

**RAMARIA RUBELLA (SCHAEFF.) R.H. PETERSEN  
– THE FIRST RECORD IN CENTRAL AND EASTERN EUROPE**

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ABSTRACT

*Ramaria rubella* (Schaeff.) R.H. Petersen is a very rare species in Europe. Until now it was known only from a few countries. A new site in Poland is the first record from Central and Eastern Europe. *Ramaria rubella* (subgen. *Lentoramaria*) belongs to xylobiontic species connected with coniferous woods. The paper includes detailed description of carpophores and microscopic features, distribution and synonyms.

**KEY WORDS:** *Ramaria rubella* (Schaeff.) R.H. Petersen, Góry Świętokrzyskie Mts., xylobiontic fungi.

INTRODUCTION

Synonyms: *Clavaria rubella* Schaeff. per Krombholz, Consp. Fung. Escul. p. 33. 1821. – *Clavaria acris* Peck, Rep. N.Y. St. Mus. Nat. Hist. 54: 155. 1901. – *Clavaria rubella* Schaeff., Fung. Bavar. Palat. 4: 119. 1774. – *Ramaria acris* (Peck) Corner, Brit. Mycol. Soc. Trans. 44: 235. 1961. – *Ramaria apicoalba* R.H. Petersen, nom. herb., ined. 1975. – *Ramaria testaceoincarnata* Marr., Thesis, Univ. Washington, ined. 1968.

Taxonomy: *Ramaria rubella* (Schaeff.) R.H. Petersen, Am. J. Bot. 61: 739-748. 1974. – Ramariaceae, Aphyllophorales, Basidiomycetes (Domański 1984), Ramariaceae, Gomphales, Hymenomycetidae, Hymenomycetes, Basidiomycota (Hansen and Knudsen 1997), Ramariaceae, Phallales, Agaricomycetidae, Hymenomycetes, Basidiomycota, Fungi (Kirk et al. 2001), Gomphaceae, Gomphales, Phallomycetidae, Agaricomycetes, Basidiomycota, Fungi (Index Fungorum 2007).

*Iconography and maps of distribution*

*Boletus informaticus* 2007 (map); Burt 1922: 23-24, pl. 5, Fig. 30; Chelyabinskaya Krasnaya Kniga 2007 (map); Corner 1970: 257; Corner, Thind 1961: 235; Domański 1984: Table 212; Krieglsteiner 1991: 299, Fig. 871 (map); Marr, Stuntz 1973: 137, Fig. 53, 104; Petersen J. H. 1999: 9; Petersen R. H. 1975: Fig. 9, Pls 6-7; Petersen R. H., Olexia 1967: 768; Schild 1971: 3-6, Table. 33.

*Morphology*

The genus *Ramaria* (Fr.) Bonord. was divided into 4 subgenera: *Ramaria*, *Laeticolora* Marr and Struntz, *Echinoramaria* Corner and *Lentoramaria* Corner, due to differences in the spores morphology and the structure of vegetative fruit bodies hyphae.

*Ramaria rubella* belongs to the subgenus *Lentoramaria*. Its fruit bodies are repeatedly polydichotomically branched, numerous and dense. Branches towards base are covered by whitish mycelial felt, which are gradually being transformed into whitish rhizomorphic strands. Stipe is indistinct, and poorly developed. The colour of the fresh fruit bodies is vinous-cinamon, greyish ochre-purple. When the fruit bodies are dry the colour becomes lighter, ochre-purple, with a distinct dark purple tint. Damaged parts of the hymenium layer are dark purple. Flesh in fresh fruit bodies has watery vinous-purple colour, in the dry fruit bodies pale purple-vinous. Taste delicately bitter, acrid; odour indistinct, little specific. Branches in their upper part are usually sharply pointed; cones about 0.5 mm long, white in colour. Hymenium amphigenous, dark red-purple when treated with 10% KOH. Whitish rhizomorphic strands become of raspberry, violet-salmon colour when treated with 10% KOH, which is a characteristic feature of this species. Spores are ellipsoidal, measuring 6.5-9.5×4-5.4 µm, with a distinct apiculus, covered by small warts (Fig. 1). Hyphae monomitic, hyaline, are differentiated in the rhizomorphic strands into two kinds, thin-walled and pseudoskeletal 3-5 µm in diameter, with numerous clamps (the clamps are not always clearly visible!), which are towards septe ampoule-like swollen up to about 35 µm in diameter. In the branches flesh the hyphae are from thick-walled to almost full, with the swollen clamps about 2-7 µm in diameter. Basidia are 4-spores, club shaped measuring 35-60×6-8 µm. Described specimens belong to the typical variety *Ramaria rubella* var. *rubella*. The specimens are deposited in the Herbarium (KTC 3476, KTC 3477 and KTC 3478) of Department of Botany, Institute Biology of Świętokrzyska Academy in the Kielce.

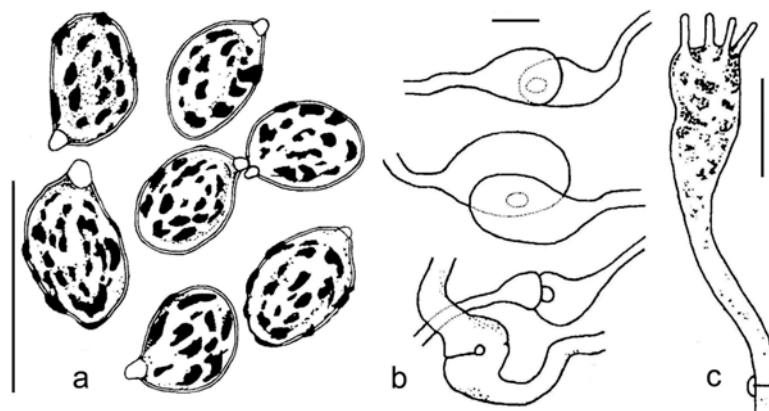


Fig. 1. *Ramaria rubella*: a – spores; b – clamps connection in rhizomorphs; c – basidium; bars = 10 µm.

