

ABSTRACT

Studies of resistance in cacao (Theobroma cacao, L.)
to Phytophthora palmivora (Butler) Butler.

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The nature of resistance in cacao (Theobroma cacao, L.) to Phytophthora palmivora (Butler) Butler was investigated in five experiments, based on ten cacao genotypes. Cultivar resistance was evaluated by inoculating attached pods using zoospores, and stems and branches using mycelial discs. Results of canker tests indicated that resistance to P. palmivora in young clonal cacao is highly correlated to resistance in mature trees.

Pair-wise comparisons of cultivar response to P. palmivora infection in pods and stems indicated a significant correlation between resistance of both organs, allowing a single ranking of cultivars into three reaction groups: resistant (Sca 6, Spec 138-8, ICS 1, Sca 12), moderately resistant (Catongo, ICS 8) and susceptible (ICS 6, IMC 67, ICS 95, MXC 67).

The tests on F1 progenies using seed and stem inoculations were effective in differentiating segregating populations, and in determining the value of parents as progenitors. The most resistant progenies were derived from crossing two resistant parents, a resistant x moderately resistant parent, or a resistant x susceptible parent.

A pattern of inheritance of resistance was established through analyses of a diallel mating, a North Carolina Mating II design, and parent-offspring regressions. The variation was largely due to additive genetic effects, with evidence of partial dominance. The results indicated that there was horizontal resistance in the experimental population, and segregation at F₁ gave evidence of polygenic inheritance.

Both narrow-sense and broad-sense heritabilities were high, indicating a potential for response to selection. There were no significant reciprocal differences, and selfing resulted in an inbreeding depression. The importance of general combining abilities of parents suggests a potential of breeding for synthetic varieties, with opportunities for production of clones resistant to P. palmivora.