

**TAXONOMY OF THE RUSSULA XERAMPELINA GROUP.
PART 2. TAXONOMIC AND NOMENCLATRURAL STUDY
OF RUSSULA XERAMPELINA AND R. ERYTHROPODA**

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Dúbravská cesta 14, SK-842 23, Bratislava, Slovakia**Abstract**

Four taxa of *Russula* sect. *Xerampelinae* with purple, purple-brown or red brown pileus cuticle associated with coniferous trees occurring in Europe are accepted: *Russula amoenipes*, *R. xerampelina* var. *xerampelina*, *R. xerampelina* var. *tenuicarnosa* and *R. favrei*. Circumscription of *R. xerampelina*, the species considered in recent literature as synonymous with *R. erythropoda*, as in the original description, suggests that it fits better with *R. favrei* than with *R. erythropoda*. In order to avoid disadvantageous changes in the nomenclature a neotype is proposed for *R. xerampelina*. A neotype is designated for *R. erythropoda*. The new variety, *R. xerampelina* var. *tenuicarnosa*, is described. A key and detailed descriptions of observed taxa are given. *R. atrosanguinea* is treated as synonym of *R. xerampelina* and other not validly published or misapplied names are listed. The taxonomy and nomenclature of *R. xerampelina*, *R. erythropoda*, *R. amoenipes*, *R. favrei* and other names of related or similar taxa are discussed.

Key words: *Russula xerampelina* var. *tenuicarnosa*, *R. amoenipes*, *R. favrei*, *R. atrosanguinea*, taxonomy, nomenclature, Slovakia

Introduction

The first part of this study (ADAMČÍK & MARHOLD 2000) included a morphometric study of fruitbodies of the *Russula xerampelina* group with a purple, purple-brown or red brown pileus cuticle associated with coniferous trees from selected localities in Slovakia. According to the results of multivariate analyses, the studied fruitbodies consist of three groups. The first group of fruitbodies with purple-brown or red-brown pileus cuticle (group A) was suggested to be classified as species, and the other two groups with purple pileus cuticle (group B) as varieties of another species. Based on these morphometric studies, this second part of the study includes taxonomic accounts of *R. favrei*, *R. erythropoda*, *R. xerampelina*, as well as *R. amoenipes*, a further species of the group occurring in Europe. Relationships with related taxa occurring in other parts of Europe as well as most important synonyms are discussed.

Taxonomic and nomenclatural notes

The first validly published name in *Russula* sect. *Xerampelinae* is *Agaricus xerampelinus* Schaeff. (SCHAEFFER 1774). Schaeffer described the colour of the pileus cuticle of *A. xerampelinus* as "fusco-purpureus"¹ (for complete original diagnosis see Tab. 1), which corresponds well with the group of fruitbodies with purple-brown or red-brown pileus cuticle, labelled as group "A" after a multivariate analyses (ADAMČÍK & MARHOLD 2000). Another character of *A. xerampelinus* similar to this group of fruitbodies from Slovakia and different from the other two groups in the multivariate analyses (with purple pileus cuticle, which were labelled as "B"), is a contrast of coloration of pileus cuticle on the margin and in the centre. SCHAEFFER (1774) added to his original description of *A. xerampelinus* his figures "Tab. CCXIV, CCXV" (SCHAEFFER 1771; for black and white copy of pl. 214 see Fig. 1.), which presents a distinctly darker colour of the cuticle on the margin than in the centre of pileus. No fruitbody of the groups with purple pileus cuticle (group B) had such coloured pileus (contrary to the group with purple-brown pileus, where all fruitbodies had purple-brown or red-brown colour of pileus cuticle and 14 of 26 fruitbodies had pileus cuticle darker on the margin than in the centre). Therefore, I consider it more likely that the fruitbodies with purple-brown or red-brown pileus cuticle (group A) growing especially in summer months in submontane to subalpine forests fit better into the original concept of *Russula xerampelina* (Schaeff.) Fr., than fruitbodies of group B. The different usage of the name *R. xerampelina* by the majority of present authors as well as the possible identity of this taxon with *R. graveolens* Romell or related taxa (see notes on Blum 1961 below) do not make it a commendable nomenclature; I accept this name in a new sense, and for that reason I'm applying for the group A the later published name *R. favrei* M. Moser (see notes on MOSER 1979 below). In order to avoid disadvantageous changes in the nomenclature of well-known species, I will propose conservation of the name *R. xerampelina*, based on a neotype that allows continued usage of the name in its present sense. The name *R. xerampelina* then remains a synonym of *R. erythropoda*.

SCHAEFFER (1774) did not designate the type of the name *Agaricus xerampelinus* and his figures "Tab. CCXIV & CCXV" (SCHAEFFER 1771) would otherwise represent the only original material suitable for selection of a type.

Tab. 1. Original diagnoses and important descriptions of selected names of taxa closely related to *Russula xerampelina*

Agaricus xerampelinus Schaeff. (SCHAEFFER 1774):

Agaricus caulescens, solitarius, carnosus; pileo fusco - purpureo, punctato, primum globoso, dein convexo, planiusculo, centro depresso; lamellis crassis, flavis; petiolo tereti, brevi, crasso, pleno, cum purpura albido; velo et annulo destitutus.

¹ The expression "fusco-purpureus" could be translated as "dark purple" or "brown-purple". The original Latin description is followed by two rows in German, where SCHAEFFER (1771) describes the colour of pileus cuticle as "purpurfarb und bräunlich".

Tab. 1 (continued)

***Russula xerampelina* (Schaeff.) Fr. (FRIES 1838):**

R. xerampelina, mitis, pileo carnoso compacto convexo-explanato depressoque sicco opaco laevi rimulosoque, margine recto laevi, carne compacta albolutescente, stipite valido firmo clavato laevi albo rubellove, demum spongiosomolli, lamellis adnexis subconfertis postice furcatis ex albo alutaceis. Schaeff. t 214, 215. Krombh t 68. f. 13, 14 ex habitu iconis non fucatae. A. tinctorius. Secr. n. 487. var. l. In pinetis campestr. passim, at raro. Ut prior ad *R. emeticam* haec ad *R. integrum* accedit, differt substantia firma, pellicula pilei non distincta, aere pileus semper siccus, vulgo rimuloso-punctatus. Pileus roseo-purpureus, disco expallens, albo-lutescens. Sporidia sordide alutacea. Stipes udus magis rubet.

***Russula erythropoda* PELTEREAU (1908):**

Stipe longtemps ferme, égal, entièrement d'un beau rose-rouge, plus rarement rosé seulement d'un seul côté; chapeau convexe, puis creusé, ferme, d'un beau rouge sombre (Sacc. chr., 12, 13), noirâtre au centre qui reste généralement plus foncé, même en vieillissant, à aspect mat, très peu decolorant et ne prenant jamais de teintes ocracées ou olive; chair douce, crème, mince au bord du chapeau qui est un peu strié dans la vieillesse; feuillets appointis près du stipe, arrondis extérieurement, blanchâtres, puis jaune de Naples (*Ochroleucus* Sacc., 28); spore ocracée, sphérique, grêlée, 10 µm.

***Russula xerampelina* var. *amoenipes* Romagn. ex BON (1987):**

A. typo differt pileo +/- purpureo-vinoso, discum versus interdum atropurpureo, stipite subvelutino persicino-roseo (Sicut in *R. amoena*). Sporibus 7-9 × 5-7 µm, spinis curtioribus 0.5 (0.8) µm, epicutis pilis +/- ampullaceis usque × 10-13 µm.

***Russula favrei* MOSER (1979):**

Pileo 3.5-11 cm lato, semiorbiculari vel irregulariter convexo, centro depresso, languido, incarnato-brunneo, rufo-brunneo, olivaceo-brunneo, interdum centro fere fuligineo, lamellis cremeis, pallide ochraceis, subconfertis, acie interdum brunneo, stipite cylindraceo subclavato, 3.5-9 cm/10-30-(45) mm, albido, dein ochrascente vel brunnescente, interdum basi roseolo tincto, leviter ruguloso, carne alba, centro subbrunnescente, odore dulcidulo, fungoso, aetate interdum leviter piscino, sapore miti, carne FeSO₄ ope primo reactionem roseam, dein viridi-griseam praebente, sporis in cumulo ochraceis. Sporis (8) 9-10.5 (13)/(6) 7-8 (9) µm, ornamentatione verrucosa, 0.5-1 µm alta, cystidiis 60-80-110/12-17 µm, epicute e hyphis plus minusve subclavatis dermatopseudocystidiisque sulfovanilliniae ope coeruleiscentibus formata.

FRIES (1838) published the combination of *Agaricus xerampelinus* in the genus *Russula*, but his description of this species differs from the original diagnosis (see Tab. 1). He indicated the colour of the pileus as "pileus roseo-purpureus, disco expallens, albo-lutescens" (pileus rose-purple with yellowish-white discolouring centre), flesh as "ad *R. integrum* accedit, differt substantia firma" (firmer than in *R. integra*) and habit as "in pinetis campestr." (in plain pine forests). The most likely application of the name *R. xerampelina* in sense of Schaeffer refers to a species that has a purple-brown pileus cuticle, of which observed specimens (see first part of this study, ADAMČÍK & MARHOLD 2000) with such coloured pileus grew in submontane or montane forests especially under trees of *Picea*. Fries' description of *R. xerampelina* corresponds better to the present application of *R. xerampelina* and is possibly the same as the species also known as *R. erythropoda* Peltreau, although this species has a pileus cuticle in the centre dark purple black to black and discolouring only rarely on small spots and does not have firm flesh (the flesh has the same consistency as in *R. integra*).

