

Notes on the central-American *Russula cremeolilacina* var. *coccolobicola* (= *R. littoralis* Pegler)

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Abstract – Microscopical features of the type of the central American *Russula cremeolilacina* var. *coccolobicola*, originally published as *Russula littoralis* Pegler nom illeg., are redescribed and compared with other *Russula*-species. Its systematic position is reassessed.

Résumé – Les caractères microscopiques du type de la russule centraméricaine, *Russula cremeolilacina* var. *coccolobicola*, originalement décrit sous le nom de *R. littoralis* Pegler nom illeg., sont redécrits et comparés avec d'autres espèces du genre. Sa position systématique est revue.

INTRODUCTION

This paper is part of a series of type studies and comments on tropical American *Russula* species (for previous contributions see Buyck 1988, 1989a-c, 1990a-b, 1992, 1999b, Buyck & De Meijer 1999, Buyck & Ovrebo, 2002, Courtecuisse & Buyck 1991). In this contribution, the author examines the features of the Central American *Russula cremeolilacina* Pegler var. *coccolobicola* Singer in section *Heterophyllae* Fr. subsect. *Cyanoxanthinae* Singer, a taxon originally published as a distinct species, *R. littoralis* Pegler nom. illeg. (in Pegler & Singer, 1980) in sect. *Plorantes* Bataille.

MATERIAL AND METHODS

The color notations indicated in the description are after Kornerup and Wanscher (1978). All microscopic observations and measurements – except for basidiospores – were made in ammoniacal Congo red, after a short aqueous KOH pretreatment to improve tissue dissociation and matrix dissolution. Original drawings for all elements of the hymenium or pellis were made at $\times 2400$. In the figures, the long 10 μm scale line is for the basidiospores and the short one for the other elements. Contents of cystidia in the hymenium and pellis are indicated schematically in the illustrations, except for a single element where contents are

represented as observed in Congo Red preparations from exsiccata. All elements of the basidiomes were also examined for the presence of ortho- or metachromatic contents or incrustations in cresyl blue as explained in Buyck (1989c). Observations and measurements of basidiospores were made in Melzer's reagent. Measurements are given according to Heinemann and Rammeloo (1985) and are based on 20 spores (n) per specimen for each species. The measurements in italics represent the low and high means among the measured collections. The mean length/width ratio (Q) gives minimum, mean, and maximum values. We refer the reader to Buyck (1991) for explanation of cystidial terminology.

DESCRIPTION

Russula cremeolilacina* var. *coccolobicola Singer in Singer, Araujo & Ivory, *Beihefte zur Nova Hedwigia* 77 : 264-266. 1983.

Syn. : - *Russula littoralis* Pegler (nom. illeg.), *Mycotaxon* 12 (1): 93. 1980, non *R. littoralis* McNabb (nom. illeg.), *New Zealand Journal of Botany* 11: 681. 1973, nec *R. littoralis* Romagnesi, *Bulletin trimestriel de la Société mycologique de France* 88: 29-31. 1972.

