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## *HELISCUS SUBMERSUS* SP. NOV., AN AQUATIC HYPHOMYCETE FROM JAMAICA

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(With Plate 7 and 1 Text-figure)

*Heliscus submersus* sp. nov. is described from submerged decaying leaves and petioles. Its behaviour in culture is compared with that of *Nectria lugdunensis*.

### ***Heliscus submersus* sp. nov. (Pl. 7; Text-fig. 1)**

Fungus aquaticus submersus, mycelio repente primo hyalino demum brunneo, septato, ramoso. Conidiophora hyalina brevia, 20-150  $\mu$  longa, simplicia vel ad apices ramosa, quoque ramo 1-4 phialides gerentia. Conidia (phialosporae) acrogena, hyalina, recta vel curvula, continua vel 1-septata, 29-51  $\mu$  longa, 1.5-2.5  $\mu$  lata ad basem, apicem versus ad 3-4.5  $\mu$ , 2-3.5  $\mu$  lata ad septum, projecturis conicis duobus ad apicem 4-8.5  $\mu$  longa et 2.5-3.5  $\mu$  lata.

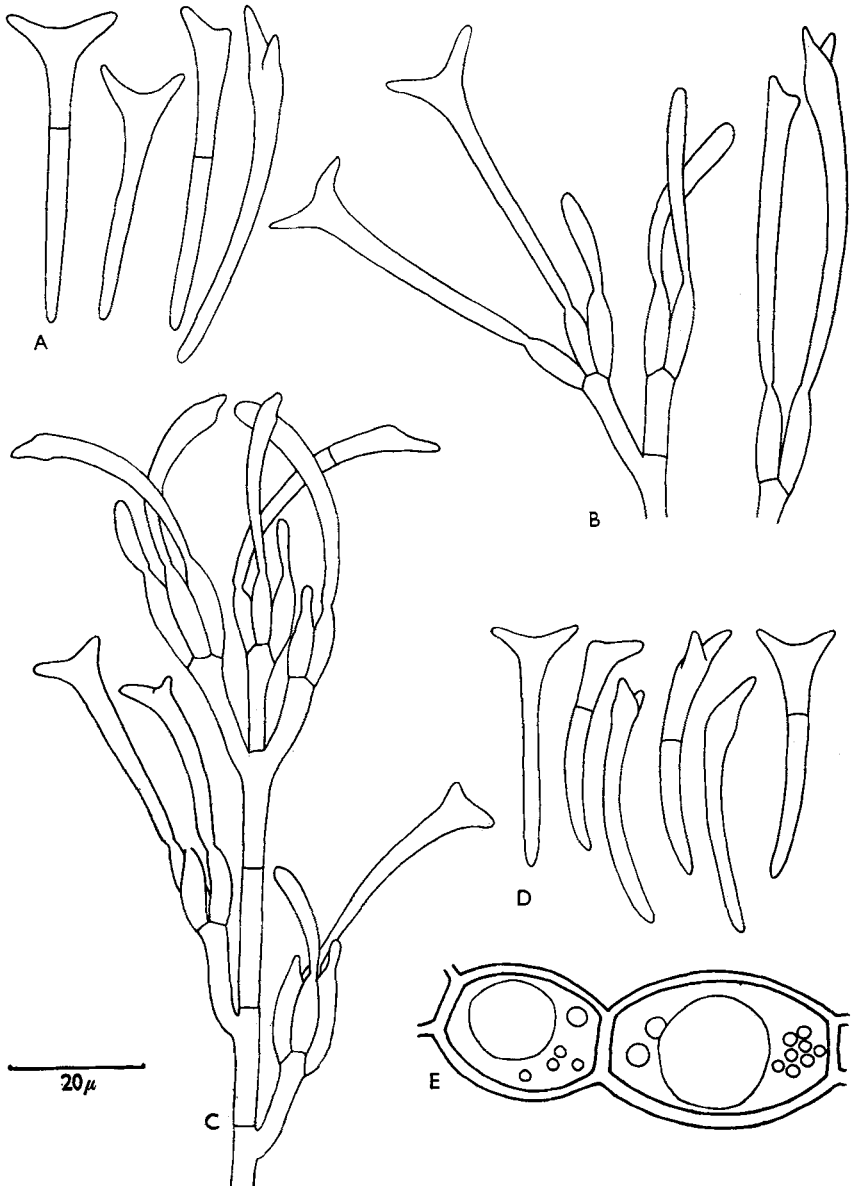
Habitat in foliis putrescentibus in flumine jacentibus Hardwar Gap, St Andrew, Jamaica. Typus Herb. I.M.I. 76792.

In a survey of Jamaican aquatic hyphomycetes Hudson & Ingold (1960) briefly mentioned a species of *Heliscus* collected on decaying leaves, especially the petioles, from a stream at Hardwar Gap, St Andrew, and the River Negro at Cedar Valley, St Thomas. At first it was thought that this might be a form of *Heliscus lugdunensis*, the conidial state of *Nectria lugdunensis* Webster (1959), but further collections and a study of the fungus in pure culture have shown that this differs sufficiently to be described as a new species.