Agaricus xerampelinus Schaeff. (SCHAEFFER 1774) was published before the starting point of the nomenclature of fungi according to pre-1983 editions of the International Code of Botanical Nomenclature (ICBN) and the valid publication place of this name was cited as *Russula xerampelina* "Schaeff. ex Fr." (FRIES 1838). Probably that was

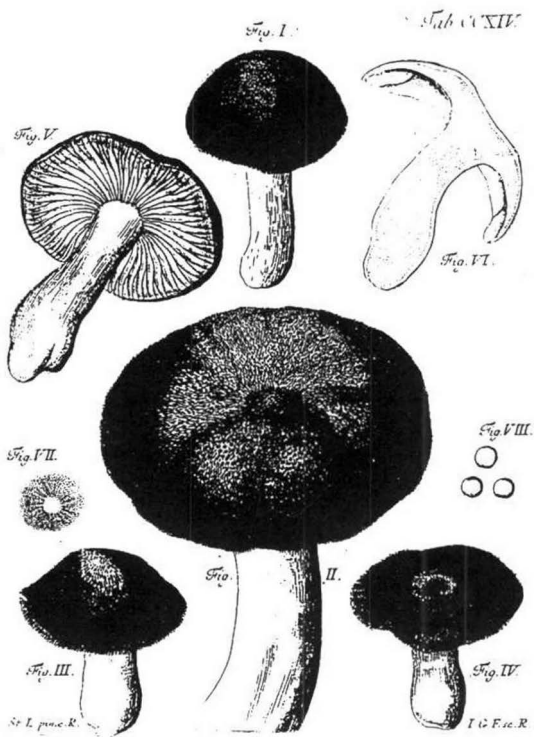


Fig. 1. Lectotype of *Russula xerampellina* (Schaeffer 1771: Tab. CCXIV).

one of the reasons why mycologists generally preferred Fries' conception of *R. xerampelina* and synonymized this name with *R. erythropoda*, such as ROMAGNESI (1967), MOSER (1983), EINHELLINGER (1987), BON (1988), KNUDSEN & STORDAL (1992), REUMAUX & AL. (1996), GALLI (1996).

FRIES (1838) described also new species *R. linnaei* based on LINNAEUS's (1753) unnamed variety *Agaricus integer* "β". RICKEN (1911) and VELENOVSKÝ (1920) considered *R. linnaei* as a species related to *R. xerampelina*. MELZER & ZVÁRA (1927a) transferred *R. linnaei* on the level of variety to *R. xerampelina*. However, *R. linnaei* in its original sense is not a species from section *Xerampelinae*, because Fries' descriptions of *R. xerampelina* and *R. linnaei* differ in characters usually used for delimitation of this section. FRIES (1838) described the flesh of fruitbodies as "carne spongioso-compacta alba" (white flesh) in *R. linnaei* and "carne compacta albolutescente" (flesh turning yellowish-white) in *R. xerampelina*. These two species are different according to Fries also in colour of spore print: white in *R. linnaei* and ochraceous in *R. xerampelina*.

MASSEE (1893) followed Schaeffer's description of *R. xerampelina* (pileus cuticle being purple-brown), but in his sense this species does not belong to the section *Xerampelinae*. The flesh of fruitbodies of *R. xerampelina* is according to Massee yellowish. He also did not mention its remarkable smell. On the contrary, all taxa of section *Xerampelinae* he classified into one species - *R. vesca*: they have flesh turning rusty-colour and on age having a crab-like smell.

PELTEREAU (1908), who commented on the taxa related to *R. alutacea*, accepted the name *R. erythropoda* for a related taxon with dark red and not discolouring pileus associated with coniferous trees. According to him FRIES (1874) was the author of this epithet describing the "forma speciosa erythropoda" of *R. alutacea*. To my understanding of the Code FRIES (1838, p. 362) mentioned, while describing *R. alutacea*, only a beautiful form, for which the epithet *erythropoda* could be used. There is no reason to consider the name *R. alutacea* f. *erythropoda* having been validly published². The epithet "erythropode" is not in accordance with Art. 24.1 of the Code (GREUTER & AL. 2000), because it is not definitely (but only indirectly) connected with a term denoting its rank and this epithet is separated from the category "forma" by the word "speciosa" and a colon. It is also in conflict with Art. 24.2 of the Code because the name does not agree grammatically with the generic name. Later FRIES (1874, p. 453) reported the same form with red stipe as "sed in forma speciosa erythropode" (without colon). But also here "erythropode" was not directly connected with the category "forma" and it was not grammatically identical with the generic name. That's why I accept PELTEREAU (1908) as the author of the name "erythropoda".

I have discussed the question of a valid publication of the name *R. alutacea* f. *erythropoda* 'Fr.' with T. Kuyper and Z. Pouzar who agree that the name was not

² The word "speciosa" FRIES (1838, 1874) was not written in italics, but in some cases he did not use italics also for some species names (such as "*R. alutacea*" in FRIES 1874, the last line of the page 453). On the opposite, the word "erythropode" is in italics, but FRIES (1838, 1874) used italics for indicating important characters in the description. However, *speciosa* is still in the ablatives and does not grammatically agree with the species and generic name (Art. 24.2).

validly published by Fries. J. Melot, in accordance with my interpretation, also agrees that FRIES (1838, 1874) has not published a new infraspecific taxon of *R. alutacea*.

Peltreau's description (PELTEREAU 1908) of *R. erythropoda* lacks characters typical for the section *Russula* sect. *Xerampelinae* (such as flesh turning yellowish or brownish and crab-like odour of older fruitbodies) and his treatment of this taxon in section *Xerampelinae* may be questionable (for the original diagnosis see Tab. 1). He believed that *R. erythropoda* is related to *R. alutacea* which is not a member of the section *Xerampelinae*. BARBIER (1908) treated *R. erythropoda* as a form of *R. alutacea*.

Characters presented in the description of *R. erythropoda* (PELTEREAU 1908), such as association with coniferous trees, dark red colour of pileus cuticle on the margin and almost black in the centre, pileus cuticle without ochraceous or olive spots, stipe almost entirely pinkish-red, spore print ochraceous, taste mild, correspond with ROMAGNESI'S (1967) concept of *R. erythropoda*. Although I can not definitely disprove Barbier's concept (that *R. erythropoda* could be related to *R. alutacea*), I'm following Romagnesi and the majority of present-day mycologists who classify *R. erythropoda* as a member of sect. *Xerampelinae*. I consider two groups with purple pileus cuticle (marked as group „B“ in the numerical analyses, ADAMČÍK & MARHOLD 2000) as conspecific with *R. erythropoda*. For reasons of nomenclatural stability, however, I will continue to use the name *R. xerampelina* for the taxon. PELTEREAU (1908) did not designate a type for *R. erythropoda* and only cited 5 illustrations by various authors who described, according to him, "perfectly the aspect of coloration" of *R. erythropoda* but some of them evidently represent different taxa.

MAIRE (1910) applied a wide concept of *R. xerampelina*. His concept of this species includes all taxa of the present section *Xerampelinae*. This conception was followed by SINGER (1926, 1932), MELZER & ZVÁRA (1927a, 1927b), MELZER (1945), SCHAEFFER (1933) KÜHNER & ROMAGNESI (1953) and BLUM (1961, 1962). KONRAD & FAVRE (1933) reduced *R. erythropoda* to varietal status under *R. xerampelina* (sensu Maire), which was followed by other authors (such as BLUM, 1961). According to the description of the colour of the pileus cuticle and habitat, SINGER (1926) and SCHAEFFER (1933) applied the name *R. erythropoda* to *R. xerampelina* var. *rubra* (Britzelm.) Singer, KÜHNER (1953) applied the name *R. favrei* to *R. xerampelina* var. *fusca* (Quél.) Melzer & Zvára and MELZER & ZVÁRA (1927a, 1927b) misapplied the name *R. erythropoda* to *R. xerampelina* var. *linnaei* and *R. favrei* probably to *R. xerampelina* var. *fusca*. MELZER (1945) created a new name - *R. xerampelina* var. *putorina* nom. inval. *R. xerampelina* var. *putorina* is associated with coniferous trees and has a mainly brown coloured cuticle of pileus with violet and olive-colour tints. I consider it highly likely that this taxon is synonymous with *R. favrei*.

VELENOVSKÝ (1920) distinguished several taxa related to *R. xerampelina*: *R. atosanguinea* (described by VELENOVSKÝ, 1920 as sp. nova), *R. xerampelina*, "*R. erythropus*" and *R. linnaei*. No herbarium material of these species was preserved by Velenovský, and the descriptions of these species are very brief, but my interpretation of these short diagnoses suggests that all these species described by Velenovský are probably conspecific with *R. erythropoda*, because they have a purple pileus cuticle and grow in coniferous forests.

Problematic is also the application of the name *R. fuscochracea* R. Schulz (MICHAEL & SCHULZ, 1926), for the same reasons as in Velenovský's species. *R. fuscochracea* R. Schulz was said to have a mainly brown coloured pileus cuticle (also with purple and olivaceous tints) and to grow in montane coniferous forests. Hence, *R. fuscochracea* R. Schulz is probably conspecific with *R. favrei* or *R. clavipes* Velen. (another taxon of section *Xerampelinae* with a mainly olive-coloured pileus cuticle). *R. fuscochracea* R. Schulz is later homonym of *R. fuscochracea* VELENOVSKÝ (1920), a species not from section *Xerampelinae*.

LANGE (1926) described a member of sect. *Xerampelinae* under the name *R. purpurea* Gillet. Subsequently, Lange (1940) reintroduced the name *R. xerampelina* for that taxon, while simultaneously expressing that that name is liable to confusion as it had been used in a restricted sense (for the species under pines with deep blood-red pileus with darker centre) and in a wide sense for all members of sect. *Xerampelinae*, which Lange thought are better kept apart.

CRAWSHAY (1933) presented a wide concept of *R. xerampelina*, much wider than SCHAEFFER (1774). *R. xerampelina* was in his sense the species associated with coniferous and deciduous trees with purple, ochraceous and brown coloured cuticle of pileus.

