CONTEMPORARY SEED AND POLLEN DISPERSAL ABILITIES OF SILVER FIR (*ABIES ALBA* MILL.) AT RANGE MARGINS

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Effective gene flow from parent to offspring is a major process shaping plant population genetic diversity and evolutionary potential. However, little is still known about the extent of within-species variation in contemporary patterns of pollen and seed dispersal, and even less on ecological drivers shaping this variation. Silver fir (*Abies alba* Mill.) is a keystone tree species in low to mid-altitude European mountainous forest ecosystems, and appears to be particularly sensitive to ongoing climatic change. In this study, we investigated contemporary patterns of gene flow at southern and northern margins of the European distribution range of silver fir, using two populations in a Mediterranean mountainous forest (EVOLTREE ISS Ventoux, France) and two populations in an old-growth forest (EVOLTREE ISS Blyzin, Poland). We used spatially explicit parentage models and a combination of nuclear and chloroplast DNA microsatellite markers to estimate seed and pollen dispersal kernels in naturally established seedlings. Patterns of contemporary gene flow appeared to vary across populations. Selfing rates were higher in southern populations (average $s = 0.18$) as than in northern populations (average $s = 0.07$). Pollen dispersal also differed strongly among sites, with fat-tailed dispersal kernels and average pollen dispersal distance (δ_p) >100 m in northern populations, while southern populations showed exponential pollen dispersal kernels and restricted pollen dispersal distance (δ_p <11 m). Patterns of seed dispersal were less variable among populations, with a general tendency for exponential dispersal kernel and average seed dispersal distance ranging between 18.2 and 24.5 m. Both pollen and seed immigration rates were highly sensitive to assumptions on background pollen pool frequencies, due to low resolution of the marker set. These results indicate limited pollen production and dispersal abilities in trailing-edge populations as compared with leading-edge populations, as well as overall limited seed dispersal abilities relative to rates of ongoing and predicted climate change.

Keywords: contemporary gene flow, microsatellite, parentage analysis, pollen dispersal, seed dispersal, selfing