

THE TWO SUBSPECIES OF *OPHIOSTOMA NOVO-ULMI* ARE NOW FREELY HYBRIDISING ACROSS EUROPE AND THE HYBRIDS EXHIBIT HIGH PATHOGENIC FITNESS

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Ophiostoma novo-ulmi subspecies *novo-ulmi* and *O. novo-ulmi* subspecies *americana* exhibit multiple phenotypic differences. Since the 1940-70s subspecies *americana* and subspecies *novo-ulmi* have spread westwards and eastwards across North America and Europe respectively, killing billions of elm trees in the process. Trans-Eurasian surveys in the 1980s showed that the ranges of the two subspecies were overlapping in Ireland, the Netherlands, Denmark, Sweden, Italy and parts of central and eastern Europe. Laboratory studies revealed there was only a weak pre-zygotic barrier to sexual crosses between the two subspecies. On this basis, unrestricted hybridisation was predicted between the two subspecies in the overlap zones. Based on phenotypic characters, the first subspecies *novo-ulmi* x *americana* hybrids were detected from a site in Limburg, Netherlands in 1980 at a frequency of *ca* 4%. By 1983, the hybrid frequency at the site was estimated to be 51%. Examination of neutral molecular markers (RAPDS) in samples collected during the 1980s from overlap zones in both the Netherlands and Italy showed that 60-70% of isolates were already hybrid. Similar samples from the Baltic Ports area of Poland revealed the early stages of introgression of subspecies *americana* DNA into the local subspecies *novo-ulmi* population. Hybrids are now dominant in the 1980s overlap zones. Pathogenicity tests on samples of the emerging hybrid population in the Netherlands show that the hybrids do not differ significantly from the parent subspecies in their ability to cause wilt on the moderately susceptible clonal *Ulmus procera* and on the more resistant *U. x Commelin*. The ecological success (high survival frequency) of the hybrids is therefore best explained by their good pathogenic fitness relative to the two parent subspecies.