Dwiroopa, a new genus of the Coelomycetes

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Abstract. Dwiroopa, anamorph gen. nov. and Dwiroopa ramya anamorph sp. nov. are proposed to accommodate a eustromatous fungus collected on dead twigs from forests of Western Ghats in Agumbe, Karnataka State. The fungus produces stromata within which two types, the α- and β-conidia are produced. Both are solitary, one-celled, gangliar and brown coloured but the α-conidia are clearly larger, darker and have very characteristic striations on the surface, absent in the β-conidia. In addition, small, one-celled, allantoid, phialoconidia may be produced in some of the conidiomata. The present fungus is compared with the closely allied Coelomycete genus Harknessia Cooke.

Keywords. Dwiroopa; Dwiroopa ramya; Coelomycetes; α- and β-conidia.

1. Introduction

This paper deals with an interesting fungus collected on dead twigs from the forests of Western Ghats in Agumbe, Karnataka State. The fungus forms black conidiomata on dry fallen twigs of an unidentified host plant. They are stromatous, immersed in the substrate, mostly solitary, rarely in groups, non-ostiolate, glabrous and 500–700 μm in diam. In vertical section the conidioma appears subspherical, and somewhat flattened and divided into 1–3 incomplete compartments from the ingress of peridial tissue in different directions (figures 1 and 13). The wall is pseudoparenchymatous, composed of about 5 layers of brown, spherical to angular cells, the cells progressively paler and finally hyaline towards the inner region. In the apical region of the conidioma, the wall is composed of about 8 layers of brown, vertically oriented cells forming a kind of ‘lid’ where the conidioma ruptures to release the conidia at maturity. Two types of conidia, here termed α- and β-conidia (figure 14) are produced. Both kinds are gangliar (Sensu Subramanian 1962; holoblastic sensu Sutton 1980), obovoid, one-celled, truncate at the base, rounded at the apex and are produced on separate conidiogenous cells in the same conidioma. The conidiogenous cells line the cavities of the conidiomata, intermixed with sterile paraphysis-like structures, and are simple, one-celled or rarely two-celled, ampulliform to subcylindrical, tapered markedly towards the apices, hyaline, smooth, 5–12 (μ = 10) × 3–6 (μ = 5-5) μm, each producing a solitary conidium at its tip (figures 3–8, 10 and 15–23). The paraphysis-like structures are filiform to shortly cylindrical, simple or branched, many-septate, blunt at the tip, smooth, hyaline, 150–200 × 5–6 μm (figure 9). The α-conidia are brown, thick-walled, guttulate, with 3–4 differentially pigmented, longitudinal striations and 25–30 (μ = 27) × 17–18 (μ = 17-5) μm (figures 2, 23 and 24). The β-conidia are brown, but paler than the α-conidia, thin-walled, smooth, eguttulate without any striations, 10–12 (μ = 11) × 3–4 (μ = 3-8) μm (figure 10).

In addition to the α- and β-conidia, small phialoconidia are also produced within some conidiomata. These phialoconidia are one-celled, elliptical, hyaline, smooth,
straight to slightly curved, 5–8 × 1.5–2.0 μm (figure 11). The phialides are subulate, swollen at the base, tapering towards the tip, simple to branched, rarely septate and 20–25 μm long and 3–4 μm wide at the base (figure 12).

2. Taxonomy

This is a unique Coelomyctes which produces two and sometimes three types of conidium within each conidioma on separate conidiogenous cells. What we have designated as the α- and β-conidia are solitary, ganglionic and brown in colour; the α-conidia are clearly larger, darker and more thick-walled than the β-conidia, and have very characteristic striations on the surface, absent in the β-conidia. In addition, sometimes one-celled phialoconidia are also produced.

Though the conidiogenous cells producing α- and β-conidia resemble each other in morphology, the initial of the α-conidium shows abundant granular cell contents, whereas the initial of β-conidium has uniform and homogeneous cell contents. Apart from this, pigmentation takes place in the β-conidia in a very early stage of their development, whereas in the case of α-conidia, the thickening of the wall and pigmentation of the conidium take place at a later stage viz only when the conidium attains its full size. The β-conidia are shed from the conidiogenous cells as soon as they are mature and do not remain attached to the conidiogenous cells once they attain maturity; but the α-conidia remain attached to the conidiogenous cells for a
comparatively long time, even after they attain full maturity. The stromatic conidioma itself has a pseudoparenchymatous wall. The conidioma is divided into incomplete compartments through the partial ingress of wall tissue into the cavity. In addition the conidioma which is not ostiulate has, nevertheless, in the apical region, a group of vertically elongated wall cells. Dehiscence occurs in this region.

