Origin and distribution of *Fagus* during the Miocene of Iceland

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At least six different fossil *Fagus* species based on leaf remains have been identified from Iceland; *Fagus antipofii*, *Fagus deucalionis*, *Fagus ferruginea*, *Fagus grandifolia fossilis*, *Fagus macrophylla* and *Fagus orientalis fossilis*. Recent comparative studies of *Fagus* leaves from Iceland show that there are two distinct morphospecies to be found in the Miocene sediments, *Fagus friedrichii* and *Fagus gussonii*. They are clearly distinguishable from each other and other known species of *Fagus* and *Pseudofagus*. Morphological characteristics that separate *Fagus friedrichii* from *Fagus gussonii* are more elliptic form of the lamina, higher number of secondary veins per 5 cm midvein, constant craspedodromous venation and more attenuate apex within the former species. *Fagus gussonii* has more variety in form of the lamina, fewer secondary veins per 5 cm midvein, craspedo- semicraspedo- or pseudocraspedodromous venation and an acute apex.

For this study we used fossil leaves, cupules and nuts of *Fagus* from Mount Þórishlíðarfjall in Selárdalur (15 Ma), the Botn sediments in Súgandaförður (15 Ma), Mount Tafla above Ketilseyri in Dýrafjörður fjord (13,5 Ma), and the Hrútagil gully in Mókollsdalur (9-8 Ma). Pollen counts from all of the major sedimentary formations at the Northwest Peninsula and West Iceland were used to support the stratigraphical distribution and distinction between the two *Fagus* species previously identified.

Pollen counts from the major sedimentary formations in Northwest and West Iceland indicate that *Fagus* occupied the island during the accumulation of sediments that are 15-13.5 Ma old as well as 9-8 Ma old. When macrofossil data are combined with the pollen data it is clear that *Fagus* leaves, cupules, nuts and pollen are only found in sediments 15-13.5 Ma in Þórishlíðarfjall in Selárdalur as well as the Botn sediments in Súgandafjörður and in Mount Tafla at Ketilseyri, Dýrafjörður. After that no *Fagus* remains are found in sediments until the 9-8 Ma old sediments at Hrútagil in Mókollsdalur, where leaves, cupules, nuts and pollen have been found.

Fagus friedrichii appears to belong to an ancient type of *Fagus* found at high latitudes. Specimens from Iceland and Alaska resemble the modern North American *Fagus grandifolia*. *Fagus friedrichii* from the Þórishlíðarfjall (15 Ma) and Botn as well as the 13.5 Ma Mount Tafla exposure displays a disjunct distribution between Iceland and Alaska. The plant-bearing sediments from which it originates belong to the two oldest sedimentary formations in Iceland. In the following younger formations 12-10 Ma *Fagus* is not represented. Only in the still younger 9-8 Ma sedimentary formation at Hrútagil in Mókollsdalur does *Fagus* reappear and forms a major component of the flora. The *Fagus* fossils in Hrútagil belong apparently to *Fagus gussonii* and both affinities to coeval and modern species of *Fagus* indicate that this late Miocene *Fagus* type colonized Iceland from Eurasia. However, there is also the possibility that this is not *Fagus gussonii,* but a new species and parallel evolution to *Fagus gussonii* in Eurasia cannot be ruled out.