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The establishment of a distribution network for the mite *Aculus hyperici* to control St John's wort (*Hypericum perforatum*) in Australia

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Abstract. The mite *Aculus hyperici* was released in Australia during 1991 into seven research areas and, during the following two years at 120 secondary release areas mainly in New South Wales. *Aculus hyperici* was slow to spread by natural means and there was concern within the farming community about a lack of information and inoculum availability to the general public. In order to address this problem, the Australian Meat Research Corporation funded the establishment of a large distribution network through local weed inspectors, to Landcare groups (an Australian initiative for solving land management problems locally) throughout the states of New South Wales and Victoria. The programme incorporated the establishment of nursery sites that could be harvested by farmers and Landcare groups. The network has facilitated fast dissemination of both information and starter mite-cultures. The advantage of the network was the community involvement in the successful dispersal of biocontrol agents. Information in the form of a management package supplied to the farmers will allow them to include the biocontrol agent in an integrated weed management strategy, while allowing the scientist to obtain information on a large number of sites during an organized monitoring programme.

Introduction

The mite *Aculus hyperici* is considered one of the most promising of the biological control agents released to date for the control of St John's wort in Australia (Wapshere 1984). Soon after the release it became apparent that the mite was capable of dispersing only 1-2 km in a year (P. Jupp unpublished data). To aid mite dispersal, a more structured distribution network involving the rural community, was required. As a result, a one-year intensive distribution network involving a number of public and private organizations was established. In this paper, the methods used and the advantages of such a programme to the scientist and to the rural industry, are explained.

The distribution network

The three main organizations involved in the distribution network were the Department of Conservation and Natural Resources in Victoria (DCNR), NSW Agriculture and the CSIRO Division of Entomology in Canberra. The nursery site coordinators were Shire Weed Officers (SWOs) in New South Wales and Catchment Management Officers (CMOs) in Victoria. The key distributing bodies were farmers, through Landcare groups.

Landcare is a government initiative that helps rural communities understand and solve local land-management issues. Landcare groups are made up of farmers and other volunteers who apply, as a group, for funding from both government and private organizations to address land-management problems in native vegetation areas and in the farming environment. The programmes are overseen by the Department of Primary Industry and Energy and involve Landcare Facilitators, Coordinators and Educational Officers who all advise and support the 2209 Landcare groups across Australia. Landcare groups also act as a network which links professionals in land management with the rural community in order to help solve problems.

Mites were mass reared at the CSIRO Division of Entomology and the DCNR Keith Turnbull Research Institute (KTRI) in Victoria, on plants in glasshouses and in constant temperature rooms. The SWOs and

CMOs selected sites, under guidelines set out by a nursery-site-management booklet supplied by CSIRO. Mite cultures were distributed as infected plants which were harvested and the cut material released into the nursery areas. Local Landcare groups were kept informed of progress and in some cases were responsible for a nursery site. On delivery of the cultures, presentations by trained personnel were given to the Landcare groups in the areas. The selected site-coordinator was instructed in the management of the site. A slide set, complete with notes, was developed for the NSW Agriculture officers and the Keith Turnbull Research Institute staff who were responsible for the delivery of the cultures and for presentations to Landcare groups.

Once these sites have sufficient numbers of mites for harvesting, field days will be held by the SWOs or the CMOs at the site, and Landcare groups will collect material for their own areas. A monitoring protocol was circulated with the management booklets; the monitoring will be completed by the person responsible for the nursery site and the results will be collated centrally for assessment.

Farmer-participation through Landcare groups is a practice which is becoming more common-place in Australia. Landcare is seen as a convenient organization to use for a distribution network as it usually includes farmers who are willing to try new techniques and who see their properties as part of a catchment area rather than a single entity. This project established 120 nursery sites throughout two States over twelve months and incorporates a distribution network consisting of 25 SWOs and 26 Landcare groups in NSW, and 18 CMOs, five Regional Co-ordinators, and 20 Landcare groups in Victoria.

Discussion

Several papers over the past few years have emphasized the advantages of farmer participation in the distribution and monitoring of biocontrol agents. The nation-wide extension programme in New Zealand shows the advantages of a co-ordinated approach to the distribution of control agents, in a system that allows information transfer and a community approach to the control of weeds (Grindell 1995; Syrett *et al.* 1993). Another example is the work done in the United States of America on the control of ragwort (*Senecio jacobaea*) where, as in the Victorian programme on this weed, schools were asked to participate in the rearing of biocontrol agents (Brown 1990; Darby and Mclaren 1993). The work in the USA resulted in over 3624 releases of the cinnabar moth (*Tyria jacobaeae*) and promoted biocontrol as a science, mainly because farmers were educated in the use of the control agent. Success was attributed to "the organized plan of distribution, collection and redistribution of biological control agents" (Brown 1990).

Andrews *et al.* (1992) describe classical biocontrol as fitting a 'farmer bypass model' where the farmer or the community has little or no participation in the implementation or monitoring of the control agents. In Australia, the 'farmer bypass model' is being challenged as the benefits of farmer participation are being realized (Darby and Mclaren 1993). In the Australian model the Landcare movement is a new component which is now being utilized to aid in the distribution and the monitoring of biological control agents. The harvesting of nursery sites can be promoted through regional Landcare newsletters and information can be disseminated by addressing Landcare monthly meetings in an informal setting. The Landcare infrastructure is ideally suited for the distribution of biocontrol agents.

The advantages of the network to the scientist are: (i) the supply of monitoring data from a large number of release sites; (ii) a greater appreciation of the heterogeneity of the farming practices used in the control of the target weed and of how the control agent can be incorporated; (iii) farmer support for the biocontrol of other weeds through appreciation of the effort being made to solve weed problems in their area; (iv) realistic expectations of biocontrol by farmers who learn to see this practice as a part of an integrated approach to weed management; and (v) the establishment of pathways to distribute information about the performance and use of an agent and to distribute further agents for the control of the target weed.

The advantages for the farmer are: (i) knowledge of how to recognize, redistribute and utilize biocontrol agents; (ii) ready supplies of control agents in their local area for inoculations into other problem areas; (iii) a sense of participation in a community-aid-orientated research programme; and (iv) a network of contacts that can help with weed control problems.

One of the main difficulties encountered in this project was a lack of information on the integration of biological control with other approaches to weed control.

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