

TIRISPORA MANDOVIANA SP. NOV. FROM CHORAO MANGROVES, GOA, THE WEST COAST OF INDIA

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Abstract

Tirisporea mandoviana sp. nov., is described based on a specimen from dead mangrove wood of *Rhizophora mucronata* collected at Goa, India. This species differs from *Tirisporea unicaudata* in the larger size of its ascomata and asci, and smaller ascospores. *Tirisporea mandoviana* is illustrated with interference contrast micrographs. A comparison with other mangrove fungi with related characters is given.

Key Words—ascomycete, mangrove fungi, *Rhizophora mucronata*, *Tirisporea mandoviana*.

Introduction

Several new genera and species of marine and mangrove fungi have been reported from the west coast of India (Borse 1987, Borse & Hyde 1989, Hyde & Borse 1986a, b, Hyde *et al.* 1992, Patil & Borse 1982, Raghukumar *et al.* 1988). During a survey of marine and manglicolous fungi of Goa, on the west coast of India, a new ascomycete was encountered on intertidal wood of *Rhizophora mucronata* Blume. This species is similar to species of *Aniptodera*, but has a single appendage at one spore pole and is therefore a species of *Tirisporea* E.B.G. Jones & Vrijmoed (Halosphaeriales). The new species is described, illustrated with interference contrast micrographs and compared with the closely related genera *Ophiodeira*, *Halosarphaea* and *Aniptodera*.

Materials and Methods

Mangrove vegetation is widely distributed in Goa along the two estuarine river systems, Mandovi on the north and Zuari in the south of Goa, India. Samples of dead and decomposing material of *Rhizophora mucronata* were collected in polythene bags from the Chorao mangrove (latitude 15°27' to 15°38'N, longitude 73°42' to 75°50'E), at the river Mandovi and returned to the laboratory for examination. Kohlmeyer & Kohlmeyer's (1979) direct examination method was followed. Materials were observed directly after they were brought to the laboratory as well as after incubation of 7 to 10 days in moist chambers.

Taxonomy

Tirisporea mandoviana V.V. Sarma & K.D. Hyde, sp. nov.

Etymology: with reference to the river Mandovi on which Chorao mangroves are distributed.

Ascomata 260–420 µm alta, 250–430 µm diam., globosa vel subglobosa, superficiales vel semi-immersa, hyaline vel pallide brunnea, solitaria, ostiolata, papillata (longicollis), periphysata collo 220–465 µm longo, 60–90 µm diam. Peridium 15–22 µm crassum, hyalino-brunneum, cum 5–8 stratis cellularum elongatarum. Catenophyses non visae. Asci 80–115 × 18–32 µm, octospori, clavati, pedicellati, unitunicati, persistentes, leptodermi, apparatus apicalis praesens. Ascospores 15–22 × 8–12 µm, ellipsoideae, uniseptatae, hyalinae, crassitunicatae, appendice apicali singulari ad ascosporam appressa.

Ascomata 264–420 µm high × 250–430 µm diam., globose to subglobose, superficial or semi-immersed, hyaline to pale brown, solitary, ostiolate, papillate (with long necks). Necks 220–466 µm long, 60–90 µm wide, periphysate. Peridium 15–22 µm thick, hyaline to light brown, of 5–8 layers of elongated, compressed cells. Pseudoparenchyma compressed in mature ascomata and *catenophyses* not seen. Asci 80–115 × 19–31 µm, 8-spored, clavate, pedicellate, unitunicate, persistent, thin-walled, with an indistinct apical pore. Ascospores 15–22 × 8–12 µm (mean = 18 × 10 µm, n = 50), ellipsoidal, bicelled with large oil globules, hyaline, thick-walled, with a single appendage at one pole, 2–4.5 µm wide and 1.5–3.5 µm high, apical, cap-like, appressed, arranged randomly in relation to the apex of the ascus. Figures 1–14.

HOLOTYPE: INDIA, Goa, Chorao mangrove, on intertidal twig of *Rhizophora mucronata*, 9 Nov. 1998, V.V. Sarma (HKU(M) 8299).

Table 1. A comparison of *Tirispora* and similar species.

