SOME INTERESTING GASTEROMYCETES (BASIDIOMYCOTA) IN DRY AREAS FROM NORTHEASTERN BRAZIL

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ABSTRACT — (Some interesting Gasteromycetes (Basidiomycota) in dry areas from northeastern Brazil). Some xerophytes gasteroid fungi from ‘caatinga’ vegetation are joined here. Several specimens belonging to four species were identified: Astraeus hygrometricus (Pers.: Pers.) Morg., Myriostoma coliforme (With.: Pers.) Corda, Podaxis pistillaris (L.: Pers.) Fr. emend. Morse and Tulostoma exasperatum Mont. All of these species, except P. pistillaris, represent first records from the caatinga region. Descriptions of macro and microscopic features are given including taxonomic and ecological considerations.

Key words — taxonomy, xerophilic fungi, caatinga

Introduction

The gasteroid mycota from dry areas of northeastern Brazil has received sporadic attention from collectors in the past and has not been adequately collected, few species in the scattered herbaria have been insufficiently reported. This paper highlights a few of the more unusual gasteroid fungi collected in some areas of the caatinga region.

The vegetation of the drier part of northeastern Brazil was called caatinga by the natives of that region, this name being maintained both in common use and scientific literature. According to Andrade-Lima (1981), although it is not the only climate type peculiar to the region, it is nevertheless the climate responsible for the caatinga vegetation.

Low and irregular rainfall and high temperatures are the main reasons for such climate.

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Floristically this biome is not a completely isolated vegetation type, with several species with widespread distribution in another biomes.

**Material and methods**

Collections of Gasteromycetes species basidiomata were made on March/1997 to June/1998, in areas of caatinga region from States of Paraíba and Pernambuco.

Climatic conditions are of the BSh type according to Köppen System. Fresh and dried material were prepared for examination in light microscopy by removing small sections of the peridium and gleba from the basidiomata and soaking them in Melzer’s reagent and 5% KOH (Singer, 1986). Colour terms in parenthesis are those of Kornerup & Wanscher (1978), abbreviated as KW.

The material is preserved at the Herbarium of the Instituto de Botânica, Seção de Micologia e Lichenologia (SP), abbreviated by acronyms according to the Index Herbariorum (Holmgren et al., 1990).

**Results**

**SCLERODERMATALES: ASTRAEACEAE**


Basonym: *Geastrum hygrometricum* Pers., *Syn. Meth. Fung.* 135, 1801. Fig. 1-3

Unexpanded basidiomata subglobose, 20-25 mm diam., epigeous. Exoperidium dehiscent to 8-14 lobes at maturity, reddish blond (KW-5C4) to yellowish brown (KW-5E5), thick, hard, four-layered: mycelial layer hyphae 4-6 µm diam., branched; fibrous layer hyphae 6-8 µm diam., branched; collenchyma-type layer hyphae 3-4 µm diam, branched; soft layer hyphae 3-6 µm diam. Endoperidium reddish blond (KW-5C3), thin, membranous, olate, no middle columela inside, hyphae 4-5 µm diam., branched; ostiole smooth to lacerate present. Gleba dark grey (KW-3F1), capillitium hyphae almost hyaline, asseptate, branched, 4-6 µm in diam.; basidiospores verrucose, brown, globose to subglobose, 7-10 µm diam.

**Material examined:** **BRAZIL. Paraíba:** Município de Patos, 03/VIII/1997, I. G. Baseia 180 (SP 307514); **Pernambuco:** Município de Afrânio, 08/IV/1998, I. G. Baseia 267 (SP 307515).

**Additional material examined:** (donated to SP Herbarium): **USA. New York:** Hampton Beach, 27/VII/1959, det. C. Rogerson (SP 141509); **PAKISTAN:** 12/VIII/1962, det. S. Ahmad (SP 107394).

**Habitat:** In groups on sandy soil at the base of ‘espinheiro’ (*Chloroleucon foliolosum* (Benth.) G. P. Lewis, Mimosaceae), in dry area.

**Distribution:** Argentina (Nouhra and Dominguez de Toledo, 1998), Brazil (Rick, 1961), China (Liu, 1984), France (Demoulin, 1983), Germany (Zeller, 1948), Mexico (Esqueda-Valle et al., 1990), Spain (Calonge and Demoulin, 1975), United States of America (Coker and Couch, 1928; Long and Stouffer, 1948).

