

HOST PATHOGEN INTERACTIONS IN A SEGREGATING POPULATION OF BC₂F₂ HYBRID *CASTANEA DENTATA* AFTER EXPOSURE TO HYPOVIRUS-CONTAINING AND HYPOVIRUS-FREE STRAINS OF *CRYPHONECTRIA PARASITICA*

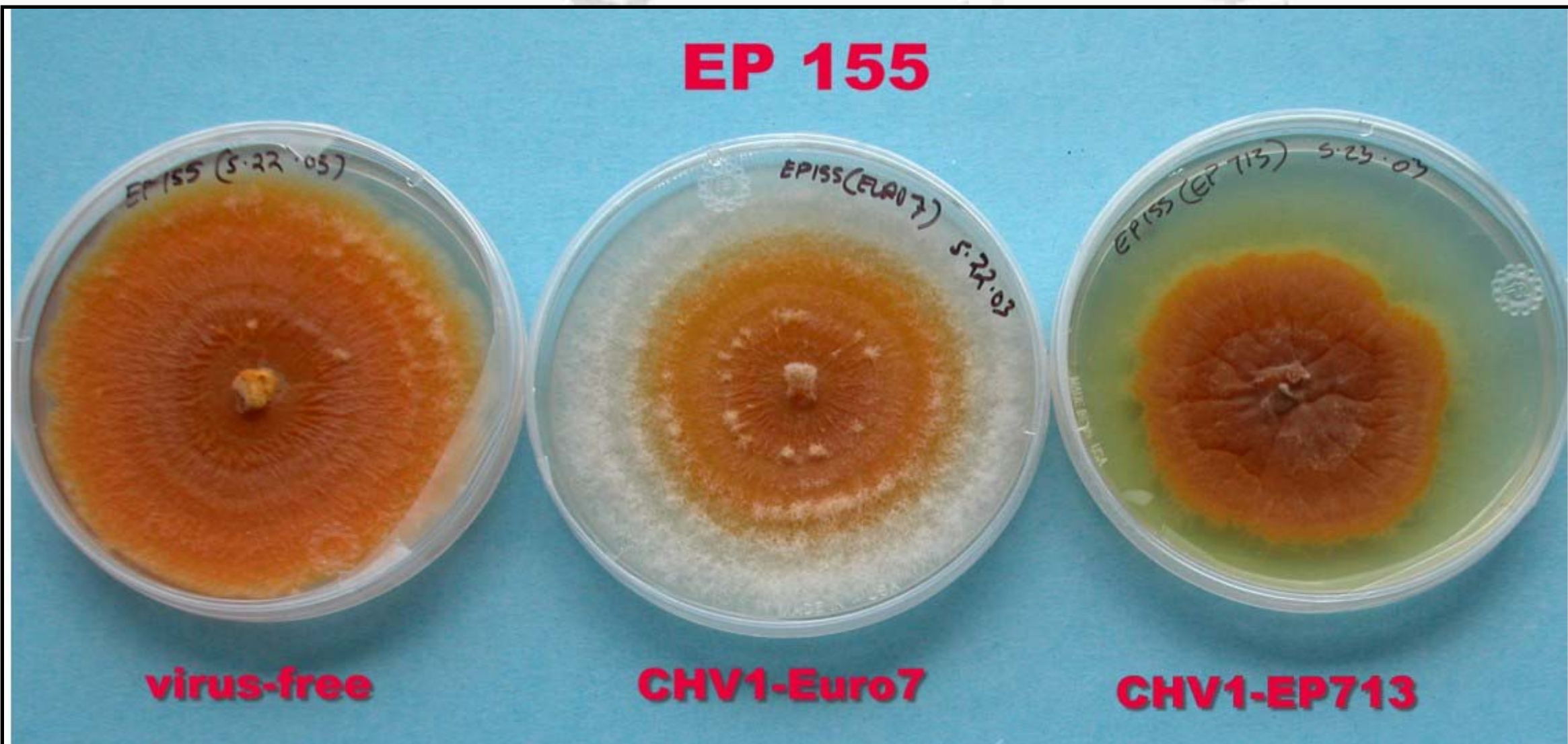
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Abstract

Host resistance in *Castanea dentata* hybrids may be a key factor allowing expression of hypovirulence (superficial cankers with reduced canker expansion). A population of 56 BC₂F₂ Chinese American interspecific chestnut trees and other species and hybrid chestnut progeny were inoculated with the virulent strain (v-strain) *Cryphonectria parasitica* Ep155 to determine levels of host resistance, and inoculated with two isogenic hypovirus-containing (h-strains) Ep155 (CHV1-Euro7) and Ep155 (CHV1-Ep713) to assess the interactions between the three strains and their host trees. As measured by 95 day old canker length and by survival at one year, *C. mollissima* resulted highly blight-resistant; *C. dentata*, *C. sativa* and *C. pumila* were highly blight-susceptible. We observed segregation in the BC₂F₂ population into highly blight-resistant, intermediately blight-resistant and highly blight-susceptible classes. Hypovirulence expression was observed on BC₂F₂ trees of the intermediately blight-resistant and blight-resistant classes. There was no significant difference between Ep155 and Ep155 (CHV1-Euro7) canker lengths at 95 days after inoculation on the BC₂F₂ trees, but Ep155 (CHV1-Ep713) canker lengths were significantly smaller.

