlin", 370 m, J. Halda, 2000/09/02 (JPH/4445); secus viam in „Velka Paklenica" ad ostium vallis", 350 m, J. Halda, 2000/09/02 (JPH/4443); secus viam in clivo montis „**Malovan**", 1670 m, J. Halda, 2000/09/06 (JPH/4478); secus viam inter montes „**Sveto Brdo**" et „Čubavac", 1550 m, J. Halda, 2000/09/04 (JPH/4424); secus viam sub monte „**Babin vrh**", 1650 m, J. Halda, 2000/09/06 (JPH/4474); secus viam sub monte „**Štirovac**", 1650 m, J. Halda, 2000/09/06 (JPH/4473); secus viam sub montis „**Crni vrh**" (inter „Veliko Močilo" et „Malo Močilo")", 1000 m, J. Halda, 2000/09/08 (JPH/4453); secus viam supra „**Dom Ramiči**" (200 m)", 700 m, J. Halda, 2000/09/08 (JPH/4449); **Dubrovnik**, Čelopeči, R. Dvořák, 1917/12 (BRNM); Dubrovnik, Lapad, Mali Petka, M. Servít, 1927 (PRM-757383, 757390, 757389); Lapad, Velki Petka, M. Servít, 1927 (PRM-757395, 757397, 757380); in mont. **Bukovica**, Pržun, M. Servít, 1907 (PRM-757402); **Istria**, Ostküste der Halb Stadt Albona, J. Baumgartner, 1925/04/21 (PRM-644846); **Zadar** (Zara), Albaneve, M. Servít, 1907 (PRM-757405); Zadar (Zara), Bibinje, M. Servít, 1907 (PRM-757404, 757396, 757386); Zadar (Zara), Bokanjac, M. Servít, 1907 (PRM-757403); Zadar (Zara), Sukošan, Vrčevo, M. Servít, 1908 (PRM-757388, 757394); Zadar (Zara), Tustica, M. Servít, 1907 (PRM-757381); Zadar (Zara), Bokanjac, Baričevic, M. Servít, 1907 (PRM-757401, 757399, 757393, 644841); **Ins. Silba** (Selve), Valle Gomilina, J. Baumgartner, 1913/04/01 (W-4447); **Ins. Sušac** (Cazza), Felsen des Dordin, J. Brunthaler & A. Ginzberger, 1911/05/27 (W); **Ins. Meleda**, am süd des Lago grande, A. Latzel, 1908/02/18 (PRM-757400, 757382);

Ins. Jabuka (San Andrea) west von Lissa, unweis Porto Slatina, A. Ginzberger, 1911 (PRM-756312).
France: **Montpellier**, La Valette, A. Hilitzer, 1931 (PRM-757392); Hyčres, A. Metzler, (PRM-757384, 757391).
Greece: Ins. Evvoia (Euböa), Berg Xerowuni (Xerochorion), Ö. Szatala, 1932 (BP-34245); K. Rechinger, (PRM-757398); **Ins. Levkas**, Megalos Rahi, J. Just, 1929 (PRM-757387); **Ins. Korfu**, Berg Herakli, K. Rechinger, 1912 (PRM-757406).
Slovakia: montes **Nízké Tatry**, mt. Ohniště, 1600 m, J. Halda, Š. Haldová, 1992/07/15 (JPH/2630, JPH/2628); supra pag. Muráň, reservatio **Cigánka**, 900 m, J. Halda, Z. Palice, A. Guttová, 2002/05/15 (JPH/5417).
Slovenia: montes **Julijske Alpe**, in declivibus vallis „dolina Triglavskih jezer" supra Veliko jezero, secus viam", 1830 m, J. Halda, Š. Haldová, 2000/06/23 (PRM-900619).
Switzerland: Mt. Saleve, J. Müller Argoviensis, 1838 (PRM-645019).

VII.-2. Commented list of synonyms

Verrucaria cazzae Zahlbr.

Annal. Mycol. **12**: 335 (1914); type: [Croatia], Ins. Sušac (Cazza), J. Brunnthaler & A. Ginzberger, 1911/05/27 (**W** – lectotypus!); *Bagliettoa cazzae* (Zahlbr.) Vězda & Poelt, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, **1981**: 363.

The original description

Thallus pale peach coloured, K+ bluish-green. Cortex layer 20-40 µm thick, colourless, upper layer purpur, of hyphae 4-5 µm thick, shortly articulated. Photobiont part of medullar layer 80-120 µm thick, photobiont cells 5-13 µm in diam., coagulated in globose or oval clusters covered by hyphae 1-2 µm thick, 3-6 µm long, articulated. All hyphae in the same orientations. Hyphae of hypothallus cylindrical, 1-5 µm thick, 5-10 µm long, articulated, throttled in septa. Hyphae are formed of cells 3-4 µm broad, 8-12 µm long, in central part or tops inflated, sometimes triangular – shaped. They form macrosphaeroids mainly around ascomata. Macrosphaeroids common, globose, 15 µm in diam. Ascomata densely distributed. The visible part of the involucrellum always 200 µm broad, convex, black, slightly glossy, always 250 µm in diam., downwards bent on margins, excipulum of colourless hyphae, paraplectenchymatic, hemisphaerical, 4-6 µm broad. Peritecium conical or ellipsoid, 160 µm high and 100 µm broad, flattened at the base, ostiolum broad, colourless at the beginning, later dark at the top, formed of hyphae 3 µm thick. Excipulum (chlamys) 15 µm thick, upper part dark. Hymenium I+ bluish, later yellow. Periphyses nearly clavate, articulated, always 35 µm long, 4 µm broad. Asci oblong or clavate, 35 µm long. Spores not seen.

Note: Holotype unfortunatelly got lost and it was necessary to make a lectotype. Zahlbruckner noted for his taxon similar structure of ascomata as *Verrucaria marmorea*. The structure of excipulum is the same as *Verrucaria sphinctrina* Duf. but it differs in colour of thallus, its K+ reaction thallus and with smaller size of ascomata. *V. cazzae* forms ascospores very rarely. The most of herbarium samples have died out ascomata and it is not possible to study them. Their thalli are identical as in description. Red crystals are presented in cortex layer of studied specimens. In my opinion both species *V. cazzae* and *V. marmorea* are identical.

Drawing tab. V/1 (Servít 1939, p. 117), photo 153: W - lectotypus.

Verrucaria cazzae Zahlbr. f. *circumarata* Zahlbr.

Annal. Mycol. **12**: 336 (1914); type: [Croatia], Ins. Silba (Selve), valle Gomilina, 20 m, J. Baumgartner (**W-4447** – holotypus!).

The original description

Thallioli coagulated or continuous, regularly scrobiculate.

Note: The thallus and ascomata correspond with *V. marmorea*.

Photo 155: W-4447 – holotypus.

Verrucaria cazzae* Zahlbr. var. *pseudomarmorea Servít

Beih. Bot. Cbl. **59**: 118 (1939), **fig. č. 2**; type: [Croatia], Ins. Mljet (Meleda), Lago grande, A. Latzel (**PRM-757400** – holotypus!, **PRM-757389** – isotypus!)

The original description

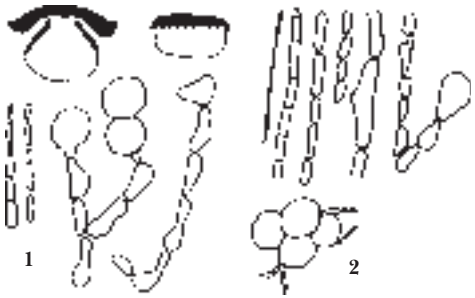
Thallus dark, dirty peach coloured, hyphae of hypothallus usually cylindrical, ascomata dispersed, involucrellum 100-150 µm broad.

Note: Servít mentioned a note in his description that both forms of *V. cazzae* belong to rare lichens of the group which are well macroscopic differentiable. But not in var. *pseudomarmorea*, which is very similar to *V. marmorea* in young stage. The thallus and most of ascomata of holotype specimen are probably died out. The isotype specimen contents a characteristic red thallus with crystals and ascomata with involucrellum and belongs to *V. marmorea*.

Drawing tab. V/2 (Servít 1939, p. 118), photos 154, 156: PRM-757400 – holotypus, PRM-757389 – isotypus.

VII.-3. Iconographia of type specimens

See pages 97 to 98 (photos).



Tab. V.: 1. *V. cazzae*, **2.** *V. cazzae* var. *pseudomarmorea*.

VIII. *Verrucaria parmigerella* Zahlbr.

Österr. Bot. Zeitschr. **68**: 64 (1919); type: [Croatia], Zadar (Zara), Ins. Mljet (Meleda), Wegmauern Brgulje gegen Zapuntello, 1913/04/13, 80-90m, J. Baumgartner (**W-1913-14275** – holotypus!, **PRM-757645** – isotypus!). *Protobagliettoa parmigerella* (Zahlbr.) Servít, *Rozp. Čs. Akad. Věd*, **65(3)**: 36 (1955), *V. sphinctrinella* Zschacke var. *parmigerella* (Zahlbr.) Servít, *Beih. Bot. Cbl.* **59**: 140 (1939); *Bagliettoa parmigerella* (Zahlbr.) Vězda & Poelt, *Bestimmungsschlüssel europäischer Flechten II. J. Cramer*, 1981: 363.

Synonyms: Two species (*P. kutakiana* and *V. sphinctrinella*) and 20 varieties or forms were restricted to the synonyms of the species *V. parmigerella*. The revision did not justify their division.

Protobagliettoa kutakiana Servít, *Rozp. Čs. Akad. Věd*, 65(3): 34 (1955); type: PRM-757515 – holotypus!, syn. nov., (see p. 124).

Verrucaria bagliettoaeformis (Hazsl.) Servít f. *perarata* Servít, *Beih. Bot. Cbl.* 59: 157 (1939); type: WU-00-68/13 – holotypus!, syn. nov., (see p. 124).

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *erumpens* Servít *Beih. Bot. Cbl.* 59: 159 (1939); type: PRM-756703 – holotypus!; *Protobagliettoa erumpens* (Servít) Servít, *Rozp. Čs. Akad. Věd*, 65(3): 31 (1955), (see p. 125).

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *graeca* (Servít) Servít f. *subinterrupta* Servít, *Beih. Bot. Cbl.* 59: 159, (1939); type: PRM-758044 – holotypus!, syn. nov., (see p. 125).

Verrucaria baldensis A. Massal. var. *cretzoiui* Servít f. *meridionalis* Servít; *Beih. Bot. Cbl.* 59 (1939): 133; type: PRM-757316 – holotypus!, syn. nov., (see p. 125).

Verrucaria baldensis A. Massal. var. *rechingeri* Servít, *Beih. Bot. Cbl.* 59: 133 (1939); type: W - holotypus!, PRM-756704 – isotypus!, syn. nov., (see p. 126).

Verrucaria calciseda DC. f. *bagliettoaeformis* Hazsl., *Magyar Birod. Zuzmofl.* 1884: 270; type: PRM-756873 – holotypus!; *Verrucaria bagliettoaeformis* (Hazsl.) Servít; *Beih. Bot. Cbl.* 59: 156 (1939); *Protobagliettoa bagliettoaeformis* (Hazsl.) Servít ex Nowak et Tobol., *Porosty polskie*: 1118 (1975), (see p. 126).

Verrucaria gyelnikii Servít var. *velebitica* Servít; *Beih. Bot. Cbl.* 59: 126 (1939); [Croatia], Velebit, Alan Mirovo, M. Servít (PRM-756299 – holotypus!, syn. nov.), (see p. 126).

Verrucaria parmigera J. Steiner var. *pieninensis* Servít, *Beih. Bot. Cbl.* 59: 146, (1939); type: PRM-757447 – holotypus!, syn. nov.; *Protobagliettoa parmigera* J. Steiner var. *pieninensis* (Servít) Nowak et Tobol., *Porosty polskie*: 1119 (1975), (see p. 127).

Verrucaria pinguis J. Steiner f. *alocizoides* J. Steiner, *Verh. Zool.- Bot. Ges. Wien* 65: 185 (1915); type: PRM-757738 – lectotypus! syn. nov.; *Verrucaria sphinctrinella* Zschacke var. *alocizoides* (Steiner) Servít, *Beih. Bot. Cbl.* 59: 139 (1939); *V. parmigerella* Zahlbr. f. *circumarata* Servít, *Hedwigia* 69: 11 (1929); *V. sphinctrinella* Zschacke f. *circumarata* Servít, *Hedwigia* 74: 122 (1934), (see p. 127).

Verrucaria sphinctrinella Zschacke; *Hedwigia* 71: 232 (1931); type: not seen, (see p. 127).

Verrucaria sphinctrinella Zschacke var. *elevata* Servít; *Hedwigia* 74: 122 (1934); type: PRM-757796 – holotypus!, syn. nov., (see p. 128).

Verrucaria sphinctrinella Zschacke var. *elevata* Servít f. *spermogonifera* (Arnold) Servít; *Beih. Bot. Cbl.* 59: 139 (1939); *V. hyascens* Ach. f. *spermogonifera* Hepp, Fl. Eur., 1853: 691; type: PRM-757767 – lectotypus!, syn. nov., (see p. 128).

