

Contributions to the study of the Origin and Distribution of Magnolias from Paleomagnetism

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The modern genus *Magnolia* is a classic biogeographic disjunct, occurring in southeast Asia and the Americas mainly from Virginia to Colombia but nowhere in-between. This disjunct has now been documented in detail by DNA studies. Magnolias are temperate to warm temperate plants. Species diversity is highest in low latitude at moderate to high altitudes. Fossils that can be securely related to the genus occur in Tertiary rocks of western and eastern North America, northern Europe and southern Siberia and in the Quaternary of Japan. Fossil localities are strung out across Europe and central Asia between these two areas of modern occurrence. Late Cretaceous probable ancestors of modern magnolias occur in western North America. Including these, the fossil ages are systematically older in the west than in the east. Paleolatitudes determined paleomagnetically of the Late Cretaceous and Paleogene fossil localities are about 60° N, much higher than at present; warm temperate conditions extended to high latitude attributable to greenhouse Earth. Paleolatitudes of Neogene fossil localities are lower typically 40° to 50° N. We attribute this to global cooling in the Oligocene. Using geophysically derived paleogeographies we propose the following. (1) Magnolias originated in western North America and migrated eastward to Europe via the Thulean land bridge during the early Paleogene and from there into eastern Asia at some time not yet ascertained. (2) Following Late Neogene uplift of mountains in SE Asia and Mesoamerica and creation of the Panama land bridge, they migrated south into these areas where they rapidly speciated. (3) During Quaternary glaciation they were eliminated from northern and western North America, Europe and southern Siberia, creating the present disjunct pattern. Based on the fossil record and paleogeographic considerations, neither of the current centres of highest diversity appear to be a centre of origin of the genus.

- 1. Chapman Conference on Timescales of the Geomagnetic Field**
- 2. Invited**
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