

*Russula olivaceopineterum*



Russula olivaceopinetorum G. Moreno, G. Sánchez-Dueñas & P. Alvarado, *sp. nov.*

Etymology: Epithet derived from *olivaceo*—because of *Russula olivacea* (which is morphologically very similar)—, and *-pinetorum*, which refers to its habitat near *Pinus sylvestris*.

Classification: *Russulaceae*, *Russulales*, *Agaricomycetes*.

Basidiocarps annual, with a central stipe. *Pileus* 8.2–19.5 cm diam., convex, plano-convex, sometimes subapplanate, non-striate in mature basidiomata, with variable coloration: greenish hues interspersed with violet or purplish areas and yellowish-cream zones. *Lamellae* crowded, with lamellulae, adnate, ventricose, up to 0.5–1 cm broad, yellowish when mature, with concolourous edges or slightly violaceous near the pileus margin. *Stipe* 5.5–11 × 2.5–7.5 cm, robust, solid, variable in shape from cylindrical to clavate, white with more or less abundant pinkish tinges. *Odour* not distinctive. *Spore print* medium yellow (IVb to IVc on the Romagnesi scale). *Context* whitish, with a mild and sweet taste, not acrid; reacts fuchsia with phenol, orange with iron(II) sulfate, and gives an intense reaction with guaiac. *Basidia* 4-spored, 65–80 × 12–13 µm, sterigmata up to 8 µm long. *Spores* 9.9–13.1 × 8.1–11.2 µm, av. = 9.7–11.5 µm, Q av. = 1.2 (n = 30, holotype), yellowish, broadly ellipsoid, thick-walled, amyloid, ornamented with warts forming crests to subreticulate patterns, suprahilar plage rounded and well-defined, amyloid. *Cheilocystidia* and *pleurocystidia* abundant, fusiform with a long appendage, 80–110 × 11–16 µm. *Pileipellis* a trichoderm, lacking dermatocystidia and encrusted hyphae, composed of hairs formed by cylindrical hyphae, some diverticulate, 5–9 µm wide, thin-walled, septate, branched, with obtuse apices. *Clamp connections* absent.

Habitat and distribution: Growing gregariously on acidic sandy soil among *Pinus sylvestris* needles. Rare in the studied area.

Typus: **Spain**, Madrid, Las Dehesas de Cercedilla, Cercedilla, on acidic sandy soil among *Pinus sylvestris* needles, 21 Nov. 1996, G. Moreno & J. Checa (**holotype** AH 58330; ITS and LSU sequences GenBank PV581923 and PV581938).

Additional materials examined: *Russula olivaceopinetorum*: **Spain**, Huesca, Selva de Oza, Hecho, under *Pinus sylvestris* and *Fagus sylvatica*, 13 Oct. 2023, G. Sánchez Dueñas (**paratype** AH 49421; ITS and LSU sequences GenBank PV581918 and PV581933); La Rioja, Canales de la Sierra, in humus of *Fagus sylvatica* and *Pinus sylvestris*, 13 Nov. 2024, Á. Morales (**paratype** AH 58360; ITS, LSU *RPB2* sequences GenBank PV581925, PV581940 and PV582987);

Colour illustrations: Spain, Madrid, Las Dehesas de Cercedilla, acidic soil where the holotype was collected. Basidiomata (holotype); basidiomata flesh reaction to phenol (AH 49425); pileipellis (AH 49428 and holotype); cheilocystidia at the edge of the gills (holotype); spores (holotype). Scale bars: basidiomata = 10 cm; all others = 10 µm.