Verrucaria sphinctrinella Zschacke var. *expallida* Servít, *Hedwigia* 74: 122 (1934); type: PRM-756862 – holotypus!, syn. nov., (see p. 128).

Verrucaria sphinctrinella Zschacke var. *italica* Servít, *Beih. Bot. Cbl.* 59: 139 (1939); type: PRM-757748 – holotypus!, syn. nov., (see p. 128).

Verrucaria sphinctrinella Zschacke var. *parmigerella* (Zahlbr.) Servít f. *calcivorella* Servít, *Beih. Bot. Cbl.* 59: 141, (1939); type: PRM-757860 – holotypus!, PRM-757859 – isotypus!, syn. nov., (see p. 128).

Verrucaria sphinctrinella Zschacke var. *parmigerella* (Zahlbr.) Servít f. *pallida* Servít; *Beih. Bot. Cbl.* 59: 141 (1939); type: PRM-757724 – holotypus!, syn. nov., (see p. 129).

Verrucaria sphinctrinella Zschacke f. *herculana* Servít, *Beih. Bot. Cbl.* 59: 138 (1939); type: PRM-756861 – holotypus!, syn. nov., (see p. 129).

Verrucaria sphinctrinella Zschacke f. *loferensis* Servít; *Beih. Bot. Cbl.* 59 (1939): 138; type: WU-00-68/4 – holotypus!, PRM-757666 – isotypus!, syn. nov., (see p. 129).

Verrucaria sphinctrinella Zschacke var. *sphinctrinella* Servít f. *viridis* Servít; *Beih. Bot. Cbl.* 59: 138 (1939); type: PRM-757713 – holotypus!, syn. nov., (see p. 129).

Verrucaria sphinctrinella Zschacke var. *thalassiformis* Servít; *Hedwigia* 74: 122 (1934); type: PRM-757691 – holotypus!, syn. nov., (see p. 129).

Verrucaria steineri Kušan var. *inaequata* Servít; *Beih. Bot. Cbl.* 55 B: 260 (1936); type: PRM-756693 – holotypus!, syn. nov. - *Verrucaria inaequata* (Servít) Servít; *Beih. Bot. Cbl.* 59 (1939): 127; *Protobagliettoa inaequata* (Servít) Nowak et Tobol., *Porosty polskie*: 1118 (1975), (see p. 130).

An original description of *Verrucaria parmigerella* Zahlbr.

Thallus pro maxima parte endolithicus, uniformis, macula continua murino-cinerea, opaca, subfarinacea, KHO-, CaCl O - indicatus sorediis destitutus, in margine linea tenui, obscure cinerea limitatus vel passim modice exaratus; stratum corticale tenue, superne parum pulverulento-inspersum, inaequale, ex hyphis dense intricatis formatum; gonidia glomerata, glomerulis rotundatis, plus minus dispersis, cellulis 5,5-8 µm latis, laete viridibus, membrana tenui cinctis; hyphae medullares intricatae, in parte thalli inferiore laxiusculae, leptodermaticae, 3-3,5 µm crassae, cellulas macrosphaeroideas gerentes, cellulis macrosphaeroideis 7-9 µm latis.

Apothecia crebra, immersa, vertice nigro, nitidulo, planiusculo, 0,09-0,1 mm lato, thallum non superante, demum elabente; perithecium depresso-globosum vel subcordatum, usque 0,26 mm latum et 7-9 µm crassum, fusco-nigricans, in parte superiore non vel vix latius; involucrellum bene evolutum, carbonaceum, superne planiusculum vel leviter convexum, ad marginem involutum, parum patens; periphyses dimidium, superiorem perithecii occupantes, filiformes, densae, perpendiculares; paraphyses mox confluentes; hymenium gelatinosum, guttulis oleosis non inspersum, J dilute coerulescens vel non mutatum; asci clavati, oblongi vel subrapiformes, 34-37 µm longi et 9-11 µm lati, J lutescens; sporae maturae non visae. Pycnoconidia ignota.

Description

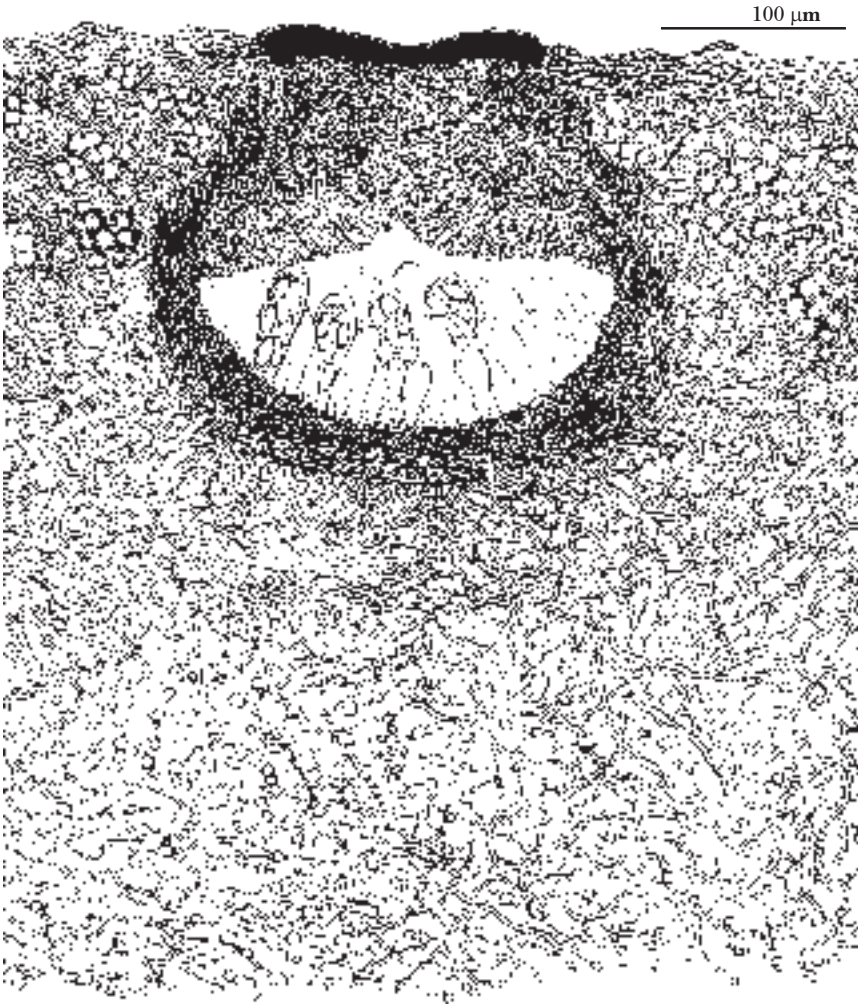
Continual thallus, wall-like grey, blue grey to grey green or dark green, floury matt (subfarinous) or glossy, on the edges often bordered by dark grey line of the prothallus, or slightly wrinkled, dotted by black ascomata (see p. 125). The cortical layer is approx. 25-30 µm thick, formed by thickly tangled hyphae (prosenchym), approx. 1 µm thick. The upper part of the crust is dirty green, the tint is caused by fine blue green crystals, finer than in the *V. marmorea* species.

The medullar layer is approx. 80-300 µm thick, hyphae freely tangled (plectenchyma), approx. 3-4 µm thick. In the lower part, there are cylindrical or oblong cells, usually 18 µm long, 6 µm wide - macrosphaeroids. Photobiont cells are in clews (25-40 µm in diam.), clews are rounded, scattered, photobiont cells 6-12 µm in diam.

Ascomata are mostly formed on the whole thallus surface, sometimes can be totally absent. From the top, they are covered by flat, coal - like, black, glossy, lid - like involucrellum (see p. 114), which does not overlap the thallus, on the edges bends downwards, in more matured ascomata can be slightly archeous. Involucrellum

is 100-150 μm in diam., and is approx. 15-25 μm thick. On the matured ascoma, involucrellum star-shapely bursts from the centre by three to five cracks. On the edge of the walls of died out ascomata, closely to ostiolum, there is sometimes a black ring left.

Perithecium is completely immersed, flately globular, conical to bottled (pear-shaped), in the central part usually 220-260 μm wide, excipulum (chlamys), colourless (pseudoparenchym), rarely in the upper part a little more darker turning to almost black (mainly on the base of matured ascomata), 7- 15 μm thick. Matured peri-



***V. parmigerella*. Vertical section of ascocarp and thallus.**

thecium is absent in the upper part, or is only partially covered by thallus. Periphyses perennial, filiform, usually 5-30 µm long, 2-2, 5 µm thick, articulated, ended by a short clavate cell, non-branching. They continually cover the upper half of the perithecium wall up to ostiolum. Asci with eight spores, cylindrical, oblong or clavate, 30-60 µm long, 5-15 µm wide, narrowed on the base, in the widest, apical part (20 µm) equipped by a thick tholus, do not react with I. Hymenium I+ bluish (perhaps gelly rests of pseudoparaphyses), later yellow.

Ascospores simple, (8)10-15 x 18-28(32) µm (25 measurements), oblong to ellipsoid, in biseriat distribution. In this species, the spores are formed rarely, mostly ascomata with faintly developed ascospores without spores can be observed. Pycnoconidiomata nor pycnoconidia are created.

V. parmigerella is found on limestone and dolomites around whole Europe. It occupies manly shady habitats, where species *V. baldensis, V. marmorea, V. cazzae, Protoblastenia rupestris, Clauzadea immersa, V. calciseda* and others are found there.

Drawing tab. VI/1 (Servít 1939, p. 140), photos 20, 21 - detail of ascocarp and thallus, 158, 159: W-1913-14275 – holotypus; PRM-757645 – isotypus.

VIII.-1. Geographic distribution in Europe

Austria: Salzburg, Grödnig, mt. Untersberg, V. Gyelnik, 1931 (PRM-756863, 757725); Ahornberg (Gainzenberg) bei Ischl, H. Lojka, 1867 (PRM-757081, 757664, 757792); **Salzburg**, Golling, A. Metzler, (PRM-757678, 757662, 757663, 757826); Salzburg, A. Krempelhuber, (PRM-757665, 757828); Tirol, im Walde gegen Brandenberg Rattenberg, F. Arnold, 1897 (PRM-757775); Stiftberg bei Lilienfeld, J. Suza, 1917 (PRM-757727); Salzburger Alpen, **Pinzgau**, Lofer, A. Krempelhuber, (PRM-757666, 757668, 757669, 757670, 757671, 757808, 757842, WU-00-68/4).

Bosnia: Čardak planina, Mlinište, R. Dvořák, 1917 (PRM-757837).

Croatia: Istria, Südende der HalbIns., Scoglio Cielo bei Medolino, J. Baumgartner, 1925 (PRM-757744, 757701); Istria, in monte Debela griža inter Ružiči et Skalnica, F. Blechschmid, (PRM-757323); Istria, Pula (Pola), Pt. Christo, J. Hruby, 1913 (PRM-757067, 757356, 757073); Istria, Punta Pustigna unter Rovinj (Rovigno), J. Baumgartner, 1924 (PRM-757730); Čičavica am südwestfunde des Kamenjak, J. Schuler, (PRM-757814); Istria, ad occid. ab urbe Rijeka versus (30 km), secus viam supra pago Ičiči (sub Učka), 650 m, J. Halda & Š. Haldová, 2000/06/19 (JPH/4415); **Dubrovnik** (Ragusa), Gionchetto, A. Latzel, 1908 (PRM-757830, 757660); Dubrovnik (Ragusa), Nachts Vella Roma rozp. des Weg nach Granosa, A. Latzel, 1907 (PRM-757849); Dubrovnik, Čelopeči, R. Dvořák, 1907 (PRM-783836, 645297, 757074, 757658, 757818, 757888); Dubrovnik, Lapad, Mali Petka, M. Servít, 1927 (PRM-757648, 757644, 757676, 757690, 757724, 757742, 757791, 757809, 757816, 757833, 757879); Dubrovnik, Lapad, Rašica, M. Servít, 1927 (PRM-757815); Dubrovnik, Lapad, Velki Petka, M. Servít, 1907 (PRM-757805), M. Servít, 1927 (PRM-757691, 757636, 757796, 757736, 757804); Župa Dubrovačka, Dubrovnik, Kupari, R. Dvořák, 1917 (PRM-757638, 757642, 757894, 757709, 757714, 757880, BRNM); Dubrovnik, Slano, A. Latzel, 1907 (PRM-757884, 783888, 758044); mt. Risnyak pr.p. Gornje Jelenje, V. Gyelnik, 1939 (PRM-757873, 757463); **Ins. Biševo** (Busi), oberhalb Porto Busi, A. Ginzberger &, 1911 (PRM-757885), J. Brun. & A. Ginzberger, 1911 (PRM-758046); **Ins. Hvar** (Lesina), L. Radlkofer, 1857 (PRM-757881, 757893); **Ins. Jabuka** (San Andrea) west von Lissa, unweis Porto Slatina, A. Ginzberger, 1911 (PRM-757882); **Ins. Kopište** (Cazziol) w. von Lagosta (Lastovo), A. Ginzberger, 1911 (PRM-757639, 757246, PRM-783895); **Ins. Korčula** (West Curzola), Wegmauern unrern ginzel Pupsan bei Velaluka (Valle grande), J. Baumgartner, 1910 (PRM-757841); **Ins. Lastovo** (Lagosta), am Cephalat. beim Laudonysplatze bei Ortes Lagota, J. Baumgartner, 1910 (PRM-757333); **Ins. Mljet** (Meleda), am süd des Lago grande, A. Latzel, 1908/02/18 (PRM-757646, 757677, 757795, 757855, 757726); Ins. Mljet (Meleda), beim dorfe Prožura, J. Baumgartner, 1910/03/14 (PRM-757687, W-4273, PRM-757641, 757857); **Ins. Svilan** bei Rogožnica, J. Brunnthaler, 1911 (PRM-783889); **Ins. Vis** (Lissa), Vis (Lissa), am Wege nach Comisa, J. Baumgartner, 1904 (PRM-757765); Scoglio **Ins. Kornat** (Incoronata), Ins. Žut, Ins. Mali Crnikovac, A. Ginzberger, 1911 (PRM-757731, 757740); Jablanac, Jablanačka draga, M. Servít, 1927 (PRM-757055, 757072, 757510, 757706, 757831); Primorje, Jablanac, M. Servít, 1917 (PRM-757042); Primorje, Jablanac, Klašnica, M. Servít, 1927 (PRM-757738); Lacus Plitvicenses, V. Gyelnik, 1939 (PRM-756952, 757361, 757679, 757787, 757790); Lika Krbava, Sejnsko Bilo, Snižnica Zukalj, J. Čanic, 1927 (PRM-757324), M. Servít, 1907

