A Rapid Method for Screening Macadamia Seedlings for Resistance to *Kretzschmaria clavus**

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Key words : *Macadamia integrifolia*, *Macadamia ternifolia*, *Kretzschmaria clavus*, root rot, resistance.

Nuts of macadamia (*Macadamia integrifolia* Maiden & Betcher) are one of the famous delicacies of Hawaii. Macadamia trees have been planted mostly on the island of Hawaii, and the industry has expanded rapidly in recent years. Root rot caused by *Kretzschmaria clavus* (Fr.) Sacc. of the Xylariaceae is the most serious disease problem of macadamia in Hawaii¹⁾. The disease causes an unthrifty appearance, followed by defoliation and death of trees that are older than 6 years of age. *Kretzschmaria clavus* forms black lines in infected roots and trunks, and produces kretzschmarioid and hypoxylloid stromata on the surface of infected tissues²⁾. Attempts to control the disease by injecting infected trees with fungicides have not been successful because extensive root damage usually precedes the appearance of external symptoms on the trees. Use of resistant root stocks has been considered a promising approach to solve this disease problem. However, advancement of the disease is extremely slow. Six months after inoculation, *K. clavus* colonizes only a few mm of the inoculated root tissues. It is, therefore, very difficult to compare susceptibility among macadamia trees. We report here a rapid method for screening macadamia seedlings for resistance to *K. clavus*.

Kretzschmaria clavus (isolate Ma-P12) was grown in a wheat-oat medium (125 ml whole wheat, 125 ml whole oat and 100 ml distilled water) for 1 month at 24 C. Stems of macadamia seedlings (12 to 18 months old) were scraped gently to remove the epidermis from bark tissues at 10-20 mm above the ground. About 30 ml of wheat-oat culture on a thin bed of moist sphagnum moss was placed on the scraped portion of the stem, wrapped with a sheet of clear plastic and secured on both ends. Macadamia seedlings similarly inoculated with wheat-oat medium were used as controls. Three replicates were used for each treatment. Young leaves of inoculated seedlings showed water soaking and turned brown within three weeks and died within three months. Infected stems showed black lines and *K. clavus* was reisolated from the diseased tissues. All three control seedlings remained healthy. Similar results were obtained in two subsequent experiments.

The method was used to screen macadamia seedlings for resistance to *K. clavus*. For

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M. integrifolia, 18 of 20 inoculated seedlings died within three months. For *Macadamia ternifolia* F. Muell., 3 of 5 inoculated seedlings died within the same time. All surviving seedlings were planted in the field for further study.

This method is fast and reliable, and should be suitable for use in large-scale screening programs.

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和 文 摘 要

Wen-hsiung Ko and Richard K. KUNIMOTO: Macadamia 実生を用いた *Kretzschmaria clavus* 抵抗性の簡易選抜法

マカダミア実生(12~18カ月苗)の茎の地上部 10~20 cm の部分の表皮を剥ぎ、そこにコムギ・エンバク培地で24C, 30日間培養した *K. clavus* を接種すると3週間以内に発病し、3カ月以内に枯死した。本法により、*K. clavus* に対するマカダミア実生の抵抗性選抜を検討した結果、*Macadamia integrifolia* では20本中18本が、*M. ternifolia* では5本中3本がそれぞれ枯死した。本法は迅速かつ正確であり、大規模な抵抗性選抜育種において有効であると考ええる。

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