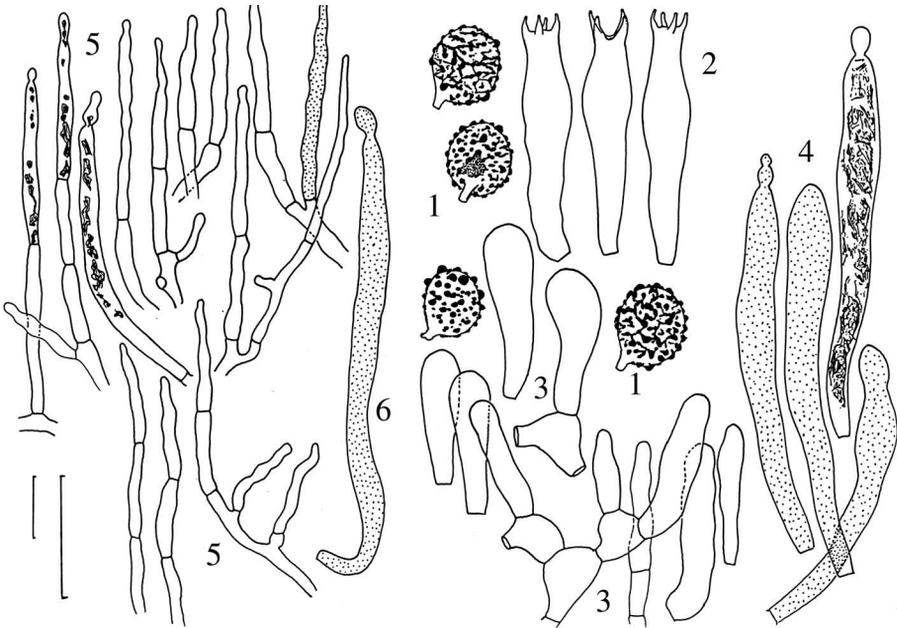


Fig.1-6. *Russula cremeolilacina* var. *coccolobicola* (holotype). 1 – Spores, 2 – Basidia, 3 – Basidia and cells of the subhymenium, 4 – Hymenial cystidia with contents indicated schematically in all but one elements, 5 – Extremities of the pileipellis with contents of pileocystidia indicated schematically in 2 of 5, as observed in Congo red in the others. 6. Pileocystidium of subpellis with contents indicated schematically. Scale bar = 10 μ m, with the longest applying only to spore size.



Fig. 7. *Russula cremeolilacina* var. *coccolobicola* (holotype). View of the type collection. Color and size are identical to dried collections of *R.ilicis*.

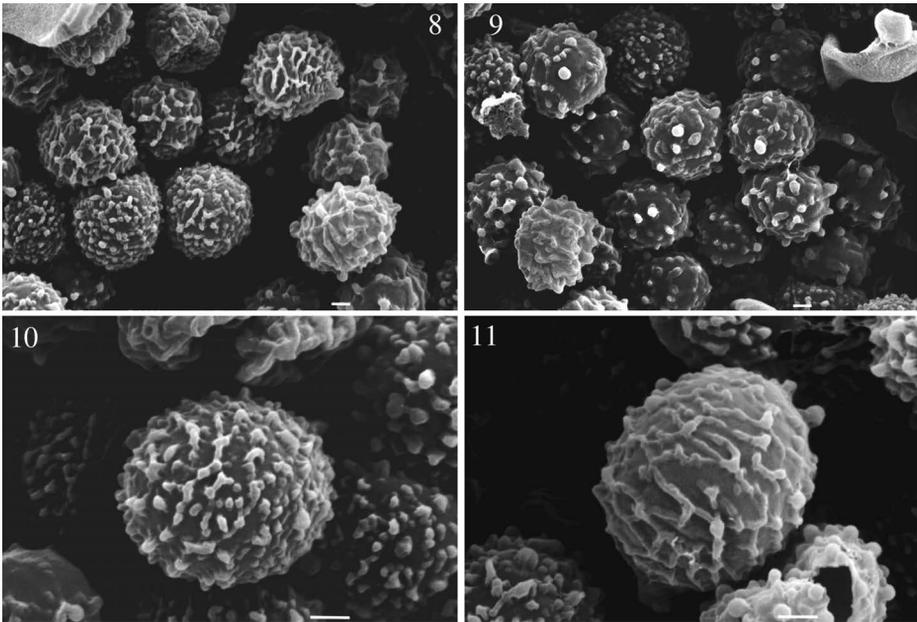


Fig. 8-11. *Russula cremeolilacina* var. *coccolobicola* (holotype). Spores as seen under the scanning electron microscope. Note the variability of the spore ornamentation and the occasional development of 'droplets' as some ornamental artifact in fig. 9 Scale bar = 10 μ m.

Macroscopical features¹

Pileus 4-6.6 cm diam., fleshy, hemisphaerical then convex to plano-convex, slightly depressed at the center, very pale ochre to ivory yellow, sometimes with faint lilaceous tints at the margin, moist but not viscid, glabrous except for sand particles which always adhere to the marginal zone, *probably peeling at least near the margin* ; margin thick, regular, down-curved, not striate. **Lamellae** adnate to adnato-decurrent, pale cream-coloured, fairly broad, often furcated, rather crowded, with a few lamellulae only. **Stipe** 2.5-5 × 1-1.7 cm, *shorter than the pileus diameter*, cylindrical or expanded above, solid, *often abruptly constricted and hard, almost rooting at the base* ; surface almost pure white, dry, glabrous, rugulose. **Context** up to 6 mm thick at the disk, firm, white, unchanging. **Odour** pleasant. **Taste** mild and sweet. **Spore print** not observed. **Exsiccatum** with smooth, brownish orange to yellowish brown or light brown (5-6CDE8) pileus and greyish orange to brownish orange (5BCD5) lamellae.

