
Clavulina iris

Fungal Planet 1007 – 18 December 2019

Clavulina iris Loizides, Bellanger & P.-A. Moreau, *sp. nov.*

Etymology. In honour of the mythical Greek goddess *Iris* (Ἶρις), associated with the rainbow.

Classification — *Clavulinaceae*, *Cantharellales*, *Agaricomycetes*, *Agaricomycotina*.

Basidiomata coralloid, 2–7 cm high × 1–5 cm wide, comprised of a sterile base and multiple fertile branches. Base 1–2.5 cm high × 1–1.5 cm wide, white-pruinose. Branches amphigenous, up to 1 cm thick, polychotomous-bifurcate (V-shaped), sometimes partially or extensively fused, smooth to strongly rugose with age; surface pruinose, ranging in colour from cream-white to ochraceous-yellow, pink, mouse grey or dull lilac; apices blunt to acute, mostly unbranched but frequently with multiple cristate ends, pale and often with a green hue when young, progressively browning and finally blackening with age. Trama pliant-cartilaginous, concolorous or paler than the branches. *Odour* unpleasant, somewhat of chlorine. Spore deposit cream-white. *Basidiospores* (8–)9.2–10.4(–11.3) × 6.5–8.5(–9.5) µm (Me = 9.2–7.3; Q = 1.07–1.45; Qm = 1.26), subspherical to ovoid or lacrymoid, sometimes broadly ellipsoid to cylindrical, smooth, thick-walled (0.5–1 µm), eguttulate, inamyloid, subhyaline to translucent ochraceous-grey in KOH, with a short hilar appendage. *Basidia* mostly bisporic, less frequently (~10 %) monosporic and rarely also trisporic, 45–80 × 6–9(–11) µm, slenderly clavate to subcylindrical, flexuous, thick-walled, with coarse vacuolar content, mostly filled with yellowish necropigment after spore discharge; postpartal septa infrequent on the upper third; sterigmata incurved, acute to somewhat rounded at the apices, 4–6 mm long; clusters of cylindrical to somewhat deformed basidioles frequent at bases of basidia. *Cystidia* absent, but long, 7–9 µm wide hyphal ends (pseudocystidia) often protruding 15–40 µm above the hymenium, thickened and incrusted at the apex by mucus. Hyphal system monomitic, comprised of smooth, 5–9(–11) µm wide, cylindrical to somewhat inflated and thick-walled hyphae frequently branching. *Clamp connections* common.

Habit, Habitat & Distribution — Terrestrial, fruiting solitary or in small groups of loosely coalescing basidiomata between January and April, on calcareous substrates under *Quercus coccifera* subsp. *calliprinos*, *Pinus brutia* and *Cistus*.

Typus. Cyprus, Dora, on calcareous substrate under *Quercus coccifera* subsp. *calliprinos*, *Pinus brutia* and *Cistus* shrubs, 5 Mar. 2015, *M. Loizides* (holotype in Herbarium of the Faculty of Pharmacy of Lille: LIP 0401586; isotype in herb. pers. *M. Loizides* n° ML5135C1, ITS and LSU sequences GenBank MN028412 and MN028396, MycoBank MB832755).

Additional materials examined. Cyprus (var. *iris*), Souni, 2 Mar. 2015, *M. Loizides*, ML5132C/LIP 0001618 (paratype, GenBank MN028411); Dora, 5 Mar. 2015, *M. Loizides*, ML5135C2 (GenBank MN028413); Anogyra, 17 Feb. 2015, *M. Loizides*, ML51271-CC (GenBank MN028414); Kelefos, 3 Jan. 2019, *M. Loizides*, ML9113CLI (GenBank MN028415). – France (var. *occidentalis*), Bonifacio, îlot Fazzio, 21 Nov. 2005, *P.-A. Moreau*, PAM05112103 (as '*C. cristata* var. *curta*', GenBank MN028407); Mérindol, 27 Nov. 2011, *J.-M. Bellanger, D. Borgarino, G. Corriol, P.-A. Moreau & F. Richard*, PAM11122702 (GenBank MN028408); Pézilla-de-Conflent, Chenil Sauvage, under *Quercus ilex* on calcareous soil, 27 Nov. 2012, *F. Richard & P.-A. Moreau*, PAM12112740 (GenBank MN028409).

