

warm and humid climate prevailed in the Siwalik region during the Miocene period.

Specimen: BSIP Museum No. 36584, 36585.

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An interesting new hyphomycete genus with basauxic conidiophores and other unique features

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I describe two interesting hyphomycetes occurring on and isolated from *Xanthorrhoea preissii* Endl. (Xanthorrhoeaceae) collected in Western Australia. Among the few fungi characterized by basauxic conidiophores, these fungi are unique in that conidial cells of the muriform conidia function as conidiophore mother cells and produce basauxic conidiophores and further conidia in continued succession to form a complex system of conidia linked by 'connectives' that are morphologically and functionally the equivalent of basauxic conidiophores. The two fungi are accommodated in a new genus, *Catenospegazzinia*, as two new species, *C. pulchra* and *C. elegans*.

THE peculiar and interesting 'basauxic' nature of growth of conidiophores in some fungi was first noted by Hughes¹ who observed this feature in a few fungi which he classified in a separate section (VIII) in the scheme he proposed. Taking the hyphomycetes as a whole this feature has been reported in approximately as few as 45-50 species belonging to the six genera, *Spegazzinia* Sacc., *Arthrinium* Kunze, *Cordella* Speg., *Pteroconium* Sacc., *Dictyoarthrinium* Hughes and *Endocalyx* Berk. and Broome. The discovery of two interesting hyphomycetes with basauxic conidiophores and, additionally, with some quite unique features, in Western Australia is therefore of special interest.

I give below a description of an interesting

dematiaceous hyphomycete collected on dead inflorescence stalks of *Xanthorrhoea preissii* Endl. (Xanthorrhoeaceae).

The fungus forms dark, blackish, effuse colonies on the substratum. The colonies consist of massive, powdery aggregations of dry, muriform conidia forming a thick layer over an apparently inconspicuous stratum of underlying vegetative hyphae, conidiophore mother cells and basauxic conidiophores. The conidiophore mother cells are hyaline to subhyaline, variable in shape, and $7.4-9.7 \mu\text{m} \times 2.6 \mu\text{m} \times 4.4 \mu\text{m}$. The conidiophores are simple, basauxic, hyaline to subhyaline, and $3.7-18.5 \mu\text{m} \times 1.8-2.9 \mu\text{m}$. The conidia are dry, muriform, brown, variable in shape, globose to subglobose to ellipsoidal to flattened, verrucose to finely echinulate, slightly constricted at septa, and $13-21 \mu\text{m} \times 11-19 \mu\text{m}$. They are produced acrogenously on basauxic conidiophores and on 'connectives' arising from one or more cells of the primary conidium, and of successive conidia similarly produced on connectives, in an infinite sequence, the whole forming a complex network or system of solitary muriform conidia linked by connectives. The connectives closely resemble basauxic conidiophores in morphology, though considerably short, and show the circumscissile break in the outer wall characteristic of these structures. Indeed, functionally also, they are potentially basauxic and are therefore the equivalent of basauxic conidiophores. The conidial cells, then, are the equivalent of conidiophore mother cells and may function as such.

A similar fungus, apparently congeneric but distinct, was also isolated from the same material. The culture was designated 10-C; a description of this fungus is given below.

The vegetative hyphae are pale to golden brown, smooth, septate, and branched. The conidiophores are basauxic and arise from conidiophore mother cells which are produced in the vegetative mycelium. The conidiophore mother cells are subhyaline to pale brown, variable in shape and $3.7-15.5 \mu\text{m} \times 2.5-5.2 \mu\text{m}$. The conidiophores are simple, subhyaline to golden brown and $2.5-9.6 \mu\text{m} \times 1.4-3.0 \mu\text{m}$. The hyphae producing conidiophore mother cells invariably form strands or ropes. The conidia are brown, variable in shape, ovoid to clavate and mostly with 1-3 transverse septa, or globose to subglobose-triangular and muriform, constricted at septa, verrucose to finely echinulate: the elongate-ovoid conidia $20-25 \mu\text{m} \times 7-17 \mu\text{m}$; the globose to subglobose conidia $13-21 \mu\text{m} \times 11-17 \mu\text{m}$. The 'connectives' measure $2-4 \mu\text{m} \times 2 \mu\text{m}$, though occasionally they may be longer and then clearly show their true basauxic character.

