

Section VII.  
Foliage & Seed Insects

EXPLOITING PEA GERMPLASM FOR SEED WEEVIL RESISTANCE

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The pea weevil, *Bruchus pisorum* (L.), is an economically important pest of peas (*Pisum sativum* L.), and is particularly damaging in areas where dry edible peas are produced. Females lay eggs on young pods and neonates burrow into developing seeds where development is completed. Larvae reduce yield by consuming a large part of the seeds they infest. Developing a pea weevil-resistant pea has been a goal of entomologists and plant breeders in Australia, Chile, United States, and the former USSR (Clement et al., 1994, 1996).

Mass screening of pea germplasm in Australia using unreplicated field trials at nine sites and over four years identified potential sources of pea weevil resistance. A total of 1,900 accessions were assessed with good resistance located only in wild pea germplasm (*P. fulvum* Sibth. & Sm.) (Hardie et al., 1995). Glasshouse trials to quantify pea weevil resistance in accessions of *P. fulvum* in Australia and the U.S. using in situ screening methods demonstrated the presence of pod, seed testa, and cotyledon-based mechanisms in resistant accessions. The mechanisms inhibited the ability of larvae to penetrate pod walls/seed testa and the development of larvae in cotyledon tissues. Larval mortality varied from 40-100%. The evaluations in Australia and the U.S. indicated that populations of pea weevil in both countries respond in a similar way to *P. fulvum* accessions (Figure 1). Research on the genetic basis of this resistance is underway in Australia.

References

- Clement, S.L., N. El-Din Sharaf El-Din, S. Weigand, and S.S. Lateef. 1994. Research achievements in plant resistance to insect pests of cool season food legumes. *Euphytica* 73:41-50.
- Clement, S.L., M.A. Evans, and D.G. Lester. 1996. Settling and feeding responses of pea weevil (Coleoptera: Bruchidae) to flowers of selected pea lines. *J. Econ. Entomol.*, 89:775-779.
- Hardie, D.C., G.J. Baker, and D.R. Marshall. 1995. Field screening of *Pisum* accessions to evaluate their susceptibility to the pea weevil (Coleoptera: Bruchidae). *Euphytica* 84:155-161.

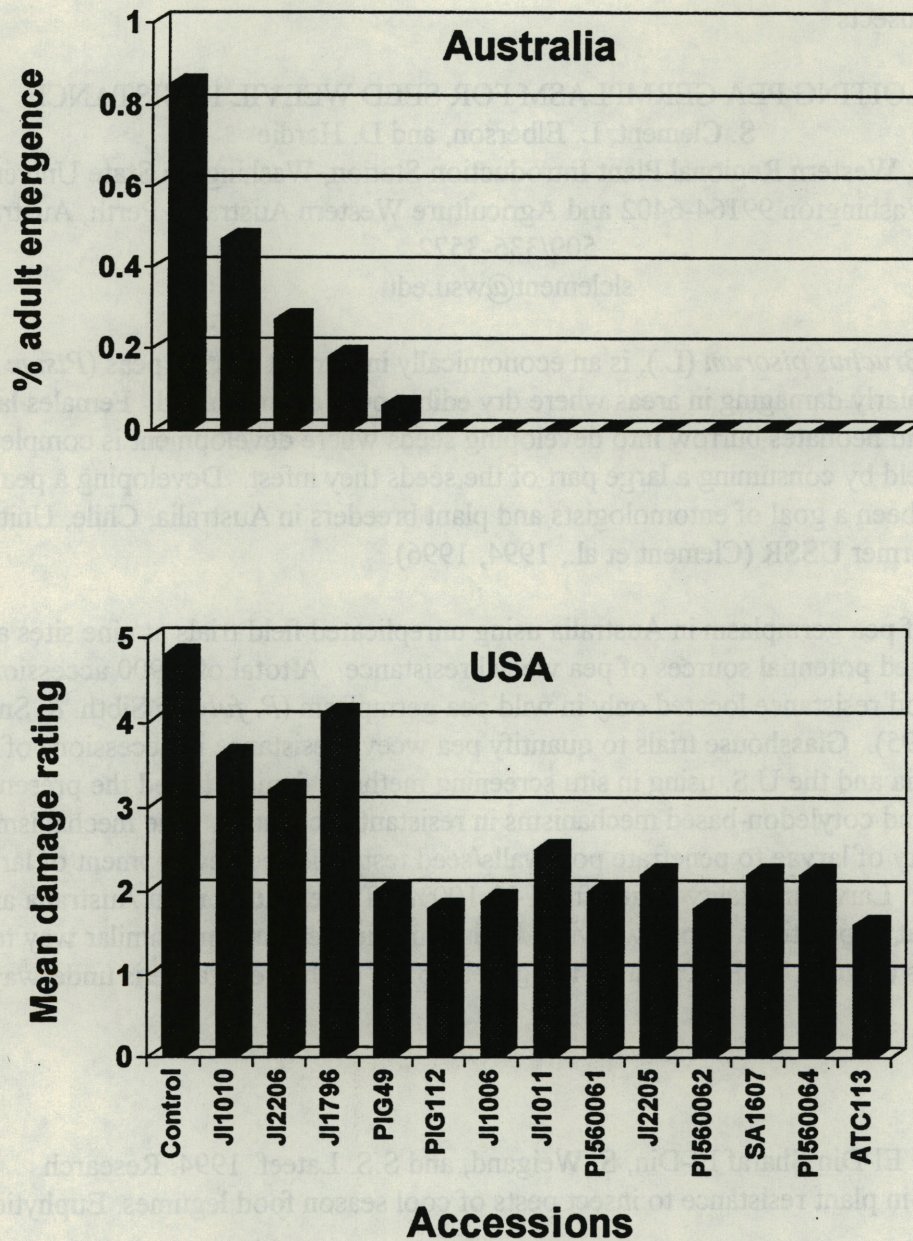


Figure 1. Results of screening 13 *Pisum fulvum* accessions and a control (cultivated pea) in Perth, Australia and Pullman, Washington (U.S.). Adult emergence was used to indicate resistance in Australia. An average seed damage rating < 2 indicated resistance in Pullman.