



The grape leaf folder, *Desmia funeralis* Hubner, is apparently an introduced pest without effective natural enemies in California. However, some 14 species of parasites and predators were found to attack the grape leaf folder in the eastern United States. Three of the most promising species have now been released in California vineyards for biological control of this pest. One of these, *Macrocentrus*, is shown on the cover. Photo above is of the parasitic wasp, *Apanteles*, depositing eggs in larvae of the grape leaf folder.

PARASITES for control of grape leaf folder

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THE GRAPE LEAF FOLDER, *Desmia funeralis* Hubner, occurs on wild grapes from central Texas to the Atlantic coast and from southern Florida to Canada. There are related species in central America and the Caribbean area. The California population was probably accidentally introduced late in the 19th century. This is suggested by the lack of early records of this pest, its peculiarly disjunct distribution, and the fact that it has very few natural enemies in California. An alien pest is an especially suitable target for biological control, so this tactic is being used on the grape leaf folder.

A search for parasites and predators of this pest was conducted during August, 1968, through most of its range in the eastern states. Approximately fourteen different species were sent to the quarantine laboratory of the Division of Biological Control, Berkeley, for testing. During September and October, three of the most promising species were colonized in Tulare County vineyards. These species are three parasitic wasps: *Macrocentrus nuperus*, *Apanteles canarsiae*, and *Pardialuomella ibseni*. The first two are solitary internal parasites of the larvae in the leaf rolls and the last species develops externally and gregariously. If

these parasites become established they will aid materially in suppressing leaf folder populations without cost to growers. More colonizations of these species will be made during the 1969 season, and additional natural enemies will be imported.

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