Methods: Inoculation



Methods: Canker Measurement

Measured Length and Width (mm) on the perpendicular axes of each canker



Methods: Fungus used in field study

1. Ep155 (virus-free) Isolates were transferred from agar slants and grown on Difco PDAMB
2. Ep155(CHV1-Euro7) Isolates were incubated at room temperature under fluorescent lights in the lab for 7-10 days before each transfer
3. Ep155(CHV1-Ep713)

Methods: Trees used in field study

- Control Group:
 - 1 *Castanea dentata*
 - 3 *Castanea sativa*
 - 2 *Castanea pumila*
 - 1 Converse hybrid
 - Experimental Group:
 - 56 half-sib BC₂F₂ hybrids from Meadowview, VA
 - 27 hybrid progeny of the Chattanooga Chestnut Tree Project
- Trees are located at Bendabout Farm, Bradley Co., TN



B2F2 Orchard at Bendabout Farms in Bradley Co., TN

Blight susceptible



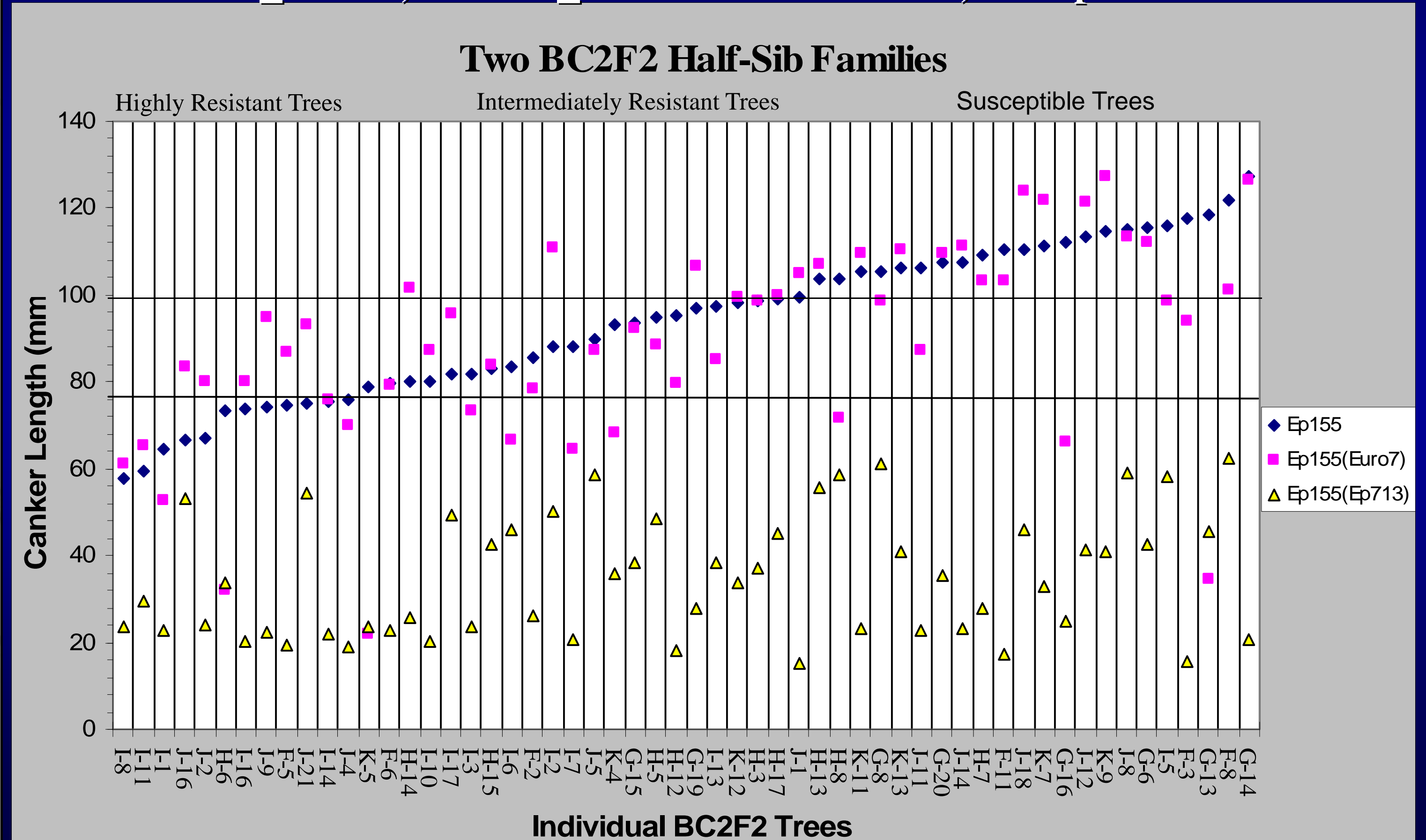
Blight resistant



Results

Ep155 canker length (mm) after 95 days ranked in ascending order for BC₂F₂s with corresponding and Ep155(CHV1-Ep713) and Ep155(CHV1-Euro7) canker lengths. Horizontal lines separate three resistance classes:

* Resistant ≤ 77mm; 100mm ≥ Intermediate > 77mm; Susceptible > 100



Conclusion: Ten trees are highly resistant. No strong host-pathogen interactions were observed.