

Fungus on Codling Moth

fungus disease in overwintering stages of the walnut pest found to be an important natural controlling agent

A. E. Michelbacher and W. W. Middlekauff

A fungus disease reduces the overwintering population of the codling moth in some northern California walnut orchards.

Investigations at Linden showed that codling moth larvae—*Carpocapsa pomonella* (L.)—under the bark of Persian walnut trees were killed by a fungus which grows in or on the bodies of insects—an entomogenous fungus. The dead larvae consisted of a hard mass of whitish cobweblike growth.

A survey made on March 7, 1945, revealed that 4.25% of the overwintering larvae were killed by the fungus, and on a subsequent survey made on March 21, some 27% were found dead.

Further observations on the action of the fungus were made during the early spring of 1950. Three surveys were conducted the results of which are given in the accompanying table.

Both larvae and pupae are attacked by this fungus. Apparently the larvae are far more susceptible to the disease than the pupae. The number of individuals killed increased as the season advanced. On the March 15 survey 34.82% were dead as compared to 70% on April 10.

Some relation existed between the location of the overwintering larvae and the prevalence of the fungus. The larvae seemed more subject to attack under moist conditions. The incidence of the disease was highest where moisture conditions encouraged the growth of moss over the tree trunk. More dead individuals were found on the north than on the south side of the trunks.

Specimen of larvae killed by the fungus were submitted to the laboratory of insect pathology in the Division of Biological Control. The fungus was diagnosed as being closely related to *Beauveria bassiana* (Balsamo) Vuillemin.

The study in the walnut orchard at Linden shows that the fungus, under some conditions at least, is an important natural controlling agent, and probably one of the many factors that result in marked fluctuations in the codling moth population observed from time to time.

A. E. Michelbacher is Associate Professor of Entomology, University of California College of Agriculture, Berkeley.

W. W. Middlekauff is Assistant Professor of Entomology, University of California College of Agriculture, Berkeley.

Number of Overwintering Codling Moth Larvae and Pupae Collected Under the Bark of Walnut Trees and the Per Cent Killed by a Fungus Closely Related to *Beauveria bassiana* (Bals.) Vuill.

Date 1950	Total number of overwintering individuals	Stage							
		Larvae				Pupae			
		No visible fungus		Killed by fungus		No visible fungus		Killed by fungus	
Number	%	Number	%	Number	%	Number	%		
March 15	224	122	54.4	78	34.8	24	10.7	0.00	0.0
March 29	228	80	35.1	120	52.6	25	10.9	3.00	1.3
April 10	200	34	17.0	137	68.5	26	13.0	3.00	1.5



Bark removed from walnut tree showing overwintering codling moth larvae that have been killed by a fungus, probably *Beauveria bassiana* (Balsamo) Vuillemin. The dead larvae form a hard mass of whitish growth.