(PRM-757696), Zukalj, Prolog, J. Kümmerle, 1924 (PRM-757079); Lika Krbava, Sejnsko Bilo, Sv. križ, Ostrovo, J. Kümmerle, 1925 (PRM-757788, (PRM); Lika Krbava, Velebit, Lukovo, Markov kuk, J. Kümmerle, 1924 (PRM-757661); m. Szusák, m. Martinšeca, V. Gyelnik, 1939 (PRM-757461); Modrus, Jelenje, Véliki Pliš, J. Kümmerle, 1911 (PRM-757455); mont. Bukovica, Pržun, M. Servít, 1907 (PRM-757684); Ogulin, mt. Klek, V. Gyelnik, 1939 (PRM-757326, 757890); Plješevica, Tisovi voh, Priboj, J. Kümmerle, 1927 (PRM-757273); Velebit, Alan Mirovo, M. Servít, 1927 (PRM-757456, 757457, 757466); Velebit, Alančič, M. Servít, 1927 (PRM-756693, 757437, 757445, 757454); Velebit, Kněževic, M. Servít, 1907 (PRM-757817); Velebit, Mirovo, M. Servít, 1927 (PRM-756299, 757458, 757464, 757465); Velebit, Stirovača, M. Servít, 1927 (PRM-756862); Velebit, Velka Paklenica, M. Servít, 1906 (PRM-757829); Velebit merid. (Paklenica national park), in fundo vallis „Mala Paklenica“, 480 m, J. Halda, 2000/09/05 (JPH/4457); montes Velebit merid. (Paklenica national park), in fundo vallis „Mala Paklenica“ prope caverna „Pozdrovača“, 400 m, J. Halda, 2000/09/05 (JPH/4460); Velebit, (in fundo vallis „Mala Paklenica“ secus viam sub caverna „Lucinka“, 600 m, J. Halda, 2000/09/05 (JPH/4463); secus viam in „Velka Paklenica Markov mlin“, 370 m, J. Halda, 2000/09/02 (JPH/4447); secus viam inter „Dom Paklenica“ et „Samardinovac“ in sylva“, 600 m, J. Halda, 2000/09/03 (JPH/4439); secus viam sub montis „Crni vrh“ (inter „Veliko Močilo“ et, „Malo Močilo“)“, 1000 m, J. Halda, 2000/09/08 (JPH/4454); Zadar (Zara), Albanese, M. Servít, 1907 (PRM-757080); Zadar, Bibinje, M. Servít, 1907 (PRM-757854); Zadar, Bokanjac, Baričevici, M. Servít, 1907 (PRM-757891); Zadar, Crnačka grobnica, M. Servít, 1907 (PRM-757835); Zadar, Sv. Helena, M. Servít, 1907 (PRM-757859, 757860); Zadar, **Ins. Dugi Otok** (Südlunga), Wegmauern zu Žman bei Luka, J. Baumgartner, 1914 (PRM-757674); Zadar, **Ins. Molat** (Melada), Wegmauern bei Brgulje gegen Zapuntello, J. Baumgartner, 1913/04/13 (PRM-757645, W); Zadar, **Ins. Pašman**, Wegmauern über Dobropoljana, J. Baumgartner, 1913 (PRM-757811); Zadar, **Ins. Uljan**, Wegmauern über Oltre, J. Baumgartner, 1913 (PRM-757812); Zadar, Malpaga, M. Servít, 1907 (PRM-757643); Zadar, **Sukošan**, Vrčevo, M. Servít, 1907 (PRM-757813); Zadar, Tustica, M. Servít, 1907 (PRM-757819); Zadar, Vinjerac, Podastrane, M. Servít, 1907 (PRM-757702, 783845); Croatien, Ill. Dolikönig bei Drachenstein, J. Glowacki, 1897 (PRM-757331); Dalmatia, Papputana, (PRM-757637, 757848); Öster. Litor., Otelia, J. Glowacki, 1869 (PRM-757789, 757821); Ternoaner Wald, Littor, J. Glowacki, (PRM-757870).

Czech Republic: Karlštejn (Karlův Týn) – Sv. Jan p. Skalou, E. Bayer, 1892 (PRM-757218, 757367); ibid. E. Bayer & J. Velenovský, 1892 (PRM-757364, 757334); okolí Kosoře a Radotína, E. Bayer, 1892 (PRM-757216); Praha, Sv. Prokop, Daleje, M. Servít, 1925 (PRM-757160); Vápenný Podol, Pleskotův mlýn, V. Kuťák, 1928 (PRM-757515); Vápenný Podol, V. Kuťák, 1908 (PRM-757514); Morava, Adamov Křtiny, J. Suza, 1921 (PRM-757747, 757820); Býčí skála prope Adamov, J. Suza, 1921 (PRM-757732, 757745); Macocha, Suchý Žleb (Suché údolí), M. Servít, 1906 (PRM-757716, 757718); Mikulov: na Pavlovských kopcích na Turolín, F. Kovář, 1907 (PRM-783886); Moravský Kras, Skalský mlýn, J. Suza, 1920 (PRM-757737); Tišnov, Čebínka, R. Dvořák, 1909/08/08 (BRNM), J. Suza, 1919 (PRM-757253).

France: Besançon, Flagey, (PRM-757755, 757756); Montpellier, La Valette, A. Hilitzer, 1931 (PRM-757045, 757707); Nice, Vallon Obscur, J. Suza, 1917 (PRM-757341); Salses, A. Hilitzer, (PRM-757025); Dep. Herault, Languedoc: Montpellier, St. Martin de Londres, ca 2 km S Frouzet, bei Bergerie de Bayle, V. Wirth, 1995/04/20 (STU); Cuzaril tehuchon Picchemidi, J. Dufour, (PRM-757785, 757366).

Germany: Bavaria, Schattige Kalkwand oberhalb Brunn bei Niedenburg in Altmühlthall, F. Arnold, 1863 (PRM-757806, 757878); Donausthall zu Kellheim n. Weltenburg bei Essing (Bayern), F. Arnold, 1838 (PRM-757875), 1852 (PRM-757769); 1854 (PRM-757889, 757767, 757802), 1858 (PRM-757672, 757750, 757752, 757763, PRM-757770, 757773, , 783894); Franken Jura, Eichstätt, F. Arnold, (PRM-757349, M); Wasserzell bei Eichstätt, F. Arnold, 1866 (PRM-757376, 757252, 757070); Wallendorf, K. Kalchbrenner, (PRM-757753); Berchtesgaden, Winkl, Kalkblöcke, E. Riehmer, 1934 (PRM-757339, 757315); Berchtesgaden, Obersee, C. Erichsen, 1927 (PRM-757827); Oberbayer. Alpen, Rahpolding, H. Zschacke, (PRM-757838); **Baden Württemberg**, Schwäbische Alb: Lichtenstein bei Reutlingen, Locherstein und Umgebung, V. Wirth & T. Nash, 1981/07/22 (STU); Württemberg, Schwäbische Alb: Blaustein, Bermaringen, „Hoher Fels“, MTB 7525/1, V. Wirth & R. Wirth, 1992/09/10 (STU); Württemberg, Schwäbische Alb: Ehingen, Kirchen, M. Eggler, 1920; Schlechtenfeld, 1919; Anhausen, 1918; **Thüringen**, Königsee, G. Lettau, 1909 (PRM-757682); **Aachen**, zu Friesenrath und Hahn, Förster, (PRM-757047).

Greece: Ins. Rhodos (Rodi), Mt. Prozeta, K. Rechinger, (BP 34379, PRM-757633, 757728); **Ins. Kefallinia**, A. Metzler, (PRM-757843); **Ins. Korfu**, Berg Herakli, K. Rechinger, 1912 (W, PRM-757289, 757697); Ins. Korfu, Berg Santi Deka, K. Rechinger, 1912 (W-1915-11566, PRM-757850); Korfu, am felsen hinter dem Koenigs Garten, P. Sydow, 1886 (PRM-756805, 757749, 757068, 757071, 757892, 757039); **Ins. Samos**, mt. Ambolos, K. Rechinger, (PRM-757288); Ö. Szatala, 1932 (BP); Peninsula **Athos**, monastir Aja Anna, Ö. Szatala, 1934 (BP 34380).

Hungary: Borsod, ad rup. calc., Bányahegy pr. **Diosgyör**, F. Hazslinszky, (PRM-757699); **Budapest**, Csobánka, Kis Kévely, V. Gyelnik, 1925 (PRM-757858, 757800, 757721, 757722, 757723, 758257); Budapest, Irhásárok, V. Gyelnik, 1932 (PRM-783832); Budapest, Kopaszerdö, G. Timkó, 1916 (PRM-757350); **Bükk**, Diosgyör, Büdöspest, F. Fóriss, 1932 (PRM-756964); Bükk, Háromkö, V. Gyelnik, 1936 (PRM-757768, 757329); Bükk, Honzusom, F. Fóriss, 1924 (PRM-757698); Estergom, **Csév**, Csévi szirter,

V. Gyelnik, 1925 (PRM-757459); **Fejér**, gajavölgy Bodajk, G. Timkó, 1923 (PRM-757325); Pest, Budakaház, Monalovac Berg, G. Timkó, 1911 (PRM-757353); Pest, Maria Remete, Hoszúerdö, V. Gyelnik, 1925 (PRM-757683, 757681, 757710, 757846); Pest, Maria Remete, Várhegy, G. Timkó, 1915 (PRM-757824); Pilisense, Csév, Legénybarlang, V. Gyelnik, 1938 (PRM-757357); Pilisense, Pilishegy, V. Gyelnik, 1925 (PRM-757762); Berg Leánykö bei Zotész, Gömörer Comites, H. Lojka, 1868 (PRM-757757); Pest: in monte Nagyszál pr. Vác, Ö. Szatala, 1918 (BP 34304); Hungary, A. Hámor, in valle Mélyvölgy, (BRA); Kirchorauf Ungarn, K. Kalchbrenner, (PRM-757685, 757793); Hungary, Zala, Tapolcza, F. Hazslinszky, 1869 (PRM-757754); Parkányi völgy, F. Hazslinszky, (PRM-757751); Sloss, Spitzberg (Szatala H1: 551: Com. Abanj. Toma, Slósz, in monte Szarvashergy), F. Hazslinszky, (PRM-757372).

Italy: Venezianer Alpen, ad rupes cina **Valstagna**, in Bibione Bananensi, (PRM-757337); **Genova, Val Bisagno**, loco Serino, rupiculo sub Castaneis, C. Sbarbaro, 1937 (PRM-757715); Val Bisagno, S. Eusebio, 1950 (PRM-783700, 757680, 757686, 757801, 1951 (PRM-756307, 757019, 757374, 757635, 757746, 757861, 783890, 783891, 783892); Val Bisagno: Molassana, C. Sbarbaro, 1931 (PRM-783840); Niusei, Val Polcevera (Genova), C. Sbarbaro, 1951 (PRM-783838); Pino (Val Polcevera), C. Sbarbaro, 1951 (PRM-783887); Su mani calc. vel pondo di Granado ecetor de mura di Genova, F. Baglietto, (PRM); **Napoli**, Gragnano, S. Angelo, V. Gyelnik, 1928 (PRM-757748, 757825, 783842); Napoli, **Ins. Capri**, C. Sbarbaro, 1936 (PRM-757286); **Trento**, Torbole Nago, **Gardasee**, F. Arnold, 1870 (PRM-757720, 757847); Trento, Gausee, Torbole Nago, F. Arnold, 1900 (PRM-757887).

