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SUMMARY

Calyptothecium planifrons (Ren. & Par.) Argent is reported new to the Western Hemisphere based on two recent collections from Brazilian Amazonia, in Pará and Rondônia; *C. planifrons* was originally described from Madagascar. Fourteen other species of mosses with apparently disjunct distributions between tropical Africa and tropical America are also discussed. It is likely that most or all of the species discussed will prove to have wider distributions in the tropics when world-wide revisions are carried out.

INTRODUCTION

According to Richards (1984) "The links between the moss floras of tropical Africa and tropical America, especially the Caribbean area, are particularly strong and an increasing number of West African taxa are being shown to be synonymous with neotropical taxa." Richards refers to the recent studies of Edwards (1980) on African *Calymperes* and Touw (1976) on African *Thuidium* as examples of revisionary studies that greatly reduce the number of taxa actually known to occur in tropical Africa by placing many previously accepted names into synonymy. Similarly, my own studies on *Calymperaceae* (1961, 1977, 1978) accomplished the same thing for the American tropics, as did the studies of Crosby (1969) for *Pilotrichum* (= *Callicosta*) and Zander (1972) for *Leptodontium*. The conspectus of African species of *Syrrhopodon* by Orbán (1981) also resulted in many names being placed into synonymy and revealed further African-American disjunctions. It is appropriate here to refer to the work of Tixier (1978), whose review of *Syrrhopodon* in Indo-Malaysia resulted in massive reductions to synonymy and in demonstration that many of the *Syrrhopodon* species he treated have wide ranges in the tropics. Other students of mosses, e.g. Frahm (1982) and Ochi (1972, 1980), amply demonstrate the great value of taking a world view in studies of mosses. Touw (1974) presents a very interesting analysis of the history and ultimate fate of names

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of mosses treated in recent revisions.

The study reported here was prompted by the discovery that two specimens of a moss collected recently at widely separate sites in Brazilian Amazonia were conspecific with *Calypothecium planifrons* (Ren. & Par.) Argent, originally described from tropical Africa. It seemed appropriate, in reporting on *C. planifrons* from Brazil, that a brief review be given of the literature on similar disjunctions in mosses. Following the report of *C. planifrons*, I review below other reports of tropical American-tropical African disjunctions in mosses. Many of the mosses I discuss below were included by Buck & Griffin (1984) in their review of African-South American bryogeography. They also include, as tropical lowland disjuncts between Africa and South America, eight species of mosses additional to those I list here.

CALYPTOTHECIUM PLANIFRONS (REN. & PAR.) ARGENT, PTEROBRYACEAE, NEW TO THE WESTERN HEMISPHERE.

In 1978, and again in 1983, I collected, a single specimen in each case, a moss that I was unable to identify with any other known from South America. Following a long and futile effort on my part I asked Dr. W. C. Steere for assistance, and he ultimately came up with the name *C. planifrons*, a moss described originally from Madagascar. The Brazilian and African specimens, although perhaps differing in minute ways, clearly belong to the same species and thus furnish another connection between the tropical American-tropical African bryofloras. [Brazil: Rondônia, 2 m on small tree in mature forest, 2-4 km above the first rapids on the Rio Pacaas Novos, foothills of the Serra dos Pacaas Novos, ca. 11°S, 64°W, elev. ca. 200 m, 17 Mar 1978, Reese 13382 (INPA, NY); Pará, on vines and shrubs at Serra Maze, mature, tall, humid forest on steep slopes, km 1208 along Cuiabá-Santarém highway (BR-163), ca. 5°55'S, 55°40' W, elev. ca. 200 m, 18 May 1983, Reese 16751 (INPA, LAF, MO, NY, SP).] The sites of these two collections are approximately 1100 km apart. Both specimens are sterile. *Calypothecium planifrons* is otherwise known only from Africa, from Madagascar, Congolese Republic, Chad, Central African Republic, and Zambia (Argent, 1973b). The illustrations of the African *C. planifrons* provided by Argent resemble the Brazilian specimens down to the last detail, including the gemmae.

