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Published by: Great Plains Agricultural Council. Leafy Spurge Symposium.

Status report on the host specificity testing of leafy spurge insects at the USDA, Albany, CA, laboratory[1]

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Albany has the responsibility of completing the host specificity of candidate leafy spurge feeding insects, intended for release in the United States. The purpose of the host specificity testing is to predict what the potential host ranges of biological control insects could become if the agents were released. Our goal is to discover insects with broad enough host ranges to accept (and damage) the leafy spurge hybrids and yet narrow enough to avoid use (and damage) of economic and native plants. The overseas (Switzerland, Rome and Canada) screening programs identify leafy spurge insects which are host specific to the genus level. Usually few or no native spurges are tested overseas, and thus little is known concerning the abilities of the insects to use native North American spurges (of which there are 113 species, including 14 under review for legal protection as endangered species).

At Albany we have attempted, often with the help of cooperators, to collect and grow a number of representative native spurges to use as test plants. These plants include species from the different North American subgenera, some endangered species and some bridging species (which are sympatric with both leafy spurge and endangered species and which could carry insects onto endangered species). The emphasis is on species belonging to the subgenus esula which contains the native species most subject to attack, since this is the group to which leafy spurge belongs. The subgeneric concept is not only useful in organizing the large number of *Euphorbia* species, it also appears to be a natural grouping reflecting true relationships. Many *Euphorbia*-feeding insects respond to these subgenera, perhaps accepting as host plants, most of the species in one subgenus while rejecting the species in the other subgenera.

Lobesia euphorbiana is one of three candidate insects currently being tested in the Albany quarantine. This tortricid moth feeds within and kills the shoot tips of its host plants. To date this moth has completed its development on members of the subgenera chamaesyce, agaloma and esula, which represent all but 3 of the native *Euphorbia* species. The species utilized included small annual plants as well as large perennial species. In oviposition tests, the moth laid on all of the spurges which were offered to it. Depending on the availability of plants, we plan to test *Lobesia* against the following subgenus esula species: *E. incisia*, *E. robusta, E. telephiodes* and *E. purpurea*. At this point, *Lobe-*

[1] June 1984

sia euphorbiana's potential host range appears to be too broad to recommend its release in the United States.

Aphthona flava is a chrysomelid flea beetle whose larvae feed on the roots of *Euphorbia* species. It is one of several *Aphthona* species (*A. czwalinae* and *A. cyparissiae* are the others) which are under study as candidate biological control agents for leafy spurge. *A. flava* appears, at this point, to be specific to plants belonging to the subgenus esula. There are 21 species of these esula *Euphorbia* species native to the United States, including 3 endangered species (*E. telephiodes, E. purpurea* and *E. roemeriana*). Of the 3 species belonging to the subgenus esula, which have been tested, *E. robusta* and *E. spatulata* supported oviposition and development while *E. telephiodes* did not. Although a single *E. spatulata* appears too small for complete development of an *A. flava* larva to occur, larvae moving and feeding within clumps of plants probably could complete development. We plan to test *E. incisia, E. purpurea* and *E. palmeri* during the 1984 season. *Aphthona* species are difficult to work with, being univoltine insects with quite poor laboratory rearing rates, even on preferred hosts. For these reasons, it may take some time to complete the work on *A. flava* and the other *Aphthona* species.

Bayeria capitigena is a cecidomyiid gall midge, which galls the apical tips of its host euphorbias. Tips which are galled usually fail to produce flowers. The plants that have been accepted for both oviposition and development thus far have been members of the subgenus esula. No subgenus chamaesyce (58 native species), 1 subgenus agaloma (26 native species) and no native esula (21 native species) euphorbias have been tested. During 1984, we plan to test the following species: *E. spatulata, E. purpurea, E. incisa, E. robusta, E. telephiodes, E. palmeri, E. corallata, E. maculata* and *E. supina*. *Bayeria* is a multivoltine insect that does quite well in the laboratory. For this reason, we expect to finish the testing of this species in the near future.