Species	<i>Tirispora mandoviana</i>	<i>Tirispora unicaudata</i>	<i>Ophiodeira monosemeia</i>	<i>Halosarpheia marina</i>	<i>Aniptodera haispora</i>
Ascomata Size (μm)	260–420 \times 250–430	90–300 \times 66–216	210–320 \times 125–270	140–300 diam.	202–283 \times 161–282
Placement of Ascomata in relation to host substrate	Superficial or semi-immersed	Superficial	Immersed under a thin black stroma	Mostly immersed	Immersed or semi-immersed or superficial
Colour	Hyaline to pale brown	Pale to dark brown	Light brown	Sub-hyaline, light brown or fuscous	Light brown to pale grey
Neck Size (μm)	220–465 \times 60–90	22–48 \times 12–46	60–300 \times 25–35	100–560 \times 42–140	172–303 \times 50–91
Cateno-Physes	Not seen	Present	Absent	Present	Not seen
Asci Size (μm)	80–115 \times 18–32	40–80 \times 14–28	45–65 \times 15–18	95–132 \times 18–28	81–113 \times 16–28
Apical pore	Indistinct	Thickened at apex with a pore	Absent	Thickened at apex with a pore	Thickened apex with a refractive pore
Persistent/Deliqescent	Persistent	Persistent	Deliqescent	Persistent	Persistent
Ascospore Size (μm)	15–22 \times 8–12	24–32 \times 8–12	15.8–20.7 \times 5.9–7.7	18–23 \times 9–12	14–22 \times 10–12
Wall Characters	Thick-walled	Thick-walled	Thin-walled	Thin-walled	Thick-walled
Appendage Characters	Single	Single	Single	Double	Absent
Host	<i>Rhizophora mucronata</i>	<i>Acanthus ilicifolius</i>	<i>Rhizophora mangle</i>	<i>Rhizophora mangle</i>	On intertidal mangrove wood

Discussion

The monotypic *Tirispora* is represented by *Tirispora unicaudata* E.B.G. Jones & Vrijmoed and was described by Jones *et al.* (1994). It has superficial, pale to dark brown ascomata, persistent asci with a ring and apical plate, and thick-walled ascospores with unipolar appendages. *Tirispora mandoviana* also has similar features. It, however, differs from *T. unicaudata* in having larger, hyaline to pale brown ascomata, larger asci, and smaller ascospores. Hence a new species of *Tirispora* is proposed.

Another taxon with bicelled ascospores having unipolar appendages is *Ophiodeira monosemeia* Kohlm. & Volkm.-Kohlm. (Kohlmeyer & Volkmann-Kohlmeyer 1988). *Ophiodeira monosemeia* also lacks catenophyses

and has long necks similar to those found in *Tirispora mandoviana*. *Tirispora mandoviana*, however, differs from *O. monosemeia* in that ascospores do not form under a black stroma and are not laterally inserted. Furthermore, asci and ascospores of *T. mandoviana* are larger than those of *O. monosemeia*. Asci of *T. mandoviana* are also persistent, while those of *O. monosemeia* are deliquescent.

Tirispora mandoviana is very similar to *Aniptodera* in having hyaline to pale brown ascospores, asci with an apical ring and pore, and thick-walled ascospores, but differs as it has unipolar appendages. *Aniptodera haispora* Vrijmoed, K.D. Hyde & E.B.G. Jones most closely resembles *T. mandoviana* and has almost the same dimensions of ascospores, asci and ascospores, but differs in lacking unipolar appendaged ascospores. Although some species of *Aniptodera* (e.g. *A. lignatilis* K.D. Hyde and *A. mangrovei* K.D. Hyde) have polar appendages, their placement in this genus is tentative (Vrijmoed *et al.* 1994). It has been suggested that *Aniptodera* should be retained for ascomycetes that have non-appendaged ascospores as originally described for the type species *Aniptodera chesapeakeensis* Shearer & J.L. Crane (Jones *et al.* 1994).

Tirispora mandoviana also resembles *Halosarpheia marina* (Cribb & J.W. Cribb) Kohlm. in having persistent asci with a pore, ascospores with long necks and ascospores of almost the same dimensions. *Tirispora mandoviana*, however, differs in having unipolar ascospore appendages. Other species in the genus *Halosarpheia*, *H. unicaudata* (E.B.G. Jones & Camp.-Als.) R.G. Johnson, E.B.G. Jones & S.T. Moss and *H. cincinnatula* Shearer & Crane also have ascospores with one apical appendage, but ascospores are filiform and multi-septate, and asci are deliquescent and lack an apical pore.

Jones *et al.* (1994) considered that *Tirispora* differed from *Halosarpheia* as the asci have a pore and ascospores are thick-walled with a unipolar appendage. In the type species of *Halosarpheia*, *H. fibrosa* Kohlm. & E. Kohlm., asci lack a pore or ring and ascospores are thin-walled, with bipolar appendages. There are, however, many species in *Halosarpheia* which deviate from this generic description (e.g. *H. ratnagiriensis* S.D. Patil & Borse has persistent asci with a refractive lens-shaped apical plate, *H. marina* has persistent asci with an apical pore where the plasmalemma retracts from the ascus wall below the apex) (Farrant 1986).

