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Affinities between the bryoflora of East Africa and Madagascar

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SUMMARY

The distribution patterns of 500 bryophyte species from East Africa were analysed. The analysis was viewed in the light of the continental drift hypothesis. As an example the *Rutenbergiaceae* are cited.

RÉSUMÉ

L'auteur discute les aires de répartition de 500 espèces de Bryophytes de l'Afrique orientale en tenant compte de l'hypothèse de la dérive des continents. La famille des Rutenbergiacées est citée en exemple.

The distribution patterns of the bryophytes collected by the author and his colleagues in East Africa were analysed in relation to their distribution in Madagascar and relative to the age of the East African mountains.

The young volcanoes from the Tertiary era have 83 species (16.6% of the total found, 500) which do not occur in the cristalline mountain chains. Only 4 of these are in common with Madagascar.

On the other hand, the old cristalline chains of Precambrian origin in SE Kenya and E Tanzania, namely the Taita, Kasigau and Sagala Hills, and the Pare, Usambara, Nguru, Ukaguru, Uluguru, Usagara, and Uzungwe Mountains bear a bryoflora closely related to that of Madagascar and which is quite isolated from the bryoflora of the young volcanoes from the Tertiary, such as Mt Kilimanjaro, Mt Meru and others.

These mountains have 225 species (45%) out of the total, which do not occur on the volcanoes. 89 (17.8%) out of these 225 species are in common with Madagascar and the Mascarenes.

In continental Africa 34 species of the above-mentioned Madagascar-Mascarene group are restricted to the area of the old cristalline chains of East Africa, and 7 others occur also in South Africa. The remaining 48 species have a wider distribution.

The following Madagascan species are restricted to the old cristalline mountain areas of East Africa:

Bazzania borbonica
Chiloscyphus mascarenensis
Porella triquetra
Frullania cambouena
Cololejeunea bidentula
Cololejeunea xaverii
Diplasiolejeunea utriculata
Diplasiolejeunea runssorensis
Dicranolejeunea madagascariensis
Drepanolejeunea cambouena
Cheilolejeunea silvestris var. s.
Microdus minutus
Campylopus fusco-luteus
Leucoloma bifidum
Leucoloma brotheri
Leucoloma cuneifolium
Leucoloma sinuosulum
Leucobryum mayottense
Leucophanes hildebrandtii
Leucophanes rodriguezii
Syrrhopodon lepervenchei
Syrrhopodon sparsus
Syrrhopodon spiralis
Hyophila potieri
Weisiopsis plicata
Racomitrium plicatum
Anomobryum laceratum
Macromitrium mauritianum
Schlotheimia malacophylla
Racopilum plicatum
Hildebrandtiella pachyclada
Pilotrichella perrobusta
Macrohymenium acicodon
Orthostichopsis subimbricata

The following Madagascan elements also occur in South Africa:

Jamesoniella purpurascens
Riccardia saccatiloba
Leucobryum isleanum
Macromitrium tristratosum
Leucodon capensis
Eriopus asplenioides
Entodon geminidens

There are only 176 species, 35.2% of the 500 species, which occur both in the volcanic and in the cristalline zones.

The above-mentioned data point to the fact that the old cristalline mountains have had an ancient link with Madagascar before the formation of the volcanoes. The recent ideas on the continental drift hypothesis (Vine, 1966; Heirtzler & al., 1968; Hurley, 1968; Le Pichon, 1968) support the opinion, that these elements developed and spread in the old cristalline mountains of East Africa and Madagascar before this part of Gondwanaland separated. This separation occurred according to the geologists and geophysicists between 140 and 100 million years ago, in the Cretaceous, when the phanerogams were at the start of their present-day development (Schuster, 1969). This is one reason why, among the bryophytes and other cryptogams, the percentage of elements in common with Madagascar and Continental Africa is higher than among the phanerogams. In some cases, more recent speciation took place among the bryophytes. A good example of this is the family *Rutenbergiaceae* (Fig. 1), which was considered to be indigenous to Madagascar and the Mascarenes in the form of the genus *Rutenbergia*. The other representative genus of this family, *Neorutenbergia*, was discovered on the mainland of Africa (Dixon, 1919; Bizot & Pócs, 1974: 444).

On the high volcanoes of East Africa (Kilimanjaro, Mt Kenya, Mt Meru, Mt Rungwe, Muhavura, Elgon, etc.) the above-mentioned Madagascan element is poorly represented and there is no member of the *Rutenbergiaceae*. Instead, a relatively high percentage of afro-alpine elements are present, composed of Holarctic, Mediterranean as well as endemic species, e.g. *Hylocomium splendens*, *Leptodon smithii*,

Oligotrichum cavallii. Where the volcanic and cristalline areas are very near to each other, this phenomenon is even more obvious (Kilimanjaro-Pare Mts, Southern Highlands).

