

Western Grape Leaf Skeletonizer

1954 biological control program indicates parasitism plus virus disease registering important reduction of vineyard pest

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Apanteles harrisinae depositing eggs in first-stage skeletonizer larvae. Length of wasp—2.5 mm.

Two insect parasites, *Apanteles harrisinae* Mues.—previously called sp. "A"—and *Sturmia harrisinae* Coq., together with an unnamed granulosis virus, have attained major importance—on the basis of field performance—as natural enemies of the grape leaf skeletonizer in San Diego County.

Two other parasites, *Pelecyostoma harrisinae* (Ashm.) and *Apanteles* sp. "B"—previously reported to show promise—failed to become established despite large-scale releases.

Biological Studies

Apanteles harrisinae is capable of laying from 500 to 1,000 eggs, and as many as 26 have completed development in a single host caterpillar. However, *Sturmia*, although solitary and producing fewer progeny—about 300—is generally the superior.

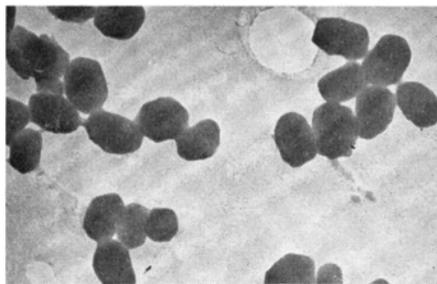
The two parasites have a life cycle of about 35 days and may complete three or more generations per season in the field. Both are highly susceptible to cryolite dust—used in chemical control of the skeletonizer—and *Apanteles* also suffers from sulphur used against mildew. Both parasites mechanically transmit the virus disease of the skeletonizer.

Field ecological studies during the past four years on fluctuations in skeletonizer populations—including evaluation of the effectiveness of the imported parasites—emphasized the importance of an unknown factor. Observational evidence pointed toward the granulosis virus disease, which controlled labora-

tory experiments confirmed, and the following important facts were revealed: 1, after being ingested, the virus develops to lethal proportions in about eight to 17 days, depending upon the stage of the larvae—the older larvae are apparently more susceptible; 2, feeding stops four to seven days before death; 3, any immature stage, including the egg and the pupae, may succumb to the virus; and 4, the moth may transmit the disease to the succeeding generation by way of the egg.

Field Evaluation Studies

Field evaluation studies have been primarily restricted to chemically untreated wild-grape areas and to a 6.2



Virus granules from gut cells of skeletonizer larva. Average size of granules 256 to 345 millimicrons.

acre Thompson Seedless vineyard—also untreated except for partial sulphur dusting for mildew—leased during 1953–1954 for experimental purposes. In agreement with the California State Department of Agriculture, the experimental vineyard was artificially infested during 1953 with approximately one-third million skeletonizers of all stages of development.

Despite this deliberate infestation and the fact that in 1954 the previous program of cryolite dusting of all domestic grape in the biological control area was discontinued, the total number of skeletonizer infestations—outside of the experimental vineyard—dropped to 32 in 1954, which was 25 below the 1953 season and 440 below the 1952 season when the chemical program was in full swing.

Average aggregate parasitism by *Apanteles* and *Sturmia* in wild-grape areas for the 1954 season was 62%—an increase of 21% over 1953. By October,

parasitism reached 62% in the unsulphured half of the experimental vineyard as compared with 52% in the sulphured half.

Only in the cryolite belt of the previous years was parasitism unimportant in 1954, and even there fall samples indicated that significant dissemination of the parasites was taking place.

Summer and fall epidemics of the virus disease broke out in the experimental vineyard and in most of the wild-grape areas. A level of parasitism of about 65%, plus occurrence of the disease, appears to be a critical combination that has evidently succeeded in bringing about elimination of the skeletonizer in 10 canyons infested in 1952. If this observation is correct, further reductions in skeletonizer infestations should occur in 1955.

With the current prospect that there will be no restoration of wholesale chemical treatment against the skeletonizer, the imported natural enemies should have an opportunity to demonstrate their full potential. Results to date are highly promising and should definitely show within the next few years whether or not commercial control of the skeletonizer has been effected by the insect parasites and disease.

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Sturmia harrisinae depositing eggs on fourth-stage skeletonizer caterpillar. Length of fly—6 mm.

