

Checklist of Algerian fungi – Part 3: Laboulbeniales (Ascomycota)

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Abstract

Our third contribution to the checklist of Algerian fungi is dedicated to Labouls (Laboulbeniales, Laboulbeniomycetes) an a typical and very diversified group of microscopic fungi that unsure their nutrition and/or dispersal by being insect ectoparasites. By screening all available bibliographic sources and herbaria catalogues it was possible to delineate 66 species belonging to 26 genera that occurs in Algeria. Additionally a list of 8 erroneous or doubtful records unsupported by literature and/or herbarium material is provided. This checklist is the first comprehensive species list fully dedicated to Algerian Laboulbeniales.

Key words – Mycobiota, Laboulbeniales, biodiversity, literature and herbaria catalogs survey, species list.

Introduction

The Laboulbeniales is an order of fungi within the class Laboulbeniomycetes (Ascomycota) that consists of over 2000 species that are obligate ectoparasites of Arthropoda, mainly insects, but also mites and millipedes.

They are in most cases microscopical fungi (0.04 mm to about 1 mm) that are unusual because they have no hyphae but cellular thalli, formed by enlargement and subsequent cell divisions of a two-celled ascospore. They parasitises the host through a foot cell which penetrates the insect cuticle with a haustorium and allows the fungus to extract nutrients from the insect body tissues. Therefore despite their parasitic habit, they cause usually little or no harm to the host, although they may impair host fitness if the level of infestation is high thus limiting their use as entomophagic agents.

First reports on Algerian laboulbeniales have been published by the famous American mycologist Roland Thaxter (1858–1932) after examination of Algerian insect specimens hold by some herbaria. In his five parts paper untitled “Contribution towards a monograph of the Laboulbeniaceae” (Thaxter 1895, 1908, 1901a, 1901b, 1902) he listed 3 genera and 9 species occurring in Algeria. Therefore the most comprehensive survey on Laboulbeniales of Algeria have been published by the French mycologist and botanist René Maire (1878-1949) who were established in the country and contributed drastically to the knowledge of it flora and mycobiota.

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He published 3 papers fully dedicated to the study of Laboulbeniales from North-Africa in which he raised the number of genera to 24 and the species to 57 from which two genera and 11 species were new to science (Maire 1912, 1916a, 1920).

In addition to the above-mentioned works at least the following ought to be mentioned as they contributed also significantly to the knowledge of Algerian laboulbeniales diversity Saccardo (1926), Picard (1913) and more recently Balazuc (1974, 1990), Santamaría *et al.* (1991). This later published a survey on the distribution of European Laboulbeniales in which he listed 62 species that occurs in Algeria. Therefore the reduced number and antiquity of the contributions on Laboulbeniales of Algeria lead one to believe that the country is clearly poorly explored and almost certainly contains many taxa of Laboulbeniales yet to be discovered. We trust that this will encourage scientists to investigate an important component of Algeria's biodiversity and to make it better known to the world's scientific community.

Material and Methods

Study area

Algeria, ca. 2.4 million km² in area, is the largest country of Africa since the partition of Sudan in 2011. It is situated to the north of this continent, its entire northern coastline stretches for ca. 1200 km along the southern boundary of the Mediterranean Sea, while inland it is delimited clockwise, along a boundaries totalling ca. 6400 km, by Tunisia, Libya, Niger, Mali, Mauritania, Sahrawi Arab Democratic Republic and Morocco. The country, which is mainly mountainous with an average altitude of 800 m, stretches from north to south (18°57'N to 37°08'N) to a distance of ca. 2000 km and from west to east (08°39'W to 12°00'E) to a distance of ca. 2100 km; the western parts of Algeria are only ca. 160 km from the Atlantic Ocean. The Mediterranean coastline and the two major mountain ranges, the Tell Atlas and the Saharan Atlas, delimitates southwards three major topographic and climatic regions (1) the Tell, (2) the Hauts-Plateaux and (3) the Sahara (Fig. 1).

