Selecting potential insect species to vector *Fusarium tumidum* spores for gorse control

**Introduction**

Goose (*Ulex europaeus L.*) is an important weed of pastures and forest plantations in New Zealand occupying over 1 million ha. The fungus, *Fusarium tumidum* Sherb., has potential as a mycoherbicide against this weed (1). Insect vectors may be an alternative method of delivering the spores to the weed. This study aimed to select an insect species with the greatest potential to vector *F. tumidum* spores for biological control of gorse.

**Methods**

- Four insect species naturally found on gorse (Fig. 1), were examined through washing and plating techniques for their surface microflora.

- Morphological and molecular techniques were used for microbial identification.

- RFLP analysis of an amplified region of ITS rDNA, using four restriction enzymes and sequencing of the rDNA ITS region were used for further identification of the fungal cultures and *F. tumidum* isolate G34-34V (provided by Landcare Research, Auckland).

- Soft Imaging System programme, Analysis® measured the mean fungal spore sizes.

- The number of *F. tumidum* spores picked up and deposited by each species was determined.

**Results**

- All insect species carried more bacteria (40-12,200 CFU) than fungi (15-460 CFU).

- *Cladosporium*, Penicillium, Yeast and Alternaria species were common on all insect species.

- *Fusarium* spp. were isolated from only Epiphyas postvittana and *Cydia ulicetana*.

- *E. postvittana* carried the largest fungal spores (Fig. 2).

- *E. postvittana* carried and deposited most *F. tumidum* spores (Fig. 3).

- *S. staphylinus* did not carry any *F. tumidum* spores.

- Fungal isolate RAMWO1, recovered from *E. postvittana*, was identified as *F. tumidum* by RFLP analysis (Fig. 4) and sequencing.

**Summary**

*E. postvittana* was identified as the best candidate to vector *F. tumidum* spores as it naturally carries *Fusarium* spores and deposited significantly more spores than the other insect species tested.

**Acknowledgement**

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**References**


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**Insect spp.**

<table>
<thead>
<tr>
<th></th>
<th>E. postvittana</th>
<th>E. ulicetana</th>
<th>A. ulicet</th>
<th>S. staphylinus</th>
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<tbody>
<tr>
<td>Largest spore size</td>
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<td>(µm)</td>
<td>F. tumidum (701)</td>
<td>Penicilliosis spp. (204)</td>
<td>Epiphyas ulicetana (E. Ul) (163)</td>
<td>Alternaria alternata (106)</td>
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<td>Mean size (µm²)</td>
<td>123</td>
<td>51</td>
<td>38</td>
<td>14</td>
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**Fig. 2. The largest and mean fungal spores isolated from insect species**

**Fig. 3. CFU of *F. tumidum* carried and deposited by insect species**

**Fig. 4. Restriction fragment patterns of PCR amplified rDNA, digested with HindII, MboI, BsaRI and HindIII. Lane U: undigested rDNA.**