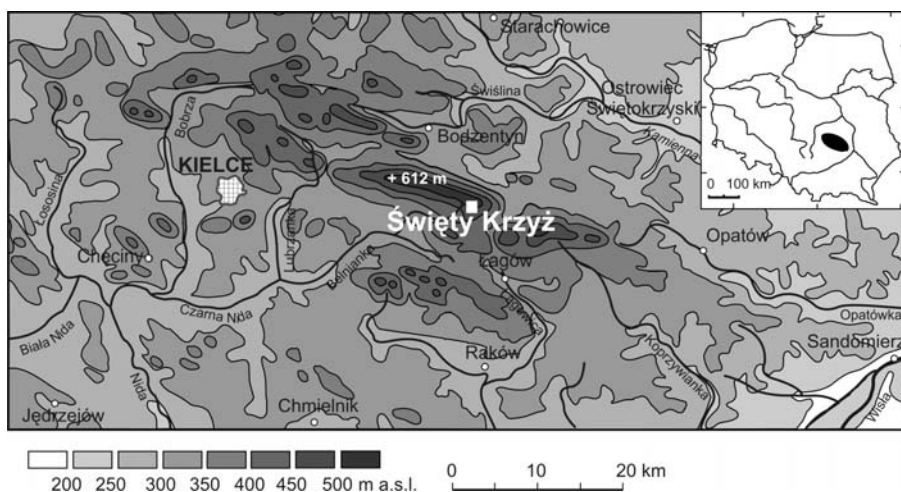


Fig. 2. Locality of *Ramaria rubella* in Poland.

Site location

The described site is situated in the Central Poland, Góry Świętokrzyskie (Holy Cross Mountains), on the N-slopes of Święty Krzyż (Holy Cross, 595 m above sea level), forest district 115, in the *Abietetum polonicum* community (Fig. 2). The fruit bodies grow in groups on rotting wood of *Abies alba* logs.

Distribution

*Ramaria rubella* is a species occurring in the Northern hemisphere. It occurs much more often in North America (Canada, USA) than in Asia (Bhutan, Japan, Russia – Western Siberia, Chelabinskaya oblast’) and Europe (Corner 1970; Petersen 1975; Shiryaev 2004). In the European continent it is a rare species, confirmed until now in alpine are-

TABLE 1. Comparison of selected features of the similar species from the *Ramaria* genus.

	<i>R. rubella</i>	<i>R. polonica</i>	<i>R. apiculata</i>	<i>R. stricta</i>	<i>R. gracilis</i>
Spores	6-9.5x4-5.5 µm E=1.31-2.24	5.9-8.5x4.1-5.2 µm E=1.31-1.73	6.5-10x3.5-5 µm E=1.69-2.80	7-10x4-5 µm E=1.69-2.33	5-7x3.5-4.5 µm E=1.27-1.9
System of hyphae	monomitic	monomitic	monomitic	dimitic	dimitic
Colour of stalks	white	white	whitish to light of green, malachite-green	yellow, yellow-ochre	whitish to cream or yellow-ochre
Colour of flesh in cross-section	reddish	reddish	whitish, none reddish	brown-vinous-red	yellowish
Colour of flesh in 10% KOH	dark red-purple	dark red-purple	brownish	copper, orange, brownish	unchanged
Taste	acidic to strongly acidic	undetermined	mildly acidic to bitter	mildly spicy to bitter	mildly bitterish, musty-fungal
Odor	absent or remaining to anise	fungoid	none	anise	slowly anise, when dry faintly of fenugreek

as of Austria, Germany, Slovenia, Switzerland and in Scandinavia in Sweden (Hansen and Knudsen 1997; Jülich 1984; Krieglsteiner 1991; Boletus informaticus 2007).

### DISCUSSION

*Ramaria rubella* displays an interspecies differentiation. Petersen (1975) distinguishes two forms, typical form *Ramaria rubella* f. *rubella*, occurring in the above-mentioned places, and *Ramaria rubella* f. *blanda* Petersen which occurs only on the shores of the Pacific and Atlantic Oceans and in the Appalachian Mountains. The second form is regarded as an endemic form of North America. Thind and Sharda (1985) described a new variety of this species from Bhutan in Himalayan Mountains, *Ramaria rubella* var. *himalaica*.

From the morphological point of view *Ramaria rubella* is similar to the other xylobiontic species such as: *R. apiculata*, *R. gracilis*, *R. polonica* i *R. stricta*. Differences between the listed species are presented in Table 1. Particular attention deserves the similarity of *Ramaria rubella* and *R. polonica*. Fruit bodies of these species are like twins, and differences regard the structure of hymenium and the size of spores. In hymenium of *R. polonica* (described by Peterson 1975), from the specimens found in the Święta Katarzyna in the Góry Świętokrzyskie (Holy Cross Mountains), there are large cystoidal cells measuring 65-80×7-8.5 µm, which are absent in *Ramaria rubella*. The size of basidia measuring over 85×7-8.2 µm is similar to that of cystoidal cells. Whereas the spores of *Ramaria rubella* are slightly longer than those of *Ramaria polonica* (Table 1). The occurrence of such similar species in the same area requires a special care when the identification is carried out in the field without the use of microscope. From the remaining above mentioned species *Ramaria rubella* differs in a very quick reaction to 10% KOH resulting in pink colour of rhizomorphs.

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