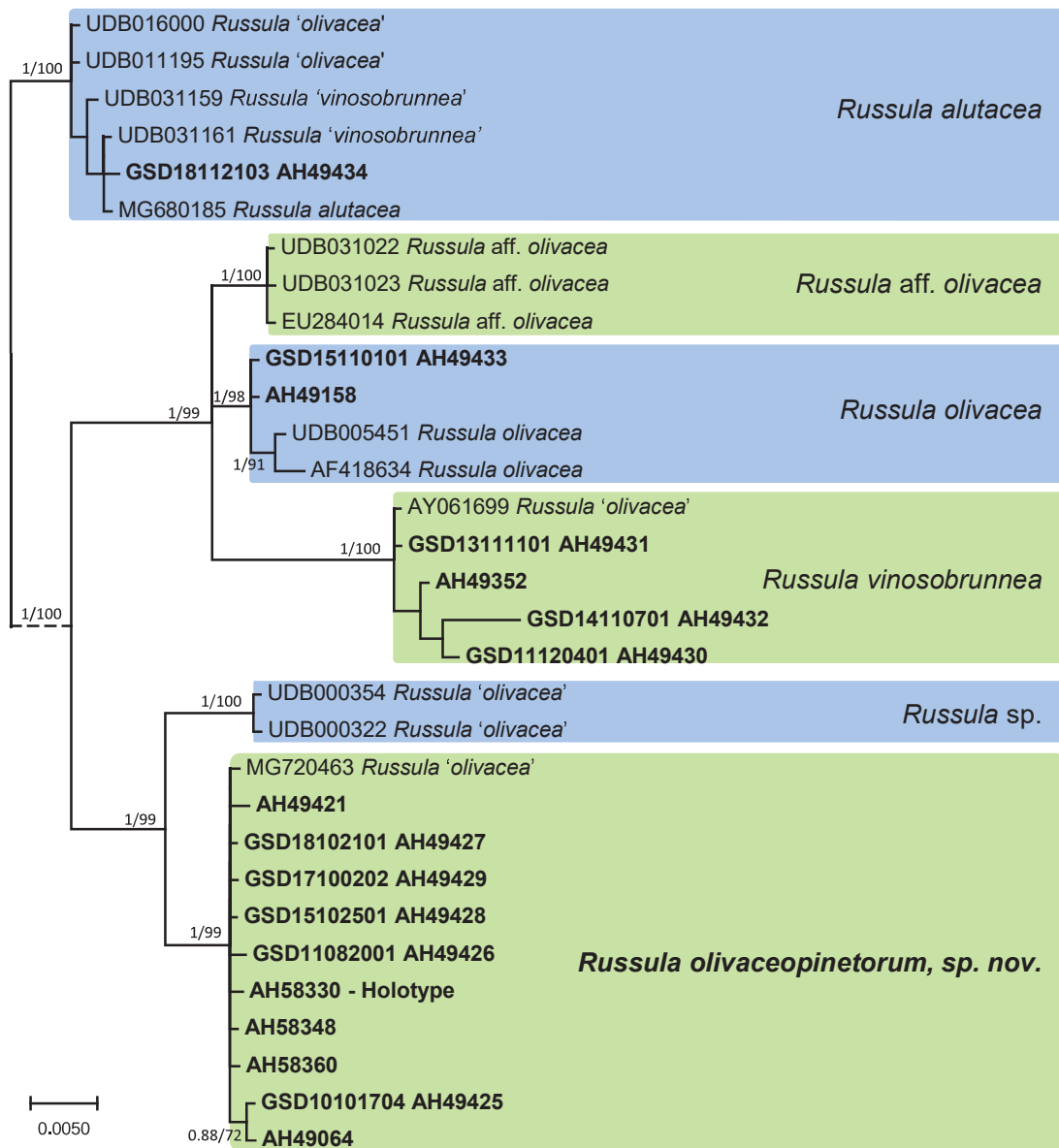
Madrid, Rascafría, Arroyo Angostura, under *Pinus sylvestris*, 20 Aug. 2011, L.M. Nieto & Dueñas (**paratype** GSD11082001 at AH 49426; ITS and LSU sequences GenBank PV581922 and PV581937); Madrid, Umbria de Siete Picos, Parque Nacional de Guadarrama, under *Pinus sylvestris*, 2 Nov. 2017, M. Lozano (**paratype** AH 49064; ITS and LSU sequences GenBank PV581927 and PV581941); Segovia, Navafria, El Chorro, under *Pinus sylvestris*, 2 Oct. 2017, L.M. Nieto (**paratype** GSD17100202 at AH 49429; ITS and LSU sequences GenBank PV581920 and PV581935); Segovia, Valsain, Las 7 Revueltas, acidic sandy soil among *Pinus sylvestris* needles, 15 Oct. 2010, F. Prieto (**paratype** GSD10101501 at AH 49424); *ibid.*, 15 Oct. 2010, J.C. Campos (**paratype** GSD15102501 at AH 49428; ITS and LSU sequences GenBank PV581921 and PV581936); *ibid.*, 17 Oct. 2010, G. Sánchez Dueñas (**paratype** GSD10101704 at AH 49425; ITS sequence GenBank PV581926); Teruel, Bronchales campsite, under *Pinus sylvestris*, 21 Oct. 2018, A. Bernal (**paratype** GSD18102101 at AH 49427; ITS and LSU sequences GenBank PV581919 and PV581934). *Russula vinosobrunnea*: **Spain**, Madrid, ascent to Puerto de Canencia, Bustarviejo, in humus of *Quercus pyrenaica*, 11 Nov. 2013, G. Sánchez Dueñas (GSD13111101 at AH 49431; ITS and LSU GenBank sequences PV581915 and PV581930); *ibid.*, 7 Nov. 2014, G. Sánchez Dueñas (GSD14110701 at AH 49432; ITS and LSU GenBank sequences PV581916 and PV581931); Madrid, Prádena del Rincón, in humus of *Quercus ilex*, 10 Oct. 2024, G. Sánchez Dueñas & J. Castillo (GSD24101002 at AH49352; ITS GenBank sequence PV581914); Málaga, Cortes de la Frontera, leaf litter of *Quercus canariensis* and *Quercus suber*, 4 Dec. 2011, G. Sánchez Dueñas (GSD11120401 at AH 49430; ITS and LSU GenBank sequences PV581917 and PV581932). *Russula alutacea*: **Spain**, Madrid, Valgallegos, Torrelaguna, in humus of *Quercus faginea*, 21 Nov. 2018, G. Sánchez Dueñas (GSD18112103 at AH 49434; ITS and LSU sequences GenBank PV581911 and PV581928). *Russula olivacea*: **Spain**, Asturias, Hayedo de Valgrande, in humus of *Fagus sylvatica*, unknown date, C. Traba (CUT O40915142 at AH 49158; ITS and LSU GenBank sequences PV581913 and PV581929); Cantabria, Reinosa, in humus of *Fagus sylvatica*, 1 Nov. 2015, C. Traba (GSD15110101 at AH 49433; ITS sequence GenBank PV581912).