The basauxic nature of conidiophores in certain hyphomycetes was first observed by Hughes¹ who, in calling attention to this unique feature, stressed its taxonomic significance. Of the genera he discussed,

basauxic growth of conidiophores is clearly typical of the genera, *Spegazzinia* Sacc., *Arthrimum* Kunze, *Cordella* Speg., *Pteroconium* Sacc. and *Dictyoarthrinium* Hughes. It is noteworthy that several of these genera and some species in these genera had been described quite early by mycologists, and yet the basauxic nature of conidiophores had eluded them. *Graphiola phoenicis* Poit. and species of the genus *Endocalyx* Berk. and Broome were also included in this group by Hughes¹. Of these, *Graphiola* does not belong here, as shown by the excellent study of Cole². *Endocalyx* may still belong here, but needs further study. Of the genera clearly in this group, then, 45–50 species are known, most of which are included in the two monographs^{3,4} on dematiaceous hyphomycetes by Ellis. Of these, the genus *Spegazzinia* stands apart from others in having conidiophores without dark bands or thickened septa. The conidiophores in *Arthrimum*, *Cordella*, *Pteroconium* and *Dictyoarthrinium* have dark bands or thickened septa.

The two fungi from Western Australia described here have, like species of *Spegazzinia*, basauxic conidiophores without septa arising from conidiophore mother cells and producing an apical gangliar dictyoconidium. But there are other unique features: the primary muriform conidia that are produced singly and acrogenously on simple, basauxic conidiophores and secondary and later muriform conidia produced on 'connectives' produced from one or more cells of secondary and a further succession of such conidia, the whole forming a complex network or system of numerous conidia linked by connectives; the conidia may get detached, but they necessarily carry a bit of the broken basauxic conidiophore (i.e. connective). The connectives are short, in fact, mini-basauxic conidiophores, have the potential to function as basauxic conidiophores and are here interpreted to be so. As already mentioned, occasionally the connectives show elongation typical of basauxic conidiophores and this has been observed in the natural material.

Solitary, muriform conidia produced acrogenously on simple, basauxic conidiophores without septa, as already noted, are typical of species of the genus *Spegazzinia* Sacc. However, the production of 'connectives' which are the equivalent of basauxic conidiophores, from conidial cells that function as conidiophore mother cells or their equivalent, linking conidia and eventually forming a close and compact network or system is, as far as the author is aware, not known in any other hyphomycete. Thus, the fungi described here have unique features. Accordingly, a new genus, *Catenospegazzinia*, is proposed here to accommodate these fungi and they are assigned here to this genus as two distinct new species, *C. pulchra* and *C. elegans*. Both species have been brought into pure culture. In culture, *C. pulchra* has hyaline to subhyaline vegetative

hyphae which do not form ropes, whereas *C. elegans* has pale to golden brown vegetative hyphae that invariably unite to form ropes or strands. The conidiophores of the former are hyaline to subhyaline in contrast to those of the latter which are brown; also the conidiophores in the latter are short compared to those of the former. There are also differences in conidial morphology and conidial size between the two species.

Catenospegazzinia C. V. Subramanian anamorph gen. nov.

Hyphomycetes dematiacei conidiophora basauxica vel conidia muriformia efferentes. Conidia sicca, gangliiformia, acrogena, super conidiophoris basauxicis et super 'connectivis' e cellulis I vel aliquot conidiorum principalium et conidiorum successivorum similiter efferentia in serie indeterminato, summa reticulum complexum conidiorum connectivis conjunctum facienti. Connectiva potentialiter basauxica; cellulae conidicae tum matricellulas conidiophori aequantes.