Microscopical features

Spores (6.8)7.1-7.42-7.7(7.8) × (6.2)6.3-6.44-6.6(6.9) μm, Q=1.06-1.15-1.24, but often remarkably variable in size and ornamentation, the latter composed of obtuse, circular to more irregular 'warts', isolated or more often fused, aligned or connected in an incomplete reticulum, in some spores typically with much larger, almost sphaerical droplets probably typical of ill development ; suprahilar spot distinct, often amyloid in the distal part. **Basidia** 40-50(55) × 9-10 μm, four-spored; sterigmata stout, sometimes longer. **Cystidia** very dispersed (less than 350/mm²), 55-90 × 7-10 μm, very faintly or insensitive to SV, slightly emerging (15-25 μm), with granular-refringent contents, fusoid to clavate or more irregularly constricted, often appendiculate to capitulate. **Marginal cells** ill-developed, resembling deformed or irregular basidiola, intermingled with basidia and cystidia. **Subhymenium** cellular. **Lamellar trama** mainly composed of large sphaerocytes. **Pileipellis** 100- 130 μm thick, slightly gelatinized and rather well delimited from the underlying trama, composed of recumbent to slightly ascending thin-walled hyphae, 2-3(4) μm diam. and slender pileocystidia ; suprapellis hardly differentiated from subpellis, hyphal extremities septate, sparsely branching, of same diameter but faintly undulating or constricted in places and usually narrower at the extreme tip, with a ortho- to slightly metachromatic wall in cresyl blue ; pileocystidia dispersed, difficult to see and only differentiated by their refringent-granular agglomerated contents in ammoniacal congo red and by the capitulate to restricted tips, becoming almost non-existent in trama (but present). Stipitipellis very similar, less structured, with dispersed, slender caulocystidia near surface. Clamps absent in all parts.

Type collection

Martinique : Grand Macabou, in littoral forest under *Coccoloba uvifera*, 9 Dec. 1976, Fiard 139D (K).

Comment

The macroscopic description is adopted from Pegler except for the italic parts which are newly added here. All microscopic features are redescribed as the

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original description is often unprecise (e.g. for spores, basidia and cystidia) or erroneous (particularly for pileocystidia). These have partly been corrected by Singer (in Singer et al., 1983), but he also describes pileocystidia as “terminal ends of the oleiferous hyphae”? In our opinion, pileocystidia are simply typical of many species in section *Heterophyllae*, that is : lacking well-differentiated, needle-like contents that react strongly to sulfovanillin, but have a more banded, refringent appearance instead.

Contrary to the opinion of Singer, I think it is to be expected that *R. cremeolilacina* var. *coccolobicola* should not have a white but at least a cream – perhaps even a dark cream – spore print colour, because of a possible adaptation to the extreme conditions in the sandy coastal soil endured during most of the year. In this respect it is interesting to note that the species described by Miller et al. (2000) from Puerto Rico, Mona and Virgin Islands under the name of *R. littoralis* Pegler has an identical spore print as *R. ilicis*! Unfortunately, the latter description, lacking any further commentary or illustration, does not elucidate very much. The description is too incomplete, even on major taxonomic features (no mention of pileocystidia or amyloidity of the suprahilar spot, nor on peeling of the pellis), but the cited characters agree with the original description by Pegler.

DISCUSSION

The systematic position of *R. littoralis* Pegler nom. inval. was differently assessed by different authors. This species was initially (Pegler & Singer, 1980 ; Pegler 1983) placed in the *R. delica*-group (sect. *Plorantes*, subsect. *Lactarioideae* Mre.) where it almost certainly does not belong for several reasons:

- the well-developed pellis is probably peeling, at least towards the margin as can be deduced from microscopical structure,
- the exceptional presence of lamellulae and presence instead of frequently forked gills,
- the colour, structure and texture of the pileipellis as well as the apparently lilaceous tints near the cap margin in fresh specimens are all quite untypical for *Lactarioideae*.