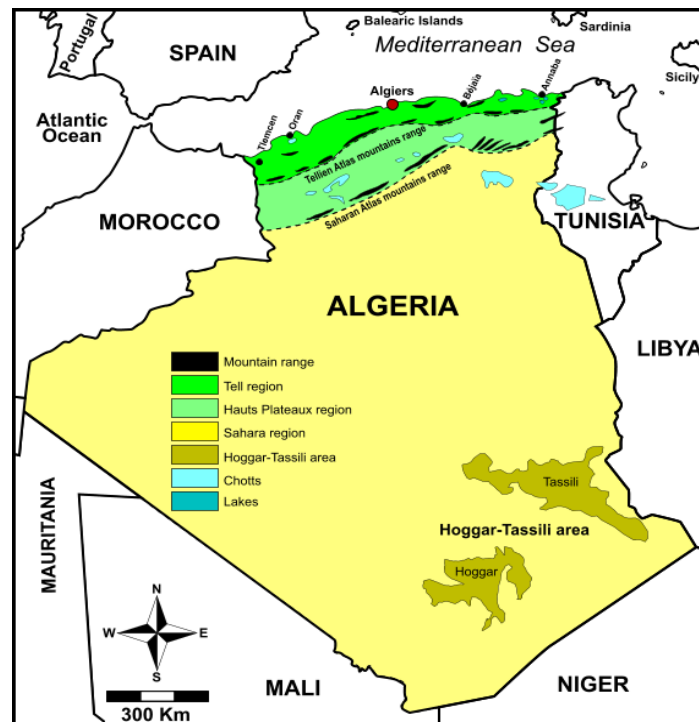


Fig 1 - Major biogeographical/bioclimatic regions of Algeria.

The Tell region, stretching only 80-190 km inland, includes the coastal strip and the Tell Atlas mountains (Tellian Atlas), that consist of narrow coastal plains, hills and mountains. The annual precipitation ranges from semi-arid (400-600 mm) to moderately humid with an increasing gradient from west to east where some permanent wetland areas occur. Although this region represents only ca. 4% of the Algerian territory, it includes 70% of the country's agricultural soils and hosts 65% of the population. The natural vegetation of this area is typically Mediterranean and many of the mountain slopes are covered with dense forest or scrub of mainly oaks (*Quercus suber*, *Quercus ilex*, *Q. coccifera*), junipers (*Juniperus oxycedrus*, *J. thurifera*, *J. phoenicea*), aleppo pine (*Pinus halepensis*) and Atlas cedar (*Cedrus atlantica*).

The Hauts-Plateaux area is essentially a huge basin, ca. 950 km in length, lying at an altitude of ca. 1000 to 1400 m between the parallel mountain ranges of the Tell Atlas to the north and the Saharan Atlas to the south. This basin, which is 190 km at its widest point, includes a series of depressions running along a central south-west to north-east axis that support in some places shallow saline wetlands (Chotts and Sebkhass), which are seasonally flooded and become more saline as they gradually dry out. The region covers 13% of the country and hosts 26.5% of its population. The annual precipitation of the region is ca. 150-400 mm and agriculture is limited to the cultivation of salt-tolerant cereals; natural vegetation is represented mainly by steppes of *Stipa tenacissima*, *Artemisia herba-alba* and *Lygeum spartum*.

The Saharan area is essentially a vast arid to desertic area characterized by very little rainfall (< 100 mm per annum) and only ephemeral streams. The Sahara desert is not homogenous and takes on many forms. In the far north-west it consists of stony and gravelly desertic high land known as the Hamada du Draâ. Eastwards, the southern slopes of the Saharian Atlas descend over a distance of ca. 250 km to a central depression at an altitude of 200-500 m running south-west to north-east and filled by extensive ergs (vast sandy desertic areas with mobile dunes). In the centre of the region the land rises up to the stony plateau of Tademait, while further south it drops away into the Tidikelt depression that lies at an altitude of less than 200 m. Southwards and eastwards of this depression, the land rises again through a series of mountains of different heights, including Mount Tahat (ca. 3000 m), the highest peak in Algeria. This mountainous area, with its deep canyons and high plateaux, delimitate the Hoggar-Tassili region that can be considered as a fourth topographic and climatic region of Algeria due to its situation that make it under the influence of the west African monsoon.

The whole Saharan region covers 83% of the country, but hosts only 8.5% of its population in several oases developed from underground rivers or aquifers. Agriculture, in almost all cases limited to the oases, is based on the cultivation of the date palm and food crops. Natural vegetation cover is very scarce and represented mainly by highly adapted bushes and trees.