OTHER MOSSES DISJUNCT BETWEEN TROPICAL AMERICA AND TROPICAL AFRICA.

Review of literature reveals only a few other moss species known to occur disjunctly in Africa and tropical America, but not elsewhere. However, it is likely that some or all of those listed below will prove to have larger ranges eventually following revisionary studies. This discussion is restricted to mosses of low tropical rainforest habitats.

Fissidentaceae

Fissidens kegelianus C.Muell. - This species ranges widely in tropical and subtropical regions of the Americas, and was reported recently from Tanzania by Bizot & Pöcs (1979), who also mention that it occurs in Gabon and the Republic of Central Africa as well. This moss probably has a pantropical distribution (personal communication, R.A. Pursell).

Dicranaceae

Campylopus savannarum (C.Muell.) Mitt. - Frahm (1982) reported on disjunctions between Africa and the Americas in *Campylopus*, including *C. savannarum*, which is widely distributed in Central America and eastern South America, and also occurs in Africa, in Zaire, Cameroon, Zambia, Tanzania, and South Africa. Other species of *Campylopus* shown by Frahm to be disjunct between Africa and the Americas are high altitude species, such as *C. chrismarii* (C.Muell.) Mitt. and *C. incacorrallis* Herz., that do not occur in tropical lowlands.

Calymperaceae

Calymperopsis disciformis (C.Muell.) Tix. - According to Tixier (1967), *C. disciformis* occurs in Africa in Cameroon, Guinea, Congo, Nigeria and Usagara. Richards & Edwards (1972) reported this species from Sierra Leone, and Bizot & Pöcs (1979) added Tanzania to its range. In the Americas, according to Tixier (1967), *C. disciformis* occurs in Surinam, Venezuela, Panama, and Nicaragua.

Calymperopsis martinicensis (Broth.) Broth. - Tixier (1967) reported this species from tropical Africa in Cameroon, Congo, Gabon, and Central African Republic, while Richards & Edwards (1972) added Nigeria to its range. According to Tixier, this moss occurs in tropical America in Martinique and Surinam.

Syrrophodon cryptocarpus Dozy & Molk. - Reported by Orbán (1981) from Africa in Zaire and Gabon, where it had previously been known as *S. lineaeifolius* P. Varde. This species occurs in the American tropics in Trinidad, Venezuela, northern Brazil, eastern Bolivia and Peru, and Colombia.

Syrrophodon gaudichaudii Mont. - This moss was shown by Orbán (1981) to have a wide distribution in Africa where it had been known under many synonyms. Orbán described its African distribution as "East African islands, the whole tropical and South Africa (except dry areas): Tristan da Cunha..." This species is also widely distributed in tropical and subtropical America, from Florida and Mexico south to northern Argentina. It is very likely that it will also turn up under various names in Asia.

Calymperes levyanum Besch. - Magill (1981) reported *C. levyanum* new to Africa on a single collection from southern South Africa. In the Americas, *C. levyanum* occurs in the Caribbean area, Central America and northern South America. It will likely

turn up under other names to the north in tropical Africa.

Racopilaceae

Racopilum tomentosum (Hedw.) Brid. - Schultze-Motel (1975) noted the occurrence of *R. tomentosum* in Africa in Guinea and Fernando Po, and I have seen a specimen at NY from Cameroon (Dusén, VII-12-1891), under the name *R. mucronatum* P. Beauv., that is apparently identical to the American *R. tomentosum*.

Leucodontaceae

Leucodontopsis geniculata (Mitt.) Crum & Steere - Richards & Argent (1968) first noted the disjunct occurrence in Africa of this moss, originally described from tropical America. In Africa this species was known under the name *L. cameruniae* (Broth.) Broth. Schultze-Motel (1975) summarized its African distribution as Nigeria, Ghana, Central African Republic, Cameroon, and Gabon; it has a wide distribution in tropical and subtropical America.

