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Can insects solve dock problems?

by K. T. Richards

Agriculturists regard dock as the most serious weed of Western Australia's higher rainfall areas. A 1972 survey indicated that it was costing farmers $400,000 a year in lost production. Forty-two per cent of the pasture in high rainfall districts had 80,250 ha infested by dock. This included 23,000 ha of dense and 33,500 ha of moderate infestation.

A further survey in the 1974/75 summer indicated that docks were moderate to dense over at least 100,000 hectares.

In the 1972 survey, a total of 75 per cent of farmers questioned considered that docks were increasing on their properties and 83 per cent said docks were a most important weed. Control of docks by normal methods is made difficult by two features not uncommon with persistent perennial weeds—a strongly developed taproot and the production of a large number of seeds, some of which may remain dormant for many years. Root fragments also are capable of producing new plants.

Docks can compete strongly with crop and pasture species. Besides depleting the available moisture and nutrients in the soil, they have a strong shading effect and tend to crowd out desirable plants.

Fiddle dock, *Rumex pulcher* L. is considered to be the most widespread species in Western Australia, followed by curled dock, *R. crispus* L.; clustered dock, *R. conglomeratus* Murray; swamp dock, *R. brownii* Campd. and pink dock, *R. vesicarius* L.

Because of the lack of economic chemical control measures, researchers considered that biological control of docks by insects could be a viable proposition.

*Lixus cribicollis*

CSIRO obtained the original colony of this Mediterranean weevil from Morocco. Host specificity studies carried out by CSIRO personnel at Indooroopilly, Queensland indicated that this insect, if released in Australia, would represent no significant threat to non target plant species. CSIRO officers considered that it could be a useful agent in the control of docks, *Rumex* spp. and doublegee, *Emex* spp.

The adult weevil is approximately 12 mm long. When it has freshly emerged from the pupal case, it is yellowish-green or orange-brown in colour. Later, as this scale covering rubs off, the weevil reverts to a dull dark brown.

The adults feed on the plant foliage, particularly along the leaf margins. The small yellowish-white eggs are laid into pits cut into the runners or petioles (leaf stems). The creamy-white larvae are stem borers. In the case of *Emex*, they feed on the internal tissues of the runners, eventually causing these runners to collapse and die.

When mature, the larvae reach a length of about 10 mm. They pupate within the stem or runner. Later the adults chew their way out. Under laboratory conditions in Queensland, the life cycle from egg to adult took approximately 40 days, followed by a pre-oviposition period of 80 to 90 days. The adults normally hibernate during the summer months.

Current programme

On August 5, 1980 the Department received 15 adult *Lixus cribicollis* from Indooroopilly, Queensland, as a starter colony of these weevils. They were caged with *Emex australis* plants for 4 to 5 days to allow runner infestation. They were then placed in a number of subsequent cages with *Emex* until they ceased egg-laying (in early December). The period between oviposition and adult emergence has varied from 5 to 6 weeks during November/December to 11 to 12 weeks in the cooler weather of August-October.

Each plant has yielded approximately 25 adults. It was observed that on one particular runner measuring 43 cm in length, there were 40 ovipositional sites. This runner yielded eight adults, the emergence holes being 5 to 5.5 cm apart. Most of the runners have produced from 5 to 9 adults, which appears to be a considerably higher yield than that obtained in Queensland. The total population so far is approximately 850 adults. These are being maintained in cages under glasshouse conditions and are regularly supplied with fresh *Emex* food plants.

If all goes well, Departmental entomologists will make limited field releases of *Lixus* into suitable *Rumex* and *Emex* areas this season.

*Encomologist, Department of Agriculture.