New and interesting records of South African fungi. XV. Two new Laboulbeniales records from South Africa

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Received 19 December 1996; revised 7 February 1997

The Laboulbeniales are predominantly parasites of true insects (Hexapoda), infesting mostly Coleoptera. Two members of the Laboulbeniales are reported from South Africa for the first time; *Polyandromyces coptosomalis* Thaxter and *Laboulbenia monoleptae* Balazuc. Both fungi are illustrated and their distribution, morphology, host specificity and nutrition are discussed.

Keywords: Fungi, Laboulbeniales, new records.

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Introduction

The Laboulbeniales (Ascomycetes) are predominantly parasites living on the integument of living insects (Benjamin 1973). Two members of the Laboulbeniales are being reported from South Africa for the first time. *Polandromyces coptosomalis* Thaxter (PREM 52789) was found on a member of the Hemiptera, *Antestiopsis orbitalis* (Westwood), otherwise known as the coffee bug. *P. coptosomalis* was originally described by Balazuc (1973) as *Eudimeromyces greatheadi*, but was synonymized by Balazuc (1982) with the former. *Laboulbenia monoleptae* Balazuc (PREM 52790) was found on *Monolepta intermedza* (Ritsema), a Coleopteran. Voucher specimens have been deposited in the National Collection of Fungi (PREM).

Distribution

Most of the Laboulbeniales have a high degree of host specificity and their geographical distribution coincides with that of their hosts (Benjamin 1973). The distribution of *L. monoleptae* is therefore deduced to comprise Angola, South Africa, Tanzania and tropical Africa. The South African specimen was collected at Nelspruit, Mpumalanga. *P. coptosomalis* has been recorded from eastern, central and southern Africa, Italy, Iran and Iraq, as well as southern parts of Asia (Benjamin 1973). In South Africa it was collected in the Graaff Reinet district, Eastern Cape Province.

Morphology of the thallus

The Laboulbeniales are not closely related to other ascomycetes (Benjamin 1973): the thallus consists of a foot and receptacle, appendages, and male and female sexual organs.

The foot and receptacle

In most Laboulbeniales, the first stages of ascospore germination consist of the enlargement of the lower end of the basal spore segment, which results in the foot. The foot is a sucker-like organ from which a small simple haustorium arises. It penetrates the integument of the host, finally reaching the living cells of the epidermis, after which there is a relatively rapid development of the fungus from the original two cells of the spore (Benjamin 1973). In both specimens a darkening of the foot (*P. coptosomalis*, Figure 1A; *L. monoleptae*, Figure 2A) was observed where it was in contact with the host. This is in accordance with the descriptions given by Balazuc (1973; 1975) for these two species. Although the receptacle of *P. coptosomalis* consists of more cells than that of *L. monoleptae*, the receptacles of both specimens are relatively simple (*P. coptosomalis*, Figure 1B; *L. monoleptae*, Figure 2B).

Appendages

An appendage may be characterized as being primary or secondary (Benjamin 1973). The primary appendage is distinguished most readily during the early stages of development; it may remain essentially unchanged as a single sterile cell, or it may develop a more or less determinate series of few to many superposed cells, one or several which form the male sex organs (Benjamin 1973). The secondary appendages (*P. coptosomalis*, Figure 1C; *L. monoleptae*, Figure 2C) may become more or less exten-

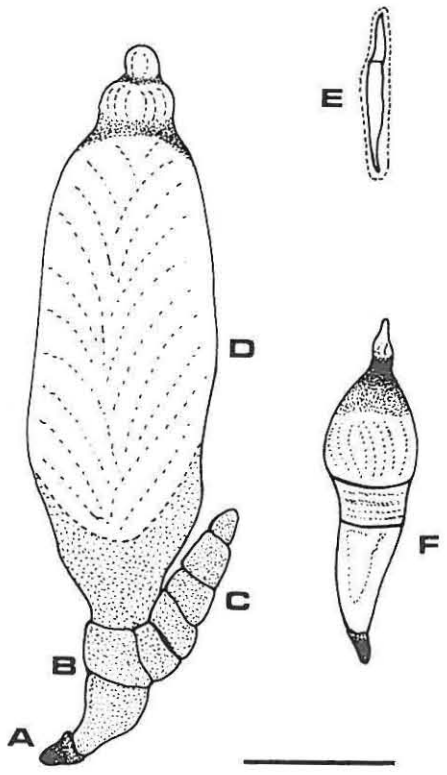

Figure 1 *Polyandromyces coptosomalis* Thaxter (PREM 52789). A, foot; B, receptacle; C, secondary appendage; D, perithecium (immature); E, ascospore; F, male sexual organ. Scale bar = 50 μm.

