Size and shape of pollen grains from *Betula pubescens*, *Betula nana* and their hybrids

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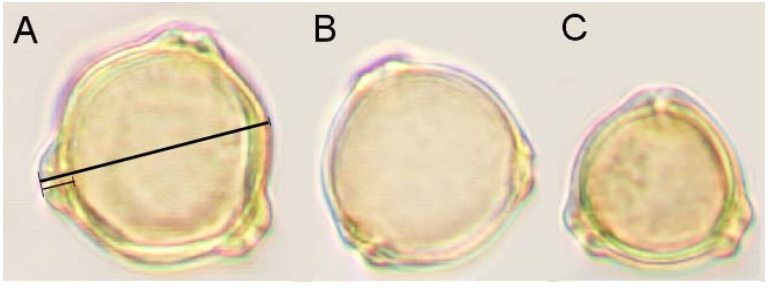
Subfossil pollen from the two *Betula* species in Iceland, *B. pubescens* and *B. nana*, is frequently found in sediments. Palaeoecological reconstruction of vegetation based on pollen analysis depends on differentiation of the two species, based on pollen size and structure. Several papers have reported differences in mean diameter, i.e. *B. pubescens* pollen being bigger by a third, but size distributions of the two species overlap considerably. Size of vestibulum, or pore depth, is also a feature that can differentiate *B. pubescens* and *B. nana* pollen, the latter having less protruding pore and therefore relatively rounder shape. In Iceland hybrids of the two species are common and a gradient of morphological features can be found in many woodlands. We measured pollen from 92 individual trees/shrubs from ten different sites in Iceland. Each individual was identified to species by its chromosome number, as tetraploid *B. pubescens*, diploid *B. nana* or triploid hybrid. Pollen size correlated to tree morphology, such that trees with *B. pubescens* appearance had larger pollen. Pollen from different sites in Iceland varied slightly in mean size and pore depth/diameter ratio. The species difference found in pollen size and shape was significant but less than other papers have reported, possibly as a result of gene-flow between the species. Average size of hybrid pollen grains was not different from that of *B. nana* pollen although the pore-depth was greater. The hybrid pollen grains were frequently damaged or deformed, the most common deformity was pollen with four pores instead of three. The frequency of abnormal pollen in sediments could possibly serve as an index of active hybridization in the early birch woodlands of Iceland.



Examples of *Betula* pollen: A, *B. pubescens* black lines show diameter (24µm) and pore-depth (3.6µm). B, *B. nana*, C, hybrid. Pollen grains shown here are in same scale but the *B. nana* pollen grain is somewhat larger than average.