Data Collection

The species listed here were compiled from bibliographical and herbaria (fungaria) online databases sources. A main list of Algerian Laboulbeniales has been developed and the taxa are given in alphabetical sequence of taxa and accepted names are highlighted in bold. The names of authors of fungal taxa are abbreviated according to Kirk and Ansell (1992) and Kirk *et al.* (2008). Name corrections, authorities reported in this work were checked against the databases Index fungorum (www.indexfungorum.org) and Mycobank (www.mycobank.org). The insect host species for each taxon is provided by keeping the original name provided by the authors.

Checklist of Algerian Laboulbeniales.

Abbreviations used

[**Herbaria (Fungaria) Specimens**]: Herbaria that hold specimens of the listed taxa are given between square brackets.

Cited herbaria (fungaria): M: Royal Botanical Garden of Madrid (Spain), NY: New York Botanical Garden (USA), PC: Muséum d'histoire Naturelle de Paris (France), SYRF: State University of New York Herbarium.

1. ***Amorphomyces italicus*** Speg.
Maire (1920), Santamaría *et al.* (1991), Santamaría (2000), Frank (2018a), Kedad and Bouznad (2018)
Trogophloeus (Carpelimus) halophilus (Staphylinidae).
2. ***Bordea coronata*** Maire (syn. *Autophagomyces coronatus*)
Maire (1916a), Saccardo (1926), Thaxter (1931), Benjamin (2000), Frank (2018a), Kedad and Bouznad (2018)
Brachygluta aubei (Staphylinidae).
3. ***Botryandromyces ornatus*** I.I. Tav. (syn. *B. heteroceri*, *Misgomyces Heteroceri*)
Maire (1920), Petrak (1920), Balazuc (1973, 1990a), Tavares & Majewski (1976), Santamaría *et al.* (1991), Weir (1994), Santamaría and Rossi (1999), Castaldo *et al.* (2004), Haelewaters *et al.* (2014), Rossi (2016), Rossi *et al.* (2019)
Heterocerus (Augiles) maritimus (Heteroceridae).
4. ***Cantharomyces bordei*** F. Picard
Maire (1912, 1916a), Picard (1912, 1913), Saccardo (1926), Thaxter (1931), Maire and Werner (1937), Santamaría *et al.* (1991), Benjamin (1989, 1992), Kedad and Bouznad (2018).
Limnichus sericeus (Limnichidae).
5. ***Cantharomyces numidicus*** Maire
Maire (1920), Petrak (1920), Saccardo (1926), Thaxter (1931), Huldén (1983), Santamaría *et al.* (1991), Santamaría and Rossi (1999), Castaldo *et al.* (2004), Rossi *et al.* (2010), Frank (2018a), Kedad and Bouznad (2018)
Trogophloeus (Thinodromus) mannerheimi (Staphylinidae).
6. ***Cantharomyces orientalis*** Speg. (syn. *C. abbreviatus*)
Maire (1920), Petrak (1920), Saccardo (1926), Thaxter (1931), Siemaszko and Siemaszko (1932), Huldén (1983), Santamaría *et al.* (1991), Majewski (1994), Castaldo *et al.* (2004), Rossi *et al.* (2010), Haelewaters and Yaakop (2014), Rossi (2016), Frank (2018a), Kedad and Bouznad (2018), Rossi and Bernardi (2018), Rossi *et al.* (2019)
Trogophloeus corticinus (Staphylinidae).
7. ***Compsomyces lestevi*** Thaxt. (syn. *C. lestevae*)
Maire (1916a), Balazuc (1973, 1990a), Santamaría *et al.* (1991), Frank (2018a), Kedad and Bouznad (2018).
Lesteva fontinalis (Staphylinidae).
8. ***Corethromyces apotomi*** Thaxt. (syn. *Eucoethromyces apotomi*)
Maire (1916a), Balazuc (1990a), Santamaría *et al.* (1991), Kedad and Bouznad (2018).
Apotomus flavescens (Carabidae).

