

# PROPICONAZOLE AS A TREATMENT FOR OAK WILT IN QUERCUS ALBA AND Q. MACROCARPA

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In Minnesota, the sterol-inhibiting fungicide propiconazole was injected into mature *Quercus alba* L. and *Q. macrocarpa* Michx. infected with *Ceratocystis fagacearum*, the oak wilt fungus. Trees were treated therapeutically in 1990 and 1991 at a constant rate of 0.168 g active ingredient/cm diameter at breast height (dbh) using a root flare injection technique (1,2). Control trees were left untreated. Diameter at breast height, proportion of canopy wilted (PCW), and mortality for each tree was collected. Data were analyzed using a two-tailed Student *t* test with a 95% confidence interval.

Trees used in this experiment were located in Hennepin, Ramsey, Anoka, and Dakota counties. Average dbh of trees treated in 1990 was 53.6 cm, while average dbh of control trees was 44.3 cm. Diameter at breast height of trees treated in 1991 averaged 39.3 cm and control trees averaged 31.9 cm. No significant difference was detected between data collected for *Q. alba* and *Q. macrocarpa* in either study ( $P > 0.05$ ); therefore, data from the two species have been combined.

Eighteen trees treated in 1990 sustained an average PCW of 0.36 before injection; two trees with an average PCW of 0.90 were left untreated to serve as controls. For the 18 trees injected in 1990, average PCW observed one year post-treatment was 0.41. PCW prior to treatment was not significantly different from PCW one year later ( $P > 0.05$ ). No further canopy wilt was observed in 15 of the trees after treatment. Three treated trees, all with PCW greater than 0.60 before injection, wilted completely one year later and were considered dead. The number of treated trees dying after treatment was not significant ( $P > 0.05$ ). Both control trees wilted completely, but PCW did not change significantly from 1990 to 1991 ( $P > 0.05$ ). Mortality in control trees in 1991 was significantly higher than in treated trees ( $P < 0.001$ ). Because of the high initial PCW in control

trees, no comparisons were made between PCW for treated and control trees in 1990 and in 1991.

In 1991, 25 trees averaging 0.37 PCW before injection were treated. Initial average PCW in the five trees serving as controls was 0.62. In treated trees one year post-treatment, average PCW was 0.46. There was no significant increase in PCW one year later ( $P > 0.05$ ). Twenty of the 25 trees treated in 1991 sustained no further canopy wilt in 1992. Four trees with greater than 0.50 PCW wilted completely and were considered dead. The number of treated trees dying after treatment was not significant ( $P > 0.05$ ). Mortality and PCW in control trees increased significantly from 1991 to 1992 ( $P < 0.001$  and  $P < 0.02$ , respectively). All five control trees experienced further canopy wilt in 1992; average PCW was 0.92. Four of the five trees wilted completely, including two trees with less than 0.50 PCW. The PCW of treated trees and PCW of control trees was not significantly different in 1991, the year of treatment ( $P > 0.05$ ). In 1992, mortality and PCW for treated trees was significantly lower than for control trees ( $P < 0.001$  and  $P < 0.001$ , respectively).

Results from trees treated in 1991 suggest propiconazole halted further wilt in *Q. alba* and *Q. macrocarpa* infected with *C. fagacearum* showing less than 0.50 PCW. The data collected from the trees injected in 1990 appear to support this conclusion. Trees from this experiment will be reevaluated for PCW and mortality five and ten years after treatment.

## Literature Cited

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