Singer (in Singer et al., 1983) recognized this and transferred it to sect. *Heterophyllae* Fr. subsect. *Cyanoxanthinae* Singer, recombining it as a mere variety (var. *coccolobicola* Singer) of another species, also described by Pegler in the same paper : *Russula cremeolilacina*. As Buyck (1989, 1992) pointed out, however, subsect. *Cyanoxanthinae* groups species with a very strong and characteristic meta-chromatic reaction in cresyl blue and seems therefore not a good choice. Buyck (1992) thus transferred *R. cremeolilacina* provisionally to the closely related subsection *Ilicinae* (Romagnesi) Buyck in *Heterophyllae*.

Having now reexamined the type of *R. cremeolilacina* var. *coccolobicola* (= *R. littoralis* Pegler nom. illeg.), as well as several collections of *R. ilicis* Romagnesi, Chevassut & Privat , I maintain my proposal of *Ilicinae* as best systematic place for this taxon as it is supported by several microscopical arguments. The very slender hyphal tips in the suprapellis of the type of *R. littoralis* Pegler fit particularly well in *Ilicinae* and fit even more *R. ilicis* itself! Both species are basically very similar under the microscope (identical spores for instance), but *R. ilicis* has less septate, less ramified hyphal tips as well as longer and larger hymenial cystidia (see fig. 12-16).