9. ***Corethromyces elegans*** Maire (syn. *Peyerimhoffiella elegans*)
Maire (1916a), Saccardo (1926), Thaxter (1931), Huldén (1983), Balazuc (1973),
Santamaría *et al.* (1991), Castaldo *et al.* (2004), Haelewaters *et al.* (2014), Frank (2018a)
Brachygluta reichei, *B. dichroa* (Staphylinidae).
10. ***Corylophomyces peyerimhoffii*** (Maire) R.K. Benj. (syn. *Autophagomyces peyerimhoffii*,
Cryptandromyces peyerimhoffii)
Maire (1920), Petrak (1920), Thaxter (1931), Benjamin (1970), Balazuc (1990a),
Santamaría *et al.* (1991)
Arthrolips obscurus var. *sanctae-balmae* (Corylophidae).
11. ***Dimeromyces falcatus*** Paoli
Balazuc (1974, 1990b), Santamaría *et al.* (1991)
Canestrinia carabicola (Canestriniidae).
12. ***Dimeromyces longitarsi*** Thaxt. (syn. *D. bordei*)
Maire (1920), Petrak (1920), Thaxter (1924), Saccardo (1926), Balazuc and Demaux
(1973), Santamaría *et al.* (1991), Kedad and Bouznad (2018)
Longitarsus parvulus (Chrysomelidae).
13. ***Dioicomycetes anthici*** Thaxt. (syn. *D. anthici* var. *fuscescens*)
Maire (1916a, 1920), Petrak (1920), Saccardo (1926), Huldén (1983), Santamaría *et al.*
(1991), Santamaría (2002), Kedad and Bouznad (2018)
Anthicus instabilis, *A. rodriguesi* (Anthicidae).
14. ***Euzodiomyces lathrobii*** Thaxt.
Maire (1916a), Balazuc (1973), Huldén (1983), Santamaría *et al.* (1991), Santamaría and
Rossi (1999), Rossi *et al.* (2010), Frank (2018a)
Lathrobium anale (Staphylinidae).
15. ***Helodiomyces elegans*** F. Picard
Maire (1916a), Thaxter (1931), Balazuc (1973, 1990a), Huldén (1983), Santamaría *et al.*
(1991), Rossi *et al.* (2010)
Dryops luridus (Dryopidae).
16. ***Herpomyces periplanetae*** Thaxt.
Maire (1916a), Santamaría *et al.* (1991)
Periplaneta americana (Blattidae).
17. ***Laboulbenia achenii*** Maire
Maire (1920), Petrak (1920), Saccardo (1926), Frank (2018)
Achenium tenellum (Staphylinidae).
18. ***Laboulbenia casnoniae*** Thaxt.
Maire (1916a, 1920), Santamaría *et al.* (1991)
Demetrias atricapilliis (Carabidae).
19. ***Laboulbenia clivinalis*** Thaxt.
Maire (1916a), Balazuc (1974, 1990a), Huldén (1983), Santamaría *et al.* (1991), Kedad
and Bouznad (2018).
Clivina epsilon (Carabidae).
20. ***Laboulbenia deltomeri*** Maire
Maire (1916a), Fragoso (1924), Saccardo (1926), Siemaszko and Siemaszko (1932),
Maire and Werner (1937), Santamaría *et al.* (1991), Kedad and Bouznad (2018).
Deltomerus punctatissimus (Carabidae).