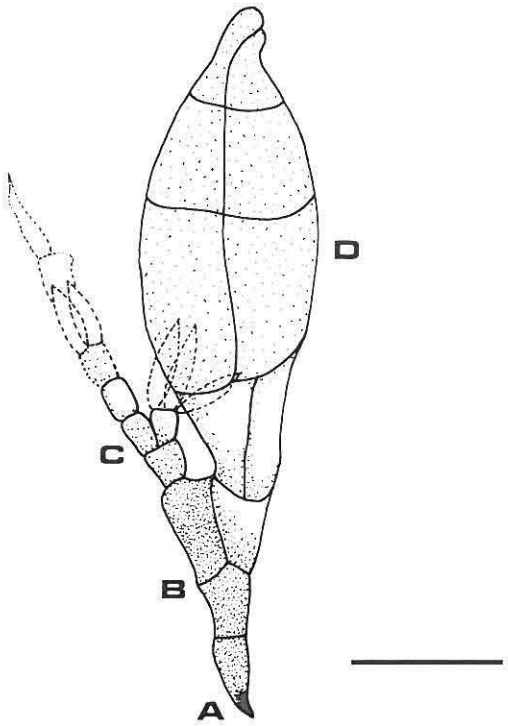

Figure 2 *Laboulbenia monoleptae* Balazuc (PREM 52790). A, foot; B, receptacle; C, secondary appendage; D, perithecium. Scale bar = 50 μm.

sively branched, remain sterile or form male or female sex organs. Perithecial appendages are usually outgrowths of outer wall cells; they may be unicellular or multicellular and are always sterile (Benjamin 1973).

Female sex organs

In the Laboulbeniales each perithecium has a trichogyne that is partly or entirely external. It may consist of a single cell or a series of cells forming a simple or branched receptive organ. A carpogenic cell gives rise to 1, 2, 4, 8 or more ascogenous cells that float freely near the base of the perithecial cavity and give rise to a succession of asci during the functional life of the fungus (Benjamin 1973).

The perithecia of both specimens are simple. In *P. coptosomalis* the perithecium (Figure 1D) has a long stalk cell which is not clearly separated from the thin-walled basal cells of the perithecium directly above it (Tavares 1985). No secondary perithecium was observed. The perithecium of *L. monoleptae* (Figure 2D) is fusiform with distinct septa. Ascospores were only seen in *P. coptosomalis* (Figure 1E).

Male sex organs

According to Benjamin (1973), the existence of sexuality in the Laboulbeniales was first suggested by Karsten who observed a trichogyne in *Stigmatomyces baeri* (Knoch) Peyritsch as well as presumptive male elements (spermatia) formed by cells of the appendage. They are usually formed by cells of the primary or secondary appendages derived from cells of the receptacle or its appendages (Benjamin 1973). The most unusual characteristic of *Polyandromyces* is the terminal position of the antheridium in contrast to the lateral position in related genera (Tavares 1985). The male sexual organ (antheridium) of *P. coptosomalis* was observed and illustrated (Figure 1F).

Host specificity and nutrition

Like other obligate parasites, the Laboulbeniales have long been known for their high degree of host specificity, and with few exceptions they have been observed only on the adult stage of the host. Not only may some show a narrow host range, but many occur only on restricted areas of the host body (Benjamin 1973). *P. coptosomalis* was found covering the body of its host, while *L. monoleptae* was found only on the pygidium of its host. In most species of Laboulbeniales it seems likely that transmission is by direct contact of the hosts themselves. However, it was found that soil may play a role in the transmission of a few species of *Laboulbenia* (Benjamin 1973).

Although the early stages of development are nutritionally independent of direct contact with living tissues of the host, further development takes place only after haustorial contact with living cells has been established (Benjamin 1973). Few studies of the pathogenic effect on their hosts have been made. It is believed that they cause little or no direct harm to their hosts, but more information is needed in this regard (Benjamin 1973).

Discussion

Although these species are new to South Africa, this does not imply that they are rare here; they are probably seldom noticed or studied. Local mycologists have, up to now, paid no attention to the Laboulbeniales and the few species described by Thaxter were probably found on museum specimens of their insect hosts (Doidge 1950). It seems, however, that recently researchers have become more aware of these fungi, as descriptions of new species are becoming more frequent in published literature.

Acknowledgements

Mrs Elsa van Niekerk is thanked for the drawings.

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