BLUM (1961) too had a wide conception of *R. xerampelina* including all taxa of section *Xerampelinae*, and he supposed that type variety of *R. xerampelina* is identical with *R. xerampelina* var. *quercetorum* Singer, which is a taxon from deciduous forests related to *R. graveolens* Romell. It is true that SCHAEFFER (1774) did not mention anything about the ecology of *R. xerampelina*, and it is also true that *R. graveolens* can have a similar colour of the pileus cuticle as *R. xerampelina*. According to my observations of material of section *Xerampelinae* from deciduous forests, there are only few fruitbodies with a combination of purple and brown colour of the pileus cuticle, and these colours are mainly combined with olivaceous or flesh-red colours. If the fruitbodies from deciduous forests have a darker colour of the pileus cuticle on the margin, then they are discolouring more to olivaceous colour. Accordingly, no taxon of section *Xerampelinae* described or indicated from deciduous forests has the combination of these two colours as described in the original description of *A. xerampelinus* (see Tab. 2).

BLUM (1962) classified *R. graveolens* var. *subrubens* J. E. Lange as a form of *R. xerampelina* var. *erythropoda* (a taxonomic synonym of *R. erythropoda*). However, *R. subrubens* (J. E. Lange) is a separate species associated with *Alnus* and *Salix* in floodplain forests (BON 1972).

ROMAGNESI (1967) considered *R. erythropoda* as a synonym of *R. xerampelina*. He designated the types, by which he most likely meant characteristic or typical collections, for almost all species accepted in his monograph (also for the species, which already have nomenclatural types) from specimens collected by him, but for *R. xerampelina* he chose as type only spore print: "Type: sporeée no 7-IX-63". He indicated the colour of the spore print as IIIc according to his scale, which corresponds to fruitbodies of the taxon with purple pileus cuticle (*R. xerampelina* or *R. erythropoda*) observed in this study. Romagnesi's designation of a neotype of *R. xerampelina* is not valid, because other original material (lectotype material) is

available: pl. 214 and 215 of SCHAEFFER (1774), according to Art. 9.6 of the Code. As a candidate neotype, intended to fix the application of the name *R. xerampleina* in its present sense, it is also not suitable, as a spore print only does not provide sufficient details to fix the name.

ROMAGNESI (1967) distinguished another taxon with a similar colour of the pileus cuticle from coniferous forests apart from *R. xerampelina*: *R. amoenipes* Romagnesi nom. inval. This name was later accepted at the level of variety of *R. xerampelina* and validly published by BON (1987, for the original diagnosis see Tab. 1). According to my study of the type material, I found many differences in microscopic structures with the taxon here called *R. xerampelina* (= *R. erythropoda*) and also from other material of section *Xerampelinae*. I therefore regard this taxon as a separate species *R. amoenipes* (Romagnesi ex Bon) Bidaud, Moëgne-Loccoz & Reumaux (combination on the level of species by REUMAUX & AL. 1996). Specific characters observed on the type specimen of *R. amoenipes* are size of terminal cells of pileocystidia, which are very wide and short, very small and narrow spores with spines densely connected with line connections and different shape of terminal cells of generative hyphae³ on the margin (subulate) and in the centre (mainly inflate) of pileus epicutis. Romagnesi described this taxon only "ad inter.", because he found only one fruitbody. The question remains if this fruitbody could not be determined as belonging to some of the numerous taxa from deciduous trees (Romagnesi found it in planted forest of *Pinus sylvestris*). I compared microscopic characters of the type specimen of *R. amoenipes* with specimens or descriptions of all taxa accepted and collected by Romagnesi (including invalid taxa described "ad inter.") and with all my material of section *Xerampelinae*, but no observed fruitbodies have a similar combination of characters. The most similar taxon is *R. clavipes*, which also has small and narrow spores and similar generative hyphae in the pileus epicutis, but the spines are only scarcely connected with lines, the pileocystidia do not exceed 8 µm and the colour of pileus cuticle is mainly olive.

Tab. 2. Colour of pileus cuticle of taxa of *Russula* sect. *Xerampelinae* with validly published names described or indicated from deciduous forests according to original description with authors and dates of their publication.

Author and date of publication	name of taxon	description of colour of pileus cuticle
Phillips in COOKE 1883	<i>R. duportii</i>	the centre rufous, or flesh red, margin bluish
BRITZELMAYR 1891	<i>R. graveolens</i>	purpurroth, weinfarben
BRITZELMAYR 1891	<i>R. graveolens</i> f. <i>rubra</i>	rot
VELENOVSKÝ 1920	<i>R. quercetorum</i>	sytě až temně nachový s tonem lilákovým [deeply to dark purple with lilac tint]
VELENOVSKÝ 1920	<i>R. pruinosa</i>	šedave lilákový [greyish lilac]
LANGE 1940	<i>R. graveolens</i> var. <i>subrubens</i>	cupreo-rubro
ROMAGNESI 1962	<i>R. faginea</i>	sordide rubido, e roseo brunneo, cacaino, medie saepe citrino vel e viridi flavo tincto
ROMAGNESI 1967	<i>R. amoenoides</i>	lepide purpureo, ad instar <i>R. amoena</i>

³ We used the term „undifferentiated hyphae“ in the first part of this study (ADAMČIK & MARHOLD 2000). However, B. Buyck suggested to replace this term with „generative hyphae“. I regard this suggested term more accurate, and I make the replacement in this paper.

Tab. 2 (continued)

Author and date of publication	name of taxon	description of colour of pileus cuticle
BON 1987	<i>R. brevis</i>	± rubris vel brunneo-roseis (<i>R. velenovskyi</i> vel <i>vescae</i> instar), margine saepe ± vinoso vel discum versus ochracei vel subolivaceis
BON 1987	<i>R. cicatricata</i>	cupreis vel aerino-olivacei, rarius brunneo-purpureis, praecipue marginem versus, sed disco cito ± ochraceo-sepiaceo
BON 1987	<i>R. gilvoscens</i>	coloribus variabilibus, roseis, vinosis cum disco ± cupreo-olivaceo, sed cito decolorantibus, postremo sordide ochraceo brunneis, ac margine diu roseo
BON 1987	<i>R. graveolens</i> var. <i>megacantha</i>	[not different from type]
BON 1988	<i>R. graveolens</i> var. <i>pseudomelliolens</i>	cupreo-roseis (<i>R. melliolentis</i> instar)
KÄRCHER 1996	<i>R. schaefferi</i>	uniformiter olivaceo, griseo-olivaceo centro plus minusve cito melleo-olivaceo, interdum virido-pallescente, sed etiam olivaceo-brunneo; ad marginem interdum paulo brunneo-roseo (<i>Russula vesca</i> in mentem revocante)
Reumaux in REUMAUX & AL. 1996	<i>R. amoenoides</i> var. <i>gracilipes</i>	purpureo-violaceum centro purpureo-violaceum centro purpureo-nigro, aliquotiens cum nonnullis ochraceo-flavis maculis
Reumaux in REUMAUX & AL. 1996	<i>R. duportii</i> f. <i>spinulosospora</i>	[not different from type]
Reumaux in REUMAUX & AL. 1996	<i>R. pseudomelliolens</i>	cupreo-rubellum <i>R. melliolentis</i> instar, saepe in medio fuscum cum magis rosaceis ad marginem coloribus
Reumaux in REUMAUX & AL. 1996	<i>R. purpurea</i> var. <i>subamoenipes</i>	[not different from type]
Reumaux in REUMAUX & AL. 1996	<i>R. purpurissata</i>	saturate violaceo-purpureum centro nigello
Reumaux in REUMAUX & AL. 1996	<i>R. rubida</i>	purpureo-rubrum unicolor vel centro purpureo-nigro

MOSER (1979) published a new species called *R. favrei* (for the original diagnosis see Tab. 1), because he considered *R. xerampelina* and *R. erythropoda* as synonyms and he noted the differences between fruitbodies from subalpine zone and other taxa from the *R. xerampelina* group. He specified for *R. favrei* the following discriminant characters: dominant colour of pileus cuticle is brown; stipe is white, then turning more or less brownish; the smell of flesh is in fresh condition null, then can be only slightly crab-like or can be entirely missing; reaction of flesh to FeSO_4 is initially pink, soon turning grey-green to green; habitat under *Picea* and *Pinus cembra* in subalpine forest. I have observed that discoloration of flesh, reaction of flesh to FeSO_4 and smell of flesh are characters depending on the age of fruitbodies, and I regard these characters as unsuitable for identification. Some fruitbodies of the group of fruitbodies with purple-brown or red-brown pileus cuticle resulting from the multivariate analyses (ADAMČIK & MARHOLD 2000, the group was labelled as "A") have clearly white stipe and two collections came from altitudes over 1000 m under *Picea* (in Nizke Tatry mountains and in Západné Tatry mountains). The results of my study on type specimen of *R. favrei* are different from Moser's description of the

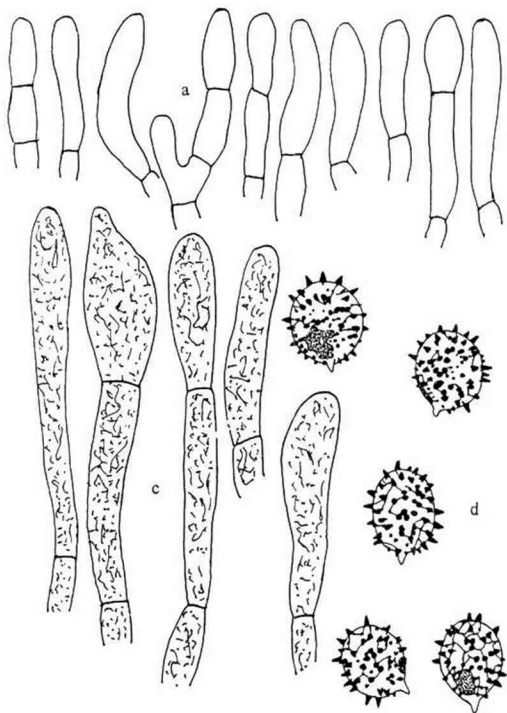


Fig. 2. Microscopic structure of holotype of the name *Russula favrei* (Moser, IB 75/95), which I consider to be a synonym of *R. xerampelina*. a. – generative hyphae on the margin of pileus epicutis (1000 ×), b. – pileocystidia (1000 ×), c. – spores (1600 ×).