Yugoslavia: Montenegro, **Lovčen**, 3 km j. Ivanova Korita, M. Servít, 1929 (PRM-757717, 757799, 757834); Lovčen, Ljubvi potok, M. Servít, 1929 (PRM-757851); Lovčen, M. Servít, 1929 (PRM-757287); Lovčen, sanatorium, M. Servít, 1929 (PRM-757167, 757832, 757760); Lovčen, sanatorium, Mali Boštur, M. Servít, 1929 (PRM-757794, 757819); Lovčen, sanatorium, Velki Boštur, M. Servít, 1929 (PRM-757852); Lovčen, Trestenjak, 1929 (PRM-756310, 757853, 757735); **Herceg Novi**, Djurinič, (BRA), **Djurinič**, M. Servít, 1929 (PRM-757316, 757692, 757729, 757761); Herceg Novi, M. Servít, 1929 (PRM-757062, 757704); Herceg Novi, Pločica, M. Servít, 1929 (PRM-757652, 757693, 757836); Herceg Novi, Savina, M. Servít, 1929 (PRM-757077, 757654, 757741).

Poland: Kielce, G. Moesz, 1918 (PRM-757355).

Romania: Danubicum, Plaviševica, in cavernam Denevérbarlang, V. Gyelnik, 1934 (PRM-757336, 757335, 757332, 757360, 757872, 757328, 757318, 757377, 757321); Praebiharicum, Gyulafehérvar, Intrégald, V. Gyelnik, 1934 (PRM-757347); Recicabanya, Budinicu, V. Gyelnik, 1937 (PRM-757370); Siculum lacum Gyilkostó Békár Szoros, V. Gyelnik, 1936 (PRM-757152); Bucegi, Salomitioara Cheile Tatarului, P. Cretzoiu, 1932 (PRM-757276); d. Severin, Domugled, F. Hazslinszky, (PRM-756873, 757758); d. Severin, Domugled, Mehavia, F. Hazslinszky, (PRM-757798); Domugled, val. Jalaran, P. Cretzoiu, 1936 (PRM-757688, 757712, 757345, 757317); distr. Dambovita, Mt. Bucegi, Pestera si Cheile Patarului, P. Cretzoiu, 1937 (PRM-757061); d. Severin, in valle Cerna, ad monte Balta Cerbului, M. Servít, 1936/12/25 (BP, PRM-757362, 757659, 757340, 757348, 757689, 756955); Domugled, Crucea Alba, P. Cretzoiu, 1935 (PRM-757342, 757343, 757883, 757734, 757346, 757327); mt. Domugled, pr. Thermas Herculi im Banatu, Czerna patak, V. Gyelnik, 1935 (PRM-757358); mt. Domugled, pr. Thermas Herculi im Banatu, Grota Hotilor, P. Cretzoiu, 1936 (PRM-756861, 757634, 757700); mt. Domugled, pr. Thermas Herculi im Banatu, H. Lojka, 1877 (PRM-757783); H. Zschacke, 1912 (PRM-757375); H. Lojka, 1877 (PRM-757782, 783896, 757886); V. Gyelnik, 1935 (PRM-757856, 757865).

Slovakia: NP Muránska planina, Muráň, reservatio Šance, secus viam in sylva, 900 m, J. Halda, Z. Palice, A. Guttová, Š. Bayerová, 2001/05/07 (JPH/4815); pag. Muráň, in valle Javorníková dolina, 750 m, J. Halda, Z. Palice, A. Guttová, 2001/05/08 (JPH/4723, JPH/5330, JPH/5329); reservatio Cigánka, in sylva sub Muráňský hrad, 900 m, J. Halda, Z. Palice, A. Guttová, 2001/05/06 (JPH/4833); reservatio Velká Stožka (dextra medietas) sub monte Klak, non procul ab cavernae Machnatá (sept.), 1000 m, J. Halda, A. Guttová, Z. Palice, 2000/05/06 (JPH/4394); Závadka n. H., in clivo montis Malá Stožka, 800 m, J. Halda, Z. Palice, A. Guttová, 2002/05/13 (JPH/5449); Muráň, in valle Klatná loco Machnatá, J. Suza, 1938 (PRM-757867); supra pag. Muráň, reservatio Poľudnica, in sylva, 700 m, J. Halda, Z. Palice, A. Guttová, 2002/05/14 (JPH/5432); Slovenský raj, Hrabušice, Zelená hora (= Szepes, Kaposztafaln, Zelena hura), G. Timkó, 1915 (PRM-756942); supra pag. Ztratená, J. Suza, 1937/07 (PRM-645266, 757290, 757840, 757869); Ztratená, Havrania skála, J. Suza, 1937 (PRM-757776, 757653); Ztratená, Hnilec, J. Suza, 1937 (PRM-757868, 757839, 757866, 757359); Malé Karpaty, Plavecké Podhradie, J. Suza, 1938 (PRM-757351); Malé Karpaty, Smolenice, Ostrý Kameň Burian, J. Suza, 1937 (PRM-645293, 757675); Monkova dolina, (BRA); Pieniny, Haligovce, J. Suza, 1937 (PRM-757845, 757447); Tatry Bielske, in monte Jatky, J. Suza, 1925 (PRM-645222); Trenč. Teplice, Žihlavník, J. Suza, 1922/06/10 (PRM-757739, 645289); Trenčín, Záskalje, Maninská soutěska, J. Suza, 1922/06/04 (PRM-757673, 645269); Val. Dubová, Z. Černohorský, 1931 (PRM-757093); Velká Fatra, Dedošovská dolina, M. Svrček, Z. Pouzar, F. Kotlaba 1953 (PRM-757508), 1954 (PRM-756961, 757363, 757369, 757448, 757460, 757462).

Slovenia: Carniola, Mojstrana, Aljažev dom, M. Servít, 1931 (PRM-757649); Mojstrana, Dovje, M. Servít, 1931/08 (PRM-756951); Dovje, Mlince pot., M. Servít, 1931 (PRM-757647, 757797); Mojstrana, in valle Vrata, M. Servít, 1931 (PRM-757656, 757705, 757778, 757779, 757780, 757743); Mojstrana, M.

Servít, 1931 (PRM-756703, 757650, 757655, 757708, 757713, 757864); Mojstrana, Vrtaški vrh, M. Servít, 1931 (PRM-757694, 758184); Julijske Alpe, Čepovan, dolom., J. Glowacki, 1873 (PRM-757766); Valentiniberg bei Görz, J. Glowacki, 1873 (PRM-757719); Verhovje bei Görz, J. Glowacki, 1872 (PRM-757759); Krain, Idria, Miller Kanonela, Weissenbach, J. Glowacki, 1869 (PRM-757823); Krain, Idria, Wilder See, J. Glowacki, 1869 (PRM-757651); Slovenia, Krain, Veldes, Kuplzweig, J. Steiner, (PRM-757695, 757877); Slovenia, Vrh Kluč bei Idria, J. Glowacki, 1869 (PRM-757373).

Sweden: Gotlandia, Summerland, C. Stenhammar, (PRM-757049, 757066); **Ins. Gottland**, Oija, H. Magnusson, 1918 (PRM-757786); ibid., prope Visby, Snäckgärdet, H. Magnusson, 1910 (PRM-757777, 757871); Visby, Galgberget, H. Magnusson, 1918 (PRM-757862); Sweden, Ins. Gottland, Thorsburg, C. Stenhammar, (PRM-757711, 757338, 757784).

Switzerland: Meride P d'arro Ticorno, R. Maas Geesteranus, 1946 (PRM-757271); Mt. Saleve, J. Müller Argoviensis, 1838 (PRM-757764, 757781); Engelberg, bei Unterwalden, A. Metzler, (PRM-757330); Jura: Tiefental, Schaffert, (PRM-757064).

Turkey: Anatolien, provinz: Hatay, ca 5 km südl. Harbiye, Sofularköyü, Ömerin Tepesi, N 36°02' E 36°08', V. John, 1989/03/18 (M); Anatolien, provinz: Hatay, Zwischen Antakya und Dursunlu, V. John, 1989/03/18 (M); Anatolien, provinz: Mugla, Belcikiz südl. Fethiye N 36°34' E 29°05', V. John, 1982/03/25 (M); West Anatolien, provinz: Antalya, N Rand des Taghtale dag, westl. Kemer, 1,5 km westl. dem Bergdwef, V. John, 1982/03/21 (M); **Cyprus**, Capo graeco, Unger, (PRM-757640);

Yugoslavia: Serbia, Tara Planina, Klisura Dervente, J. Suza, 1923 (PRM-757144).

Without localities: (PRM-757052); E. Kernstock, (PRM-757895); J. Steiner, (PRM-757807); Cliod, A. Hilitzer, 1921 (PRM-757320).

VIII.-2. Extraeuropean distribution

China: Handel Mazzetti, Mertinense 1914-1918: Prov. Yunnan, inter urbem Yungbei et pagum Yungning, in regionis calide temperatae lapid.u, H. Handel Mazzetti, (PRM-757059).

Libanon, I. Reichert, 1934 (PRM-757063).

Palestina: bei **Haifa**, I. Reichert, 1930 (PRM-757065, 757076)

VIII.-3. Commented list of synonyms

Protobagliettoa kutakiana Servít

Rozp. Čs. Akad. Věd, **65(3)**: 34 (1955); type: [Czech Rep.], Vápenný Podol, Pleskotův mlýn, V. Kuťák (**PRM-757515** – holotypus!).

The original description

Thallus dirty grey, rough, wihout prothallus. Cortex layer very thin. Photobiont part of medullar layer to 100 µm high, hyphae densely intricated, to 1 µm broad, shortly articulated. Photobiont cells green in clusters. Hyphae of hypothallus 0,7-4 µm broad, sometimes in dense ropes, macrosphaeroids common, usually 20 µm in diam. Dense to 500, ascomata immersed. Exothecium 150 µm broad, slightly convex and covered by a thin ring of the thallus. Excipulum hemisphaeroidal, 250-280 µm in diam., pale in bottom, in upper part redish to usually brown-black. Involucrellum 200-220 µm broad. Excipulum (chlamys) dark, usually well developed. Periphyses usually 28 µm long, 0,5 µm thick. Asci never in mature stage. Nucleus J+ bluish, later pink.

Note: Servít mentioned a note in his description for this species easy determination from similar taxa with dark excipulum by smaller exothecium. It is clearly mistaken character. In my opinion with study of microscopic sections it is not possible to clearly differ layers of the excipulum. Mentioned hyphal structures coalesce together and is not possible to determinate them. With the colour of thallus, size of ascomata and involucrellum accord with *V. parmigerella*.

Drawing tab. VI/2 (Servít 1955, p. 33), photo 160: PRM-757515 – holotypus.

Verrucaria bagliettoaeformis (Hazsl.) Servít f. *perarata* Servít

Beih. Bot. Cbl. **59**: 157 (1939); type: [Croatia], Rogožnica, Scoglio Svilan, J. Brunnthaler and A. Ginzberger, (**WU-00-68/13** – holotypus!).

The original description

Thallus deeply scrobiculate, colourless, separated in thallioli, convex.

Note: The size of ascomata and an involucrellum accord with *V. parmigerella.*
Photo 162: WU-00-68/13 – holotypus.

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *erumpens* Servít

Beih. Bot. Cbl. **59**: 159 (1939); type: [Slovenia], Mojstrana, M. Servít (**PRM-756703** – holotypus!); *Protobagliettoa erumpens* (Servít) Servít*; Rozp. Čs. Akad. Věd*, **65(3):** 31 (1955).

The original description

Thallus nearly glossy smooth, greenish or bluish white with white dots, slightly scrobiculate without prothallus. The upper part of cortex layer is formed of siliceous material (HCl-). Cortex layer very thin. Photobiont part of medullar layer 60-80 µm high, hyphae densely intricated, 1 µm broad, shortly articulated, photobiont cells in clusters, 6-10 µm in diam., covered by hyphae 1-2 µm wide. Hyphae of hypothallus max. 0,8-3 µm broad, cells mostly cylindrical, usually to 12 µm long with inflated cell at the top. Photobiont's cells 6 µm in diam., clusters covered by densely intricated hyphae, 4 µm broad. Medullar layer well evoluted of similar hyphae. Hyphae of hypothallus densely intricated, unbranched, 0,4-8 µm thick, cells cylindrical or slightly inflate, 6-30 µm long, rarely conical, 15 µm thick and 20 µm long. Macrosphaeroids to 8 µm in diam., dense mostly around ascomata. Cells to 18 µm in diam., globose, hyphae usually 6 µm broad, to 20 µm long. Hyphae of hypothallus formed ropes sometimes. Ascomata dispersed, at the beginning as whitish dots. Involucrellum 50-200 µm in diam., black, often with a ring 20 µm broad. Density to 200. Exothecium to 100 µm broad, nearly covered by thallus or absent, 20 µm broad, white pruinose. Excipulum usually 300 µm broad, usually 250 µm high, dark at the base to violet-brown, upper layer of septated hyphae 2,5 µm broad. Inner layer of perithecium nearly colourless. Periphyses usually 30 µm long. Asci never in mature stage. I+ blue.