The stromatic conidiomata of our fungus and the one-celled, solitary, gangliar conidia invite comparison with the genus *Harknessia* Cooke. In the type species of *Harknessia*, i.e., *H. eucalypti* Cooke, the conidia are thick-walled, one-celled and gangliar (holoblastic sensu Sutton 1980). Nag Raj and DiCosmo (1981) have also recorded enteroblastic proliferation of conidiogenous cells in the genus. In our fungus the conidia are gangliar and are produced from simple conidiogenous cells as in *Harknessia*. However, within the same conidioma two different kinds of one-celled, gangliar conidia are produced on separate conidiogenous cells, what we have called the $\alpha$- and $\beta$-conidia. The $\alpha$-conidia are larger, thick-walled, darker coloured than $\beta$-conidia. In addition, they have very characteristic striations on the wall. The $\beta$-conidia are smaller, thinner-walled, paler in colour and have no striations. It is necessary to distinguish between these two types of conidia produced within the same pycnidium and we have preferred to call them $\alpha$- and $\beta$-conidia, although they can have other designations also. Apart from these two types of conidia, in some conidiomata, small one-celled, allantoid, phialoconidia are also produced from phialides. The combination of these features makes this fungus unique. Therefore it is being described here as a new genus. The generic name *Dwiroopa* is from Sanskrit, *Dwi*=two, *roopa*=form, from the two types of gangliar conidia which are found in all pycnidia. The specific epithet *ramya* means beautiful.

2.1 *Dwiroopa* gen. nov. Subramanian and Muthumary

Conidioma immersed, solitary, brown to black, non-ostiulate, dehiscing irregularly, divided into incomplete locules by ingress of peridium; peridium pseudoparenchymatous, with several layers of vertically oriented cells at the apex. Conidiogenous cells simple, intermixed with paraphysis-like structures. Conidia gangliar, unicellular, solitary, truncate at the base, of two types: $\alpha$-conidia brown, thick-walled, with longitudinal striations. $\beta$-Conidia brown, thin-walled without any striations. $\alpha$- and $\beta$-conidia both occurring in the same conidioma but on different conidiogenous cells. One-celled, elliptical, hyaline phialoconidia occasionally also produced from phialides.

Conidioma immersa, solitaria, brunnea vel nigra, non-ostioluta, irregulariter dehiscentia, in loculis incompletis per ingressum peridii divisa; peridium pseudoparenchymatosum, cum pluribus stratis cellularum verticaliter ordinatarum ad apicem. Cellulae conidiogenosae simplices, intermixtae structuris paraphysi similibus. Conidia gangliosa, unicellulata, solitaria, truncata ad basim, duplici forma: $\alpha$-conidia brunnea, cum pariete crasso, et cum striis longitudinalibus; $\beta$-conidia brunnea, cum pariete tenui, sine striis, $\alpha$-et $\beta$-conidia occurrentia in pycnidio communi sed in cellulis conidiogenesis diversis. Interdum uni cellulatus, ellipticus hyalinus phialoconidia proferentes ab phialidae.

2.2 Species typica: *Dwiroopa ramya* sp. nov. Subramanian and Muthumary

Conidioma immersa, plerumque solitaria, raro in catervis, non ostioluta, glabra, 500–700 $\mu$m diam. In sectione verticali conidioma divisum in 1–3 loculis incompletis
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Per ingressum texturae peridialis. Peridium pseudoparenchymatosum, habens circiter 5 strate cellularum, brunnearum, globosarum vel angularium, quae cellulae gradatim sunt pallidiores et finaliter hyalinae prope region interiorem conidiogenosum; cellulae in regione apicali pycnidii brunneae, verticaliter ordinatae, in circiter 8 stratis disrupentes in liberatione conidigenae. Cellulae conidiogenosae ortae singulatime cellulis praetextentibus cavi pycnidialis, intermistae structuris parapressi similibus, simplices, uni cellulares, rare bi cellulatae, laeviae, 5–12 (x = 10) x 3–6 (x = 6) µm, singulae preferentes, conidium solitarium terminale in apicem. Conidia gangliosa, unicellularia, solitaria, truncate ad basim, duplici forma; α-Conidia brunnea, obovata, cum pariete crasso, retundata ad apicem, guttulata, cum 3–4 striis longitudinali pigmentationis discriminatis, 25–30 (x = 27) x 17–18 (x = 17) 5 µm. β-Conidia brunnea, sed pallidiora quam α-conidia, obovata, cum pariete tenui, rotundata ad apicem, eguttulata stris nullis, 10–12 (x = 11) x 3–4 (x = 3) 8 µm. Phialidae filiformes, tumescens ad basim angustatus ad apicem simplicibus vel ramosis, rare septatis, 20–25 µm longus. 2–5 µm latus ad basim. Phialoconidia unicellularia, ellipsoidea, hyaline, laevae, rectae ad leviter curvatae, 5–8 x 1.5–2.0 µm.


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