

Distribution of the Coniferae: the Cupressaceae in Africa

THE Cupressaceae are distributed more evenly between hemispheres than any other extant family of the Coniferae. They have a high degree of generic endemism in the sense used by Good¹ or of quasi-endemism. Their range, like that of most conifers, adds support to the concept that two great phytogeographical dominions existed from early geological times. Several members of genera considered to be exclusively southern traversed the equator in Tertiary or Pleistocene times, but only one of northern origin has reached the southern boundary of the equatorial belt. This is the genus *Juniperus* of the family Cupressaceae (a species of the northern genus *Taxus* is recorded from Malaysia on latitude 5° 50' S., but the Taxaceae has no members of southern origin; *Austrotaxus* from a limited area in New Caledonia is now considered on morphological grounds to be in a family of its own)².

Despite these transgressions, the Coniferae are conspicuously absent from intervening tropical lowlands. Although there is some measure of agreement about the routes involved in the migrations, particularly on the African continent, there is little unanimity about the regions of origin of the Coniferae. Discontinuities along existing migration routes or zones of occurrence of plant groups are frequently of relative—not absolute—significance and may be due primarily to insufficient knowledge of the habitats of the plant groups rather than to any limiting factor affecting their dispersal or to anomalous and divergent migration paths²⁻⁵.

The concepts of bihemispheric ranges and palaeo-endemism are of considerable value in studying the origin and distribution of these older taxa. The application of these concepts, however, has been severely limited through paucity of fossil records and the lack of overlap in areal boundaries within extant family groups of a different hemispheric origin. This is true of genera such as *Podocarpus*, *Phyllocladus*, *Agathis* and *Dacrydium*, which have

crossed the equator in recent geological times but are fundamentally southern in origin with no extant northern representatives of their respective families. *Papuacedrus* is a southern genus of the Cupressaceae extending northwards from New Guinea to the Moluccas, but this limited area of occurrence does not overlap that of northern members of the family².

No monographic treatment has hitherto been applied to the distribution of the Cupressaceae, although individual genera and species have been dealt with, generally on a narrowly regional basis⁶⁻⁹. The recent discovery of *Juniperus procera* Endl. in the Inyanga district of Rhodesia provides the first authentic example among living Coniferae of an overlap between two members of distinct phytogeographical groups, namely, *Juniperus*, which is of strongly northern affinity, and *Widdringtonia*, which has hitherto been presumed to be of southern origin. Furthermore, the new station extends the geographical range of the species from 10° 40' S. to 18° 08' S., on the extreme limit of the equatorial zone. The known northern limit of *Widdringtonia* is 16° S.

The implications of this remarkable discovery may be of great significance; more particularly as the history of *Widdringtonia* is practically unknown. Palaeogeographic evidence suggests that it was never represented in the northern hemisphere, although chemo-taxonomic investigation has shown a relationship with northern Cupressaceae and distinct differences from southern genera such as *Callitris* and *Actinostrobus*¹⁰. It has been inferred that, like certain sections of *Podocarpus*, it reached Africa from Australia by way of the so-called Lemuria route in late Mesozoic times. The East African section of *Juniperus* undoubtedly migrated from western Asia by way of Arabia in mid-Pliocene times, and the link is still well defined. Southern genera of the Cupressaceae occupy very restricted areas at the present time, and while *Widdringtonia* is not, strictly speaking, endemic to a particular floral region (in the sense used by Good), it is an oligotypic genus and palaeo-endemic in character.

A description of the new station of *Juniperus* and the status of the species is being prepared for publication, and studies on the origin and distributional ranges of African members of the Cupressaceae are in progress.

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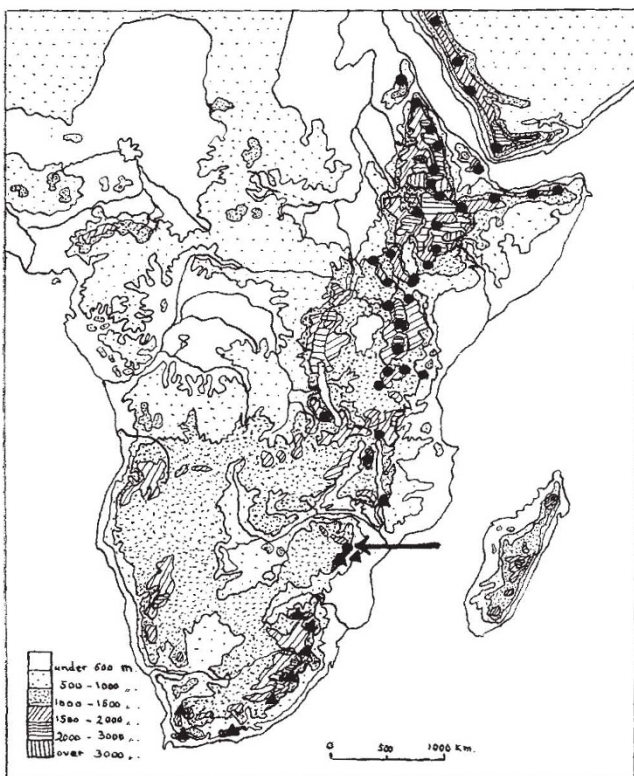


Fig. 1. Distribution map for the genus *Widdringtonia*, marked \blacktriangle , and *Juniperus procera* Endl., marked \bullet . The new station in Rhodesia is marked by an arrow.

SOIL SCIENCE

Colloidal Selenium Availability to Three Pasture Species in Pot Culture

WITH the discovery of the importance and even the necessity of trace amounts of selenium in animal nutrition¹, and with the recognition that the response of animals to the administration of selenium can vary²⁻⁵, it has become important to know more about the state of selenium in the soil and its uptake by plants. The first investigators were chiefly concerned with the uptake of selenium from