micromorphological characters, but similar to those observed in fruitbodies of the group A. I have found spores with size $8.7\text{-}10.3 \times 6.9\text{-}8.7 \mu\text{m}$ and with spines length $0.8\text{-}1.2 \mu\text{m}$, but Moser indicate height of spore ornamentation only $0.3\text{-}1 \mu\text{m}$. This difference could be caused by heterogeneity of the type collection, which includes a spore print with mature spores and a fruitbody with immature spores (and not well developed ornamentation). Prof. Moser acknowledged me in a letter, that the spore print is from the same collection as the fruitbody. Moser's description and accessory figure of the structure of the pileus epicutis of *R. favrei* is also different from my observation on the type material. The "type" fruitbody was poorly conserved and on the surface of the pileus epicutis are hyphae of a parasitic fungus. It was problematic to find well-preserved hyphae in the pileus epicutis. There were observed a few not deformed hyphae (Fig. 2.) which are similar to those of group A. Accordingly, I treat *R. favrei* as the correct name for fruitbodies of the group A. *Russula favrei* is distinguished from *R. xerampelina* (= *R. erythropoda*) also by BON (1988) and KNUDSEN & STORDAL (1992).

AICHER (1996) noted a difference in coloration of pileus cuticle between the original description of *R. xerampelina* and the concept of the majority of present authors. She claimed that, on the basis of pl. 214 and 215 (Schaefer 1774), it is not possible to synonymize *R. erythropoda* with *R. xerampelina*, because the illustrations do not present dark purple-black colours in the centre of pileus cuticle (as occurs in *R. erythropoda*). She regarded *R. xerampelina* and *R. amoenipes* to be conspecific.

REUMAUX & AL. (1996) accepted other taxa with purple or similar coloured pileus cuticle associated with coniferous trees and related these to *R. xerampelina*: *R. atrosanguinea*, *R. abietum* and *R. favrei*. They described new species from this range (although three of them under invalid names): *R. rivulosa* Reumaux nom. inval., *R. brevissima* Moëgne-Loccoz, *R. suberythropus* Moëgne-Loccoz nom. inval. and *R. subpurpurea* Reumaux nom. inval. They made also new combination: *R. amoenipes* (Romagnesi ex Bon) Bidaud, Moëgne-Loccoz & Reumaux. I have not studied the material collected by Reumaux & al. and labelled with these species names and can only suppose their relation with taxa accepted in our study. Whereas the classification of species by these authors is based mainly on colour of pileus and habitat, several names are probably synonyms of *R. favrei* and *R. xerampelina* (= *R. erythropoda*), but in order to arrive at a final clarification further study are needed.

R. abietum differs from *R. favrei*, according to REUMAUX & AL. (1996) by presence of "multiseptate hyphae", large spores with subreticulate ornamentation and light yellow spore print. With exception of colour of spore print, these characters fall under the natural variability of *R. favrei*. The figures of *R. abietum* and *R. favrei* also represent distinctly clavate terminal cells of hyphae in pileus epicutis similar to my observations on *R. favrei*. Hence, for the time being and pending a study of the holotype, I regard *R. abietum* and *R. favrei* in a sense of these authors as conspecific. *R. abietum* was described by BLUM (1953) as *R. xerampelina* var. *abietum* and BON (1983) made the combination on the level of species. According to Blum the colour of pileus cuticle is not purple-brown, but vinaceous, rosy or rosy-brown. I have not studied any specimens of *R. abietum* identified by Blum, but I have studied material collected by Bon. The terminal cells in the centre of pileus epicutis are inflated as in *R. faginea*, accordingly I expect that *R. abietum* is not related to *R. favrei* or *R. xerampelina*. *R.*

fuscochracea Schulz. in the sense of Reumaux & al. is related to *R. clavipes* (dominant colour of pileus cuticle is green or olive-colour).

R. rivulosa, *R. brevissima*, *R. atosanguinea*, *R. subpurpurea*, *R. suberythropus*, *R. marthae* and *R. amoenipes* in the sense of REUMAUX & AL. (1996) resemble in colour of pileus cuticle *R. xerampelina* (= *R. erythropoda*). The figures of microscopic structures of this species show that all taxa with the exception of *R. rivulosa*, have attenuated or constricted terminal cells of generative hyphae of the pileus epicutis (this is an important differential character between *R. xerampelina* and *R. favrei*). However, *R. rivulosa* has very narrow terminal cells of generative hyphae and according to descriptions of the authors it can not be synonymized with any species accepted in our study. Some characters similar to those of *R. amoenipes* measured on type specimen (see above) occur according to Reumaux & al. in *R. amoenipes* and *R. subpurpurea*. *R. amoenipes* in sense of these authors has small spores ($7.8.5 \times 5.5.7 \mu\text{m}$) and *R. subpurpurea* has wide dermatocystidia ($8-12 \mu\text{m}$). The authors did not mention the width of pileocystidia of *R. amoenipes* and they indicated $5.8-13 \mu\text{m}$ wide generative hyphae in the pileus epicutis. In the type specimen these hyphae were so wide only on the centre of the pileus epicutis, but their shape was different from that presented in the figure. On the contrary, more similar to the type specimen of *R. amoenipes* is the description of generative hyphae of *R. subpurpurea*, which are said to be $3-5 \mu\text{m}$ wide, but on the figure spores are presented without line connections. Possibly, *R. subpurpurea* and *R. amoenipes* sensu Reumaux & al. are synonyms of *R. amoenipes*, but I have not found enough characters necessary for this conclusion in the descriptions of these authors. Further studies are needed to clarify the identity of these taxa. I accept only three species with purple pileus cuticle from coniferous forests, and I therefore suppose that further species names (namely *R. rivulosa*, *R. brevissima*, *R. atosanguinea*, *R. suberythropus* and *R. marthae*) refer to the species *R. xerampelina* (= *R. erythropoda*).

Key to the European taxa of section *Xerampelinae* with purple, purple-brown to red-brown pileus cuticle associated with coniferous trees.

1A. In the centre of pileus epicutis terminal cells of generative hyphae wider than $7 \mu\text{m}$ present. Pileocystidia very wide, $26.5-62 \times 8-13.5 \mu\text{m}$. Spores small, ($7.3-8.1-8.7 \times 6.1-6.7 \mu\text{m}$). Surface of pileus cuticle velvety-granulose. Growing in coniferous forests in the planar zone.

Russula amoenipes

1B. Terminal cells of generative hyphae in the centre of pileus epicutis thinner than $7 \mu\text{m}$. Width of pileocystidia only rarely exceeding $10 \mu\text{m}$. Spores mostly longer than $9 \mu\text{m}$. Surface of pileus cuticle not velvety-granulose 2

2A. Pileus cuticle purple-brown, red-brown to purple-black. Spore print ochraceous, IIIb according to ROMAGNESI'S (1967) scale. Spores large, ($8.6-9.2-11.3(-12.3) \times (6.7-7.3-8.6(-9.2) \mu\text{m}$). Pleurocystidia without appendage or with a short one (shorter than $3 \mu\text{m}$). Terminal cells of generative hyphae on the margin of pileus epicutis mainly clavate or cylindric and in the terminal part not narrower than $3 \mu\text{m}$. Growing in submontane to subalpine coniferous forest from June to August

Russula favrei

2B. Colour of pileus cuticle purple to purple-black in the centre. Spore print pale yellow, IIIc-IVa according to ROMAGNESI's (1967) scale. Spores smaller, very rarely exceeding 10 μm length. Pleurocystidia with mostly long (longer than 3 μm) appendage. Terminal cells of generative hyphae on the margin of pileus epicutis mainly subulate or attenuate, in the terminal part narrower than 3 μm . Growing in planar to submontane coniferous forests from September to November 3

3A. Pileus (4.8-)5.7-7.3(-8.2) cm wide, pileus margin striated to 3-12 mm. Stipe 1.3-1.9(-2.3) cm thick, cortex of stipe (1-)1.5-2 mm thick, flesh in the half of pileus radius 2-3.5 mm thick. Hymenium with (79-)99-162 lamellae

Russula xerampelina var. *tenuicarnosa*

3B. Pileus (3.7-)5.3-9.5(-10.7) cm wide, pileus margin striated to 0-9 mm. Stipe (1.2-)1.5-3 cm thick, cortex of stipe 1.5-3.5(-4) mm thick, flesh in the half of pileus radius (2.5-)3.5-6.5 mm thick. Hymenium with more dense lamellae, (138-)141-202(-234)

Russula xerampelina var. *xerampelina*

Taxonomic account of the taxa of the *Russula xerampelina* group in Europe

Russula amoenipes (Romagnesi ex Bon) Bidaud, Moëgne-Loccoz et Reumaux in Reumaux, Bidaud et Moëgne-Loccoz, *Russules rares ou méconnues*: 281, 1996 (Fig. 3.)

≡ *Russula xerampelina* var. *amoenipes* Romagnesi ex Bon, *Doc. Mycol.* 18 (69): 36, 1987.

Holotypus: [France] "Dans une plantation de *Pinus silvestris*, sur sol siliceux, Thiers (Oise)" (PC, coll. Romagnesi 58180).