21. ***Laboulbenia dolicaontis*** Maire
Maire (1920), Petrak (1920), Saccardo (1926), Frank (2018a).
Dolicaon densiventris (Staphylinidae).
22. ***Laboulbenia flagellata*** Peyr. (syn. *L. flagellata* var. *bordei*, *L. flagellata* var. *romana*, *L. lepidoides* var. *bordei*, *L. algerina*)
Maire (1912, 1916a, 1920), Picard (1913), Saccardo (1926), Balazuc (1974), Santamaría *et al.* (1991), Kedad and Bouznad (2018).
Harpalus tenebrosus (Carabidae), *Platynus algerinus* (Carabidae), *Laemostenus fezzensis*, *Laemostenus prolixus* (Carabidae), *Olisthopus fuscatus* (Carabidae).
23. ***Laboulbenia lagari*** Speg.
Spegazzini (1915), Maire (1916a), Saccardo (1926), Kedad and Bouznad (2018).
Platysma (Lagarus) ineptum (Carabidae)
Maire (1916a) stated that Spegazzini (1915) misidentified the host of this taxon since the subgenus *Lagarus* (genus *Platysma*) does not exist in North Africa and that the host reported by Spegazzini belongs to the subgenus *Pedius* an another subgenus of *Platysma*.
24. ***Laboulbenia luxurians*** Peyr.
Maire (1920), Balazuc (1974), Santamaría *et al.* (1991), Haelewaters *et al.* (2014).
Bembidion varium (Carabidae).
25. ***Laboulbenia macrotheca*** Thaxt. (syn. *L. ophoni* var. *dilatata* Maire)
Maire (1920), Petrak (1920), Santamaría *et al.* (1991).
Ophonus pubescens (Carabidae).
26. ***Laboulbenia nebriae*** Peyr. (syn. *L. nebriae* subsp. *maghrebiana*)
Thaxter (1908), Maire (1912, 1916a), Picard (1913), Balazuc (1974), Santamaría *et al.* (1991), Santamaría (1993), Kedad and Bouznad (2018).
Nebria rubicunda (Carabidae).
27. ***Laboulbenia ophoni*** Thaxt.
Thaxter (1899, 1908), Saccardo (1902), Maire (1912, 1916a, 1920), Picard (1913), Frago (1924), Balazuc (1974, 1990a), Huldén (1983), Santamaría *et al.* (1991), Rossi *et al.* (2010), Kedad and Bouznad (2018).
Ophonus sp. (Carabidae), *Scybalicus oblongiusculus* (Carabidae).
28. ***Laboulbenia orthomi*** Thaxt.
Thaxter (1899, 1908), Saccardo (1902), Maire (1912, 1916a), Picard (1913), Kedad and Bouznad (2018).
Orthomus aquila (Carabidae).
29. ***Laboulbenia pasqueti*** F. Picard
Maire (1916a), Balazuc (1974, 1990a), Santamaría *et al.* (1991), Santamaría (1993), Kedad and Bouznad (2018).
Chlaeniellus olivieri (Carabidae).
30. ***Laboulbenia pedicellata*** Thaxt.
Maire (1916a, 1920), Balazuc (1974, 1990a), Santamaría *et al.* (1991), Frank (2018a), Kedad and Bouznad (2018).
Reicheia lucifuga (Carabidae), *Dyschirius punctatus* (Carabidae), *Aleochara tenuicornis* (Staphylinidae).

31. ***Laboulbenia polyphaga*** Thaxt.
Thaxter (1908), Maire (1912, 1916a, 1920), Picard (1913), Balazuc (1974), Santamaría *et al.* (1991), Kedad and Bouznad (2018).
Bradycellus puncticollis (Carabidae), *Platyderus ruficollis* var. *alacris* (Carabidae), *Acupalpus luteatus* (Carabidae), *Platyderus nolatus* (Carabidae).
32. ***Laboulbenia proliferans*** Thaxt. (syn. *L. proliferans* var. *interposita*)
Thaxter (1895, 1908), Maire (1912, 1916a, 1920), Picard (1913), Santamaría *et al.* (1991), Kedad and Bouznad (2018).
Chlaenius velutinus, *C. aeratus*, *C. aeratus* var. *varvasi*, *Chlaenius* sp. (Carabidae).
33. ***Laboulbenia rougetii*** Mont. & C.P. Robin
Thaxter (1908), Maire (1912, 1916a, 1920), Picard (1913), Siemaszko and Siemaszko (1932), Santamaría *et al.* (1991), Kedad and Bouznad (2018).
*Chlaenius aeneocephalus** *C. chrysocephalus*, *C. fulgidicollis* (Carabidae), *Brachinus sclopeta*, *Brachinus* sp. (Carabidae)
*This taxon have been reported for Algeria by Thaxter (1908) on specimens of *Chlaenius aeneocephalus* which not occurs in Algeria. Maire (1916a) stated that the right host is most probably *Chlaenius chrysocephalus*, a closely related species.
34. ***Laboulbenia siagonae*** F. Picard
Picard (1913), Maire (1916a), Saccardo (1926), Santamaría *et al.* (1991), Kedad and Bouznad (2018).
Siagona rufipes (Carabidae).
35. ***Laboulbenia slackensis*** Cépède and F. Picard
Maire (1920), Balazuc (1974, 1990a), Santamaría *et al.* (1991).
Pogonus chalceus (Carabidae).
36. ***Laboulbenia subterranea*** Thaxt.
Maire (1916a), Balazuc (1974), Santamaría *et al.* (1991), Kedad and Bouznad (2018).
Trechus maculipennis, *T. rufulus*, *T. tingitanus* (Carabidae).
37. ***Laboulbenia thaxteri*** Cépède & F. Picard
Maire (1920), Santamaría *et al.* (1991), Weir (1994), Rossi *et al.* (2019).
Asaphidion (Tachypus) flavipes (Carabidae).
38. ***Laboulbenia vulgaris*** Peyr. (syn. *L. abyssalis*, *L. lepesmei*)
Maire (1945, 1916a, 1920), Saccardo (1926), Santamaría *et al.* (1991), Kedad and Bouznad (2018).
Bembidium maculatum, *B. minimum*, *B. dalmatinum* subsp. *africanum* (Carabidae), *Ocys (Oreocys) bedeli*, *Ocys (Oreocys) rufescens* (Carabidae).
39. ***Mimeomyces speluncalis*** (Maire) I.I. Tav. (syn. *Corethromyces speluncalis*, *Sphaleromyces speluncalis*)
Maire (1916a, 1920), Petrak (1920), Saccardo (1926), Thaxter (1931), Lepesme (1941), Frank (2018a).
Heterothops nigra (Staphylinidae).
40. ***Misgomyces dyschirii*** Thaxt.
Maire (1916a, 1920), Thaxter (1931), Balazuc (1973), Huldén (1983) Santamaría *et al.* (1991) Rossi *et al.* (2010).
Dyschirius rufoaeneus (Carabidae).
41. ***Misgomyces reicheiae*** (Santam.) Santam.
Santamaría (1989c), Balazuc (1990a), Santamaría *et al.* (1991), [M]
Reicheia brisouti, *R. kabyliana* ssp. *quezeli*, *R. subterranea* (Carabidae).