Typus: *Catenospegazzinia pulchra* C. V. Subramanian anamorph sp. nov.

Dematiaceous hyphomycete producing basauxic conidiophores and muriform conidia. Conidia dry, gangliar, acrogenous on basauxic conidiophores and on 'connectives' arising from one or more cells of the primary conidium and of successive conidia similarly produced, in an indefinite sequence, the whole forming a complex network of solitary muriform conidia linked by connectives. Connectives potentially basauxic; conidial cells the equivalent of conidiophore mother cells.

Type species: *Catenospegazzinia pulchra* C. V. Subramanian anamorph sp. nov.

Catenospegazzinia pulchra C. V. Subramanian anamorph sp. nov.

Characteristici generis. Matricellulae conidiophori hyalinae ad subhyalinae, in forma variabiles, 7.4–9.7 $\mu\text{m} \times 2.6$ –4.4 μm . Conidiophora simplicia, hyalina vel subhyalina, 3.7–18.5 $\mu\text{m} \times 1.8$ –2.9 μm . Conidia brunnea in forma variabilia, globosa ad subglobosa, ellipsoidea, vel complanata, verrucosa vel subtiliter echinulata, ad septa leviter constricta, 13–21 $\mu\text{m} \times 11$ –19 μm . Connectiva 2.0–7.6 $\mu\text{m} \times 2$ μm .

Typus: in scapo emortuo *Xanthorrhoea preissii* Endl. (Xanthorrhoeaceae), John Forrest National Park, Darling Range, Western Australia, 27.8.1987, leg. C. V. Subramanian (No. 9c).

Characteristics of the genus. Conidiophore mother cells hyaline to subhyaline, variable in shape, 7.4–9.7 $\mu\text{m} \times 2.6$ –4.4 μm . Conidiophores simple, hyaline to subhyaline, 3.7–18.5 $\mu\text{m} \times 1.8$ –2.9 μm . Conidia brown, variable in shape, globose to subglobose to ellipsoidal

