

**Anacker, Brian L.; Rank, Nathan E.; Hüberli, Daniel; Garbelotto, Matteo; Gordon, Sarah;** Harnik, Tami; Whitkus, Richard; and Meentemeyer, Ross. 2008. Susceptibility to *Phytophthora ramorum* in a key infectious host: landscape variation in host genotype, host phenotype, and environmental factors. *New Phytologist* 177: 756–766. DOI: 10.1111/j.1469-8137.2007.02297.x.

**Summary:** Sudden oak death is an emerging forest disease caused by the invasive pathogen *Phytophthora ramorum*. Genetic and environmental factors affecting susceptibility to *P. ramorum* in the key inoculum-producing host tree *Umbellularia californica* (bay laurel) were examined across a heterogeneous landscape in California, USA. Laboratory susceptibility trials were conducted on detached leaves and assessed field disease levels for 97 host trees from 12 225-m<sup>2</sup> plots. Genotype and phenotype characteristics were assessed for each tree. Effects of plot-level environmental conditions (understory microclimate, amount of solar radiation and topographic moisture potential) on disease expression were also evaluated. Susceptibility varied significantly among *U. californica* trees, with a fivefold difference in leaf lesion size. Lesion size was positively related to leaf area, but not to other phenotypic traits or to field disease level. Genetic diversity was structured at three spatial scales, but primarily among individuals within plots. Lesion size was significantly related to amplified fragment length polymorphism (AFLP) markers, but local environment explained most variation in field disease level. Thus, substantial genetic variation in susceptibility to *P. ramorum* occurs in its principal foliar host *U. californica*, but local environment mediates expression of susceptibility in nature.