42. ***Monoicomycetes homalotae*** Thaxt. (syn. *M. homalotae* var. *geostibae*)
Maire (1916a, 1920), Saccardo (1926), Thaxter (1931), Balazuc (1974), Huldén (1983), Santamaría *et al.* (1991), Frank (2018a).
Atheta pertyi, *A. amacula*, *A. parens* (Staphylinidae), *Geostiba peyerimhoffii* (Staphylinidae).
43. ***Monoicomycetes sanctae-helenae*** Thaxt.
Thaxter (1908, 1931), Maire (1912, 1916a), Picard (1913), Balazuc (1974), Huldén (1983), Santamaría *et al.* (1991), Frank (2018a), Kedad and Bouznad (2018).
*Oxytelus piceus**
* Thaxter (1908) cites as host insect for this taxon *Oxytelus luteipennis* (Staphylinidae) that which not occurs in Algeria. Maire (1916a) and Frank (2018) considers that it is most probably *Oxytelus piceus* (Staphylinidae) which is a very similar species.
44. ***Peyerimhoffiella elegans*** Maire (syn. *Corethromyces brachyglutae*, *C. elegans*, *Cryptandromyces elegans*)
Maire (1916a), Saccardo (1926), Siemaszko and Siemaszko (1932), Balazuc (1973), Huldén (1983), Santamaría *et al.* (1991), Rossi *et al.* (2013), Haelewaters *et al.* (2014), Frank (2018a), Kedad and Bouznad (2018).
Brachygluta reichei, *B. dichroa* (Staphylinidae).
45. ***Peyritschiella furcifera* (Thaxt.) I.I. Tav.** (syn. *Dichomyces furciferus*, *D. furcifer*)
Maire (1916a), Thaxter (1931), Santamaría *et al.* (1991), Frank (2018a), Kedad and Bouznad (2018).
Philonthus discoideus (Staphylinidae).
46. ***Peyritschiella princeps* (Thaxt.) I.I. Tav.** (syn. *Dichomyces princeps*)
Maire (1916a), Thaxter (1931), Santamaría *et al.* (1991), Frank (2018a).
Philonthus sordidus (Staphylinidae).
47. ***Peyritschiella protea*** Thaxt.
Maire (1920), Siemaszko and Siemaszko (1932), Balazuc (1974, 1990a), Huldén (1983), Santamaría *et al.* (1991), Haelewaters *et al.* (2017), Frank (2018a), Kedad and Bouznad (2018), Rossi *et al.* (2019).
Planeustomus miles (Staphylinidae).
48. ***Peyritschiella vulgata* (Thaxt.) I.I. Tav.** (syn. *Dichomyces vulgatus*)
Maire (1916a), Santamaría *et al.* (1991), Frank (2018a).
Philonthus minutus (Staphylinidae).
49. ***Rhachomyces fagniezi*** F. Picard
Maire (1920), Thaxter (1931), Santamaría *et al.* (1991).
Zuphium baeticum (Carabidae).
50. ***Rhachomyces furcatus* (Thaxt.) Thaxt.**
Maire (1916a, 1920), Balazuc (1973), Huldén (1983), Santamaría *et al.* (1991), Frank (2018a), Kedad and Bouznad (2018), Rossi *et al.* (2019).
Othius pilifer, *O. punctulatus* (Staphylinidae).
51. ***Rhachomyces lavagnei*** (F. Picard) W. Rossi (syn. *Dimeromyces lavagnei*)
Maire (1916a, 1920), Thaxter (1924), Saccardo (1926), Balazuc (1974), Santamaría *et al.* (1991), Rossi (2016), Kedad and Bouznad (2018).
Dyschirius sp. (Carabidae), *Microlestes laevipennis* (Carabidae).