Note: Some of the studied ascomata really had elongated upper part of excipulum. This shape of ascomata can be seen in other species. This character is very variable and is not suitable for the taxonomy of new species. The type specimen with the colour of thallus, size of ascomata and involucrellum clearly accord with *V. parmigerella.*
Drawing tab. VI/3, 4 (Servít 1939, p. 159, 1955, p. 33), photo 161: PRM-756703 – holotypus.

Verrucaria bagliettoaeformis (Hazsl.) Servít var. *graeca* (Servít) Servít f. *subinterrupta* Servít

Beih. Bot. Cbl. **59**: 159, (1939); type: [Croatia], Slano, 30 m, 1907, A. Latzel (**PRM-758044** – holotypus!).

The original description

Thallus bluish, sometimes in alveols and around ascomata pink (red cells in cortex layer). Macrosphaeroids rare, 10-15 µm broad, usually 20 µm in diam.

Note: Pink spots sometime present on greenish thallus probably do not belong to the thallus. Red crystals not present in cortex layer. With the size of an involucrellum this specimen accords with *V. parmigerella.*
Photo 165: PRM-758044 – holotypus.

Verrucaria baldensis A. Massal. var. *cretzoiui* Servít f. *meridionalis* Servít

Beih. Bot. Cbl. **59** (1939): 133; type: [Yugoslavia], Herceg Novi, Djurinič, 1929, M. Servít (**PRM-757316** – holotypus!).

The original description

Thallus white to pink, with smooth surface, alveoli broad, with sharp margins, rough. Ascomata absent.

Note: The thallus of the type specimen is died out. Not aborting ascomata accord with *V. parmigerella* with the size of involucrellum.

Photo 163: PRM-757316 – holotypus.

Verrucaria baldensis A. Massal. **var.** *rechingeri* **Servít**

Beih. Bot. Cbl. **59**: 133 (1939); type: [Greece], Ins. Samos, Vathy, 1904, K. Rechinger, (**W** – holotypus!, **PRM-756704** – isotypus!).

The original description

Thallus nearly glossy, smooth. Cortex layer 10-35 µm thick. Hyphae of hypothallus 1-1,5 µm thick, 4-8 µm long, sometimes narrowed, 4 µm broad and 12 µm long, macrosphaeroids 8-12 µm, rarely 16 µm broad. Ascomata always not dense, visible part of involucrellum to 100 µm, plane, not cracking, slightly convex, 140 µm broad, thin. Perithecium slightly flattened at the bottom, conical in upper part, 200-220 µm broad, 160-180 µm high. Dark on base at the beginning only, later all with dark spots. Asci 32-35 µm long, 10-12 µm broad. Spores not seen.

Note: The descrition includes only general details of ascomata. Two small specimens of the holotype belong with colour of the thallus and the size of an involucrellum to *V. parmigerella*.

Photos 164, 166: PRM-756704 – isotypus, W - holotypus.

Verrucaria calciseda DC. **f.** *bagliettoaeformis* **Hazsl.**

Magyar Birod. Zuzmofl. **1884**: 270; type: [Romania], Domugled, F. Hazslinszky (**PRM-756873** – holotypus!). *Verrucaria bagliettoaeformis* (Hazsl.) Servít; *Beih. Bot. Cbl.* **59**: 156 (1939); *Protobagliettoa bagliettoaeformis* (Hazsl.) Servít ex Nowak et Tobol., *Porosty polskie*: 1118 (1975).

The original description

Thallus bluish white, plane or scrobiculate with smooth surface, nearly subhyaline. Cortex layer 25-30 µm thick, colourless, nearly cartilaginous. Photobiont cells usually 10 µm broad, clusters to 40-60 µm broad, covered by densely branched hyphae. Hyphae of hypothallus densely intricated, 3-4 µm thick, cylindrical or slightly inflate. Macrosphaeroids absent or usually 20 µm in diam. Hyphae of hypothallus deeply penetrate limestone as hyphal ropes. Macrosphaeroids often closed in paraplectenchymatic position.

Ascomata regularly dispersed in thallus. Involucrellum 200 µm in diam., young small and plane, later clearly convex, in central part plane, with radial fissures, 30 µm thick, bent downwards on margins. Excipulum usually colourless or dark in upper part, pale or colourless at the bottom. Perithecium in lower part hemisphaerical, 300-400 µm high, 300-320 µm broad, in upper part bottleneck elongated, young nearly colourless, later brown to black. Periphyses thin, 40 µm long, in upper half of perithecium only. Asci clavate, in upper part narrowed, 40 µm long, 12 µm broad. Spores not seen. Hymenium J+ bluish, later yellowish.

Note: The type specimen was deposited in PRM, not in BP. Servít described to this taxon *V. bagliettoaeformis* strongly resembles with thin involucrellum *V. subconcentrica*. It was recognized macroscopically very easily in typical form with bluish thallus and further characters as a surface of thallus, ascomata common, higher than broader sometimes with elongate neck and with bunches of hyphae in hypothallus. In my opinion the length of that bunches depends on physiological status of a thallus and conditions on habitats. The thallus and ascomata of the holotypus belong to *V. parmigerella*.

Drawing tab. VI/5 (Servít 1939, p. 156), photo 167: PRM-756873 – holotypus.

Verrucaria gyelnikii **Servít var.** *velebitica* **Servít**

Beih. Bot. Cbl. **59**: 126 (1939); [Croatia], Velebit, Alan Mirovo, M. Servít (**PRM-756299** – holotypus!).

The original description

Thallus plane and smooth, cretaceous white with deep grooves. Cortex layer 20-50 µm thick. Hyphae of hypothallus branched. Ascomata irregularly dispersed in thallus. Involucrellum 100-150 (250) µm in diam. Peritecia 250 µm broad, 150 µm high. Spores in biseriate orienta-

tion, shortly ellipsoidal, 9-14 µm long, 7-9 µm broad, usually oval, 13-20 µm long, 10-13 µm broad. Hymenium J+ bluish, later yellowish.

Note: The size of involucrellum accords with *V. parmigerella*. The holotype is not cretaceous white but is yellow-brown.

Drawing tab. VI/6 (Servít 1939, p. 127), photo 169: PRM-756299 – holotypus.

Verrucaria parmigera J. Steiner var. *pieninensis* Servít

Beih. Bot. Cbl. **59**: 146, (1939); type: [Slovakia], Pieniny, Haligovce, 650 m, J. Suza (**PRM-757447** – holotypus!); *Protobagliettoa parmigera* J. Steiner var. *pieninensis* (Servít) Nowak et Tobol., *Porosty polskie*: 1119 (1975).

The original description

Thallus whitish, or slightly pink, smooth, separated by black prothallus. Hypothallus penetrates deeply the limestone, hyphae cylindrical, 2-4 µm thick or inflate. Macrosphaeroids 12-16 (20) µm in diam. Involucrellum usually 240 µm, perithecium 280 µm broad. Excipulum colourless at the base.

Note: Mentioned sample of holotype has smaller involucrellum than the description gives (max. to 150 µm) and thallus is typically greenish as in *V. parmigerella*. It is probably a mistake in the description.

Photo 168: PRM-757447 – holotypus.

Verrucaria pinguis J. Steiner f. *alocizoides* J. Steiner

Verh. Zool.-Bot. Ges. Wien **65**: 185 (1915); type: [Croatia], Primorje, Jablanac, Klašnica, 80 m, M. Servít, 1927 (**PRM-757738** – lectotypus!); *Verrucaria sphinctrinella* Zschacke var. *alocizoides* (J. Steiner) Servít, *Beih. Bot. Cbl.* **59**: 139 (1939) *V. parmigerella* Zahlbr. f. *circumarata* Servít, *Hedwigia* **69**: 11 (1929). *V. sphinctrinella* Zschacke f. *circumarata* Servít, *Hedwigia* **74**: 122 (1934).

The original description

Thallus map-shaped of small fields 2-3 µm broad, separated by deep grooves (as in *V. sphinctrina*, *V. calciseda, V. parmigera* etc.). Ascomata absent.

Note: Steiner did not indicate any locality for type specimen that probably got lost. Servít did not see it too, nevertheless he made a new combination.

Photo 170: PRM-757738 – lectotypus.

Verrucaria sphinctrinella Zschacke

Hedwigia **71**: 232 (1931); type: [Greece], Corfu, Mt. Deka, K. Rechinger, (HP), not seen.

The original description

Thallus pale or dirty bluegreen, smooth, planewithout prothallus. Cortex layer 10-50 µm thick, hyphae densely intricated, colourless, the upper layer of dirty green od bluish hyphae, 4-6 µm broad. Hyphae of hypothallus densely branched and close in upper part, loosen in bottom, cylindrical, 2-4 µm broad, short or long, inflate, often conical. Macrosphaeroids common, 12-15 µm broad. Ascomata not densely dispersed. Involucrellum 100-200 µm broad, in central part 40 µm thick, bent downwards on margins, black. Perithecium nearly globose, 300 µm (rarely to 370) in diam., young on base brownish, in upper part colourless, later all with brownish dark spots, of plectenchymatic orientation of hyphae, 1,4 µm broad. Excipulum colourless brownish in upper part. Periphyses articulated, usually 30 µm long, 3 µm broad, the last cell hemisphaerical, 6-10 µm broad. Old involucrellum often bent downwards on margins, upper part black, with porus. Asci clavate, upper part narrowed, usually not in mature stage. Hymenium J+ bluish, later colourless.

Note: Zschacke's description accords to *V. parmigerella*.

Drawing tab. VI/7: Servít 1939, p. 136.

Verrucaria sphinctrinella Zschacke. var. *elevata* Servít

Hedwigia **74**: 122 (1934); type: [Croatia], Dubrovnik, Lapad, Velki Petka, M. Servít (**PRM-757796** – holotypus!).

The original description

Thallus grey or bluish green, deeply scrobiculate. Ascomata immersed in thallus, convex. Peritecia pale. Periphyses usually 25 µm long, 3 µm broad. Hymenium J+ blue, later yellow.

Note: Thallus and ascomata of the holotypus belong to the description of *V. parmigerella.*

Photo 173: PRM-757796 – holotypus.

Verrucaria sphinctrinella Zschacke var. *elevata* Servít f. *spermogonifera* (Arnold) Servít

Beih. Bot. Cbl. **59**: 139 (1939); *V. hyascens* Ach. f. *spermogonifera* Hepp, Fl. Eur. 691 (1860); type: [Germany], Bavaria, Kehlheim, Weltenburg (Arnold in Arn. 36: *Hymenelia hiascens* (Ach.) A. Massal. f. *spermogonifera*); (**PRM-757767** – lectotypus!).

The original description

Thallus grey or grey-green, with regular white dots, scrobiculate.

Note: The type specimen has got lost. It was necessary to choose a lectotype from Servít's herbarium. Mentioned specimen has completely degraded thallus.The rests of ascomata accord with *V. parmigerella.*

Photo 171: PRM-757767 – lectotypus.

Verrucaria sphinctrinella Zschacke var. *expallida* Servít

Hedwigia **74**: 122 (1934); type: [Croatia], Velebit, Stirovača, M. Servít (**PRM-756862** – holotypus!).

The original description

Thallus whitish or pale blue, smooth, scrobiculate with dark prothallus. Cortex layer 12-25 µm thick, colourless, without upper part of cortex. Involucrellum emerging the thallus. Macrosphaeroids to 20 µm broad.

Note: Typical thallus and ascomata (the size of an involucrellum) of *V. parmigerella.*

Photo 174: PRM-756862 – holotypus.

Verrucaria sphinctrinella Zschacke var. *italica* Servít

Beih. Bot. Cbl. **59**: 139 (1939); type: [Italy], Napoli, Gragnano, S. Angelo, V. Gyelnik (**PRM-757748** – holotypus!).

The original description

Thallus plane, whitish, with bluish green spots, macrosphaeroids to 15 µm broad. Peritecia nearly colourless, dark on base. Spores usually 25 µm long, 10 µm broad.

Note: The thallus and ascomata of the holotypus belong to *V. parmigerella.*

Photo 172: PRM-757748 – holotypus.

Verrucaria sphinctrinella Zschacke var. *parmigerella* (Zahlbr.) Servít f. *calcivorella* Servít

Beih. Bot. Cbl. **59**: 141, (1939); type: [Croatia], Zadar (Zara), Sv. Jelena, 20 m, M. Servít, (**PRM-757860** – holotypus!, **PRM-757859** – isotypus!).

The original description

Thallus grey, rough, deeply scrobiculate.

Note: The thallus and ascomata of the type specimen belong to *V. parmigerella.*

Photos 175, 176: PRM-757859 – isotypus, PRM-757860 – holotypus.

Verrucaria sphinctrinella Zschacke var. *parmigerella* (Zahlbr.) Servít f. *pallida* Servít

Beih. Bot. Cbl. **59**: 141 (1939); type: [Croatia], Dubrovnik, Lapad, Mali Petka, M. Servít (**PRM-757724** – holotypus!).

The original description

Thallus whitish, hyphae of cortex layer green, rare. Cells of hypothallus usually cylindrical.