[*Russula amoenipes* Romagnesi, *Les Russules d'Europe et d'Afrique du Nord*: 687-688, 1967; nom. inval., Art. 36.1]

Description of macromorphological characters according to ROMAGNESI (1967):

Pileus 6.8 cm diam., fleshy, plane, slightly depressed in the centre, margin very shortly and indistinctly striated, cuticle separable to half of pileus radius, surface of the cuticle densely velvety-granulose under magnifying glass, rather shining. Colour of pileus cuticle distinctly different from *R. xerampelina*: rusty-vinaceous coloured on the margin, brownish-red towards the centre and purple-black in the centre.

Stipe 5 cm long, 1.5 cm thick, upwards thickened, downwards slightly attenuate, lightly soft and spongy-stuffed, bright rose-carmine (resembling *R. amoena*), turning to brownish-honey colour, very fine and regularly striated on the surface.

Lamellae not very dense, rigid, with some long lamellulae, rarely furcate, free, ventricose, rounded towards the margin of pileus, 7 mm wide, pale cream-ochraceous, than pale ochraceous, with concolours edge, rather distinctly intervenose.

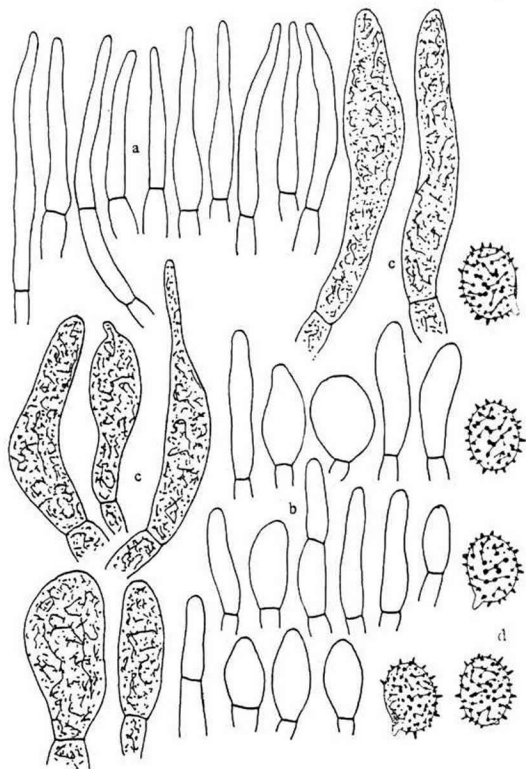


Fig. 3. Microscopic structure of holotype of the name *Russula amoenipes* (PC, coll. Romagnesi 58180). a. - generative hyphae on the margin of pileus epicutis (1000 \times), b. - generative hyphae on the centre of pileus epicutis (1000 \times), c. - pileocystidia (1000 \times), d. - spores (1600 \times).

Flesh thick, compact but not firm, white above lamellae, turning yellow minutely in cortex of stipe and turning more yellow in clots of medulla of stipe. Smell and chemical reactions as in *R. xerampelina*.

Spore print ochraceous (IIIb according to ROMAGNESI, 1967).

Description of micromorphological characters according to observation on the type specimen:

Basidia 32-39 × 9-11 (-12) μm, short and narrow.

Pleurocystidia 63.5-72.5 × 10-11.5 μm, appendiculate (appendage 5-11 μm long), often constricted and mostly rounded in the terminal part.

Spores (7.3-)8.1-8.7 × 6.1-6.7 μm, narrow, Q = 1.25-1.37, spines 0.7-1 μm long and middle distant - 5-9 in the circle of diameter of 3 μm, amyloid punctations numerous - 0-5 in the circle, line connections frequent - 1.5-5 in the circle, contact connections also frequent - 0.5-5.5 in the circle, isolated spines rare.

Terminal cells of **generative hyphae** on the pileus epicutis on the margin 29-40.5 (-52) × 3-5 μm, narrow and long, subulate to attenuate, in the terminal part narrower than 3 μm. The terminal cells on the centre of pileus epicutis 14-29.5 × 4-13 μm, shorter and more inflated than on the margin (often wider than 7 μm), cylindrical or ellipsoid, rounded.

Terminal cells of **pileocystidia** 26.5-62 × 8-13.5 μm, very variable in shape: fusoid, cylindrical or also clavate, always distinctly inflated, in the terminal part rounded or acute, sometimes with appendage.

Habitat - known only from one locality in France, where grew in planted forest of *Pinus sylvestris* on the sandy silicate soil.

Specimens examined - [France] Thiers (Oise), dans une plantation de *Pinus sylvestris*, sur sol siliceux, 23. VIII. 1958, Romagnesi (PC, coll. Romagnesi 58-180).

Russula favrei M. Moser, Sydowia 31: 98, 1979

(Fig. 4., 5a.)

Holotypus: [Austria] "Ochsenkopf bei Obergurgl, Ötztal, Tirol, Nadelwald (*Pinus cembra* und *Larix*) an grasiger Stelle (Silikatboden), 25.08.1975, Moser" (IB, 75/95).

= *Russula fuscoochracea* R. Schulz in Michael et R. Schulz, Führer für Pilzkunde, Vol. 2: N° 241, 1926 [nom. ileg. - Art. 53.1], non Velen., 1920. Ind. loc.: [Germany] "Ziemlich selten in Gebirgswäldern. Er wurde bisher von Michael im Dogtlande, von Berfasser im Riesengebirge beobachtet." [Typus ignotus., ex descr. et icon.]

[*Russula xerampelina* var. *putorina* Melzer, Atlas holubineck: 155, 1945; nom. inval., Art. 36.1]

Misidentifications:

Russula elephantina auct. non (Bolton) Fr.: Kühner et Romagnesi, Flore analytique des champignons supérieurs: 449, 1953.

Russula abietum auct. nom (J. Blum) Bon: Reumaux, Bidaud et Moëgne-Loccoz, Russules rares ou méconnues: 172-173, 1996.

Russula xerampelina var. *olivascens* auct. non Pers.: Galli, Le Russule: 374, 1996.

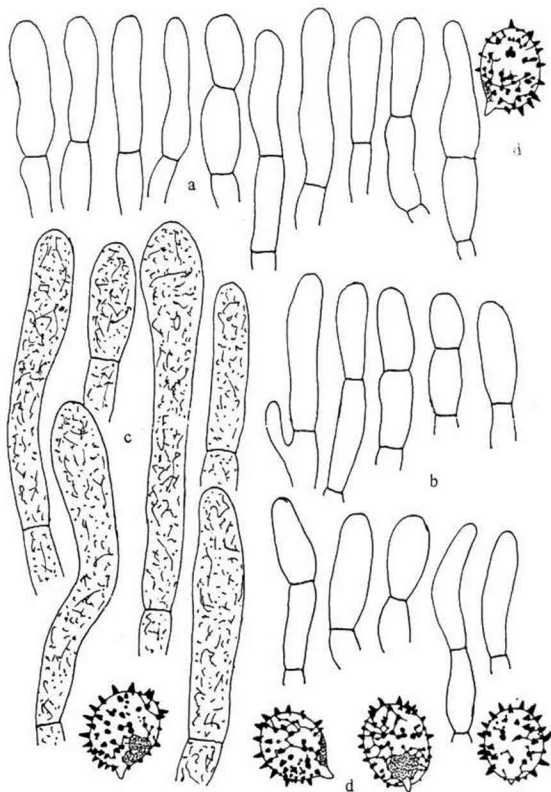


Fig. 4. Microscopic structure of epitype of the name *Russula xerampelina* (Adamčík, SAV): a. - generative hyphae on the margin of pileus epicutis (1000 \times), b. - generative hyphae on the centre of pileus epicutis (1000 \times), c. - pileocystidia (1000 \times), d. - spores (1600 \times).

Pileus (2.4-)2.6-8(-9.2) cm diam., subglobose to convex when young, then expanded plane and slightly depressed at the centre to entirely applanate, frequently irregularly lobate, margin subobtuse to obtuse, striate to 0-12 mm from the margin to the centre, cuticle separable to 7-32 mm from margin. Cuticle of pileus on the margin purple-brown, chestnut-coloured to black-brown with purple tint, often discoloured on tobacco-brown to olive-brown, sometimes with thin bright purple zone on the margin, on the centre dark purple-brown, black-brown to entirely black, often discoloured on olive-brown, rusty-brown, tobacco-brown or cacao-brown, often on the centre discoloured and therefore on the margin darker. Surface of pileus cuticle in the middle zone rough and wrinkled, on the centre often scrobiculated, almost all mat or in the centre slightly shining. The pigment trace on the wet filter paper after chaffing on pileus cuticle is rose-brown to brown.

Stipe 2.3-6.5(-7) long, 0.9-2.3 cm thick, often excentric, cylindrical or clavate, the surface is mostly strongly striated, white and rose-tinged on one side, rarely completely white or more than on half of surface rose coloured, then slightly ochraceous, after bruising turning rusty-colour to brown, cortex 1-4 mm thick.

Hymenium with (90-)106-231(-251) lamellae, 0-8(-9) lamellulae and (0-)1-15(-34) furked lamellae (furkations mainly near the stipe). Lamellae 3.5-12(-18) mm wide, cream-coloured, also with yellow tint in frontal view, adnexed.

Flesh compact but not firm, white, in the cortex of stipe almost not changing colour, in the medulla of stipe turning brown, in the half of pileus radius 2-4.5 mm thick. Smell almost none in fresh condition, crab-like when drying or damping off. Reaction to FeSO_4 grey-green to blue-green when young, then less intensive and more with ochraceous tint.

Colour of **spore print** ochraceous (IIIb according to ROMAGNESI, 1967).

Basidia (30.5-)37-60.5(-66) \times (9-)10.5-16(-19) μm , in some fruitbodies often very long and wide.

Pleurocystidia (61-)66.5-103.5(-114) \times (10-)11-15.5(-18) μm , in majority of observed fruitbodies without appendage, only rarely constricted and mostly rounded in terminal part. If appendage present, than 1-3(-8) μm long.