**Remarks:** The genus *Astraeus* was proposed by Morgan (1889) whilst transferring *Geastrum hygrometricus* Pers. According to Nouhra and Dominguez de Toledo (1998), two species are currently included, *A. hygrometricus* (Pers.) Morgan and *A. pteridis* (Shear) Zeller. The genus was monotypic until Shear (1902) described *Scleroderma pteridis* as a new species, being subsequently transferred to *Astraeus*, by Zeller (1948).

This transfer and also its placement in the family Astraeaceae V. J. Stanek (order Sclerodermatales) seems to be generally accepted (Dring, 1973; Calonge and Demoulin, 1975; Demoulin and Marriott, 1981; Sunhede, 1989; Mornard, 1993).

According to Coetzee et al. (1997), the correct name and author citation are *Astraeus hygrometricus* (Pers.: Pers.) Morgan, whereas in the
Zeller (1948) opinion this species is cosmopolitan throughout temperate climates.

Coker and Couch (1928) stated A. hygrometricus to be a “worldwide in distribution” although it had not been satisfactorily recorded from South America, in spite of several mycological explorations. A. hygrometricus was cited from Brazil by Rick (1961) from Rio Grande do Sul, constituting the first register from the northeastern Brazil.

LYCOPERDALES: GEASTRACEAE

_Myriostoma coliforme_ (With.: Pers.) Corda, Anleit. zum Stud. der Myc. 16-17, 1842. Basonym: _Geastrum coliforme_ Pers., Syn. Meth. Fung. 131, 1801. Fig. 4-6. Unexpanded basidiomata subglobose, 30-50 mm diam., epigeous. Exoperidium dehiscent to 6-7 rays at maturity, reddish blond (KW-5C4), revolute, rigid, not hygroscopic, two-layered; mycelial layer glabrous, smooth, hyphae 4.7-7 µm diam., thick-walled, finely spinose; soft layer yellowish white (KW-4A3) to yellowish brown (KW-5F4), adnate, rigid at first, later peeling off. Endoperidium 20-30 mm diam., brownish grey (KW-5D2), pluripedicellate (6-8), plurioistillate (6-8), subglobose, hyphae 4-5 µm diam., branched; mouths fibrillose, peristome absent. Gleba yellowish brown (KW-5D5), pulverulent, several columellas (6-8); capillitium hyphae pale brown, unbranched, 4-4.5 µm diam., thick-walled; basidiospores globose, with halo, 3.5-4.5 µm diam. exclusive of halo, 6-7 µm diam. including halo, strongly warted, pale brown.

**Material examined:**

**BRAZIL, Paraíba:** Município de Patos, 03/VI/1997, I. G. Baseia 183 (SP 307514);

**Pernambuco:** Município de Ouricuri, 15/VII/1997, I. G. Baseia 197 (SP 307515).

**Additional material examined:** (donated to SP Herbarium): **BRAZIL, Rio Grande do Sul:** Paracatu, 1918, Rick, J. (SP 33983);

**Santa Catarina:** Município de Blumenau, 17/VIII/1965, Lowy 212-B (SP 92452).

**Habitat:** Solitary on sandy soil near at ‘umbuzeiro’ (_Spondias tuberosa_ Arruda Cam., Anacardiaceae), in dry place.

**Distribution:**

Argentina (Spegazzini, 1927), Brazil (Rick, 1961), Canary Islands (Beltrán-Tejera _et al._, 1998), Hawaii (Smith and Ponce de Leon, 1982), Mexico (Pardavé, 1991), South Africa (Bottomley, 1948), United States of America (Coker and Couch, 1928; Long and Stouffer, 1948).

**Remarks:** The genus _Myriostoma_ only contains one species: _M. coliforme_, characterized by an endoperidium borne on many pedicels and by many ostioles. It was originally described from England by Persoon (1801). Controversy about
Figure 4-6. *Myriostoma coliforme* (With.: Pers.) Corda. 4. basidioma (general aspect); 5. capillitium hyphae; 6. basidiospores.

the taxonomic position of the genus *Myriostoma* exists. In spite of the greater number of recent authors (Sunhede, 1989; Mornand, 1993; Hawksworth *et al.* 1995; Coetzee *et al.* 1997 and Beltrán-Tejera *et al.* 1998) they employed the genus *Myriostoma* in the family Geastraceae (Lycopercales); some others (Dring, 1973 and Ponce de Leon, 1982) have transferred this taxon to the family Astraeaceae (Sclerodermatales) based on the lacunar development of the gleba, according to them, probably in analogy with *Astraeus*. According to Coetzee *et al.* (1997), the correct citation to this species should be *Myriostoma coliforme* (With.: Pers.) Corda. At the present time, only one report of Geastraceae species from northeastern Brazil, appears in the literature (Kimbrough *et al.* 1995) to State of Pernambuco. *M. coliforme* was cited for the first time from Brazil by Rick (1961) to State of Rio Grande do Sul. This is the first report from the caatinga region.