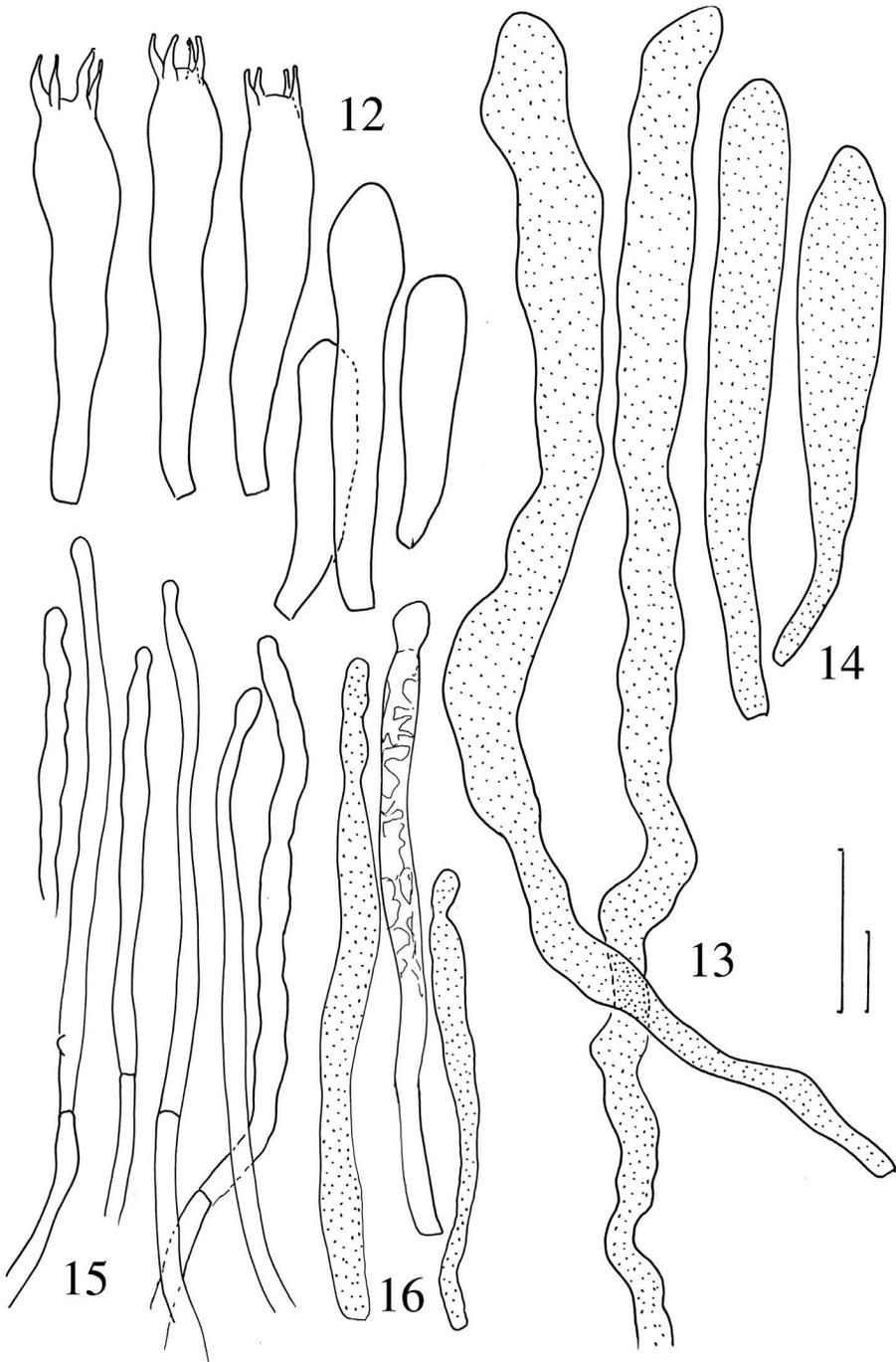


Fig. 12-16. *Russula ilicis* (holotype). 12 – Basidia and basidiola; 13 – Hymenial pleurocystidia; 14 – Hymenial cheilocystidia; 15 – Extremities of the pileipellis; 16 – Pileocystidia with contents indicated schematically in 2 of 3 elements. Scale bar = 10 μ m.

In *Ilicinae*, as in *R. pallidospora* and other *Russula* of subsection *Lactarioideae* with darker spore print (in Europe often referred to as subsection *Pallidosporinae* Bon), the spore ornamentation is a network of blunt convex warts and ridges that may occasionally form larger, almost spherical 'droplets' (see fig. 8-11). This spore ornamentation is different from the *R. delica*-group in the strict sens (*R. delica*, *R. chloroides*, *R. brevipes*, etc..) where truncated warts, cones or sharp spines of varying height are formed after the basic reticulate design for spore ornamentation has been laid down. In *Ilicinae* and the *R. pallidospora*-group, the development of hemispherical to spherical droplets seems more some kind of artifact being, however quite frequently encountered in all individuals. The same type of spore ornamentation is also typical of several North-American species such as *R. vesicatoria* Burlingham, *R. angustispora* Bills or *R. austrodelica* Singer. These species all probably belong in the *R. pallidospora*-group with which they share the typical dark cream to light ochre spore prints (using Romagnesi's 1967 scale). The same type of spores, producing this time a white spore print, as well as a basically similar, perhaps more gelatinized, partly peeling pellis are features of *R. fuegiana*, a species of South American *Nothofagus* forests. *R. fuegiana* is placed in the *R. delica*-group by most authors, although it differs from these species both in its macroscopical aspect (see <http://www.nybg.org/bsci/res/hall/fuegiana.html>) and some minor quantitative microscopical features, such as much more dermatocystidia and a much thicker pileipellis. It might be closer to *Ilicinae* than it is to *R. delica*.

In the herbarium, the exsiccata of *R. cremeolilacina* var. *coccolobicola* and *R. ilicis* are so similar that it is impossible to separate them without microscopic examination. Although both are very variable in color in the field, with cap colors ranging from almost entirely white to different blends of lilac, violaceous, greenish and grayish tints as in *R. cyanoxantha*, the exsiccata of both species have an almost even brownish yellow to orange yellow cap.

If it was not for the wide geographical separation and host difference, *R. cremeolilacina* var. *coccolobicola* would have deserved infraspecific rank within *R. ilicis*. The latter is found on the other side of the Atlantic ocean in very similar xerophilous, mostly rocky, habitats of the Mediterranean area, but is associated with *Quercus ilex*, predominantly on calcareous substrate.

Remains the question of whether there is enough ground to distinguish different varieties in *R. cremeolilacina* as proposed by Singer. In my opinion there certainly is at the moment, they may even be different species. Various monographs on European *Russula* show that there exists an incredible variation in cap color in species belonging to one of the various subsections of *Heterophyllae*. There is no reason to assume this should be different in other parts of the world. The slight color differences between both varieties seem, therefore, hardly reliable. Microscopical examination of the holotype of *R. cremeolilacina*, however, shows essentially the same characters but *R. cremeolilacina* has much shorter basidia and more inflated extremities in the pileipellis (see Buyck, 1992). Experience with closely related European species suggests that these characters are of much more value to argument on the exact rank of the var. *coccolobicola*, but more field collections are needed to assess correctly the variability of these characters in *R. cremeolilacina*.

Acknowledgements. The author expresses his gratitude to the Curators of K for loan of type material and to G. Mascarell for help in taking spore pictures with the scanning electron microscope.

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