

Nota

Laboulbenia formicarum Thaxt. (Ascomycota, Laboulbeniales) crosses the Atlantic

Xavier Espadaler

Unitat d'Ecologia and CREAM.

Universitat Autònoma de Barcelona. 08193 Bellaterra, Spain.

Xavier.Espadaler@uab.es

Sergi Santamaria

Unitat de Botànica, Departament de Biologia Animal, de Biologia Vegetal i d'Ecologia.

Universitat Autònoma de Barcelona. 08193 Bellaterra (Barcelona). Spain.

Sergi.Santamaria@uab.es

Manuscript received in September 2003

Key words: Formicidae, Madeira, *Lasius grandis*, parasitic fungi.

Laboulbeniales are an enigmatic and fascinating group of fungi (Santamaria, 2001; Weir & Beakes, 1995). Ectoparasitic on a diverse assemblage of arthropods, the majority in insects, specially beetles and flies, and a few arachnids (mites) and millipedes (Tavares 1985), those fungi show a rather high level of host specificity. They cause little, if any, damage to their hosts. Their study remains in a difficult interface, between entomologists and mycologists and, consequently, clearly belong in the domain of a very few specialists in the world.

Among the hymenoptera, only ants are known to harbour some species of Laboulbeniales, from the genera *Rickia*, *Dimorphomyces* and *Laboulbenia*. The first genus has one species parasitic on ants, *R. wasmannii* Cavara, and is limited to *Myrmica* ants (subfamily Myrmicinae) in Europe. *Dimorphomyces formicicola* (Speg.) I.I.Tav., has been collected only once, in Argentina, on *Paratrechina* (as *Prenolepis*; Spegazzini, 1917). For the third genus, three species have been described from ants: one species, *Laboulbenia formicarum* Thaxter, has been extensively reported from North America (Bequaert, 1920; Cole, 1935, 1949; Judd & Benjamin 1958; Nuhn & Van Dyke, 1979; Smith, 1917, 1928, 1946, 1961; Wheeler, 1910). Hosts belong in the genera *Acanthomyops*, *Formica*, *Lasius*, *Myrmecocystus*, *Polyergus*, and *Prenolepis*. *Laboulbenia ecitonis* G. Blum was reported on army ants *Eciton* (subfamily Ecitoninae) from Brazil (Blum, 1924). *Laboulbenia camponoti* S.W.T. Batra, the third *Laboulbenia* parasitic on ants, is known from a mere four localities in Eurasia: one in India (Batra, 1963) and Turkey (Espadaler & Lodos, 1983),

two in Spain (Balazuc et al., 1982; Espadaler & Blasco, 1990), solely on *Camponotus* ants. All ants harbouring *L. formicarum* or *L. camponoti* belong in the subfamily Formicinae.

During a recent survey of the ants in Madeira (Wetterer et al. in prep) it has been found that *Laboulbenia formicarum*, formerly known from North America, has crossed the Atlantic and reached the island of Madeira.

Material studied

The sample was collected 26 June 2002, at sea level, within an urban site with ruderal vegetation, next to a bus parking lot and at some 50 m from the sea in the small town of São Vicente (32° 48' 15'' N, 17° 02' 38'' W), north of the island. Five out of eleven workers were infested and they were running about as deftly as uninfested workers. Individual infestation level was extraordinary (Figs. 1, 2) and, using the words of Wheeler (1910), "so excessive that they resemble hedgehogs, fairly bristling with tufts of the fungus". It is clear that *L. formicarum* has successfully broken the admitted sanitary protection provided by the secretion of metapleural glands in ants (Maschwitz et al., 1970; Veal & Trimble, 1992; Mackintosh et al., 1995). Perhaps the very high air humidity level next to the beach at São Vicente and > 1200 mm annual rain diminishes in an unknown way the protective effect of metapleural gland secretions in this ant. *Laboulbenia formicarum* is one of the smallest species in the genus (Figs. 3, 4), and a further interest of this species is its dioecism (Benjamin & Shanor, 1950), extremely rare within the genus (Santamaria, 1996).

The host species was the soil nesting *Lasius grandis* Forel, the most common native ant on the island, from shoreline to mountaintop, in both relatively undisturbed and highly disturbed habitats (Wetterer et al. in prep). *Lasius grandis* is known from the Iberian Peninsula, the Maghreb, Madeira, Azores, Balearic islands, and Canary islands. It inhabits from the sea level up to 2800 m., avoiding xerothermous biotopes (Seifert, 1992). Other ant species collected there were *Hypoponera eduardi* and *Monomorium carbonarium*. Nearly two thirds of the ant species presently known from Madeira are non native; thus, the now extended geographical distribution of *Laboulbenia formicarum* is not unexpected, albeit none of its Northamerican hosts is known from Madeira. So, the question is posed how did *L. formicarum* reach the island. Voucher specimens of the fungus have been deposited at BCB Mycotheca herbarium and one infested ant worker at the Museum Municipal do Funchal.

