Implications of Chestnut Blight incidence in Recently Clearcut and Mature Forests for Biological Control of Blight with Hypovirulent Strains of *Endothia parasitica.*

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In recently clearcut sites, the incidence of chestnut blight increased from about 20 percent, the level in mature forest areas, to 100 percent between 4 and 9 years after clearcutting. During this period, the increase wan linear with time. Disease progress was of the compound interest type, indicating that inoculum for the epidemics was generated in the clearcut sites. The disease-progress curve could be modeled when provision was made for an increase in canker area with an increase in tree diameter. This provision explained the 4-year delay in the start of the epidemics: sporulating area, and thus inoculum production, was dependent on canker area. The mean diameter at breast height of chestnut sprouts greater than 0.8 cm diameter was smaller at mature forest sites than that at 6-year-old or older clearcut sites, presumably because the sprouts at mature forest sites were shaded. Thus, sprout size alone may explain the low incidence of chestnut blight at mature forest sites.

However, there are additional factors that may have impeded epiphytotics on mature forest sites and favored them in clearcuts. Larger (greater than 3 cm diameter) stem parts at mature forest sites, but not clearcut sites, had dead outer bark (rhytidome), which decreased the number of stromata per unit canker area. On trees with rhytidome, sporulation occurred only in cracks or gaps in the rhytidome which reached the inner bark. Rhytidome also may have decreased the frequency of infection courts (wounds). There were more sprouts per clump in clearcuts and this may have helped epiphytotics start in clearcuts by favoring the spread of the pathogen

within sprout clumps, and thus the build-up of inoculum.

The sporulating area per 20- x 20-m plot was 500 cm^{-} when incidence increased above the starting level in clearcuts. This suggests that this much sporulating area of hypovirulent strains of *Endothia parasitica* may be needed to start an outbreak of hypovirulence. It will be necessary to control virulent strains in released chestnut sprouts. Thus, it appears that it would be better to conduct hypovirulence deployment experiments at clearcut sites than at mature forest sites. The rapid rate of disease progress indicates that it would be necessary to treat young (ca. 4-year-old) clearcuts to avoid an outbreak of virulent strains of *Endothia parasitica*.

Before effective strategies for deploying hypovirulence can be devised and implemented, it will be necessary to know the canker growth and sporulation characteristics of average hypovirulent isolates from Italy, and the distribution of vegetative compatibility groups there. Also, it will be helpful to know the *role* of host resistance and the weather in virulent canker growth, sporulation, and disease progress in Europe.