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## **Note on the northern temperate element in the flora of the Ethio-Arabian region**

J. J. LAVRANOS

### **SUMMARY**

In studying the flora of the Ethio-Arabian region, the author subdivides the northern extra-tropical element into four different categories based on their distribution. The geographical affinities are analysed, and the present-day distribution pattern is discussed from a paleogeographical point of view.

### **RÉSUMÉ**

Lors de son étude de la flore de la région éthiopico-arabe, l'auteur répartit les éléments extra-tropicaux septentrionaux en quatre catégories différentes selon leur distribution. Une analyse est faite de leurs affinités géographiques et le schéma de distribution actuelle est discuté du point de vue paléogéographique.

When this subject was originally considered, I had intended to limit my studies to what has so aptly been called "mist oases" of which, besides the one at Erkowit, there appear to be several between Massawa and Cape Guardafui. It did, however, soon become clear that taxa of northern extratropical affinity and, in particular, annuals are present virtually throughout the North facing slopes which overlook the Gulf of Aden and the adjoining littoral plain. They may be more abundant and even form close communities in the "mist oases", but their distribution can be better understood if their entire, known range within the area is taken into account.

Similar considerations have led me to bring within the scope of my studies the South West corner of Arabia. Indeed, the Arabian mountains between Taïf in the North West and Dhofar in the South East are an integral part of Africa, in the geological as in the biogeographical sense. Any botanical study of North East Africa which does not take Arabia into close account is perforce one-sided and it is regrettable, in this context, that our Association (AETFAT) has hitherto failed to include in its scope the study of that area. It is, in a way, as if we had excluded Madagascar because it is not, now, part of the African continent.

In the end it was decided that my project should cover, in so far as possible:

1. the North facing escarpments of Somalia and the watershed areas immediately adjacent to these and receiving at least some precipitation in the cool, North-East-monsoon season (October-April);

2. that part of the "Territoire Français des Afars et des Issas" that also receives its rain in the same season;
3. the west and south facing escarpments and the isolated massifs of South West Arabia and adjacent plateau areas.

Botanical work throughout this region (e.g. Schwartz, 1939; Hemming, 1966) has been hampered, to a large extent, by fluctuating political conditions. Consequently it has been very spasmodic, particularly since the beginning of this century. Nevertheless, significant work was done in recent years and much of it has been published by Glover (1947), Gillett (1941), Chedeville (1972), Bavazzano (1972), not forgetting the *Adumbratio Florae Aethiopicae* and the *Enumeratio Plantarum Aethiopiae*.

The presence of extensive Mediterranean, Macaronesian and, to a lesser degree, Central European and Himalayan elements in the flora of this area has become more and more evident. The presence of genera such as *Coronilla*, *Trifolium* (annual species), *Medicago*, *Coris*, *Helianthemum*, *Umbilicus*, *Scrophularia*, *Parietaria*, *Sonchus*, *Delphinium* and others could not fail to attract attention. It is, indeed, surprising to find these plants, often in closed communities, in such low latitudes and associated with mesophytic tropical plants such as *Ficus* spp., *Trema*, *Dombeya*, *Phoenix* and many others, surrounded by areas ranging in aridity from semi-arid to desert.

Of my own fairly comprehensive collections, made before 1973, only a part has been identified so far, while the herbarium brought together in the "Territoire français des Afars et des Issas" (T.F.A.I.) and in Yemen in March-April 1974, has been examined only superficially. It is, therefore, too early to assess these collections properly. Yet, it is gratifying to note that they have already yielded some interesting finds. Among these, one might single out: an *Anemone* (*A. somaliensis*), of marked Mediterranean parentage, from the extreme North East of the Somali Peninsula, *Drusa glandulosa* (hitherto held to be endemic to the Canary Islands), *Papaver* (found to be rather common in the Goda Mountains of the T.F.A.I.). It is to be hoped that they will yield other records, equally significant from the phyto-geographical point of view.

At this stage it would appear that the northern extratropical element in the Ethio-Arabian region falls into the following categories:

1. taxa reaching Yemen but not North East Africa, e.g. *Myrtus*, *Ceratonia*, *Iris*, *Anagyris*;
2. taxa reaching the Ethiopian Somali region but not penetrating further south, e.g. *Lavandula*, *Jurinea*, *Ceratostigma*, *Helianthemum*, *Coris*, *Colutea*, *Pistacia*;
3. taxa also occurring in favourable localities in tropical and Southern Africa, e.g. *Juniperus*, *Buxus*, *Trifolium*, *Viola*, *Astragalus*, *Lotus*;
4. there might be included all those genera or species of Macaronesian affinity that are found in the area being studied and that extend beyond it, in many cases e.g. *Erica arborea* (cf. Zinderen-Bakker, 1970) *Canarina* sp. (cf. Hedberg, 1961), *Euphorbia balsamifera*, and *Drusa glandulosa*.

It seems clear that many of the northern extratropical taxa now present in the Ethiopian-Somali region and South West Arabia (and which have often penetrated

southward) have filtered along the great marginal swell of Arabia overlooking the Red Sea, or, in the case of Macaronesian affinities, across the Saharan mountains at a time when a moister climate tended to eliminate or narrow the extensive gaps of desert climate which now separate South West Arabia from the Middle East, or the Saharan massifs from one another.

It is more difficult to imagine the process whereby so many forms crossed the Red Sea and adjacent hot lowlands to reach their present distributions. The problem, clearly, is a complex one. The Red-Sea and the Gulf-of-Aden Rifts and the Afar Depression pre-date the Pleistocene, during which much of the migration is supposed to have taken place. While the high ground on the Arabian side of the Red Sea is more or less continuous, the hills on the African side, at least north of Port Sudan, are much lower and far apart. Moreover, they do not link up at all with the highlands of Mediterranean Asia. That the sea has been a barrier to dispersal is proven by those taxa that have not crossed to Africa from Arabia. Had the principal migration route lain on the African side—whether trans-saharan or via the Red Sea hills—one might have expected these taxa to have reached the Ethiopian-Somali region.

The problem is further complicated by plants such as *Buxus hildebrandtii* which, while clearly of “northern” affinity, are confined to the area East of the Ethiopian Rift (including Socotra) but are absent from Arabia and ecologically favourable stations further West, in Africa, where its main associates (*Juniperus*, *Pistacia*, *Cordia*, *Dracaena*, etc.) thrive. Could they be relics of a Pleiocene flora of wider distribution? If so, they are, of course, not immigrants, at least not in the sense of my present study. If this be true it may well be asked how many taxa other than *Buxus*, present in this complex region, might be similar relics.

A better understanding of these problems will require much additional field work and it is hoped that the States to which this area belongs will continue to lend their support to the necessary activities. It is encouraging to note that they are increasingly aware of the potential economic value of this type of project, the purely scientific appearances notwithstanding. After all, any biogeographical work cannot fail to have a practical value.

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