Colour illustrations. Collection area of ML9131C at Kelefos. From top to bottom: holotype coll. *in situ* LIP 0401586; basidiospores; hymenium with projecting pseudocystidia; basidium; coll. ML71322V5 *in situ*. Scale bars 10 mm (specimens *in situ*), 30 µm (hymenium), 10 µm (basidiospores and basidium).

Notes — *Clavulina iris* is a species of exceptional morphochromatic variability, often displaying a blend of ochraceous, cream, pink, green and lilac colours all in the same specimen, as well as a mixture of smooth and rugose branches with both blunt and cristate tips. It is common on the island of Cyprus, where it is found from late winter to early spring in a variety of calcareous habitats (300–700 m asl). Lilac tinges are present in very few European species of *Clavulina*, most notably *C. amethystina* (Donk 1933), a species originally described in genus *Clavaria* by Bulliard (1791). European collections identified as this taxon, however, display vibrant violet-lilac colours (Corner 1970), lacking the ochraceous, cream or green tinges seen in *C. iris*, and cluster in a different phylogenetic lineage (Olariaga et al. 2009; Supplementary Fig. FP1007-1). *Clavulina reae*, proposed by Olariaga & Salcedo (2012) for collections previously identified as '*C. cinerea* var. *gracilis*' (Rea 1918), is also characterised by lilac-grey tinges, but produces smaller, slender and sparsely branched fruit bodies nesting in a distant lineage (Olariaga et al. 2009; Supplementary Fig. FP1007-1). Among the many forms and variants of *C. cinerea* formerly described, '*Clavaria cinerea* f. *sublilascens*' (Bourdot & Galzin 1928), later invalidly renamed '*Clavulina crassa*' by Corner (1950), is morphologically close to *C. iris*. We refrain from adopting Bourdot & Galzin's epithet, because the very short original description could also apply to *C. reae*, among others, but also because the Arvernian authors did not prospect Mediterranean localities in their description, with their collections likely originating from temperate deciduous forests, where *C. iris* has yet to be documented.

Clavulina iris var. ***occidentalis*** Bellanger, P.-A. Moreau & Loizides, *var. nov.*

Differs from the type by more slender, smooth basidiomata and abundant pseudocystidia.

Typus. France, Pézilla-de-Conflent, Pathy-Danglade, 26 Nov. 2012, *P.-A. Moreau & F. Richard* (holotype in Herbarium of the Faculty of Pharmacy of Lille: LIP 0401619; isotype in herb. pers. *P.-A. Moreau* n° PAM12112617, ITS sequence GenBank MN028410, MycoBank MB832819).

Notes — The variability of *C. iris* is also geographical and, to some extent, phylogenetic. In the type collections from Cyprus specimens are usually stout, early rugose and with few pseudocystidia. Collections from France, on the other hand, all found under *Quercus ilex* in late autumn, are more slender, smooth and with abundant pseudocystidia (Supplementary Fig. FP1007-2). No significant differences in spore size could be found, but the geographical and subtle morphological patterns correlated to few but significant differences in ITS sequences (1 indel and 2 SNPs), which led us to propose West-European collections at the rank of variety.

Supplementary material

FP1007-1 ITS phylogeny of *Clavulina*. Alignment with Muscle 3.7, Maximum likelihood phylogenetic analysis with PhyML 3.0, tree building with TreeDyn 198.3, all performed online at phylogeny.fr (Dereeper et al. 2008). Lineage supports indicated on each branch are SH-aLRT values, significant when > 0.8.

FP1007-2 *Clavulina iris* var. *occidentalis*. Collection area at Pézilla-de-Conflent (France). From left to right: holotype coll. *in situ* LIP 0401619, and coll. PAM11112702. Scale bars = 10 mm.

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