Note: The thallus and ascomata belong to *V. parmigerella*.

Photo 179: PRM-757724 – holotypus.

Verrucaria sphinctrinella Zschacke *f. herculana Servít*

Beih. Bot. Cbl. **59**: 138 (1939); type: [Romania], Thermae Herculi, Hotilor, P. Cretzoiu (**PRM-756861** – holotypus!).

The original description

Thallus whitish, hyphae in upper part of cortex dark (black dots or lines), usually 20-200 µm broad.

Note: A thallus of mentioned specimen is dead. It probably belong to *V. parmigerella*.

Photo 177: PRM-756861 – holotypus.

Verrucaria sphinctrinella Zschacke f. *loferensis* Servít

Beih. Bot. Cbl. **59** (1939): 138; type: [Austria], Salisburgia, Pinzgau, Lofer, A. Krempelhuber (**WU-00-68/4** – holotypus!, **PRM-757666** – isotypus!).

The original description

Thallus clearly emerging, plane, smooth, membranaceous, dark olive green. Ascomata convex.

Note: The thallus and ascomata of the type specimen belong to *V. parmigerella*. Different shape of their involucrellum (plane to convex) is caused by their age.

Photos 178: WU-00-68/4 – holotypus.

Verrucaria sphinctrinella Zschacke f. *viridis* Servít

Beih. Bot. Cbl. **59**: 138 (1939); type: [Slovenia], Carniola, Mojstrana, M. Servít (**PRM-757713** – holotypus!).

The original description

Thallus wrinkled.

Note: A typical thallus and ascomata of *V. parmigerella*. Mentioned surface of the thallus clearly depends on different substratum.

Photo 180: PRM-757713 – holotypus.

Verrucaria sphinctrinella Zschacke var. *thalassiformis* Servít

Hedwigia **74**: 122 (1934); type: [Croatia], Dubrovnik, Lapad, Petka, M. Servít (**PRM-757691** – holotypus!).

The original description

Thallus usually dark coloured, interrupted, with pits 5 µm broad. Cells of hypothallus rarely fusiform, usually cylindrical.

Note: The thallus of mentioned specimen is died out. Shallow depressions on the thallus are very old and they have not got any continuity with the thallus. Well-preserved parts of the thallus with ascomata accord with *V. parmigerella*.

Photo 181: PRM-757691 – holotypus.

Verrucaria steineri Kušan var. *inaequata* Servít

Beih. Bot. Cbl. **55** B: 260 (1936); type: [Croatia], Velebit, Alančič, M. Servít (**PRM-756693** – holotypus!) - *Verrucaria inaequata* (Servít) Servít; *Beih. Bot. Cbl.* **59** (1939): 127; *Protobagliettoa inaequata* (Servít) Nowak et Tobol., *Porosty polskie*: 1118 (1975).

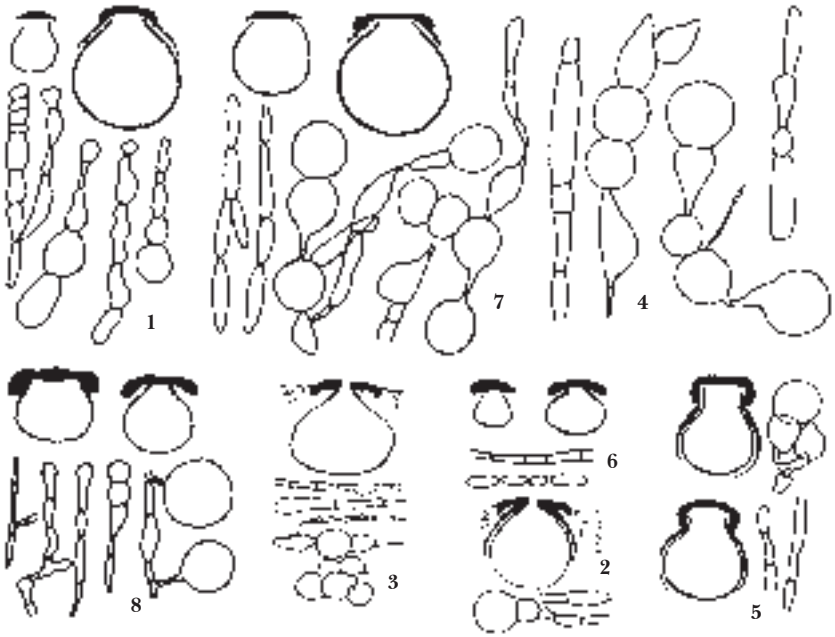
The original description

Thallus emerging, whitish to usually grey, smooth, not plane, deeply scrobiculate, interrupted. Cortex layer 15-40 µm thick. Photobiont part of medullar layer continuous, always 100 µm high, photobiont cells in clusters, 8-14 µm broad. Hyphae 1,2 µm thick. Hyphae of hypothallus branched in upper part, 1,3-3 µm thick, cells 3-7 µm long, throttled in septa, rare in conical cells to 6 µm broad, 15 µm long,in globose cells to 6 µm broad. In bottom part of hypothallus hyphae rarely branched, twisted, 2-4 µm thick. Cells always 30 µm long and macrosphaeroids always 20 µm broad, rare, inflate. Ascomata common, in pits, often in regularly concentric rows. Involucrellum 100-250 µm broad, young plane, 30-40 µm thick, downwards on margins. Young perithecium globose, colourless, later in upper part elongated, usually 250 µm in diam., pale brown. Asci clavate. Periphyses 30 µm long, 3 µm broad, nearly clavate. Spores not seen. Hymenium J+ blue, later yellow.

Note: The size of an involucrellum mentioned in description is mistaken. An involucrellum of ascomata of the type specimen do not reach 150 µm in diam. Thallus clearly accord to *V. parmigerella*.

Drawing tab. VI/8 (Servít 1939, p. 128), photo 182: PRM-756693 – holotypus.

VIII.-4. Iconographia of type specimens - See pages 99 to 104 (photos).



Tab. VI.: 1. *V. parmigerella*, **2.** *P. kutakiana*, **3., 4.** *V. bagliettoaeformis* var. *erumpens*, **5.** *V. calciseda* f. *bagliettoaeformis*, **6.** *V. gyelnikii* var. *velebitica*, **7.** *V. pinguis* f. *alocizoides*, **8.** *V. steineri* var. *inaequata*.

C. Discussion

IX. Mistakes in Servít's understanding the genera and species

IX.-1. The generic concept according to taxonomic priorities of characters

Any of the previously mentioned characters (see the chapter Servít's generic concept) is not consistently monitored in the whole group of genera. The genera separation according to ascospores type, absence or presence of involucrellum is not sure, and often they are hard to distinguish according to the description. E. g. genera ***Bagliettoa*** (spores transversaly longitudinaly divided) and ***Protobagliettoa*** (spores not developed at all, or are not completely developed), should according to the description differ in the type of spores. This is a very misleading character, because ascomata which do not have entirely developed spores, can be studied in other lichen species, too. Nevertheless, in such cases a new genus has not been established.

IX.-2. Division according to types of ascospores

In case of division of genera according to types of ascospores (spores not divided, transversally divided, transversally and logitudinally divided), Servít evaluated the characters in a too formal way, with no bird's eye view and with an approach that did not admit any variability or deviation caused by the own ontogenesis of the studied samples. The idea is supported by the following note (**Servít 1954 p. 44): „**Domnívám se, že postupuji vědecky správně, když do rodu *Thelidium* přeřazuji i některé druhy dosud označované jako *Verrucaria*, bez involucrela, u nichž je sice většina spor jednobuněčných, vyskytují se však i jednotlivé spory dvojdílné. Považuji to za důkaz, že obsahují faktor dědičnosti vyvolávající dělení spor, i když se tento faktor většinou nemůže uplatnit a vyvolat dělení u většiny spor.“ = „I am convinced that I follow all the scientific rules when Iput some other species up to date considered as *Verrucaria*, without involucrellum, in which most of the spores are one - celled, but there also appear individual two - part ones, into the genus *Thelidium*. I consider it a proof that they contain a factor of inheritance evoking spore division, even if most of the time this cannot be put into practice and thus evoke the division in most of the spores.“

This way, the characters in the species descriptions, varieties and forms, are very often repeated. Servít never clearly set any rules according to which characters individual taxonomic items should be divided. To some extent, this is caused by a bad arrangement of a large number of the described taxa, that after beeing published, were not critically revided again. That can be the key for understanding the later combinations of *Verrucaria sphinctrina* to the genus *Polyblastia*, the recovery of the genera *Bagliettoa* and describing a new genera *Protobagliettoa*. Similarly, new family *Bagliettoaceae* was artifically described by Servít (1955).

On the base of several more - celled spores, that probably did not have to belong to he lichen studied – either *V. sphinctrina* Ach. f. *bavarica* Servít, *V. sphinctrina* Ach.

var. *calcivora* Servít, *V. sphinctrina* Ach. var. *lojkae* Servít, *V. sphinctrina* Ach. f. *gallica* Servít or *V. sphinctrina* Ach. var. *tiroliensis* Servít, Servít overcombinated author (Servít 1952) these taxa to the species *Polyblastia*, even if in any of the original descriptions of the mentioned taxa he did not note more - celled spores. Similarly, the new species *Bagliettoa limborioides* A. Massal., even if the author did not study the type specimen and his decision explains on the base of information taken from literature (Servít 1952 p. 381). My observations of the already mentioned taxa did not prove occurence any more - celled spores. Now and then, in some microscopic preparations, there appeared two - celled ascospores, but never regularly - such occurance is common in many other species of this genera as was already noted in the chapter The genera concept. Servít used the character of the divided spores also when describing the species *V. suzaeana*. In other case, he combined on the base of the same character other species to the genus *Thelidium*.

From this reason, the whole system of the order *Verrucariales* turned to be a chaos. Servít transfered to another genus a great deal of generic taxa on the base of unclear characters into other or completely new genera. In a such large number of combinations, it is very hard to have a system since the author did not put his new combinations back to the new system. His most extensive study targetted at *Verrucariales* was probably only one of many he intended to publish. It is based on the fact that in this study he grasped only a fragment of his older combinations. The study then includes many other new descriptions. As a consequence, a critical revision of all his newly described taxa is necessary.

IX.-3. Density

In many descriptions of type specimen Servít noted density of ascomata, too. This number stands for a number of ascomata per 1 cm^2. Large number of type specimen does not even reach this area. Either the type speciment are not of the original size, out of which the author set the density (maybe because of the obtaining of isotypes), or Servít the density just calculated. In some bigger specimen, another problem is the correct localization of the place, where the density should be measured. The number of ascomata in different places in the framework of the same thallus often meaningfully varies - in that case, the areas with the biggest density were counted. There again, the gathered informations often differed from the data given in the descriptions. E. g. in the item of the species *Protobagliettoa alocyza* (Arnold) Servít gives the density 500 in the thallus of the thallus - on the type specime, there often change areas with densely coagulated ascomata with the areas with no ascomata. If the author meant area with the biggest number of ascomata, we come to he result of density of at least 800 (see the photo of this specimen). The specimen PRM-783713 (*V. baldensis*) has the area of 0,25 cm^2. Its thallus contents approx. 20 well - preserved ascomata and approx. 40 empty pits after the died out ascomata. The density of the herbarium item Servít set himself and by his own hand, he marked it as 400. The specimen PRM-783716 (*V. baldensis*) contents approx. 20 ascomata and 20 pits on the area of approx. 0,4 cm^2 – Servít determined the density - 450. It would be possible to present many other similar examples (PRM-783703, 783711,

783712, 783708 783720, 783690…). Out of the given density it is clear that its value does not really have any significant taxonomic meaning. It surely characterizes better the ascoma development than only the so often used terms for ascomata such as scarcely, slightly dense, quite densely, or meaningfully. It is then surely dependant on the fyziological stage and age of the thallus.

IX.-4. The statistic evaluation

Servít very often gave in a very detailed way the measures of the individual anatomic parts in his descriptions. The measures in the desccriptions of the individual taxa statistically vary pretty meaningfuly (the size of spores, asci or periphyses). He also published a project on measuring and statistic evaluation of the measurements of spores (Servít 1929). This way of the measurements evaluation was at that time, in lichenology, a pretty rare one and surely very enlightning. On the other hand, it is very surprising that in any described taxa, he did not give at least the number of the objects measured and the dispersion in the way he recommended in his work.

