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Developing apple leafcurling midge rearing techniques

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Apple leafcurling midge (*Dasineura mali*; ALCM) is considered a quarantine pest in some of New Zealand's valuable export markets. Research into alternatives to methyl bromide as a fumigant requires a mass rearing programme to provide large numbers of all life stages. Our aim was to focus on developing an understanding of the environmental conditions that break ALCM diapause and facilitate ALCM oviposition. A trial was conducted comparing ALCM oviposition rates on apple seedlings in a controlled temperature room versus a shade house in ambient conditions over the summer months. Additionally, long day length and high humidity conditions were tested to break the diapause of ALCM cocooning larvae. Oviposition rates on young apple seedlings were similar in the controlled environment room and the shade house; however, apple seedlings grew better in the shade house due to lower incidence of powdery mildew. Adults emerged from ALCM cocoons that had been in diapause for five months and then held at 20.9°C for seven days. Conditions to break ALCM diapause have been determined. Seedlings at the six- to eight-leaf stage have the potential to provide an oviposition substrate. Further investigations are required into artificial oviposition substrates and the development of a larval diet to mass rear ALCM larvae.

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Effects of morning vs. evening inoculation on the development of *Neonectria ditissima* lesions

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The study of *Neonectria ditissima* causing European canker in apple trees is often dependent on controlled inoculation of tree wounds and development of canker lesions. This makes the success of the initial inoculation crucial for time-efficient research. The effect of morning vs. evening inoculation on the successful development of canker lesions was investigated. Ninety-six 'Royal Gala' trees were inoculated on six different days (February–March 2017), which covered several different weather conditions. On each inoculation day, 16 trees were inoculated on four rasp and four picking wounds, at 10:00 and 19:00 hours. These were then assessed over the following 8 months for presence of disease symptoms. Irrespective of rain (0–4.5 mm rainfall at the day of inoculation), temperature (average daily temperature of 14.8–21.3°C), and humidity (average daily relative humidity of 59.8–94.2% rH), neither the day nor the hour of inoculation affected symptom development. However, more inoculated wounds developed symptoms in rasp wounds (91%) than in picking wounds (63%). Under the environmental conditions tested, inoculation timing (date and hour) had little effect on *N. ditissima* symptom expression.