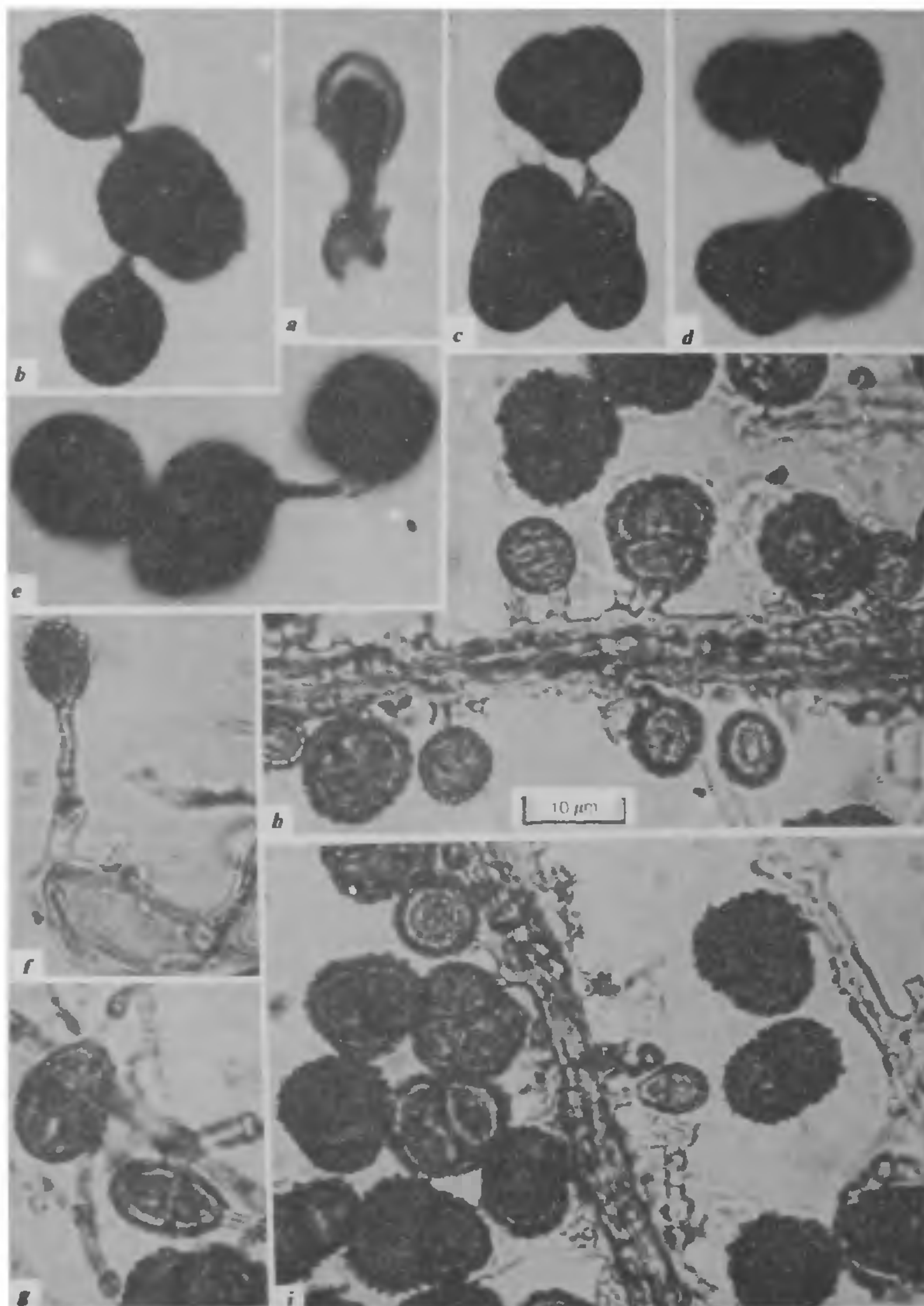


Figure 1, a-g. *Catenospegazzinia pulchra*, **a/b**, ex specimen 16A, **c-g**, ex Type (No. 9c). **a**, Early stage in development of primary conidium initial, and basauxic conidiophore from within conidiophore mother cell. **b**, Three mature conidia linked by 'connectives'. **c-e**, Conidia linked by connectives. Note the morphology of the connectives clearly indicating that they are of the nature of basauxic conidiophores. The circumscissile rupture of the wall bridging 'conidiophore mother cell' and conidium, and the variable length of the conidiophore may be noted. **f,g**, Vegetative hyphae, conidiophore mother cells, basauxic conidiophores and primary conidia ex culture 10b. **h,i**, *Catenospegazzinia elegans* ex Type culture 10-C; figures show ropes of hyphae with conidiophore mother cells, young, developing and mature conidia, and secondary conidia, note 'connectives' linking conidia.

to flattened, verrucose to finely echinulate, slightly constricted at septa, $13-21\ \mu\text{m} \times 11-19\ \mu\text{m}$. Connectives $2.0-7.6\ \mu\text{m} \times 2\ \mu\text{m}$. (Figure 1).

Type: on dead inflorescence stalk of *Xanthorrhoea preissii* Endl. (Xanthorrhoeaceae), John Forrest National Park, Darling Range, Western Australia, 27.8.1987, Coll. C. V. Subramanian (No. 9c).

Other collections: 1. On dead inflorescence stalk of *Xanthorrhoea preissii*, John Forrest National Park, Darling Range, Western Australia, 27.8.1987, coll. CVS (No. 10b); 2. On dead inflorescence stalk of *X. preissii*, Madong Reserve, Western Australia, coll. Giles Hardy (No. 16A).

