DIPTERYGIUM GLAUCUM DECNE. *(CAPPARIDACEAE)*: GENERAL DISTRIBUTION AND OCCURRENCE IN SOUTHERN IRAN

by

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Resumen

RIEDL, H. (1996). Distribución general de Dipterygium glaucum Decne. (Capparidaceae) y hallazgo de la misma en el sur de Irán. *Anales Jard. Bot. Madrid* 54: 189-192 (en inglés).

Se cita *Dipterygium glaucum* Decne. en Irán. Se revisa la distribución general de esta especie y se hace una interpretación de la misma.

Palabras clave: *Spermatophyta, Capparidaceae, Dipterygium*, distribución geográfica, Irán.

Abstract

RIEDL, H. (1996). Dipterygium glaucum Decne. (Capparidaceae): General Distribution and Occurrence in Southern Iran. *Anales Jard. Bot. Madrid* 54: 189-192.

A new locality for *Dipterygium glaucum* Decne., is reported from Iran. Possible explanations are proposed for its present ecological and geographical distribution.

Key words: *Spermatophyta, Capparidaceae, Dipterygium*, geographical distribution, Iran.

The genus *Dicterygium* has been placed alternatively in the *Cappar(id)aceae* and *Cruciferae* by various authors. As the length of the filaments and position is the same in all six stamens, I prefer to include it in *Capparidaceae,* to which it seems to have the closest relations in other respects also. I do not want to discuss here details of this problem, which can be found in pertinent literature for those interested.

Dipterygium glaucum has been known from northern Sudan and Egypt East of the Nile through the Arabian peninsula to the desert areas of NW-India in the provinces of Rajasthan and Gujarat. A second species mentioned in the literature, *D. scabrum,* is not considered as distinct from *D. glaucum.* It had not been known from Iran until recently, when ASSADI & RUNEMARK (1983) reported its occurrence from the Makran area (50 km to Bampoor on the road from Nikshahr at an elevation of 600 m). In Pakistan it is most widespread, though not common, in Sind, but it has also been collected from a few isolated localities in Balochistan. Ecologically, it prefers the deep sand of dunes and similar habitats where it can form fairly dense stands.

The discovery of this species in southern Iran near Bander Jask (Balochistan) [Iran, prov. Balochistan, sand dunes near the coast round Bander Jask, April 24, 1977, leg. *H. and I. Riedl & D. Ershad,* s.n. (W)] offers an opportunity to reconsider the distribution of the species in more detail and to discuss some general implications.

In Egypt, the plant is confined to the Ara-

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bian desert on the right bank of the Nile. It does not enter the Sahara proper anywhere, though its distribution would generally be considered Saharo-Sindian in the sense of EIG (1931-1932). If this were a rare and unusual case, the fact could either be explained by extinction in the area west of the Nile or be simply dismissed as an exception to the rule. However, this seems to be quite a common type of distribution. Most of the members of *Zygophyllaceae* found in Egypt, for instance, follow the same pattern, such as *Zygophyllum dumosum, Z. propinquum, Z. coccineum, Z. berenicense, Z. decumbens, Z. dumosum, Tribulus pterocarpus, Fagonia thebaica, F. boulosii, F. indica, F. paulayana, F. taeckholmiana, F. tristis, F. mollis, F. sinaica* var. *sinaica, F. tenuifolia, Seetzenia lanata* (HADIDI, 1974). In the central and northern Sahara, there are quite different species of the same genera (OZENDA, 1958). The Sinai Peninsula in particular is very rich in endemics, but there are also endemics in the Arabian desert in Egypt.

In the sense of ZOHARY (1973), who already noted this type of distribution, these species belong to the Nubo-Sindian province of the Sudanian region. He overlooked the fact that in African phytogeography there is nothing comparable to a Sudanian region. Strangely enough, he mentions *Dipterygium glaucum* among the leading Nubo-Sindian species in Iran, though it had not yet been discovered there. WHITE & LÉONARD (1991) transferred the Nubo-Sindian province to the Saharo-Sindian regional centre.

In the Arabian Peninsula, *Dipterygium* is fairly widespread and present in nearly all parts. In the tropical South, it is confined to southern Hidjaz and the coastal region of South Yemen (MIGAHID & HAMMOUDA, 1974; SCHWARTZ, 1939). In the Jidda-Mecca-Saidiyah area, it is the most common species together with *Panicum turgidum,* according to Laheta (ZOHARY, 1973).

To our present knowledge, it is absent from the northeastern side of the Gulf area, both in Iraq and Iran. Beyond the Strait of Hormuz, the newly discovered localities in Makran and Balochistan are the only places from which it is known in Iran. Near Bander Jask it is growing on top and along the slopes of low coastal sand dunes.

