Diversity and Geography of the Genus Abies around the World

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The genus *Abies* is the second largest genus in the family Pinaceae (after *Pinus*) and, like the rest of the family save one species of pine, is confined to the Northern Hemisphere. The genus, although diverse, is more limited in its actual distribution as its climate and soil requirements are within a relatively narrow range. For these reasons it is limited both in its latitudinal range and its altitudinal range. In latitude, it does not occur at the extreme northern edge of the tree line; in altitude it is a conifer genus that occupies the middle montane zone except in its southernmost populations where this genus ascends to the limit of trees in e.g. the Himalayas and Central America. Unlike pines and spruces (*Picea*) firs (*Abies*) rarely form vast forests composed of a single species; they are most commonly a constituent of mixed forest, either all coniferous or mixed with broadleaved trees. Firs are relatively shade tolerant conifers which are able to compete with most broadleaved trees, which partly explains this mixture. The genus *Abies* has an almost equal number of species represented in Eurasia and North America and several species across the North Pacific are closely related, with 'sister species' in Asia and North America. This implies relatively recent connections across the Bering Strait that united the ancestors of these species. There is evidence for recent speciation, e.g. in the so-called Sino-Himalayan region, but also for relict species, e.g. *Abies koraiensis*, now limited to a few isolated mountains in Korea. Evidence for the relict status of the latter species comes from its extraordinary genetic variability, probably the result of isolation, which is exploited in horticulture. Europe is very poor in species diversity as a result of the confinement caused by high mountain ranges which blocked a southward retreat during the expansion of Pleistocene glaciations. These repeated events trapped many trees, causing their extinction. However, for *Abies* we can only surmise these events because the fossil record is remarkably poor.