Spores (8.6-)9.2-11.3(-12.3) \times (6.7-)7.3-8.6(-9.2) μm , $Q = 1.2-1.32$, spines (0.6-)0.8-1.1 μm long and middle distant - (2.5-)4-7.5(-10) in the circle of diameter of 3 μm , amyloid punctations numerous - (0-)2-5.5(-8) in the circle, line connections frequent - 0-2.5(-4) in the circle, contact connections also frequent (0-)1.5-5.5(-8) in the circle. In spite of numerous line and contact connections of the spines and amyloid punctations some isolated spines present.

Terminal cells of **generative hyphae** on the pileus epicutis on the margin (10-)19.5-36(-53.5) \times (4-)4.5-6.5(-9) μm , mainly cylindrical or clavate, sometimes also capitate, ellipsoid, fusoid or subulate, in terminal part mostly rounded and wider than 3 μm . The terminal cells on the centre of pileus epicutis (9.5-)14.5-25.5(-44) \times (4-)4.5-7(-8) μm , mainly cylindrical, rarely also ellipsoid, ovate, clavate, ampullaceous or fusoid, in the terminal part rounded and wider than 3 μm .

Terminal cells of **pileocystidia** (14.5-)28-57.5(-79) \times (5.5-)6-10(-13.5) μm , clavate, rarely narrowly ellipsoid or cylindrical, almost all rounder in the terminal part.

Habitat - in submountane to subalpine coniferous forests associated with *Picea*, *Pinus sylvestris* or *Larix* trees, from June to September.

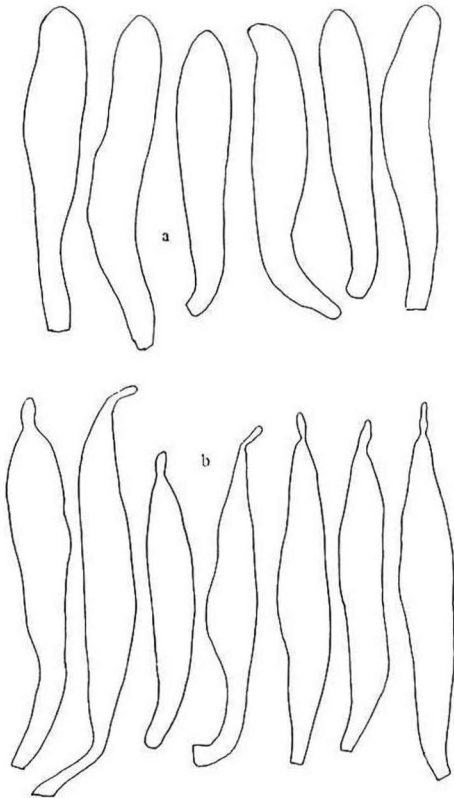


Fig. 5. Pleurocystidia of the type specimens of *Russula xerampelina* (Adamčík, SAV) and *R. erythropoda* (Adamčík, SAV). a. - epitype of *R. xerampelina* (750 ×), b. - neotype of *R. erythropoda* (750 ×).

Specimens examined - [Slovakia] [Západné Beskydy] Oravský Podzámok, 15.VIII.1959, Fábry (BRA, *R. xerampelina* var. *pseudomelliolens*) - convexum Turčianska kotlina, in piceto acido in silva "Rovná hora" dicta 2 km situ merid. a pago Dubové (distr. Martin), alt. 520 m, 25.VII.1985, Hagara (BRA). - Mont. Vysoké Tatry [Západné Tatry], prope Podbanské, terr. nat. munitum Machy, in piceto, alt. 900 m, 13.VII.1986, Kuthan (BRA). - Západné Tatry mountains, at Jalovecký potok stream, in the mouth of Jalovecká dolina valley, under *Picea abies*, *Larix decidua*, on the decayed needles among the sparse herbal undergrowth, ca. 730 m a.s.l., 26.VI.1998, Adamčík (SAV). - Západné Tatry mountains, in the firth of Bobrovecká dolina, under *Picea abies*, in the dense herbal undergrowth of *Melampyrum sylvaticum*, *Alchemilla* sp., *Poa* sp. and other plants, ca. 750 m a.s.l., 26.VI.1998, Adamčík (SAV). - Veľká Fatra mountains, Bukovinka hill, under *Picea abies*, on the decayed needles in the sparse herbal undergrowth, 780 m a.s.l., 16.VII.1998, Adamčík (SAV). - Nízke Tatry mountains, on the pasture above Brankovský vodopád falls, under *Picea abies*, in decayed needles, ca. 1000 m a.s.l., 16.VII.1998, Adamčík (SAV). - [Czech Republic] Sub *Picea*, Hor. Rokytnice, alt. 1000 m, VIII.1933, Zvára (PRM, 770644). - Protivín ("Háj"), 30.VII.1936, Herink (PRM, 770635, *R. xerampelina* var. *fusca*). - Silva "Farářství" distr. Turnov, picetum ad terram, 12.VIII.1941, Schmidt (PRM, 521391, *R. xerampelina* var. *elaeodes*). - Zátouň, mons "Boubín" (distr. Prachatice), piceto-abietofagetum, ad terram, 10.VII.1946, Herink (PRM, 520204, *R. xerampelina* var. *putorina*). - Lenora, osada Zátouň (distr. Moses), "Červený vrch", silv. mix., *Picea exc.*, *Abies alba*, *Pinus sylv.*, *Coryllus avell.*, ad terram, 18.IX.1948, Herink (PRM, 609822, *R. xerampelina* var. *putorina*). - [France] Dans le département des Alpes Maritimes, au lieu dit "La Vacherie du Boréon", alt. 1600 m, 25.VII.1981, Trimbach (herb. Trimbach, Nice, no. 2056) - [Austria] Ochsenkopf bei Obergurgl, Ötztal, Tirol, Nadelwald (*Pinus cembra* und *Larix*) an grasiger Stelle (Silikatboden), 25.VIII.1975, Moser (IB, 75/95, *R. favrei*)

***Russula xerampelina* (Schaeff.) Fr.**, Epicr. Syst. mycol.: 356, 1838., *nom. cons.*
prop.

Neotypus (designated here, and proposed as *typus conservatus*): [Germany] „Oberbayern: Alteichenrevier im Forstenrieder Park a. d. Römer str., MTB 7934, bei randlicher Fichte, 15.IX.1981, Einhellinger" (M, 30-99/8).

= *Agaricus xerampelinus* Schaeff., Fung. Bavar. Palat. nasc., Vol. 4: 49-50, 1774. Ind. loc.: [Germany, Bavaria] "Wächst unter den übrigen Täublingen im Herbste in den Wäldern." Original illustration and syntypes to be rejected: Schaeff., Fung. Bavar. Palat. nasc., Vol. 3: Tab. CCXIV, Tab. CCXV, 1771.

= *Russula erythropoda* Peltreau, Bull. Soc. Mycol. France 24: 117, 1908. Ind. loc.: [France] "dans les bois résineux, très tardivement, fin octobre ou novembre". Neotypus (designated here): Slovakia, Nízke Tatry mountains, 1 km S of the margin of the Liptovský Hrádok town, under *Pinus sylvestris* and *Picea abies*, on decayed needles, 775 m a.s.l., 14.X.1998, Adamčík (SAV).

= *Russula xerampelina* var. *erythropoda* (Peltreau) Konrad et J. Favre, Bull. Soc. Mycol. France 49: 195, 1933.

= *Russula atosanguinea* Velenovský, České houby, Vol. 1: 143, 1920. Ind. loc.: [Czech Republic] "V starých smrkových lesích říde, 7-8. U Mnichovic a Hrusic na více místech, vždy pospolitě. U Radotína blíž cihelny Kosofské". [Typus ignotus, ex descr.]

Misidentifications:

Russula Innaei auct. non Fr.: Ricken, Blätterpilze Deutschl.: 49, 1911; Velen., České houby: 155, 1920.

Russula purpurea auct. non (Schaeff.) Gillet: J. E. Lange, Dansk Bot. Ark. 4 (12): 42-43, 1926.

Russula xerampelina var. *rubra* auct. non (Britzelm.) Singer: Singer, Hedwigia 66: 238, 1926, Jul. Schaeff., Ann. Mycol. 31 (5-6): 373, 1933.

Russula xerampelina var. *linnaei* auct. non (Fr.) Melzer et Zvára: Melzer et Zvára, České holubinky: 59, 1927.