Acknowledgments

Dora Aguin Pombo and António Aguiar were kind and helpful companions in Madeira. This work was supported by The National Geographic Society (7241-02) to X.E. and by MCYT and FEDER (REN2002-04068-C02-02, "Flora Micológica Ibérica V) to S.S.

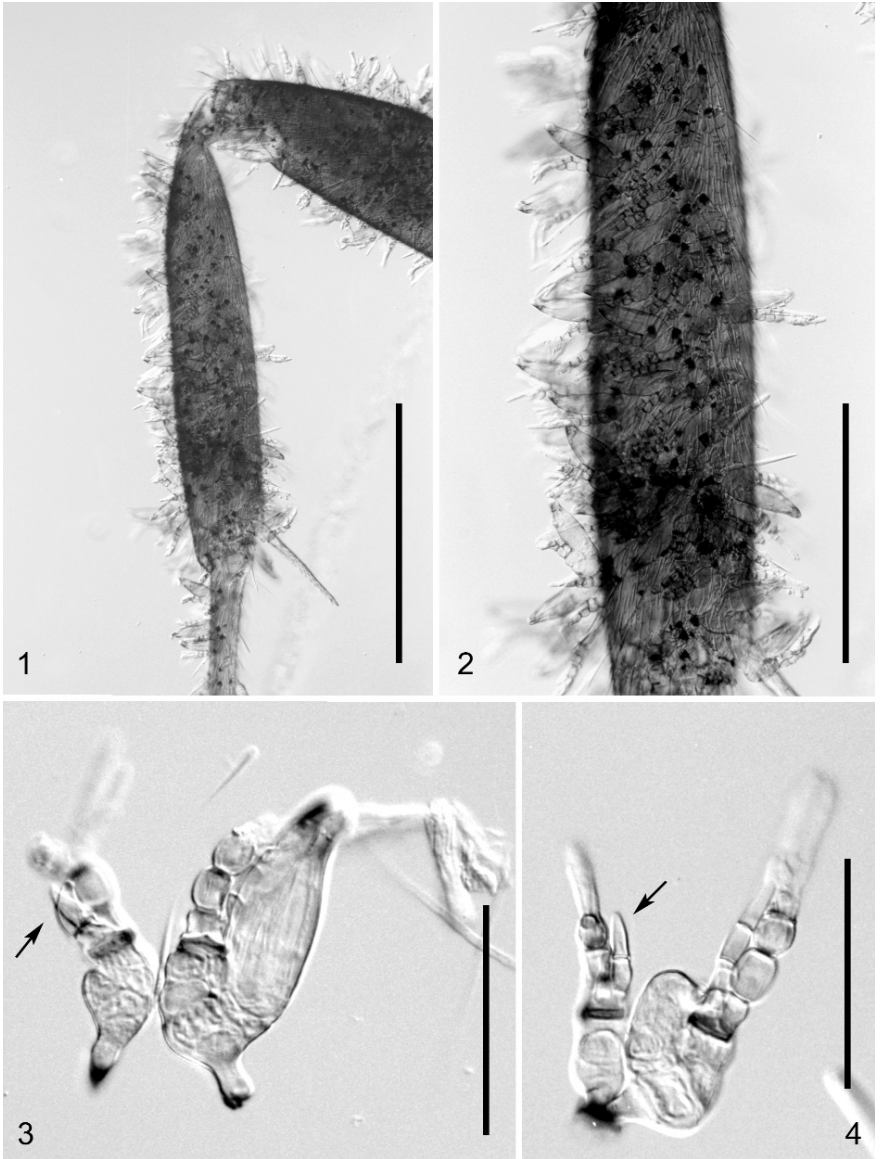


Fig. 1. Leg (femur + tibia) of an infested worker *Lasius grandis*. Scale bar = 500 μ m. **Fig. 2.** Femur of an infested worker. The dorsal face of the femur shows >60 dark, vaguely triangular spots, indicating the point of insertion of living *Laboulbenia* plus some left by abraded or fallen specimens. Scale bar = 250 μ m. **Fig. 3.** A pair of mature thalli, with the male at left and the female at right. The male shows two antheridia (arrow). Scale bar = 50 μ m. **Fig. 4.** A pair of immature thalli, with the male at left and the female at right. The male shows one antheridium in development (arrow). Scale bar = 50 μ m.

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