Observations on the occurrence of *Rhizopogon pannosum* in Austria

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Abstract: *Rhizopogon pannosum*, according to MARTÍN only known from three localities in America and three from Europe, was recorded on three sites near the Zireiner Lake, Tyrol, Austria, at upper timber line in association with *Pinus mugo*. A detailed description and some cultural characters are given.

Zusammenfassung: Nach MARTÍN ist *Rhizopogon pannosum* bisher nur von jeweils drei Funden aus Amerika und Europa bekannt. Drei weitere Funde wurden im Gebiet des Zireiner Sees, Tirol, Österreich, an der oberen Waldgrenze bei *Pinus mugo* gemacht. Eine Beschreibung mit einigen Angaben über Kulturmerkmale wird gegeben.

During preparations for the 26th Dreiländer-Tagung in Rotholz, Tyrol, we visited on 15th July 1998 one of the planned alpine excursion areas around Zireiner Lake, Rofan Mountains. For this altitude at timber line this was rather early in the season. And we were surprised to find already quite a number of fungi, which in normal years do not fruit before mid August. Among others in two sites west of Zireiner Lake we found a semihypogeous fungus which resembled a *Rhizopogon*, but differed from other species known to us by the lack of rhizomorphs over the surface and a more velvety appearance and salmon-orange colours. Studying it in detail it keyed easily out to *Rhizopogon pannosum* ZELLER & DODGE (1918), both in the keys of SMITH & ZELLER (1966) and MARTÍN (1996). From the description of MARTÍN (1996) we realized, that this species was recorded before only from six localities, two of them in Austria. These two Austrian records were made by W. KLOFAC near Wiener Neustadt in a completely different habitat. In the Zireiner Lake area the fungus was recorded a third time during the Dreiländer-Tagung, but this time east of the lake. So it seems worth while to give some notes on this fungus and its ecology.

Description of the *Rhizopogon pannosum* records from Zireiner Lake

Macroscopic characters: (Colour fig. III)
Basidiomata globose to slightly pear-shaped or somewhat applanate where growing between stones, 2-2.8 cm, with rhizomorphs at the base only, surface finely granulose-verrucose, similar to *Elaphomyces* but verrucae smaller, from above also reminding of *Cystoderma*, with salmon orange colour, R (RIDGWAY 1912) Apricot Buff, Ochraceous Orange, Pinkish Cinnamon, Orange Cinnamon, Cinnamon, Mu (MUNSELL 1975) 7.5YR7/8 to 5YR7/8 to 6/8, peridium simplex, relatively thin, about 0.5 mm. Gleba lacunose, the lacunes very small, at first R Olive Buff, later Deep Olive Buff, at maturity Dark Olive Buff. Without distinctive odour. Spore print olivaceous.

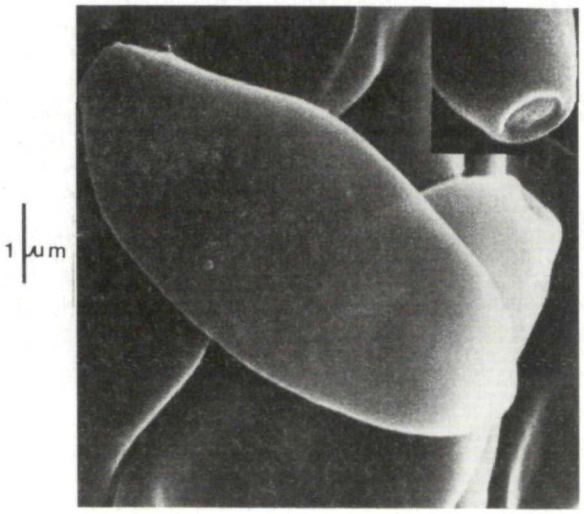
Microscopic characters: Basidiospores 6.5-9.7 x 2.35-3.5 µm, mean 8.2 (S/D = 0.7) x 2.9 (S/D = 0.24) µm, Q = 2.3-3.25, mean 2.77 (S/D = 0.21), V = 22.2-61.4 µm³, mean 38.2 µm³ (S/D = 9.9), cylindrical with base truncate, apex roundish, smooth, pale olivaceous (Figs. 1 and 2) (n = 33). Basidia (3-)4-, occasionally 6-spored, slender, 31-35 x 5-6 µm. Cystidia not frequent, bottle-shaped subulate, tapering towards apex, 40-61 x 6-7 µm (Fig. 3). Pustulae on peridium of erect, ascending hyphae.