52. ***Rhachomyces peyerimhoffii*** Maire
Maire (1912, 1915, 1916a, 1916b), Picard (1913), Fragoso (1924), Saccardo (1926), Thaxter (1931), Santamaría *et al.* (1991), Kedad and Bouznad (2018), [M, NY, P, SYRF]
Trechus (Trechopsis) lapiei (Trechini).
53. ***Rhachomyces philonthinus*** Thaxt.
Maire (1920), Thaxter (1931), Huldén (1983), Santamaría *et al.* (1991).
Philonthus concinnus (Staphylinidae).
54. ***Rhachomyces stipitatus*** Thaxt. (syn. *Rhachomyces stipitatus* var. *pallidus*)
Maire (1912, 1916a), Picard (1913), Saccardo (1926), Lepesme (1941), Balazuc (1970, 1973, 1990a), Rossi (1978), Santamaría *et al.* (1991), Rossi *et al.* (2001), Kedad and Bouznad (2018), [P]
Duvalius (Aphaenops) iblis (Carabidae).
55. ***Rickia peyerimhoffii*** Maire
Maire (1920), Saccardo (1926), Thaxter (1926), Siemaszko and Siemaszko (1932), Balazuc (1974), Huldén (1983), Santamaría *et al.* (1991), Castaldo *et al.* (2004), Frank (2018), Kedad and Bouznad (2018), Rossi *et al.* (2019).
Scaphosoma agaricinum, *Scaphosoma flavonotatum* (Staphylinidae).
56. ***Scalenomyces endogaeus*** (F. Picard) I.I. Tav. (syn. *Laboulbenia endogaea*)
Balazuc (1971, 1974, 1990a), Santamaría *et al.* (1991), [P]
Reicheia sp.
57. ***Sphaleromyces obtusus*** Thaxt. (syn. *Corethromyces obtusus*)
Thaxter (1900, 1908, 1931), Saccardo (1902), Maire (1912, 1916a, 1920), Picard (1913), Siemaszko and Siemaszko (1932), Santamaría *et al.* (1991), Frank (2018a), Kedad and Bouznad (2018).
*Lathrobium Illyricum**, *Dolicaon illyricus*
* Thaxter (1900) cites as host insect for this taxon *Lathrobium Illyricum* (Staphylinidae) that does not occur in Algeria. Maire (1916a) considers that it is most probably *Dolicaon illyricus* (Staphylinidae) which is a very similar species.
58. ***Sphaleromyces propinquus*** Thaxt. (syn. *Corethromyces propinquus*)
Maire (1916a, 1920), Thaxter (1931), Santamaría *et al.* (1991), Frank (2018a), Kedad and Bouznad (2018).
Dolicaon illyricus (Staphylinidae).
59. ***Stichomyces conosomatis*** Thaxt.
Maire (1920), Thaxter (1931), Santamaría *et al.* (1991), Castaldo *et al.* (2004), Haelewaters *et al.* (2017), Rossi *et al.* (2019).
Conosoma testaceum (Staphylinidae).
60. ***Stigmatomyces crassicollis*** Thaxt. (syn. *Stigmatomyces papuanus* var. *leiostoma*)
Maire (1920), Saccardo (1926), Thaxter (1931), Santamaría *et al.* (1991), Rossi *et al.* (2013).
Leptocera (Limosina) fontinalis (Limosiniinae).
61. ***Stigmatomyces micrandrus*** Thaxt.
Rossi (1988), Santamaría *et al.* (1991).
Psilopa nana (Ephydriidae).
62. ***Stigmatomyces purpureus*** Thaxt.
Rossi (1988, 2016), Rossi *et al.* (2013)
Scatella stagnalis (Ephydriidae).