IX.-5. Servít's collections and their way of dating

Servít was actively interested in the calcicolous species of the genus *Verrucaria* for at least 40 years. To such extensive period, also the collections of the mentioned species are dated. In the herbarium PRM is surely gathered the biggest amount of his collections, even if he used to change the herbaceous material with his colleaques from the foreign countries (M. Choisy, P. Cretzoiu, C. Erichsen, F. Fóriss, V. Grummann, V. Gyelnik, J. Kümmerle, H. Magnusson, V. Savicz, C. Sbarbaro, Ö. Szatala, G. Timkó, M. Tomin and many others). The herbarium samples of the lichen collections suggest the extent to which the author dedicated his time to the studied group right in the field. In the herbarium PRM, it is possible to find more than 400 samples of the group studied of the species collected by Servít himself. Out of this amount, the largest number collected in the years 1906-1907, when he took part in the millitary service in Zadar, Croatia - 102 items altogether. The years 1908 – 1926 weren't very rich in new samples (graduation, starting a new job, service in the war, the years - taking recovery from the war wounds) - 18 samples. The samples collected during the W. W. I, according to he author's notes, got lost. In the coming years 1927, 1929 and 1931 he made ways to the well- known Yugoslavia, where again, he obtained a rich material (253 samples). In the following 20 years Servít probably did not collect any calcicolous species of the genus *Verrucaria* since there weren't found any in his herbarium. From the given numbers it is clear that the time Servít was interested in the studied group the most, was between the years 1927 - 1931, when he gathered the largest number of samples for his future monography, published in the year 1939. The following 28 years, he only worked with the herbaceous material and did not dedicata his time to the research in the terrain (this fact is based on the oral testimony of Z. Černohorský and A. Vězda).

X. The distribution of the species in the Czech republic

From the localities given on the herbarium samples it is clear that the species *Verrucaria baldensis* and *V. parmigerella* were distributed meaningfully on the limestones in the whole Czech republic as soon as in the first half of the 19th century. Many items came from Moravský kras (Macocha), Pálava, Krkonoše and Český kras. Most of the mentioned localities is unfortunately preserved to these days (e. g. Kuťák's locality in Prostřední Lánov, where there was extensive mining of limestone). The same happened to the well – known limestone locality in Radotín, where the whole bunch of researchers collected their samples (see The distribution). Other example are the limestone localities in Moravský kras and the outskirts of Prague, where there till the end of the fifties, the lichen were washed out under the influence of acid rain. Out of the oral presentation of A. Vězda, the localities of Moravský kras were still well - preserved in the fifties. In the present time, on these places, which used to be rich in calcicolous limestone, is possible to find only the disappearing rests, and only in the preserved localities. The areas in Český kras are damaged in a similar way. Nevertheless, on the described habitats, it is possible to come across a meaningful number of lichen from the order *Verrucariales*. From the lichen of the group studied, here there were collected only samples of the species *V. baldensis*. The species *V. parmigerella* is obviously less resistent, out of these localities, thee was not gathered any sample. The same situation is in Prokopské údolí near Prague and in Pálava, where the most spread representative of the studied species is *V. baldensis*. The freshly new locality with the distribution of *V. baldensis* is Tvarožné díry in the valley of the river Morava, under the Kralický Sněžník, where there on several calcicolous rocks of boulders were collected samples of the species *V. baldensis*.

The other two species *V. marmorea* and *V. limborioides* do not have any locality within our country of distribution. They probably have (see localities) different climatic claims.

D. Summary

1. By a detailed study of morphology of great quantity of fresh material of endolitic calciolous species of the genus *Bagliettoa* and *Protobagliettoa* was not sustained on the base of flat, ray - like cracking involucrellum, the rightfulness its separation from the genus *Verrucaria*. Servít's conception of other genera in the framework of *Verrucaria* is not unanimous. To devide this genus, it would be neccesary to study in a more systematic way all types of ascomata, which internal morphology, and production of involucrellum in all species of the genus *Verrucaria*.

2. In all the taxa studied, no essential characters were discovered, that would illustrate their unique occurance. Herbarial specimen proved this claim. The revision of other noncalcicolous species should bring the same results. The taxa revision brought a meaningful summary. For a difficult availability of some specimens (a lot of herbarial specimens got lost in Zschacke's revision - see Servít 1939 p. 124), it was very hard to revise all the group in the past. Taking this fact into account, the

study brings a great numer of new synonyms.

4. The study of ascoma morphology in the optimum developmental stage proved, that species *V. baldensis* A. Massal., *V. limborioides* (A. Massal) Clauzade & Roux, *V. marmorea* (Scop.) Arnold, and *V. parmigerella* Zahlbr., differ also in the shape of involucrellum. By the thallus build, differ mainly species *V. marmorea* and *V. parmigerella*, that have colourful crystals in the cortical layer of the thallus. Involucrellum of both kinds of ascomata is flat, but differs in size and shape. In the species *V. marmorea* is very thick - 40 μm, reaches up to twice of the involucrellum thickness of species *V. parmigerella* and *V. baldensis*. By the ascoma development, it is cracking, and creates a black ring around the ascoma mouth. Species *V. baldensis* and *V. limborioides* are typical for their thallus with crystals absent in the cortical layer, but surely differs in shape and involucrellum size, which is, in the first case flat, and does not exceed the size of 300 μm, in the second case is meaningfully archeous, and reaches the size of 450 μm.

5. The study of other internal characters of ascoma and thallus did not bring any fundamental differences. The shape and ascoma size, ascospores and asci, length of periphyses, thickness and colour of excipulum wall, measurements of hyphae of the medullar layer, and neither shape nor size of macrosphaeroidal cells, do not show any significant differences as for the species studied.

6. The dependance of colour and the thallus build on habitat and substrata was beeing studied. The colour of the thallus is very changeable, mainly in the *V. baldensis* species. This speciality is probably caused by the thallus ability to adapt different light and habitat conditions (see chapter on thallus morphology). Thus the thallus tint from shady and sunny habitats is so changeable. It depends on the occurance of the clusters of cirrhus cells, their distance from the cortical layer, that also changes its thickness according to the habitat conditions. The usual white tint of the thallus in the species *V. baldensis*, is for such changes entirely ideal. This ability is probably the cause, why there were so many taxa described within the framework of this species.

7. The measurements of the thallus thickness in the descriptions, cannot be regarded as a determination character. It was proved, that it is dependant on the developmental stage of the thallus, substrata type, habitat, and its microclimatic conditions. The used character is also the dark spots or hyphae on the thallus surface. Such spots are made, when the cortical layer of the thallus is damaged in a particular place, and consequently very quickly colonised by heterogenous parasite hyphae is dying out. The died out hyphae are getting black, and form dark spots of different shape on the thallus. In some descriptions, Servít admitted that the thallus could be died out.

8. The presence or absence of the prothallus of the thallus cannot be considered a significant taxonomical character, since there aren't any other differences in these lichens. Thus they should be considered morphological differences of he thallus or ascoma, by which the natural variability of this genera group is illustrated. The variability greatly depends on the stage of development as well as the substrata.

9. The results of macrosphaeroidal cells of the studies under microscope proved,

that they are in great numbers created in the lower part of the medullar layer in all representatives, except for the dying out samples, and differ neither in size nor shape. This way, they cannot be considered a significant taxonomical character.

10. All available type specimens were studied, both lectotype and neotype were estimated, and there was framed a key for determination of species.

11. A new section *Bagliettoa* has been established within the genus *Verurucaria*, which is well defined by the way of opening and shape of involucrellum.

12. They have been established a new neotype and a isoneotype of the species *V. marmorea* and 19 taxa have been lectotypified (*Protobagliettoa lactea* (Arnold) Servít var. *ochracea* Servít, *Verrucaria bagliettoaeformis* (Hazsl.) Servít var. *caesia* (Arnold) Servít, *Verrucaria baldensis* A. Massal., *Verrucaria baldensis* A. Massal. var. *canici* Servít f. *bakonyensis* Servít, *Verrucaria baldensis* A. Massal. var. *spilomatica* A. Massal., *Verrucaria calciseda* DC. f. *alocyza* Arnold, *Verrucaria calciseda* DC. var. *lactea* Arnold, *Verrucaria cazzae* Zahlbr., *Verrucaria inaequata* (Servít) Servít f. *helvetica* Servít, *Verrucaria inaequata* (Servít) Servít var. *transsilvanica* Servít, *Verrucaria parmigera* J. Steiner, *Verrucaria parmigera* J. Steiner var. *calcivoroides* J. Steiner, *Verrucaria parmigera* J. Steiner var. *calcivoroides* J. Steiner f. *arnoldiana* Servít, *Verrucaria pinguis* J. Steiner f. *alocizoides* J. Steiner, *Verrucaria sphinctrina* Ach. var. *tiroliensis* Servít, *Verrucaria sphinctrinella* Zschacke var. *elevata* Servít f. *spermogonifera* (Arnold) Servít, *Verrucaria steineri* Kušan f. *scrobicularis* Servít, *Verrucaria subconcentrica* (J. Steiner) Servít var. *nigroaureolata* (Servít) Servít f. *limitata* Servít and *Verrucaria subconcentrica* (J. Steiner) Servít var. *nigroaureolata* (Servít) *Servít* f. rauca Servít).

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F. List of synonyms

Bagliettoa
baldensis = *Bagliettoa baldensis* (A. Massal.) Vězda >>> ***Verrucaria baldensis***
bavarica = *Bagliettoa sphinctrina* (Ach.) Körb. var. *bavarica* (Servít) J. Nowak & Tobolewski >>> ***Verrucaria limborioides***
cazzae = *Bagliettoa cazzae* (Zahlbr.) Vězda & Poelt >>> ***Verrucaria marmorea***
ceracea = *Bagliettoa ceracea* (J. Steiner) Jatta >>> ***Verrucaria limborioides***
limborioides = *Bagliettoa limborioides* A. Massal. >>> ***Verrucaria limborioides***
parmigera = *Bagliettoa parmigera* (J. Steiner) Vězda et Poelt >>> ***Verrucaria baldensis***
parmigerella = *Bagliettoa parmigerella* (Zahlbr.) Vězda & Poelt >>> ***Verrucaria parmigerella***
quarnerica = *Bagliettoa quarnerica* (Zahlbr.) Vězda >>> ***Verrucaria baldensis***
sphinctrina = *Bagliettoa sphinctrina* (Duf.) Körber >>> ***Verrucaria baldensis***
steineri = *Bagliettoa steineri* (Kušan) Vězda >>> ***Verrucaria baldensis***
tiroliensis = *Bagliettoa sphinctrina* (Duf.) Körber f. *tiroliensis* Servít >>> ***Verrucaria limborioides***

Lichen marmoreus Scopoli >>> ***Verrucaria marmorea***

Polyblastia

bavarica = *Polyblastia sphinctrina* (Duf.) Servít f. *bavarica* (Servít) Servít >>> ***Verrucaria limborioides***
calcivora = *Polyblastia sphinctrina* (Duf.) Servít f. *calcivora* Servít >>> ***Verrucaria limborioides***
gallica = *Polyblastia sphinctrina* (Duf.) Servít f. *gallica* (Servít) Servít >>> ***Verrucaria baldensis***
limborioides = *Polyblastia sphinctrina* (Duf.) Servít f. *limborioides* (Servít) Servít >>> ***Verrucaria limborioides***
lojkae = *Polyblastia sphinctrina* (Duf.) Servít f. *lojkae* (Servít) Servít >>> ***Verrucaria baldensis***
tiroliensis = *Polyblastia sphinctrina* (Duf.) Servít f. *tiroliensis* (Servít) Servít >>> ***Verrucaria limborioides***

Protobagliettoa

alocyza = *Protobagliettoa alocyza* (Arnold) Servít >>> ***Verrucaria baldensis***
alocyza = *Protobagliettoa parmigera* (J. Steiner) Servít f. *alocyza* (Arnold) Grummann >>> ***Verrucaria baldensis***
arnoldiana = *Protobagliettoa parmigera* (J. Steiner) Servít f. *arnoldiana* (Servít) Grummann >>> ***Verrucaria baldensis***
bagliettoaeformis = *Protobagliettoa bagliettoaeformis* (Hazsl.) Servít ex Nowak et Tobol. >>> ***Verrucaria parmigerella***
baldensis = *Protobagliettoa baldensis* (A. Massal.) Servít ex Nowak et Tobol. >>> ***Verrucaria baldensis***
bohemica = *Protobagliettoa parmigera* J. Steiner var. *bohemica* (Servít) Nowak et Tobol. >>> ***Verrucaria baldensis***
britanica = *Protobagliettoa steineri* (Kušan) Servít f. *britanica* (Servít) Grummann >>> ***Verrucaria baldensis***
calcivoroides = *Protobagliettoa parmigera* (J. Steiner) Servít f. *calcivoroides* (J. Steiner) Grummann >>> ***Verrucaria* baldensis**
circumarata = *Protobagliettoa parmigera* (J. Steiner) Servít f. *circumarata* (J. Steiner) Grummann >>> ***Verrucaria baldensis***
composita = *Protobagliettoa steineri* (Kušan) Servít var. *composita* (Servít) Grummann >>> ***Verrucaria baldensis***
croatica = *Protobagliettoa steineri* (Kušan) Servít f. *croatica* (Servít) Grummann >>> ***Verrucaria baldensis***
erumpens = *Protobagliettoa erumpens* (Servít) Servít >>> ***Verrucaria parmigerella***
graeca = *Protobagliettoa graeca* Servít >>> ***Verrucaria baldensis***
gyelnikii = *Protobagliettoa gyelnikii* (Servít) Servít ex Nowak et Tobol. >>> ***Verrucaria baldensis***
inaequata = *Protobagliettoa inaequata* (Servít) Nowak et Tobol. >>> ***Verrucaria parmigerella***
istriana = *Protobagliettoa bagliettoaeformis* (Hazsl.) Servít ex Nowak et Tobol. var. *istriana* (Servít) J. Nowak & Tobolewski >>> ***Verrucaria baldensis***
kutakiana = *Protobagliettoa kutakiana* Servít >>> ***Verrucaria parmigerella***
lactea = *Protobagliettoa steineri* (Kušan) Servít var. *lactea* (Servít) Grummann >>> ***Verrucaria baldensis***
mittenwaldensis = *Protobagliettoa steineri* (Kušan) Servít var. *mittenwaldensis* (Servít) Grummann >>> ***Verrucaria baldensis***
ochracea = *Protobagliettoa lactea* (Arnold) Servít var. *ochracea* Servít >>> ***Verrucaria baldensis***
parmigera = *Protobagliettoa parmigera* (J. Steiner) Servít >>> ***Verrucaria baldensis***
parmigerella = *Protobagliettoa parmigerella* (Zahlbr.) Servít >>> ***Verrucaria parmigerella***
pieninensis = *Protobagliettoa parmigera* J. Steiner var. *pieninensis* (Servít) Nowak et Tobol. >>> ***Verrucaria parmigerella***
steineri = *Protobagliettoa steineri* (Kušan) Servít ex Nowak et Tobol. >>> ***Verrucaria baldensis***