Notes: *Russula olivaceopinetorum* is characterized by its large pileus with variable colouration, yellowish lamellae, whitish stipe with pink tinges, sweet and non-spicy taste, spores with crested to subreticulate ornamentation, and its association with *Pinus sylvestris* forests. It belongs to sect./subsect. *Olivaceinae* (located inside the ‘crown’ clades of *Russula* s. str., Kong *et al.* 2015), whose species — particularly *Russula olivacea* — have often been confused with morphologically similar taxa (Kong *et al.* 2015). This species differs from *R. olivaceopinetorum* because it is associated with *Fagus sylvaticus*, and spores are ornamented with spines. In the present work, several specimens of *R. vinosobrunnea* and



R. alutacea were also analysed. These species have also been confused with *R. olivacea* in the past, but differ from it because of their habitat, associated with broadleaved forests, and a different molecular profile.

Supplementary material: doi: 10.6084/m9.figshare.30354538 (table, alignment and tree figure).



A 50 % majority rule ITS rDNA-28S rDNA consensus phylogram of *Russula olivaceopinetorum* and related species (with *R. alutacea* as outgroup) obtained using MrBayes v. 3.2.6 (Ronquist *et al.* 2012) from 900 sampled trees. Nodes were annotated if they were supported by ≥ 0.95 Bayesian posterior probability (left) or ≥ 70 % maximum likelihood bootstrap proportions (right). Sequences newly generated in this study are in **bold**.