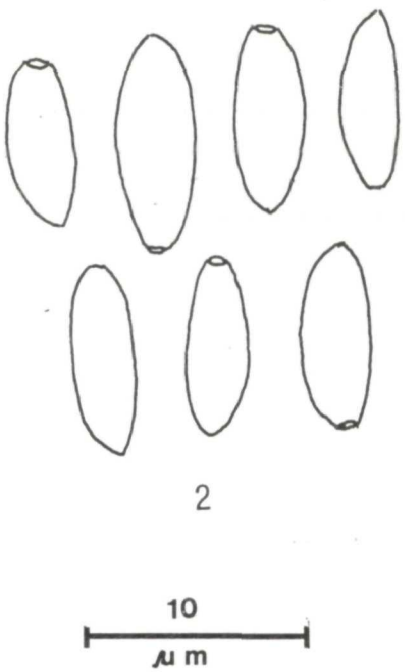
Chemical reactions: KOH 30% on fresh peridium blackish, $FeSO_4$ negative. Both reagents negative on gleba.

Culture characters: Attempts to make a pure culture from tissue succeeded, but growth is very slow on medium Moser b (half concentrated, MOSER 1958) and malt extract medium (2% malt extract, 2% agar) one cm per month at 20 °C. Aerial mycelium of a beige colour, forming densely interwoven accumulations of hyphae or primordia-like knobs above the substrate with brown pigmentation. Culture consisting exclusively of thin-walled, generative hyphae without clamp connections, (1-)1.5-2.5(-3.6) µm wide (n = 42). Hyphae inamyloid, not dextrinoid, cyanophilic, not metachromatic. Without sulpho-positive reaction, but hyphal walls dissolving in sulfovanilline, in H_2SO_4 60% and HCl forming needle-shaped crystals. In the pigmented parts of the culture hyphae encrusted with granules or platelets and some interhyphal accumulations.

Habitat: coll. 1998/0014 in herbarium IB, 15th July 1998, west of Zireiner Lake, Rofan Mountains, 1830-1840 m s. m., at the margin of a *Pinus mugo* TURRA stand, on dolomitic soil, pH values varying from 4.2-5.3, (soil diluted in 0.01 M CaCl solution 1:2.5 according to ÖNorm). The first site was bare soil with stones, the second was partly overgrown with herbaceous plants. On this second site we left the basidiomata, as they were smaller and appeared to be not fully mature. Two weeks later we visited the place again, but the fruitbodies were seemingly eaten by some animals. At this time we checked the whole area more carefully but could not make any further records. On 31st August, during the foray of the Dreiländer-Tagung the fungus was recorded again but on a site east of the Zireiner Lake, again with *P. mugo*.

The two collections of W. KLOFAC were made at two sites at Mollram near Neunkirchen, Lower Austria, on 22nd May 1987 and are now united in the Herbarium WU under nr. 6023. They come from a quite different habitat. The collecting site was in a coniferous forest under *Pinus nigra* ARN. in a road track, of about 380-390 m s. m.