Collections of leaves and petioles kept in dishes of aerated water in the laboratory produced within 24 hr. crops of conidiophores, either simple or sparingly branched and up to 150  $\mu$  long and 9  $\mu$  wide. Each branch produces 1-4 phialides, usually 3, measuring 9-12  $\times$  3-4  $\mu$ . Each mature phialospore is hyaline, T or Y-shaped and straight or slightly curved (Text-fig. 1 A, B; Pl. 7 A, B). In the young club-shaped phialospore the growth of the original apex is arrested and a new growing point is initiated which grows out laterally and opposite to the original one, giving the spore its characteristic shape. The mature phialosporae have an overall length of 29-51  $\mu$  and are 26-44  $\mu$  from their attachment to the phialide to the point of divergence of the arms. They are 1.5-2  $\mu$  wide at the base, 3-4  $\mu$  wide below the arms and 2-3.5  $\mu$  wide at the single septum, if present. This septum is usually formed immediately before, or just after the spore is liberated and occurs 20.5-24  $\mu$  from the base. The two arms are 4-8.5  $\mu$  long and 1-2  $\mu$  wide at the tip, diverging to 2.5-3.5  $\mu$  at the body of the spore.

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Single spores were isolated and these germinated rapidly, usually from the three extremities. On 2% malt extract agar the fungus forms at first a white slow-growing colony with sparse aerial mycelium. The colony soon turns brown by producing a light brown aerial mycelium with a much darker pigmentation near the surface of the medium. This darker coloration



Text-fig. 1. *Heliscus submersus*. A, Phialospores; B, phialospores in various stages of development; both from leaves in a stream at Hardwar Gap; C, conidiophore and phialospores from a submerged culture; D, mature phialospores formed aerielly on 2% malt agar; E, chlamydo-spores from culture.

often occurs in concentric rings with lighter brown areas in between. With age a fluffy aerial mycelium is formed which shows a tendency to aggregate into rope like strands of ten or more hyphae. Phialospores are produced abundantly in culture at laboratory temperatures and differ in no way from those produced even more profusely when slices from a colony are placed in sterile aerated water (Text-fig. 1 C, D; Pl. 7 D, F). The aerial conidiophores, which are simple or occasionally branched, are up to 140  $\mu$  long and produce sticky heads of phialospores 20–95  $\mu$  diam. (Pl. 7 E). Phialospore clusters are also borne on the surface of the medium and buried within it. Phialides may be produced on horizontal hyphae and this is also true in submerged aerated cultures.

A further feature of the fungus in culture is the production of irregularly branched chains of chlamydospores on the aerial mycelium where they appear as dark brown knots. The chlamydospores are spherical to elongate, measuring 24–40  $\times$  15–28  $\mu$ . They have a dark brown pigmented wall, 1–2.5  $\mu$  thick, and each usually possesses a single large oil guttule together with several smaller ones (Text-fig. 1 E and Pl. 7 C). As the culture ages, small sclerotium-like bodies, 160–460  $\mu$  diam., are formed. These are dark brown to black, formed within the media and are more abundant towards the margin of the colony.

Of the four species of *Heliscus* described, *H. submersus* most resembles *H. (Nectria) lugdunensis* (syn. *H. aquaticus* Ingold). It differs markedly in spore form from *H. tentaculus* Umphlett, *H. longibrachiatus* Ingold and *H. stellatus* Ingold & Cox and in culture from the last two species. *H. lugdunensis* Sacc. & Therr produces cylindrical-clavate to clove-shaped phialospores, up to 3-septate and 32–42  $\times$  7–8  $\mu$ , whereas the phialospores of *H. submersus* are never more than 2-celled and are 29–51  $\times$  3–4  $\mu$ . They form only two conical arms at the apex, in contrast to *H. lugdunensis* which normally produces three arms and also microconidia, which have not been observed in *H. submersus*.

In culture they resemble each other more than any one of the other species, in that they produce a fluffy aerial mycelium, pale brown in the centre with white margin, and they both show a tendency for the aerial mycelium to aggregate into strands. But they differ markedly in growth rates (Table 1).

Table 1. *Comparison of Heliscus submersus and Nectria lugdunensis in culture*

		Colony diam. (mm.) at 20° C. (average of 5 replicates)		
		7 days	10 days	14 days
<i>H. submersus</i>	2% malt extract agar	21	30	36
	Potato dextrose agar	20	31	37
<i>N. lugdunensis</i>	2% malt extract agar	28	42	55
	Potato dextrose agar	33	50	67

Chlamydospores have not been described for *N. lugdunensis* and Webster (1959) does not mention sclerotium-like bodies. Ingold (1942), in his description of the species under *H. aquaticus*, described irregular,

small, dark brown sclerotium-like bodies, 0.3–1.0 mm. diam., found below the surface of the medium. The phialospores of *H. submersus* show a closer resemblance to those of *H. aquaticus* (Ingold, 1942, Text-fig. 14A) than those of *N. lugdunensis* (Webster, 1959, Text-fig. 1E). But in *H. submersus* there are never three diverging arms and the phialospores borne aerielly are identical with those produced in water.

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## EXPLANATION OF PLATE 7

- A, mature phialospore from stream water ( $\times 1000$ ).  
 B, two developing phialospores and phialides from a leaf ( $\times 1000$ ).  
 C, chlamydospores from culture ( $\times 250$ ).  
 D, mature phialospores produced from culture in aerated water ( $\times 1000$ ).  
 E, conidiophore with sticky head of conidia from a dry culture ( $\times 200$ ).  
 F, conidiophore produced in submerged culture ( $\times 500$ ).

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