TECHNIQUE FOR MASS REARING OF *HARRISINA BRILLIANS* (ZYGÆNIDÆ)

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The Western Grape Leaf Skeletonizer, *Harrisina brillians* B. & McD., a dark metallic blue Zygænid moth, is a pest of wild and cultivated grapes in the southwestern United States. To combat this pest, a biological control program was initiated in 1950 by the University of California. Several parasites were found within the range of the host insect in Arizona, New Mexico, and northern Mexico (Smith & Langston, 1953). Two diseases were also discovered, which were diagnosed as caused by a spore-forming bacillus (apparently *Bacillus cereus* Frankland & Frankland), and a granulosis virus (Steinhaus & Hughes, 1952).

To propagate the parasites and for biological experimentation it was necessary to rear large numbers of the Skeletonizer. With the various modifications being omitted, the principal parts of the technique are given as follows:

The first step in mass rearing of the moth is to have sufficient quantities of the host plant — wild and/or domestic grape. From late spring to early fall, wild grape leaves are obtainable from the field. However, if the insects are to be raised continuously, it is necessary to grow grapes in a greenhouse to insure foliage throughout the winter. It is advantageous also to have the young larvæ feed on a living plant rather than a cut "bouquet" of grape leaves. The larvæ are gregarious, feeding side by side (figured by Smith, 1953), but will disperse if the leaves dry up only slightly.

Under the environmental conditions of the greenhouse in La Mesa, San Diego County, California, Thompson Seedless grapevines were superior. They started easily from cuttings and were of a better quality for larval food than Concords, Tokays, or even the wild grape. The rooted cuttings were planted in 10-quart galvanized pails and permitted to grow as much foliage as possible, considering the limitations of time and space, before being subjected to the insects.

Being diurnal insects, the adult moths mate and lay eggs only on bright, sunny days. Therefore, several potted vines are placed in a large, room-like cage with an exposure to the sun throughout the day. The freshly emerged adult moths are added each day to the cage. They usually mate the first day and oviposit on the second. However, once the process is started, and if a steady supply of a few adults a day is available, new vines are added each day. When a sufficient number of eggs are deposited on the leaves, the vines are removed to a greenhouse bench. The number of eggs desired per vine depends upon the size of the vine and if supplementary leaves will be available for the larger larvæ. The larvæ are permitted to feed through the fourth instar on the vines on the benches.

During the fifth instar the larvæ lose their gregarious habit and commence searching for suitable sites for pupation. Before they start wandering, the larvæ are put in cages. The bottom of the cage is lined with removable corrugated cardboard. The larvæ and a fresh grape bouquet are added. The larvæ feed to maturity in the cage. The majority then crawl down into the corrugations of the cardboard and pupate, although a few may pupate in dry leaves or on the sides of the cage.

Diapause occurs in the pupal stage of *H. brillians.* Once diapause begins, a definite time interval is required, regardless of external conditions, before developmental activity is resumed (Smith & Langston, 1953). If diapause does not occur (*e.g.,* from spring or early summer larvæ from the field, or if prevented experimentally), the adults will emerge in a week or so, and the procedure continues in the large oviposition room.

The large oviposition room is necessary for mass rearing where many vines are subjected to a large number of adults. For individual biological or genetic studies (Langston & Smith, 1953), a small vine is placed in a two-foot cubical cage and subjected to one pair of adults. Although the space is much more confined, the female moth will readily oviposit. The resulting larvæ from this egg mass are kept separate for subsequent experimentation.

Literature Cited

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