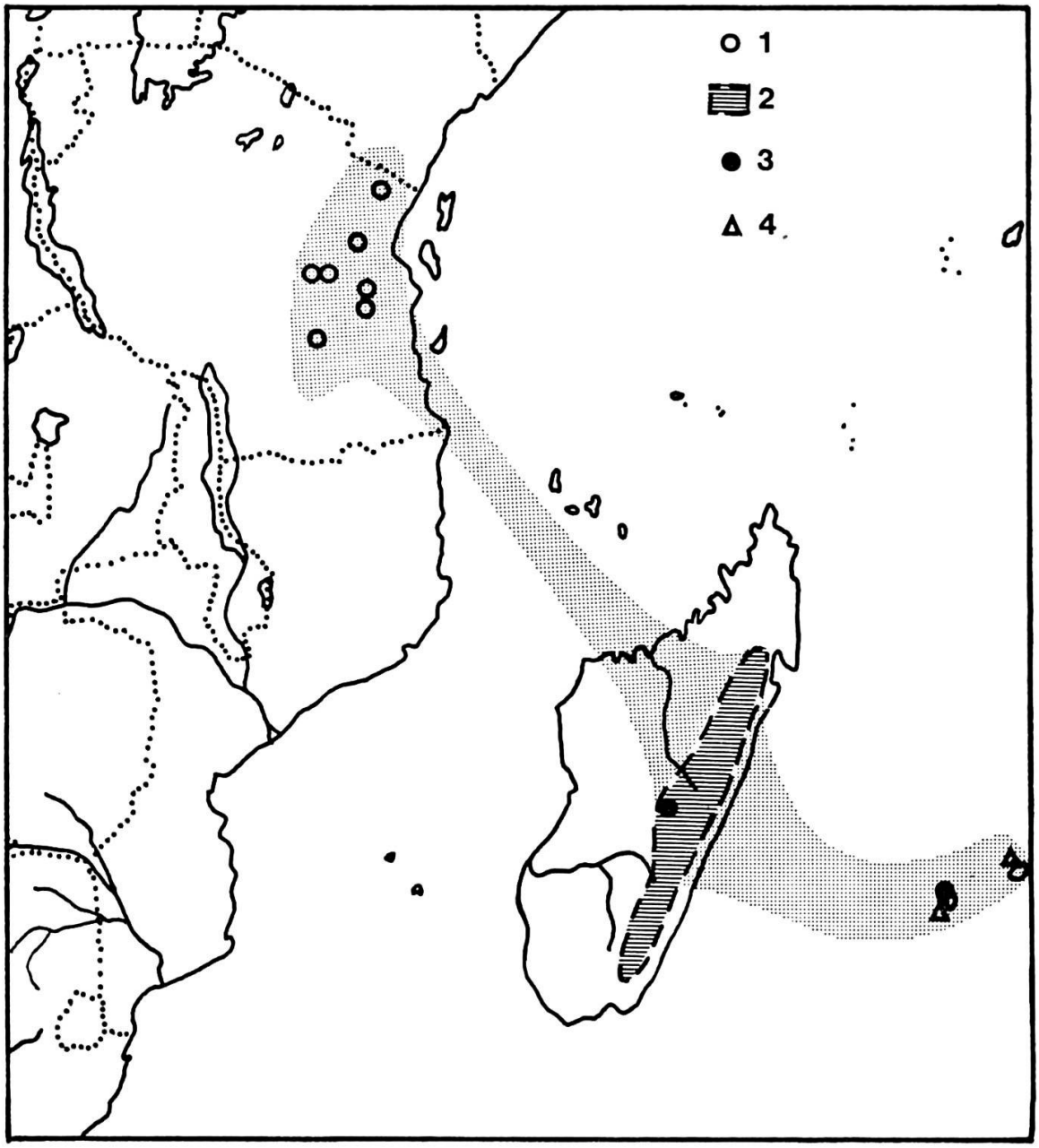

Fig. 1. — The distribution of the family *Rutenbergiaceae.*
1. *Noerutenbergia usagarae* (Dixon) Bizot & Pócs. — 2. *Rutenbergia cirrata* Renauld & Cardot, *R. limbata* (Hampe) Bescherelle, and *R. madagassa* Geheeb & Hampe. — 3. *Rutenbergia borbonica* Bescherelle. — 4. *Rutenbergia prionodon* (Bescherelle) Renauld.

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