**PODAXALES: PODAXACEAE**


Basonym: *Scleroderma pistillare* (L.) Pers., Syn. Meth. Fung. 150, 1801. Fig. 7-9. Basidiomata epigeous, stipitate, 12-17 cm high, consisting of an campanuliform to subcylin-
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America (Brasfiel, 1937), West Tropical Africa (Dring, 1964).

Remarks: According to several authors (Morse, 1933; McKnight and Stransky, 1980; DeVilliers et al., 1989) *P. pistillaris* is a rather polymorphic species with great variation in the size of the basidiomata, basidiospores and structure of the capillitium hyphae. Chaves Batista (1950) without comparing or discussing any species previously reported, described three new species of *Podaxis* from Brazil using a combination of microscopic basidiospore characteristics. However, these features in our opinion, are not a solid support to establish these new taxa and probably are not valid, since there were included in concept of *P. pistillaris* sensu Morse.

According to Coetzee et al. (1997) the terms of article 47.1 of the Tokyo Code, the reassessment of this species by Morse (1933) “... does not warrant a change of authorship of this taxon”, as has been done by Bottomley (1948). The appropriate citation, as employed in Dring and Rayss (1963), Binyamini (1973) and De Villiers et al. (1989), adopted here to reflect the changes to the ICBN enacted in 1981 (Korf, 1983), is *Podaxis pistillaris* (L.: Pers.) Fr. emend. Morse.

TULOSTOMALALES:
TULOSTOMATACEAE

*Tulostoma exasperatum* Mont., Ann. Sci. Nat. (Bot.) II, 8: 362, 1837. Fig. 10-12. Basidiomata composed of sporocarp and stipe. Sporocarp depressed globose, 12-16 mm high, 14-22 mm wide; exoperidium composed by long pointed, conical warts, 1-2 mm long, dark brown (KW-5F3), deciduous on upper part leaving distinct yellowish white (KW-4A2) scars. Stipe woody, yellowish brown (KW-5F2), cylindrical, 3-5 cm tall. Endoperidium almost yellowish white (KW-4A1), composed of hyphae similar to the capillitium threads, but hyaline; mouth raised, fibrillose, about 1 mm diam. Gleba dark brown (KW-5F4), pulverulent; capillitium hyphae thin-

Figure 7-9. *Podaxis pistillaris* (L.: Pers.) Fr. emend. Morse. 7. basidioma (general aspect); 8. capillitium hyphae; 9. basidiospores.
walled, branched, not exceeding diameter of basidiospores, hyaline, rarely septate with un-swollen nodes, 1.5-3 µm diam.; basidiospores globose to subglobose, 6-7 µm diam., very strongly warted, pale brown.


Habitat: In groups on decaying wood of ‘ju-remoa-preta’ (Mimosa tenuiflora (Willd.) Poiret., Mimosaceae), in dry place.

Distribution: Argentina (Spegazzini, 1927), Brazil (Lloyd, 1906; Rick, 1961; Bononi et al. 1984), Cuba (Saccardo, 1888; White, 1901), India (Long and Ahmad, 1947), Philippine Islands and United States of America (Long, 1947), Venezuela (Dennis, 1970).

Remarks: The genus Tulostoma was proposed by Persoon (1801) and it is characterized by stipe inserted in a socket at the base of the subglobose endoperidium which opens by a small apical mouth. Only one other genus, named Schizostoma has a stipe of this nature.

From Schizostoma however, Tulostoma differs in having a well-developed mouth and septate capillitium threads. According to Wright (1987) this group is worldwide in distribution with a presence to warm and sandy places. Currently, 79 species are considered (Hawksworth et al., 1995).

All of the Tulostoma species occurring on the ground, with the exception of two or three species which grow on decaying wood, like as T. exasperatum, characterized by exoperidium covered by long pointed conical warts, shape of basidiospores very strongly warted.

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References