63. *Stigmatomyces rugosus* Thaxt.
Rossi (1988), Santamaría *et al.* (1991), Rossi *et al.* (2013).
Psilopa flavipalpis (Ephydridae).
64. *Stigmatomyces trianguliapicalis* T. Majewski
Rossi (1988), Santamaría *et al.* (1991).
Parydra hecate (Ephydridae).
65. *Teratomyces actobii* Thaxt. (syn. *Teratomyces atropurpureus*)
Maire (1920), Petrak (1920), Benjamin (1968), Balazuc (1974, 1990a), Santamaría *et al.* (1991), Rossi *et al.* (2019).
Actobius signaticornis (Staphylinidae).
66. *Triceromyces hydrometrae* R.K. Benj.
Santamaría and Rossi (1999), Santamaría (2008).
Hydrometra stagnorum (Hydrometridae).

Erroneous or doubtful records weakly supported by literature and herbarium material.

1. *Euzodiomyces capillarius* Cépède & F. Picard
Frank (2018a).
Lobrathium anale
This taxon is quoted for Algeria only by Frank (2018) probably by error since the given references (Maire 1916a, Balazuc 1973b) and host insect (*Lobrathium anale*) are the same to those supplied by this author for *Euzodiomyces lathrobi* (Staphylinidae).
2. *Laboulbenia acupalpi* Speg.
Santamaría (1989b), Balazuc (1990a), Santamaría *et al.* (1991), Haelewaters *et al.* (2015).
Acupalpus sp.
Santamaría (1989b) consider possible the occurrence of this taxon in Algeria on the basis of Thaxter's report (1908) on the presence of *Laboulbenia polyphaga* on *Acupalpus luteatus* ((as *Bradycellus puncticollis* (Carabidae) and included it later in the list of Laboulbeniales that occurs in Algeria (Santamaría *et al.* 1991).
3. *Laboulbenia egens* Speg.
Balazuc (1990a), Santamaría *et al.* (1991).
Tachys (*Tachyura*) *parvula* var. *curvimanus* (Carabidae)
Santamaría *et al.* (1991) consider that this taxon occurs in Algeria after examination of an illustration of an Algerian specimen from Balazuc's collection classified as *Laboulbenia tachyis* but having all the characteristics of *L. egens*.
4. *Laboulbenia gyrinicola* Speg.
Maire (1916a), Siemaszko and Siemaszko (1932), Balazuc (1971b), Huldén 1983
Santamaría *et al.* (1991).
Gyrinus urinator, *G. natator* (Gyrinidae)
Reported by several authors as present in Algeria only on the basis of Maire (1916a) reports and in which the localities mentioned (Tanger, Aïn-Hammera = Aïn Hamra) are in fact located in Morocco.

5. *Laboulbenia polyhirmae* Thaxt.

Thaxter (1899), Saccardo (1902), Thaxter (1908), Picard (1913), Kedad and Bouznad (2018).

Polyhirma sp. (Carabidae)

Reported by several authors as present in Algeria only on the basis of Thaxter (1899) reports, this taxon must be excluded from the list of Algerian Laboulbeniales since the host cited by Thaxter (*Polyhirma* sp.) is a genus that lack totally in North Africa (Maire 1916a). and furthermore the locality mentioned by the author (Tangar, Algeria) correspond in all likelihood to Tanger in Morocco.

6. *Laboulbenia tachyis* Thaxt.

Maire (1920), Barragán *et al.* (2013).

Tachys haemorrhoidalis var. *socius*(Carabidae)

Barragán *et al.* (2013) Consider that all the records of *Laboulbenia tachyis* reported on various species of “*Tachys*” sensu lato from outside the American continent should be considered very carefully. Furthermore Santamaría *et al.* (1991) stated that report of this species by Maire (1920) for Algeria is possibly erraneous.

7. *Monoicomyces invisibilis* Thaxt. (syn. *Eumonoicomyces californicus*, *Monoicomyces californicus*)

Maire (1920), Thaxter (1931), Frank (2018a), Kedad and Bouznad (2018).

Oxytelus inustus (Staphylinidae)

Reported by Maire (1920) from Algeria, this taxon was considered soon by Thaxter (1931) on the basis of the illustration of the antheridium given by Maire (1920) of some other fungal species than *Monoicomyces californicus*.

Conflict of Interest

The authors do not have any conflicts of interest.

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