The foregoing account shows the heterogeneous nature of the genera *Halosarpheia* and *Aniptodera* which are in need of further investigation (Jones *et al.* 1994). Until such results are available, we place the new species, tentatively, in *Tirispora*, based on the presence of superficial, hyaline to pale brown ascospores, persistent asci with an apical pore, and thick-walled, one-septate ascospores with unipolar appendages.

Acknowledgements

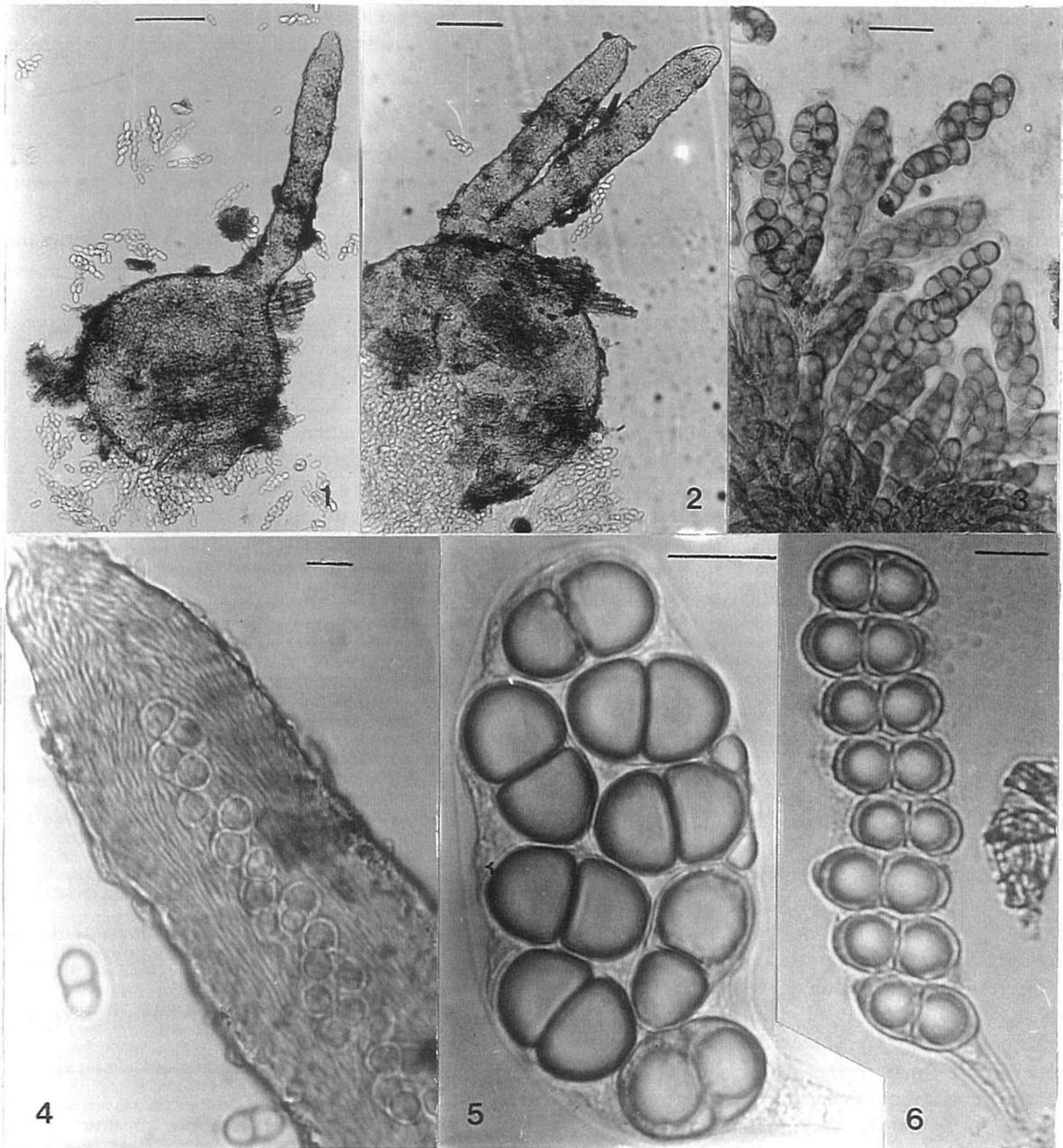
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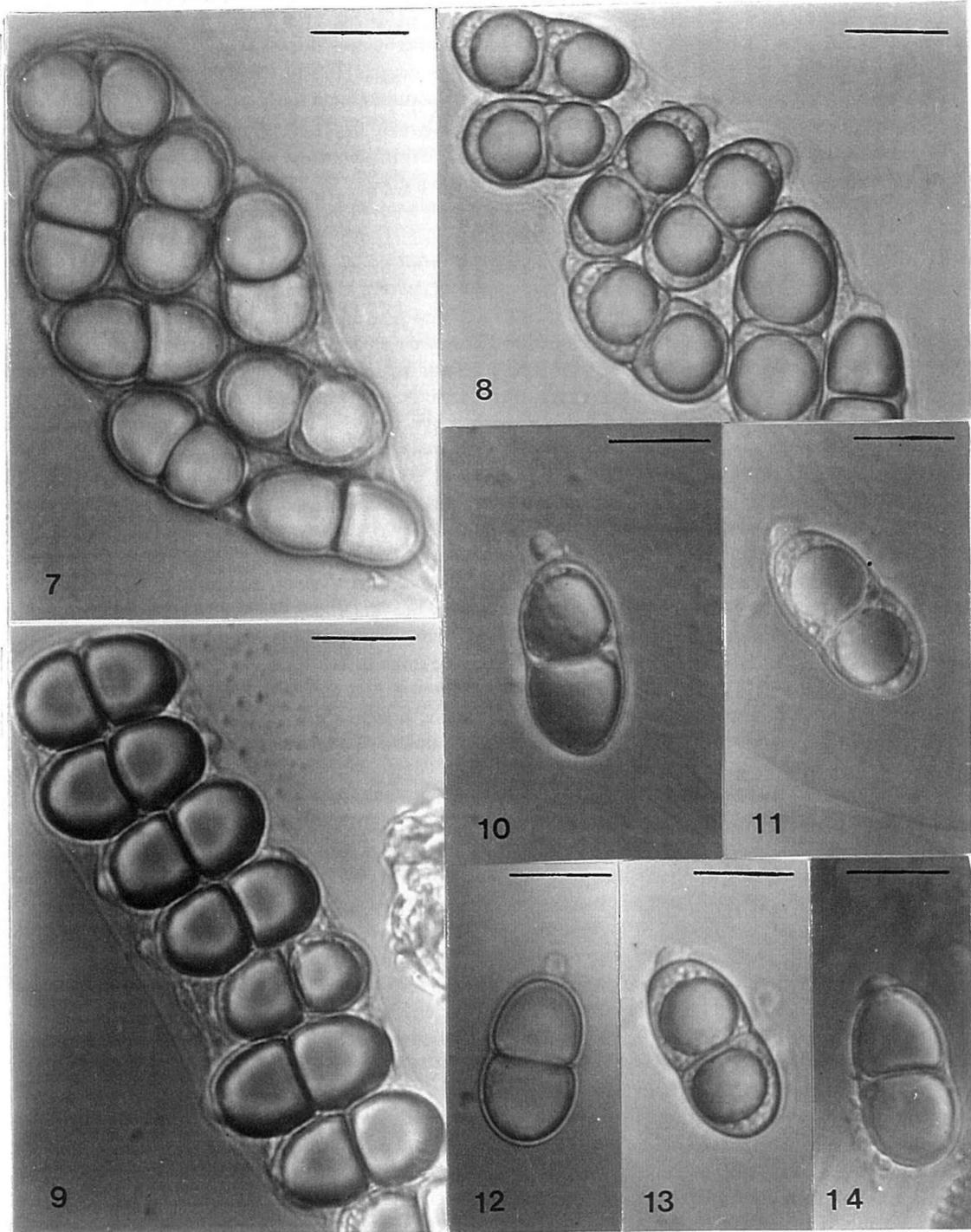
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Figures 1–6. Micrographs of *Tirispora mandoviana* (from holotype). **Figs 1, 2.** Ascoma, note the double necks in Fig. 2. **Fig. 3.** Asci in a group. **Fig. 4.** Tip of ascus neck (enlarged), showing periphyses. **Figs 5, 6.** Asci. **Bars:** 1 & 2 = 100 μ m, 3 = 50 μ m, 4–6 = 10 μ m. **Fig. 6.** An abnormal ascus with wall torn at the tip.



Figures 7–14. Micrographs of *Tirispora mandoviana* (from holotype). Figs 7–9. Asci. Figs 10–14. Ascospores. Bars = 10 μ m.