Specimens examined (determined on the level of species) – [Slovakia] [Západné Beskydy] Oravský Podzámok, 12.VIII.1960, Fábry (BRA, *R. xerampelina* var. *erythropoda*). - [Záhorská nížina] Plavecký Štvrtok, 13.X.1960, Fábry (BRA, *R. xerampelina*). - [Záhorská nížina] Plavecký Štvrtok, v borovom lese, 19.X.1960, Fábry (BRA, *R. xerampelina*). - [Veľká Fatra] Lubochňa prope Ružomberok, in silva coniferarum, alt. 500 m, 13.VIII.1967, Kuthan (BRA, *R. xerampelina*). - Záhorská nížina, ad terram in pineto prope pag. Plavecký Štvrtok, 13.X.1973, Horváthová (BRA, *R. xerampelina* var. *erythropoda*). - Záhorská nížina, Jakubov "Feld", ad terram in pineto, 3.IX.1977, Dermeková (BRA, *R. xerampelina*). - Malá Fatra, v smrečine na sev. úbočí vrchu Dubový diel, 1,8 km ZJZ od obce Bystrička, alt. 570 m, 1.X.1982, Hagara (BRA, *R. xerampelina*). - Malá Fatra, smrekovo-borový porast na sev. úbočí vrchu dubový diel (chotárná časť Tírstie), 1,9 km ZJZ od obce Bystrička, alt. cca. 550 m, 16.X.1982, Hagara (BRA, *R. xerampelina*). - Montes Malá Fatra, in piceto ad pedem collis Hrádok 21,4 km situ occid. a pago Bystrička (distr. Martin), alt. cca. 570 m, 9.X.1984, Hagara (BRA, *R. xerampelina*). - Montes Malá Fatra, sub Piceis in loco "Lazy" dicto cca. 1,5 km situ septent.-occid. a pago Bystrička (distr. Martin), alt. cca. 600 m, 14.X.1984, Tolnay (BRA, *R. xerampelina*). - Montes Malá Fatra, in piceto ad calcem in colle Hrádok 2,4 km situ occid. a pago Bystrička (distr. Martin), alt. cca. 570 m, 15.X.1984, Hagara (BRA, *R. xerampelina*). - Convexum Turčianska kotlina, in piceto acido in silva "Rovná hora" dicto 2 km situ merid. a pago Dubové (distr. Martin), alt. 520 m, 22.VIII.1985, Hagara (BRA, *R. xerampelina*). - [Veľká Fatra] sub piceis in valle "Jasenská dolina" 2,6 km situ merid.-orient. a pago Turčianske Jaseno (distr. Martin), alt. 670 m, 6.IX.1986, Hagara (BRA, *R. xerampelina*). - Borská nížina [Záhorská nížina], 4 km SZ od obce Studienka (okr. Senica), v riedkej brezovej mladine na okraji borovicového lesa, alt. cca. 200 m, 18.X.1987, Sand (BRA, *R. xerampelina*). - Tribeč, Klátova Nová Ves, časť Sádok, lokalita Kozlica, okraj lesa, pod borovicami a čerešňami, alt. cca. 220 m, 5.X.1996, Benko (BRA, *R. amoenipes*). - [Czech Republic] Všenory ad Prag., sub picea et pino, X.1934, Zvára (PRM, 770645, *R. xerampelina* var. *erythropus*). - "Lomec" pr. Vodňany, in pic., 6.VIII.1937, Herink (PRM, 480143, *R. xerampelina*). - Vodňany, in musc. pic. "Kovár", 12.VIII.1937, Herink (PRM, 490096, *R. xerampelina*). - Prachatice, in silva montis Libin, in pic., alt. 1091 m, 24.VIII.1937, Herink (PRM, 489852, *R. xerampelina*). - Praha, Divoká Šárka, in picetis, 7.IX.1937, Herink (PRM, 770637, *R. xerampelina*). - Golčuv Jeníkov, in pic., 7.VIII.1940, Herink (PRM, 770647, *R. xerampelina* var. *linnaei*). - Hřebečnický (distr. Rakovník), in piceto-pineto, 16.IX.1940, Herink (PRM, 770628, *R. xerampelina* var. *linnaei*). - Hřebečnický (distr. Rakovník), in gram. piceto-quercetis, 16.X.1940, Herink (PRM, 770671, *R. xerampelina* var. *linnaei*). - Dolní Kralovice, in silva conif., 24.VIII.1942, Herink (PRM, 770703, *R. xerampelina* var. *rubra*). - Vodňany, in picetis, 2.IX.1942, Herink sen. (PRM, 770700, *R. xerampelina* var. *rubra*). - Valdštejn pr. Turnov, in pinetis (cum Quercubus et Fagis), 24.X.1943, Herink (PRM, 770709, *R. xerampelina*). - Hlásná Třebáň (silva "Poličko"), in silvis mixtis (*Pinus sylvestris*, *Quercus*), 26.XI.1944, Svrček (PRM, 770670, *R. xerampelina* var. *erythropoda*). - Valdštejn pr. Turnov, in pineto c. *Vaccinio myrt.*, 19.VIII.1945, Herink (PRM, 770681, *R. xerampelina*). - Klokočí, vallis rivi "Klokočský potok" locus "Rašovka" dictus, distr. Trutnov, picetum, alt. 260 m, 3.IX.1946, Schmidt (PRM, 521417, *R. xerampelina* var. *erythropoda*). - Klokočí, vallis rivi "Klokočský potok" (distr. Trutnov), picetum, alt. 260 m, 9.IX.1946, Schmidt (PRM, 521458, *R. xerampelina* var. *erythropoda*). - Lnáňe pr. Blatná, in piceto muscoso ad stationem hydrobiologicam, 20.IX.1946, Svrček (PRM, 770705, *R. xerampelina*). - Čimelice, silva Chlum, in piceto-pineto, 2.VIII.1966, Svrčková (PRM, 626242, *R. xerampelina* var. *erythropus*). - [Germany] Potsdam-Ferch, sub pinis, IX.1930, Schaeffer (FH, *R. xerampelina*). - Görlitz, X.1933, Pilát (PRM, 770629, *R. xerampelina* var. *rubra*). - Umgebung vom Augsburg: Horgau, 3.VII.1965, Stangl (M, 30-99/16, *R. xerampelina* var. *rubra*). - Dürnbucher Forst bei Münchsmünster, 26.IX.1969, Einhellinger (M, 30-99/1, *R. xerampelina*). - Eichenrieder Moos

bei Eichenried i. Zdkr. Erding, Fichten auf Moorboden, 26.IX.1970, Einhellinger (M, 30-99/4, *R. xerampelina* var. *erythropus*). - Isarau bei Ismaning, Fischerhäuser, 26.IX.1971, Einhellinger (M, 30-99/2, *R. xerampelina*). - Waldkraiburg, im Hart im Fi-Wald, 9.VIII.1973, Marschner (M, 30-99/12, *R. xerampelina*). - Eichenreider Moos bei Eichenried im Erdinger Moor, cca. 20km nordöstl. von München, Fichtenwald auf ehemaliger Abtoobringungsfeuchte, 15.VIII.1974, Einhellinger (M, 30-99/14, *R. xerampelina*). - Dürbucher Forst bei Siegenburg i. d. Hallertau, MTB 7236, im flechtenr. sandigen Kiefernforst, 5.X.1980, Einhellinger (M, 30-99/7, *R. xerampelina*). - Alteichenrevier östl. bauting i. Forstenrieder Park a. d. Römer str., MTB 7934, aber aud. Grenze zum Fichtenwand, 28.X.1980, Einhellinger (M, 30-99/9, *R. xerampelina*). - Alteichenrevier im Forstenrieder Park a. d. Römer str., MTB 7934, bei randlicher Fichte, 15.IX.1981, Einhellinger (M, 30-99/8, *R. xerampelina*). - LSG Siegenburg, sandigen, flechtenreichen Kiefernwald, MTB 7236, 6.XI.1982, Einhellinger (M, 30-99/10, *R. xerampelina*). - Isarhochunterwald a. d. Isar, bei Fichten, 21.IX.1984, Einhellinger (M, 30-99/11). - Umgebung von Augsburg, Stangl (M, 30-99/5, *R. xerampelina* var. *erythropus*).

Russula xerampelina* var. *xerampelina

(Fig. 5.b, 6.)

Pileus (3.7-)5.3-9.5(-10.7) cm diam., convex when young, soon expanded plane and slightly depressed in the centre, often infundibuliform with age, mainly regularly shaped and often lobate, margin obtuse, striated to 0-9 mm from the margin to the centre, cuticle separable to 7-23 mm, from the margin. Cuticle on the margin bright purple-red and only rarely spotted, towards the centre dark purple, purple-black to black, sometimes with small brown, olive to ochraceous spots. Surface of the cuticle mat on the margin or to the half of pileus radius, in the centre shining, in the middle zone rough and wrinkled, in the centre rough, smooth or rarely scrobiculated. The pigment trace on the wet filter paper after chaffing on pileus cuticle is rose to rose-vinaceous, very rarely also rose brown. Pileus cuticle in some fruitbodies growing in dry condition has more violet colour and surface mat to almost pruinose.

Stipe (2.4-)4-7.8(-9.6) cm long, (1.2-)1.5-3 cm thick, often eccentric, cylindrical or clavate, surface strongly longitudinal striate, the majority of surface is covered by rose to carmine-red colour, turning rusty-colour after bruising, cortex 1.5-3.5(-4) mm thick.

Hymenium with (138-)141-202(-234) lamellae, 2-9 lamellulae (1-7 lamellulae longer than half of length of lamellae) and 3-15 furked lamellae. Lamellae (3.5-)4.5-12(-13) mm wide, cream colour to pale ochraceous, with yellow tint in frontal view, adnexed.

Flesh compact, white, turning minutely yellow in cortex of stipe and turning rusty-brown in medulla and pileus, in the half of pileus radius (2.5-)3.5-6.5 mm thick. Smell obscure in fresh condition, crab-like when drying of damping off. Reaction to FeSO_4 grey-green when young, than less intensive and more with ochraceous tint.

Colour of **spore print** ochraceous to pale yellow (IIIc-IVa according to ROMAGNESI, 1967).

Basidia (35.5-)37.5-60.5(-65.5) \times (10.5-)11.5-14(-15.5) μm .

Pleurocystidia (70-)78-105.5(-114.5) \times (10.5-)11-15(-16.5) μm , almost all with 1-17.5 (-23.5) μm long appendage, mostly constricted and acute in terminal part.

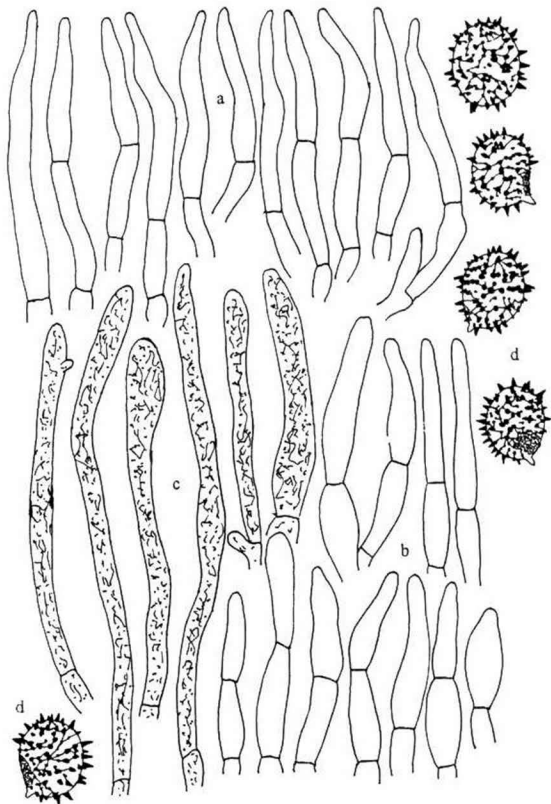


Fig. 6. Microscopic structure of neotype of the name *Russula erythropoda* (Adamčík, SAV). a - generative hyphae on the margin of pileus epicutis (1000 \times), b - generative hyphae on the centre of pileus epicutis (1000 \times), c - pileocystidia (1000 \times), d - spores (1600 \times).