Catenospegazzinia elegans C. V. Subramanian anamorph sp. nov.

Characteristici generis. Matricellulae conidiophori subhyalinae ad pallido-brunneae, forma variabili, $3.7-15.5\ \mu\text{m} \times 2.2-5.2\ \mu\text{m}$. Conidiophora simplicia, subhyalina vel aureo-brunnea, $2.5-9.6\ \mu\text{m} \times 1.4-3.0\ \mu\text{m}$. Conidia brunnea, elongato-ovoidea ad elongato-clavata, septis transversis, vel globosa ad subgloboso-triangularia muriformia, septa constricta, verrucosa ad subtiliter echinulata; conidia elongato-ovoidea $20-25\ \mu\text{m} \times 7-17\ \mu\text{m}$; conidia globosa ad subgloboso-triangularia $13-21\ \mu\text{m} \times 11-17\ \mu\text{m}$. Connectiva $2-4\ \mu\text{m} \times 2\ \mu\text{m}$.

Typus: cultura 10-C ex CVS No.10 sejuncta, in scapo emortuo *Xanthorrhoea preissii* Endl. (Xanthorrhoeaceae), John Forrest National Park, Darling Range, Western Australia, 27.8.1987, leg. C. V. Subramanian.

Catenospegazzinia elegans C. V. Subramanian anamorph sp. nov.

Characteristics of the genus. Conidiophore mother cells subhyaline to pale brown, variable in shape, $3.7-15.5\ \mu\text{m} \times 2.2-5.2\ \mu\text{m}$. Conidiophores simple, subhyaline to golden brown, $2.5-9.6\ \mu\text{m} \times 1.4-3.0\ \mu\text{m}$. Conidia brown, variable in shape, elongate-ovoid with transverse septa, or globose to subglobose-triangular and muriform, constricted at septa, verrucose to finely echinulate; elongate-ovoid conidia $20-25\ \mu\text{m} \times 7-17\ \mu\text{m}$; globose to subglobose conidia $13-21\ \mu\text{m} \times 11-17\ \mu\text{m}$. Connectives $2-4\ \mu\text{m} \times 2\ \mu\text{m}$. (Figure 1)

Type: Culture No. 10-C isolated ex collection No. 10, on dead inflorescence stalk of *Xanthorrhoea preissii* Endl. (Xanthorrhoeaceae), John Forrest National Park, Darling Range, Western Australia, 27.8.1987, coll. C. V. Subramanian.

The following key highlights the differences between the genera in this group.

Basauxic conidiophores without dark bands or thickened septa

Primary conidiophores alone present *Spegazzinia*
Primary conidiophores present,
conidial cells additionally functioning
as conidiophore mother cells and
giving rise to secondary and a further
succession of basauxic conidiophores
and conidia *Catenospegazzinia*

Basauxic conidiophores with dark bands or thickened septa

Conidia one-celled, usually lenticular and
with pale rim or germ slit
Stroma well-developed *Pteroconium*
Stroma none
Setae present *Cordella*
Setae absent *Arthrimum*
Conidia muriform, without germ slit

Dictyoarthrinium

Arthrimum with about 20 or more species has both tropical and temperate representatives some of which are especially common on sedges, in marshes and fens. The other genera have largely tropical species and are common on a variety of plant species, especially grasses, bamboos and palms. The two species of *Catenospegazzinia* described in this paper have not been found on any other plant species by the author in the course of his exploration in Western Australia. Limited though this exploration has been, curiously, these two fungi were not found on other species of *Xanthorrhoea* or on *Kingia australis* R.Br. and *Dasypogon hookeri* J. L. Drummond, also of the *Xanthorrhoeaceae*. The author⁵ had earlier described a new species of *Spegazzinia*, *S. xanthorrhoeae* on *Xanthorrhoea preissii*, also from Western Australia. Further work would doubtless throw more light on the substrate preferences and distribution of these unique and interesting fungi.

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