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Technical Note

Animating tree colonization and growth

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Abstract

In the early twentieth century the woodland at Heald Brow, north-west England, was largely a tree-less pasture, but changing land management practices led to natural tree colonization and the development of a mixed deciduous woodland with ash (*Fraxinus excelsior*), oak (*Quercus robur*), yew (*Taxus baccata*) and small-leaved Lime (*Tilia cordata*) the main components. The research focused on *T. cordata* due to its rarity and conservation value, and aimed to investigate the timing of its appearance, rates of reproduction by layering and the effects of competition on its longer-term survival. A small, 0.32 ha area of woodland was mapped using standard field-based survey methods and increment cores were taken to provide minimum age estimates for living stems of all species present. The spatial and temporal data generated led to the development of a new micro-GIS animation method, using ArcGIS software, that visually highlighted secondary woodland establishment and development, and gave novel insights into the competitive interactions that governed the development. Results showed *T. cordata* colonization in the 1940s and layering developing in the 1960s. The later appearance and rapid establishment of *T. baccata* with its light-excluding canopy produced high competition scores and undoubtedly restricted further development of the main *T. cordata* canopy aided by *F. excelsior* at the periphery. This animation method and associated GIS analyses have potential application in both dendrochronological, wider ecological research and in conservation management.

Key words: animation, competition, micro-GIS, tree colonization, tree growth.

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