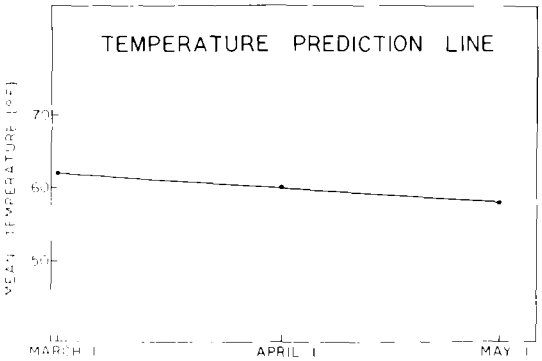

Fig. 2. Populations of *Erwinia amylovora* during bloom are usually detected in flower samples taken shortly after the mean temperature exceeds the prediction line; bactericide applications should then be initiated.

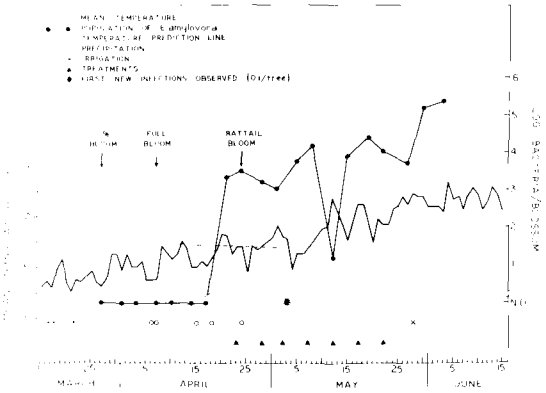

Fig. 3. Monitoring record for populations of *Erwinia amylovora* in pear flowers in a Glenn County orchard, 1975.

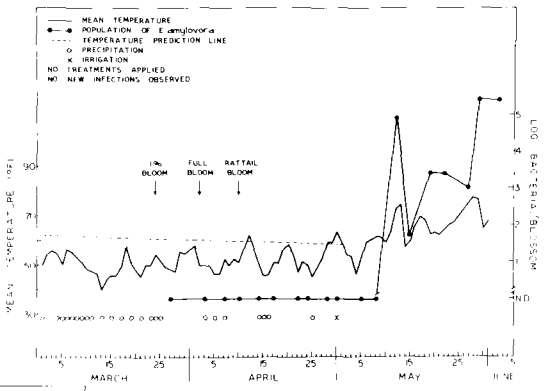

Fig. 4. Monitoring record for populations of *Erwinia amylovora* in pear flowers in a Sacramento County orchard, 1975.

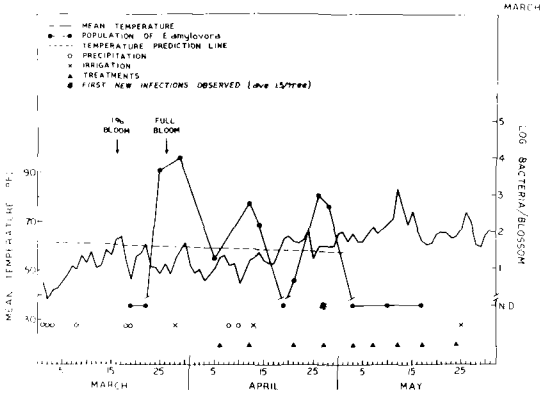

Fig. 5. Monitoring record for populations of *Erwinia amylovora* in pear flowers in a Yolo County orchard, 1976.

cumulated data by computer to provide a more accurate prediction method based on other environmental parameters in addition to the mean temperature.

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Codling moth, *Laspeyresia pomonella* (Linn), is one of the most serious pests attacking walnuts. Yet many growers and researchers have observed that certain walnut varieties are more susceptible to codling moth damage than others.

Of the old standard varieties, Payne and Concord have proven to be the most susceptible to codling moth damage, while the Franquette and most other late varieties generally escape damage caused by this insect.

There is no evidence of any walnut variety having an actual resistance to codling moth attack, although shell characteristics, such as seal, may be of some importance in warding off codling moth damage to kernels.

Pubescence on the developing nutlets may serve as a repellent against the egg-laying activity of the first brood of codling moth, since female codling moths prefer smooth surfaces for oviposition rather than rough, uneven,textured surfaces. Pubescence on the nutlets is lost on most varieties as the nutlet grows, but on some varieties, such as Hartley, this pubescence remains until the nutlets are quite large. Leafing date and fruit development characteristics seem to be important in escaping attack from this pest.