Spores (8.2-)8.8-9.9(-10.6) × (6.3-)6.9-7.8(8.2) μm, Q = 1.23-1.33, spines (0.6-)0.8-1(-1.2) μm long and numerous - (5-)5.5-9(-11) in the circle of diameter of 3 μm, amyloid punctation middle distant - (0-)2-4.5(-10) in the circle, line connection frequent - (0-)2-5(-8) in the circle, contact connections numerous - (3-)3.5-8(-11) in the circle. The spines are only rarely isolated.

Terminal cells of generative hyphae on pileus epicutis on the margin (19-)24.5-44(-57) × (3-) 3.5-5.5 (-6) μm, mainly subulate or attenuate, rarely cylindrical of fusoid, often with lateral nodules, almost all narrower than 3 μm in terminal part. The terminal cells on the centre of pileus epicutis (13.5-)21-31.5(-42) × 3-6 (-9) μm, with very various shape: cylindrical, fusoid, attenuate, subulate, ampullaceous, rarely also clavate or ellipsoid, frequently narrower than 3 μm in the terminal part. The second cell of generative hyphae on the centre is often inflated and wider than the terminal cell.

Terminal cells of pileocystidia (19-) 30-68 (-93.5) × (4-)4.5-7.5(-8.5) μm, mainly cylindrical, often also clavate, fusoid, attenuate, very slender, often irregularly inflated, acute and rarely rounded or with appendage in the terminal part, often with lateral nodules.

Habitat - coniferous forest in colline to submountane zone, associated with *Pinus sylvestris* and *Picea* trees, growing in September to November.

Specimens examined - [Slovakia] Nízke Beskydy mountains, Ondavská vrchovina hills, 2 km E of Kvakovce village, under *Pinus sylvestris*, on the ground without herbal undergrowth, 200 m a.s.l., 7.X.1998, Adamčík (SAV). - Nízke Tatry mountains, 1 km S of the margin of the Liptovský Hrádok town, under *Pinus sylvestris* and *Picea abies*, on decayed needles, 775 m a.s.l., 14.X.1998, Adamčík (SAV). - Nízke Tatry mountains, in the valley 1 km SSW the town of Liptovský Hrádok, under *Picea abies*, in decayed needles and among grass, 725 m a.s.l., 14.X.1998, Adamčík (SAV). - Liptovská kotlina, 1 km S of Východná village, on the right side of river Váh, under *Picea abies*, among mosses, 860 m a.s.l., 15.X.1998, Adamčík (SAV). [Italy] Trento region, "Kieslereck" near Pergine Valsugana, under *Picea* and *Larix*, 1300 m a.s.l., 24.IX.1997, Adamčík and Floriani (SAV).

Russula xerampelina var. *tenuicarnosa* var. *nova*

(Fig. 7.)

Diagnosis:

A typo differt carne versus medium pilei radium 2-3 mm crassa, pileo versus marginem manifeste striato (3-12 mm), stipite angustissimo, 1,3-1,9 (-2,3) cm crasso et lamellis minus numerosis (99-162).

Holotypus: Záhorská nížina lowland, between Tomky village and Červený rybník lake, 5 km W of Lakšárska Nová Ves village, on the sandy soil, among mosses and grass on the margin of the path, under *Pinus sylvestris*, 200 m a.s.l., 30.IX.1998, Adamčík (SAV).

Pileus (4.8-)5.7-7.3(-8.2) cm diam., soon expanded plane and slightly depressed in the centre, then infundibuliform, often irregularly shaped and lobate, margin obtuse, striated to 3-12 mm from the margin to the centre, cuticle separable to 8-27(-30) mm from the margin. Colour of pileus cuticle similar to the type variety. Surface of pileus cuticle wrinkled or rough in the middle zone and rough or obscurely

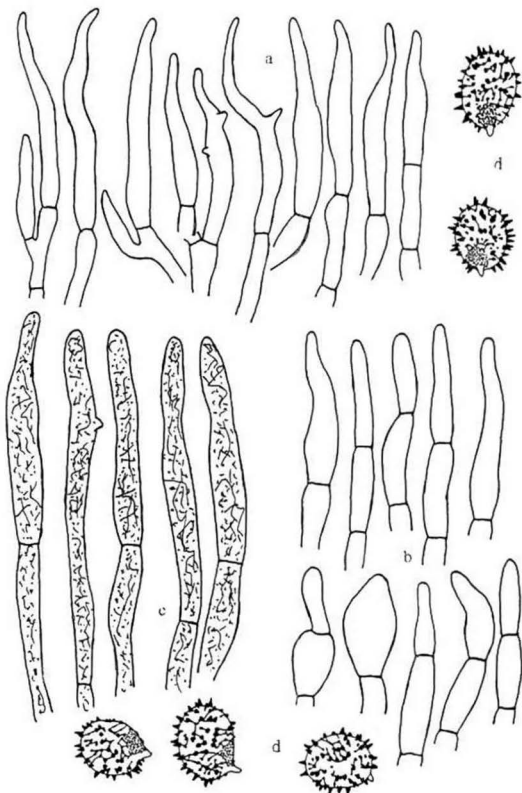


Fig. 7. Microscopic structure of holotype of the name *Russula erythropoda* var. *tenuicarnosa* (Adamčík, SAV). a. – generative hyphae on the margin of pileus epicutis (1000 \times), b. – generative hyphae on the centre of pileus epicutis (1000 \times), c. – pileocystidia (1000 \times), d. – spores (1600 \times).

scrobiculated in the centre. The pigment trace on the wet filter paper after chaffing on the pileus cuticle rose.

Stipe 4.9-9 cm long, 1.3-1.9(-2.3) cm thick, often eccentric, cylindrical, surface distinctly longitudinal striate, majority of surface is covered by rose to carmine colour, turning rusty colour after bruising, cortex (1-)1.5-2 mm thick.

Hymenium with (79-)99-162 lamellae, 1-5 lamellulae (0.5 lamellulae longer than half of length of lamellae), 0-8 furked lamellae. Lamellae 5-12 mm wide, cream colour to pale ochraceous, bright yellow in frontal view, adnexed.

Flesh compact, then fragile, 2-3.5 mm thick in the half of pileus radius. Smell, reaction to FeSO_4 and changing of colour after bruising as in type variety.

Colour of **spore print** ochraceous (IIIc according to ROMAGNESI, 1967).

Basidia (35.5-)36.5-47.5(-53.5) \times (10.5-)11.5-14.5(-15.5) μm .

Pleurocystidia (63.5-)77-92(-124.5) \times (11-)12-13(-15.5) μm , almost all with 1-7.5(-17) μm long appendage, mostly constricted and acute in the terminal part.

Spores (7.3-)7.9-9.5(-10.5) \times (5.9-)6.4-7.5(-8.2) μm , $Q = 1.2-1.29$, spines (0.7-)0.8-1.1(-1.2) μm long and numerous - (4-)6-9(-11) in the circle of diameter of 3 μm , amyloid punctation medium distant - (0-)2-4.5(-7) in the circle, line connections frequent - (0-)1-3.5(-6) in the circle, contact connections also frequent - (3-)3.5-8(-11) in the circle.

Terminal cells of **generative hyphae** on pileus epicutis on the margin (17-)22-49(-66) \times (3-)4-5(-5.5) μm , subulate, attenuate, ampullaceous or fusoid, rarely cylindrical or clavate, almost all narrower than 3 μm in the terminal part, sometimes with lateral nodules. The terminal cells on the centre of pileus epicutis (13.5-)18-28.5(-44) \times (3-)3.5-5(-8) μm , mostly cylindrical, rarely subulate, ampullaceous or clavate, often narrower than 3 μm in the terminal part.

Terminal cells of **pileocystidia** (26-)31-69.5(-108.5) \times (4-)5-7(-8) μm , mainly cylindrical, often clavate or fusoid, rounded or acute in the terminal part, frequently irregularly inflated.

Habitat - on the sandy soil under *Pinus sylvestris*.

Specimens examined - [Slovakia] Záhorská nížina lowland, between Tomky village and Červený rybník lake, 5 km W of Lakšárska Nová Ves village, on the sandy soil, among mosses and grass on the margin of the path, under *Pinus sylvestris*, 200 m a.s.l., 30.IX.1998, Adamčík (SAV). - Záhorská nížina lowland, Červený rybník lake, 3 km W of Lakšárska Nová Ves village, on the sandy soil, among mosses, under *Pinus sylvestris*, 200 m a.s.l., 30.IX.1998, Adamčík (SAV). - [Italy] Trento region, Langhestel near Pine, under *Pinus sylvestris* on acid soil, 900 m a.s.l., 25.IX.1997, Adamčík and Floriani (SAV).

Acknowledgments

I wish to thank Anemiecke Verbeke, Bart Buyck, Thomas Kuyper and Zdeněk Pouzar for reviewing this paper, Karol Marhold, Pavel Lizoň and Richard P. Korf for language correction and taxonomic notes, Marco Floriani for allowing to visit Italian localities and taxonomic notes, Jacques Melot for taxonomic and nomenclatural notes and Jan Holec for help with literature. This research was supported by VEGA grant # 1069.

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