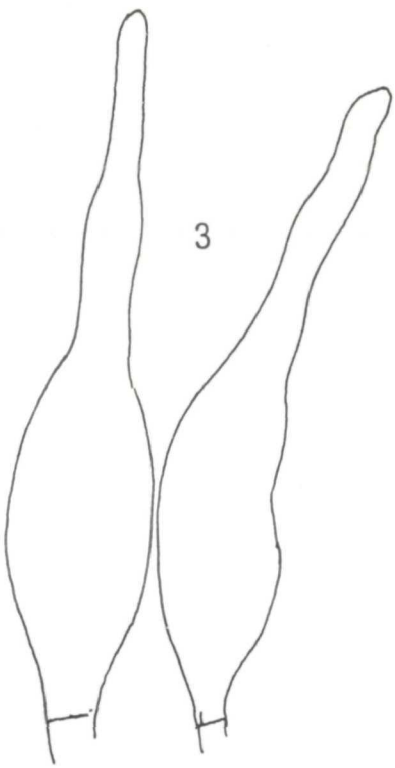


Fig. 1. Basidiospores of *Rhizopogon pannosum* (coll. 1998/0014), x 12000. Figs. 2 and 3. Basidiospores and cystidia of *R. pannosum* (1998/0014). Bar = 2 cm.

The basidiomata had a size up to 4 cm, their colour was salmon-pink to greyish orange, with age darker red brown and blackening in spots, the gleba at first pale olivaceous to olive-brown with age, underneath the peridium whitish to pink, the rhizomorphs white. The peridium gave a dark wine red reaction with KOH (30%), dark brown with NH_4OH, negative with $FeSO_4$, H_2SO_4, formol, guaiac, the gleba turned brown with KOH, olive yellow with phenole and $FeSO_4$. The colour photograph shows basidiomata, which agree well with the collections from Zireiner Lake. These two collections were examined and determined by MARTÍN.

No ecological data exist for the collections from Spain and America.

The species seems to be associated with pines, to judge from our Austrian records with two-needle pines (*P. nigra*, *P. mugo*), but may have a rather broad ecological amplitude. Characteristic seems the relatively early fruiting, May in Lower Austria, July (to early September) at subalpine timber line, July in Spain, June and August in America.

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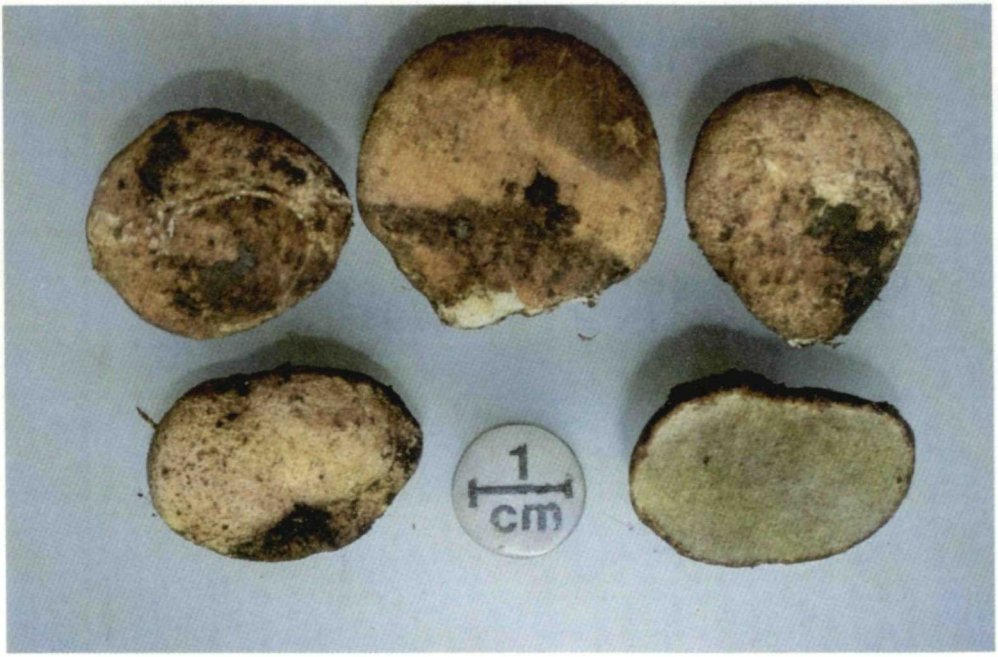

Colour fig. III. *Rhizopogon pannosum*. - Phot. U. PEINTNER.

Colour fig. IV. *Lepiota* aff. *pilodes*, IB 96-774. - Phot. U. PEINTNER.