

APION SEED WEEVIL INTRODUCED FOR BIOLOGICAL CONTROL OF SCOTCH BROOM

L. A. ANDRES • R. B. HAWKES • A. RIZZA



Adult *Apion fuscirostre* before emergence from seed of Scotch broom, *Cytisus scoparius*.

S COTCH BROOM, *Cytisus scoparius* (L.) Link, is an introduced perennial noxious weed infesting over 75,000 acres throughout 18 northern counties in California. It is an unpalatable invader of range and timber lands, and a deterrent to seedlings of some coniferous tree species. It also burns with such intense heat that many forest trees may be killed by a Scotch broom fire.

To aid in slowing the spread of this plant, a small seed weevil, *Apion fuscirostre* F., was introduced into California in 1964. A member of the subgenus *Exapion*, which attack exclusively the pods of woody legumes in the Old World tribe Genisteae, *Apion fuscirostre* has been re-

corded only from the pods of *Cytisus scoparius*.

Active in spring

The weevil hibernates as an adult, becoming active in the spring when new plant growth begins. It feeds on the developing buds, flowers, and broom pods, and oviposits in the pods. Each larva destroys one or two seeds during development. Pupation occurs in the pod, and the imago emerges when the pod dehisces in mid-summer (July to August). The newly emerging adults feed on the fresh broom foliage which develops concurrently with the maturing pods. After feeding, they seek out winter shelter in the cracks and crevices along the broom stems, in partially opened pods, and in suitable niches along the stems and branches of other plants in the broom association (*Castanea* spp. and *Adenocarpus complicatus* (L.) J. Gay, in Europe).

The weevil's development is closely synchronized with the several growth phases of the host plant. Thus the temperature threshold of spring activity terminates hibernation when the floral and foliar buds of Scotch broom are beginning to develop. Oviposition in the young pods is further regulated by the need of the females to feed on the host floral structures before they can develop eggs. Highly refined mechanisms of this type in which a plant parasite adapts to the phenology of its host are not uncommon, especially with an obligate parasite whose habitat is

as temporary as the developing Scotch broom pod.

Although a number of closely related woody legumes with morphologically similar flowers and pods occur in association with *Cytisus scoparius*, they do not serve as hosts for *Apion fuscirostre*. One reason is the difference in the phenologies of the plant species. *Ulex europaeus* L. blooms at temperatures too low for weevil activity, for example. Of greater importance, however, is the unacceptability of other legumes as food hosts for adult *A. fuscirostre*. Tests with newly emerged and overwintered adult weevils on the foliage and flowers of a variety of legumes—including alfalfa, bean, vetch, Acacia, and other species of the broom tribe—indicate that *A. fuscirostre* does no feeding on the economic plant species tested and only slight feeding on the several woody legumes. The weevil exhibited a marked preference for *Cytisus scoparius*.

Apion fuscirostre was released in Marin, Sonoma, Mendocino, El Dorado, and Nevada counties in the spring of 1964, and is now established at all localities.

Lloyd A. Andres and Robert B. Hawkes are Research Entomologists, U. S. Department of Agriculture, Agricultural Research Service, Albany, California, and Associates in the Agricultural Experiment Station, University of California, Berkeley. Antonio Rizza is Laboratory Technician, USDA, ARS, Rome, Italy.

CALIFORNIA AGRICULTURE

Progress Reports of Agricultural Research, published monthly by the University of California Division of Agricultural Sciences.

William W. Paul *Manager*
Agricultural Publications
Jerry Lester *Editor*
Chispa Olsen *Assistant Editor*
California Agriculture

Articles published herein may be republished or reprinted provided no advertisement for a commercial product is implied or imprinted. Please credit: University of California Division of Agricultural Sciences.

California Agriculture will be sent free upon request addressed to: Editor, California Agriculture, 207 University Hall, University of California, Berkeley, California 94720.

To simplify the information in California Agriculture it is sometimes necessary to use trade names of products or equipment. No endorsement of named products is intended nor is criticism implied of similar products which are not mentioned.