Verrucaria

adriatica = *Verrucaria parmigera* J. Steiner var. *adriatica* Servít >>> ***V. baldensis***
albae = *Verrucaria bosniaca* Servít var. *lovcenensis* Servít f. *albae* Servít >>> ***V. baldensis***
alociza = *Verrucaria parmigera* J. Steiner var. *alociza* (Arnold) J. Steiner >>> ***V. baldensis***
alocizoides = *Verrucaria pinguis* J. Steiner f. *alocizoides* J. Steiner >>> ***V. parmigerella***
alocizoides = *Verrucaria sphinctrinella* Zschacke var. *alocizoides* (Steiner) Servít >>> ***V. parmigerella***
alocyza = *Verrucaria calciseda* DC. f. *alocyza* Arnold >>> ***V. baldensis***
alocyza = *Verrucaria parmigera* J. Steiner var. *alocyza* (Arnold) J. Steiner >>> ***V. baldensis***

arbensis = *Verrucaria bagliettoaeformis* (Hazsl.) Servít var. pseudointerrupta (Servít) Servít f. *arbensis* Servít >>> ***V. baldensis***
arnoldiana = *Verrucaria parmigera* J. Steiner var. *calcivoroides* J. Steiner f. *arnoldiana* Servít >>> ***V. baldensis***
asperella = *Verrucaria subconcentrica* (J. Steiner) Servít var. *euthallina* Servít f. *asperella* Servít >>> ***V. baldensis***
bagliettoaeformis = *Verrucaria bagliettoaeformis* (Hazsl.) Servít >>> ***V. parmigerella***
bagliettoaeformis = *Verrucaria calciseda* DC. f. *bagliettoaeformis* Hazsl. >>> ***V. parmigerella***
bakonyensis = ***V. baldensis*** var. *canici* Servít f. *bakonyensis* Servít >>> ***V. baldensis***
baldensis A. Massal.
bavarica = *Verrucaria sphinctrina* Ach. f. *bavarica* Servít >>> ***V. limborioides***
berchtesgadensis = *Verrucaria inaequata* (Servít) Servít var. *berchtesgadensis* Servít >>> ***V. baldensis***
biokovensis = *Verrucaria parmigera* J. Steiner var. *calcivoroides* J. Steiner f. *biokovensis* Servít >>> ***V. baldensis***
bohemica = *Verrucaria parmigera* J. Steiner var. *bohemica* Servít >>> ***V. baldensis***
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britanica = *Verrucaria steineri* Kušan var. *lactea* (Arnold) Servít f. *britanica* Servít >>> ***V. baldensis***
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calcivora = *Verrucaria sphinctrina* Ach. var. *calcivora* Servít >>> ***V. limborioides***
calcivorella = *Verrucaria sphinctrinella* Zschacke var. *parmigerella* (Zahlbr.) Servít f. *calcivorella* Servít >>> ***V. parmigerella***
calcivoroides = *Verrucaria parmigera* J. Steiner var. *calcivoroides* J. Steiner >>> ***V. baldensis***
canici = *V. baldensis* var. *canici* Servít >>> ***Verrucaria baldensis***
cazzae = *Verrucaria cazzae* Zahlbr. >>> ***Verrucaria marmorea***
ceracea = *Verrucaria ceracea* J. Steiner >>> ***V. limborioides***
circumarata = *Verrucaria parmigerella* f. *circumarata* Servít >>> ***V. parmigerella***
circumarata = *Verrucaria sphinctrinella* Zschacke f. *circumarata* Servít >>> ***V. parmigerella***
circumarata = *Verrucaria cazzae* Zahlbr. f. *circumarata* Zahlbr. >>> ***V. marmorea***
circumarata = *Verrucaria parmigera* J. Steiner var. *circumarata* J. Steiner >>> ***V. baldensis***
composita = *Verrucaria steineri* Kušan var. *composita* Servít >>> ***V. baldensis***
cretzoiuana = *Verrucaria bosniaca* Servít var. *cretzoiuana* Servít >>> ***V. baldensis***
cretzoiui = *Verrucaria baldensis* var. *cretzoiui* Servít >>> ***V. baldensis***
croatica = *Verrucaria steineri* Kušan var. *croatica* Servít >>> ***V. baldensis***
dalmatica = *Verrucaria dalmatica* Servít >>> ***V. baldensis***
dealbata = *Verrucaria cazzae* Zahlbr. f. *dealbata* Servít >>> ***V. baldensis***
dealbata = *Verrucaria pinguis* J. Steiner f. *dealbata* J. Steiner >>> ***V. baldensis***
domogledensis = *Verrucaria sphinctrinella* Zschacke var. *alocizoides* (J. Steiner) Servít f. *domogledensis* Servít >>> ***V. baldensis***
dvorakii = *Verrucaria parmigera* J. Steiner var. *dvorakii* Servít >>> ***V. baldensis***
elegans = *Verrucaria parmigera* J. Steiner var. *calcivoroides* J. Steiner f. *elegans* Servít >>> ***V. baldensis***
elevata = *Verrucaria sphinctrinella* Zschacke var. *elevata* Servít >>> ***V. parmigerella***
erumpens = *Verrucaria bagliettoaeformis* (Hazsl.) Servít var. *erumpens* Servít >>> ***V. parmigerella***
eumacrosphaeroidea = *Verrucaria subconcentrica* (J. Steiner) Servít var. *eumacrosphaeroidea* Servít >>> ***V. baldensis***
euthallina = *Verrucaria subconcentrica* (J. Steiner) Servít var. *euthallina* Servít >>> ***V. baldensis***
exesa = *Verrucaria subconcentrica* (J. Steiner) Servít f. *exesa* Servít >>> ***V. baldensis***
expallens = *Verrucaria inaequata* (Servít) Servít var. *transsilvanica* Servít f. *expallens* Servít >>> ***V. baldensis***
expallida = *Verrucaria sphinctrinella* Zschacke var. *expallida* Servít >>> ***V. parmigerella***
forissi = *Verrucaria parmigera* J. Steiner var. *forissi* Servít >>> ***V. baldensis***
gallica = *Verrucaria sphinctrina* Ach. f. *gallica* Servít >>> ***V. baldensis***
genovensis = *Verrucaria subconcentrica* (J. Steiner) Servít var. *euthallina* Servít f. *genovensis* Servít >>> ***V. limborioides***

geographica = *Verrucaria parmigera* J. Steiner f. *geographica* J. Steiner >>> ***V. baldensis***
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graeca = *Verrucaria cazzae* Zahlbr. var. *graeca* Servít >>> ***V. baldensis***
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gyelnikiana = *Verrucaria parmigera* J. Steiner var. *gyelnikiana* Servít >>> ***V. baldensis***
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helvetica = *Verrucaria inaequata* (Servít) Servít f. *helvetica* Servít >>> ***V. baldensis***
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incavatula = *V. baldensis* var. *canici* Servít f. *incavatula* Servít >>> ***V. baldensis***
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interruptoides = *Verrucaria subconcentrica* (J. Steiner) Servít var. *saxivora* Servít f. *interruptoides* Servít >>> ***V. baldensis***
istriana = *Verrucaria bagliettoaeformis* (Hazsl.) Servít var. *istriana* Servít >>> ***V. baldensis***
italica = *Verrucaria sphinctrinella* Zschacke var. *italica* Servít >>> ***V. parmigerella***
kierkiensis = *Verrucaria parmigera* J. Steiner var. *calcivoroides* J. Steiner f. *kierkiensis* Servít >>> ***V. baldensis***
kuemmerleana = *Verrucaria inaequata* Servít var. *kuemmerleana* Servít >>> ***V. baldensis***
lactea = *Verrucaria calciseda* DC. var. *lactea* Arnold >>> ***V. baldensis***
lactea = *Verrucaria steineri* Kušan var. *lactea* Servít >>> ***V. baldensis***
lapadensis = *Verrucaria parmigera* J. Steiner var. *lapadensis* Servít >>> ***V. baldensis***
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ninensis = *Verrucaria subconcentrica* (J. Steiner) Servít var. *saxivora* Servít f. *ninensis* Servít >>> ***V. baldensis***
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pallida = *Verrucaria sphinctrinella* Zschacke var. *parmigerella* (Zahlbr.) Servít f. *pallida* Servít >>> ***V. parmigerella***
parmigera = *Verrucaria parmigera* J. Steiner >>> ***V. baldensis***
parmigerella Zahlbr.
parmigerella = *Verrucaria sphinctrinella* Zschacke var. *parmigerella* (Zahlbr.) Servít >>> ***V. parmigerella***
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petkae = *Verrucaria subconcentrica* (J. Steiner) Servít var. *petkae* Servít >>> ***V. baldensis***

pieninensis = *Verrucaria parmigera* J. Steiner var. *pieninensis* Servít >>> ***V. parmigerella***
plumbea = *Verrucaria bosniaca* Servít var. *lovcenensis* Servít f. *plumbea* Servít >>> ***V. baldensis***
pseudointerrupta = *Verrucaria baglietoaeformis* (Hazsl.) Servít var. *pseudointerrupta* (Servít) Servít >>> ***V. baldensis***
pseudointerrupta = *Verrucaria sphinctrinella* Zschacke f. *pseudointerrupta* Servít >>> ***V. baldensis***
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punctatissima = *Verrucaria subconcentrica* (J. Steiner) Servít f. *punctatissima* Černohorský >>> ***V. baldensis***
quarnerica = *Verrucaria quarnerica* Zahlbr. >>> ***V. limborioides***
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spermogonifera = *V. hyascens* Ach. f. *spermogonifera* Hepp >>> ***V. parmigerella***
spermogonifera = *Verrucaria sphinctrinella* Zschacke var. *elevata* Servít f. *spermogonifera* (Arnold) Servít >>> ***V. parmigerella***
sphinctrina = *Limboria sphinctrina* Duf. >>> ***V. baldensis***
sphinctrinella = *Verrucaria sphinctrinella* Zschacke >>> ***V. parmigerella***
spilomatica = *Verrucaria baldensis* var. *spilomatica* A. Massal. >>> ***V. baldensis***
steineri = *Verrucaria steineri* Kušan >>> ***V. baldensis***
subcomposita = *Verrucaria parmigera* J. Steiner var. *lapadensis* Servít f. *subcomposita* Servít >>> ***V. baldensis***
subconcentrica = *Verrucaria subconcentrica* (J. Steiner) Servít >>> ***V. baldensis***
subinterrupta = *Verrucaria baglietoaeformis* (Hazsl.) Servít var. *graeca* (Servít) Servít f. *subinterrupta* Servít >>> ***V. parmigerella***
subrosea = *Verrucaria parmigera* J. Steiner var. *subrosea* (Servít) Servít >>> ***V. baldensis***
sulcata = *Verrucaria gyelnikii* Servít var. *velebitica* Servít f. *sulcata* Servít >>> ***V. baldensis***
suzaeana = *Verrucaria suzaeana* Servít >>> ***V. baldensis***
thalassiformis = *Verrucaria sphinctrinella* Zschacke var. *thalassiformis* Servít >>> ***V. parmigerella***
tiroliensis = *Verrucaria sphinctrina* Ach. var. *tiroliensis* Servít >>> ***V. limborioides***
transsilvanica = *Verrucaria inaequata* (Servít) Servít var. *transsilvanica* Servít >>> ***V. baldensis***
triglavensis = *Verrucaria inaequata* (Servít) Servít var. *triglavensis* Servít >>> ***V. baldensis***
turgescens = *Verrucaria steineri* Kušan f. *turgescens* Servít >>> ***V. baldensis***
velebitica = *Verrucaria gyelnikii* Servít var. *velebitica* Servít >>> ***V. parmigerella***
viridis = *Verrucaria sphinctrinella* Zschacke var. *sphinctrinella* Servít f. *viridis* Servít >>> ***V. parmigerella***
Thrombium *limborioides* (A. Massal.) Zschacke >>> ***V. limborioides***

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