While the genus ist most common near the coast as far East as Iran, in Pakistan it has not yet been found anywhere near the sea. It is unknown from western Balochistan and confined to the Northeast at Bandagan, Nala (JAFRI, 1973), but more widespread in Sind, where it was found in the East (Sukkur and Khairpur districts) and from the Northeast (Multan). Ecologically, sandy places are preferred here as well. BHANDARI (1978) calls it a very rare plant of the desertic regions in the provinces of Rajasthan and Gujarat. Apart from sand dunes, gravelly grounds are also mentioned.

While there is clearly a centre of endemism in Arabia together with Egypt East of the Nile, and a smaller one on the Sinai Peninsula, there is nothing of the kind in Sind. Endemic species of Balochistan generally have closer relationships to Irano-Turanian species than to Saharo-Sindian ones (there are also strong arguments against the term "Irano-Turanian", which are outside our present considerations, however). Another group of species which is adapted to less arid conditions and sometimes also to higher altitudes, is found in Ethiopia and extends farther south to East Africa, in tropical Arabia and again in the mountains of north-eastern Balochistan, and sometimes also in the Northwest Frontier Provinces of Pakistan as far North as the Karakorum range. This group will be discussed in more detail elsewhere. In ZOHARY's terminology, it combines parts of the Eritreo-Arabian and the Nubo-Sindian province, while it is truly Saharo-Sindian in the interpretation of WHITE & LÉONARD (1989).

Let us return to *Dipterygium glaucum.* There are at least two ways to interpret its distribution: biogeographically and ecologically. Biogeographically, it extends roughly from the Arabian desert to Rajastan. There are some interesting questions arising from that fact. One is the question, in relation to a great number of plants, of why the Nile Valley is a more effective border for the dispersal of a species than, for instance, the Red Sea, part of

the East African Rift extending northwards to the Dead Sea depression. Another question is whether the coastal or near-coastal region of the Indian Ocean including the Red Sea has had any special appeal for migrating plants at any time in the more recent past.

Ecology can explain why the plant follows the coast of the Indian Ocean up to the newly discovered locality in Iran. It is sand dunes which represent the preferred habitat. But again, two questions arise. Sands are found on both sides of the Nile. The plant's occurrence exclusively on the Eastern side must have different explanations. In Iran, it is even more difficult to explain ecologically why *Dipterygium* is confined only to these particular sites, as the adjacent area does not differ much as far as I could see in the case of Jask. Why does it leave the coast and grow on sandy places in the interior of Pakistan and India? And why does it even leave the sands sometimes in the easternmost part of its area to grow in gravelly places? We cannot hope to answer all these questions, not even by proposing hypotheses.

In the case of fossil mammals, a barrier similar to that preventing the occurrence of desert plant species East of the Nile has been observed (GOLDSMITH & *al.*, 1988). Rodents and hares especially are absent from the Sirtean plain, though they are found both in Arabia and the Negev. The barrier was explained by an epicontinental gulf northwest of the Proto-Red Sea in the early Miocene, postulated by COGLEY (1982). Later on, a swampy area persisted in this same region, never wholly replaced by arid land vegetation during periods of greatest expanse of the desert, such as the ice ages. This area roughly corresponds to the present day lower Nile valley and especially the delta. In the late Tertiary and interglacial periods, it became wider and the desert was confined to small basins; during the ice ages it became narrow again. It may well have been a serious barrier to the spreading of desert plants, while species from less arid regions of East and Northeast Africa could migrate easily along a route farther South. An explanation from geological evidence renders an ecological explanation superfluous.

If we consider that explanation as correct, we probably must assume that a migration eastward along the Indian Ocean took place at a later time, as another epicontinental gulf divided the present Arabian Peninsula in two halves. Unlike the western gulf it left no swampy area, but rather a desert basin, the interior of Saudi Arabia. This indicates that ecology may well explain plant species spreading to the East. This all would be very nice in the case of *Dipterygium* were the species to occur continuously along the coast. As we have seen, this is not the case. From the present distribution it is disputable whether the humid lands of former Mesopotamia between the Euphrates and the Tigris, and specially the swamps in the delta of the former have been another barrier.

As we have seen, the wide gaps in the distribution of *Dipterygium glaucum* in the eastern part of its area cannot be explained by ecology alone, as similar conditions prevail over wide stretches where it is absent. It must be kept in mind, however, that the original vegetation especially in present Makran is a thornbush savanna. *Dipterygium* certainly does not belong to the elements of this type of vegetation. Desertification is a comparatively late event here. It has occurred mainly during periods of human settlement in the more recent past. While the western branch of the so-called Saharo-Sindian flora comprises natural desert vegetation, in the East this vegetation is the recent result of human influence. An interdisciplinary study might add further arguments to such reasoning. The Balochi people consider themselves as descendants of Arabian invaders in historical times. They may have brought with them a lot of plants native to their country of origin. Anthropogenic distribution is strongly dependent on chance. If we consider the present distribution of *Dipterygium glaucum*, a high degree of randomness does not seem unlikely. It is not possible with our present knowledge, however, to prove this hypothesis. It is proposed here for further discussion.

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