Trial

The purpose of this trial was to compare the susceptibility of many of the newer walnut varieties to codling moth damage when exposed to the same population levels of codling moth.

A trial consisting of ten walnut varieties, which received no chemical control of codling moth, was established in 1974 in a 12-acre walnut variety plot

Walnut varieties differ in susceptibility to codling moth damage

William H. Olson

at the California State University at Chico.

Since this variety collection is one of a kind with single rows of each variety, it did not lend itself to a trial that could be set up in a scientific manner with randomized and replicated plots. Therefore, to gain some confidence in the data collected, the trial was repeated for the next two consecutive years.

Pheromone traps were used to monitor the codling moth population in the orchard and to get some idea as to the size of the moth population. The average first- and second-brood peak moth catch in the pheromone traps, for the three years of this study, was 23 moths per day. Although it is not clear what a particular number of moths caught means, a peak catch of 23 moths per day does indicate there was a codling moth population of at least moderate size in the orchard. Furthermore, this walnut orchard was surrounded on three sides by almonds, and on a fourth side by grapes, neither of which is a host of codling moth, indicating that the moth population was local.

Damage caused by the first brood of codling moth was evaluated each year in late June by examining all nuts on the ground under six trees of each variety and by looking at the crop in each of the six trees for any additional evidence of codling moth damage.

Damage caused by the second brood of codling moth was evaluated by collecting and examining a 500-gram sample of walnuts from the same six test trees of each variety at harvest time. When worm damage was present, careful identification was made to be sure that the damage was a result of codling moth and not navel orangeworm, the other important worm pest of walnuts.

The table shows the results of this trial.

Conclusions

The numbers of walnuts damaged by the first brood of codling moth in each of the three test years were much higher in the Ashley and Chico varieties than in any other variety evaluated. In the variety plot, these two varieties were separated by the Hartley, Serr, Tehama, Marchetti, and Gustine varieties, indicating that the codling moths' preference for the Ashley and Chico varieties was not the result of an area effect, but that the moths actually selected out these two varieties.

For each of the three test years, no obvious difference in susceptibility to first brood codling moth damage was observed among the Gustine, Marchetti, Serr, Pedro, Vina, Tehama, or Hartley varieties. Of these varieties Gustine had the most codling moth damage, with an average of 1.8 damaged nuts per tree. The Ashley variety had four times the damage found in the Gustine variety, with an average of 7.4 damaged nuts per tree. Practically no first brood codling moth damage was found in the Scharsch Franquette variety during the three test years.

Damage caused by the second brood of codling moth was most severe in Chico, Ashley, Vina, and Serr, all early varieties. The midseason and late-season varieties tested had considerably less damage than did any of the early varieties tested.

The data indicate that, under equal codling moth pressure, Ashley and Chico are more susceptible to first brood codling moth damage than others, and these same two varieties, plus the Serr and Vina varieties (also early varieties), are also more susceptible to damage caused by the second brood of codling moth. However, in actual orchard situations where large blocks of a single variety may be involved, considerable codling moth damage could result even in varieties that have been shown to be less susceptible to codling moth damage when the moths are given a choice between varieties, as in this trial.

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Nut Damage Caused by Worms of First-Brood and Second-Brood Codling Moths

	Worm Damage							
	First brood				Second brood			
Variety	1974	1975	1976	Ave.	1974	1975	1976	Ave.
	no. of nuts/tree (average)				*% nuts/tree (average)*			
Ashley	7.0	11.0	4.2	7.4	2.4	1.4	1.8	1.9
Chico	3.0	9.3	4.2	5.5	5.1	1.6	1.3	2.7
Vina	.7	.8	.0	.5	2.8	.6	1.4	1.6
Serr	.8	.7	.8	.8	2.5	.7	1.0	1.4
Tehama	.3	.3	.2	.3	.7	.0	1.0	.6
Pedro	1.0	1.5	.0	.8	.0	1.4	.3	.6
Gustine	1.2	3.8	.5	1.8	.0	.0	.7	.2
Marchetti	.8	2.3	.7	1.3	.7	.0	.0	.2
Hartley	.2	.3	.0	.5	.6	.0	.7	.4
Scharsch Franquette	.2	.0	.0	.2	1.0	.0	.3	.4