Pterobryaceae

Calyptothecium planifrons (Ren. & Par.) Argent - See discussion above.

Jaegerina scariosa (Lor.) Arzeni - This species was known in Africa under other names until Argent (1973a) demonstrated that the African plants were the same as those known in the Americas as *J. scariosa*. Its range in Africa includes Cameroon, Gabon, Ghana, Nigeria, and Central African Republic, as reported by Argent. Schultze-Motel (1975), added Guinea to the range in his review of African literature on mosses.

Neckeraceae

Neckeropsis disticha (Hedw.) Kindb. - In his review of African moss literature (1975), Schultze-Motel noted the occurrence in Africa of this species in Ghana, Togo, Central African Republic, Cameroon, Fernando Po, Gabon, and Congo, and De Sloover (1977) reported *N. disticha* new for Burundi. In the Americas, *N. disticha* occupies a wide range from Florida and Mexico south throughout tropical South America.

Plagiotheciaceae

Stereophyllum radiculosum (Hook.) Mitt. - This species was included by Schultze-Motel (1975) in his review of African moss literature, from Cameroon. Egunyomi (1980) reported *S. radiculosum* new to Nigeria. In the Americas, this species ranges widely from the southern United States throughout the American tropics.

Sematophyllaceae

Taxithelium planum (Brid.) Mitt. - This species was reported from Africa in

Nigeria by Mitten (1863) but apparently has not been recorded from there since. It has a wide range in the Americas, from Florida and Mexico southwards.

Hypnaceae

Racopilopsis trinitensis (C.Muell.) Britt. & Dix. - Reports of this moss in Africa were summarized by Schultze-Motel (1975): Ghana, Nigeria, Central African Republic, Cameroon, Gabon, and Congo, and it was also discussed by Richards & Argent (1968) who noted its occurrence in Madagascar, and Bizot & Pócs (1982), who reported it from Tanzania. In the Americas, *R. trinitensis* occurs in Central America and northeastern South America.

DISCUSSION

Due to the relatively poor state of knowledge of the bryofloras of tropical areas of the world in general, as noted in particular by Tow (1974), it is certain that the small list of amphiatlantic mosses given above is not exhaustive, and doubtless I have overlooked other examples. It also seems certain that further examples of amphiatlantic mosses will turn up when revisions are performed of appropriate taxa. *Isopterygium tenerum* (Sw.) Mitt., for example, is a likely candidate to turn up in tropical Africa under other names because it is so widespread in the Americas, ranging from the eastern United States deep into South America. Additionally, there are a few taxa now recognized as vicariads at the level of subspecies that might, on closer examination, be accepted as disjunct species. Tow (1976) for example, recognized two subspecies of *Thuidium involvens* (Hedw.) Mitt., one in Africa and the other in the Americas. He noted, however, that the differences separating the two were not great. Also Edwards (1980), in his revision of west tropical African *Calymperes*, recognized subspecies of *C. lonchophyllum* Schwaegr. and *C. palisotii* Schwaegr. disjunct between Africa and America. Mention has already been made above that there is a good possibility for species discussed here to turn out to have greater ranges than are known at present. Such species may prove to occur also in Asia and thus have a tricentric pattern of distribution, or may prove to be more or less pantropical, as is already known for certain mosses, *Octoblepharum albidum* Hedw., for example.

Future workers on revisionary studies of tropical mosses should be encouraged to seek additional instances of amphiatlantic distributions.

RESUMO

Calypothecium planifrons (Ren. & Par.) Argent (Pterobryaceae) é uma nova

ocorrência para o Brasil, sendo baseada nas coletas dos Estados do Pará e Rondônia. Outras 14 espécies de musgos com distribuição disjunta entre África e América tropical são também discutidas baseadas na literatura.

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