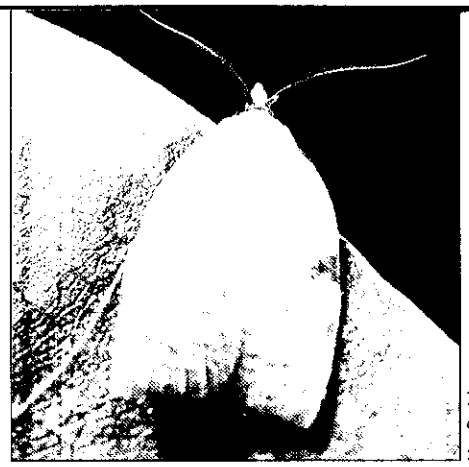
Omnivorous looper moth



Amorbia moth

Max Badgley

Blacklight trap

Blacklight monitoring of two avocado insect pests

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Two lepidopterous insects have been reported as sporadic pests in California avocado groves for over 50 years: the omnivorous looper (*Sabulodes aegrotata* Guenée) and *Amorbia cuneana* (Walsingham). With the dramatic increase in avocado acreage over the past several years, these pests have grown in importance. They have also gained in significance recently as pests of citrus in the San Joaquin Valley.

The larval stages of both insects feed on avocado foliage and fruit. Foliar feeding damage can be found in almost all groves, but it is usually light and is generally not of major importance to growers. Large populations of omnivorous looper have been known to completely defoliate mature avocado trees, although such severe damage has been infrequent and isolated. Feeding damage to fruit by either pest results in scarring and, if severe enough, can result in economic losses.

Populations of these two pests are generally kept below economically important levels by a complex of natural enemies, including hymenopterous and dipterous parasites (*California Agriculture*, November-December 1985), predators, and pathogens. Consequently, few insecticide applications are required.

To gain a better understanding of the seasonal abundance of these two pests, we operated blacklight traps in the major avocado production areas of southern California for three years (1980-82). By monitoring the abundance of adults trapped, we hoped to learn how many generations there were per year and when they occurred. Such information would be valuable in timing supplemental releases of the egg parasite *Trichogramma platneri* Nagarkatti, a potential control agent of both pests. Since egg laying is greatest when moths are most abundant, release of egg parasites should be timed to coincide with seasonal flights; releases at other times are of little value. Periods of possible crop damage can also be identified based on blacklight trap captures.

Along with the installation and operation of blacklight traps, we conducted research to develop a more species-specific trapping system using sex pheromones (to be discussed in a future issue of *California Agriculture*). Besides capturing only a single insect species, pheromone traps are cheaper, do not require a source of electricity, and are simple to operate. Sex pheromones have been developed for both pests and are available on an experimental basis.

Trapping study

Blacklight traps were stationed in eight commercial avocado groves in 1980—four sites in San Diego County, and one each in Riverside, Orange, Ventura, and Santa Barbara counties. Essentially the same arrangement was used during the following two years. Traps were occasionally moved to another site within the same general area because of changes in cooperators.

The traps, of standard design with a 15 watt, 110 volt AC fluorescent blacklight bulb, were connected to a household electrical source. The insect killing agent was either dichlorvos (Shell No-Pest Strip) or a 70 percent ethanol solution in a 1-quart wide-mouth jar. Traps were emptied at least once a week.

Catches were sorted and the number of omnivorous looper and *A. cuneana* moths recorded at the University of California South Coast Field Station, Irvine. In 1980 and 1981, a total of 5,675 male and 2,240 female *A. cuneana* and 16,625 male and 3,190 female omnivorous loopers were captured. The specific reason for the higher male catch is not known, although we speculate that the males are more active fliers and thus more likely than the females to encounter the traps. Females emitting the sex pheromone to attract males for mating would probably tend to remain stationary to provide a more even pheromone plume and a better target for the males.

Seasonal *A. cuneana* flights

Trap catch records from all counties except San Diego showed relatively distinct seasonal patterns of adult *A. cuneana* abundance. Peaks in the catches suggest that there are three generations (egg to adult) per year in Orange, Riverside, and Ventura counties (fig. 1). The first flight generally began early in the year and continued for three to four months. A second flight was detected during June and July, and a third during September or early October. A November flight also occurred in Riverside County in 1981.

Two prolonged periods of adult *A. cuneana* catches indicate only two generations a year in Santa Barbara County (fig. 2). The reason for fewer generations could be

the cooler seasonal temperatures at this northern site or an inherent characteristic of the different *A. cuneana* population occurring there as well as in San Diego County. Subsequent research with this insect's sex pheromone led to the discovery that a distinctly different ratio of pheromone components was required for optimal trap catch of *A. cuneana* in those two counties compared with the other counties.

Blacklight captures of *A. cuneana* in San Diego County during this three-year study did not reveal clear enough seasonal flights to make comparisons with other counties possible. Only the catches from a single site (near San Luis Rey) in 1981 were distinct enough to indicate the occurrence of an early-season flight. This flight was similar to early-season trap catches in Santa Barbara County. Because of low population densities and possible interference from massive populations of omnivorous looper captured in traps, we have no other *A. cuneana* data from San Diego County.

Omnivorous looper flights

Relatively clear seasonal omnivorous looper flight activity was recorded at six locations monitored with the blacklight traps (results from four sites shown in fig. 3).

At most locations, intermittent adult activity was detected from January through April, with the February and March period sometimes showing the most activity. The most distinct and generally the largest flight of the year began near the middle to end of May and continued for four to six weeks. Peak trap catch during this interval was usually from late May to mid-June. This was followed by a late-summer flight in August and September. In 1980, a fourth flight was recorded in October and November in San Diego, Orange, and Ventura counties.

Thus, there appear to be four omnivorous looper generations per year in all the areas monitored except Santa Barbara County, where apparently only three generations occur (fig. 4). These results also indicate that a generation is completed in about seven weeks during the summer. The other generations take longer because of cooler temperatures.

During the larger mid-May to July flight of the omnivorous looper, catches sometimes exceeded 600 moths per night. Since larvae produced by these adults have caused most of the observed omnivorous looper damage to avocado groves, this major flight is important in timing the purchase and release of *T. platneri*, the wasp that stings and kills moth eggs.

San Diego County, which consistently had the highest trap catches of omnivorous looper, has also had the most extensive damage. Comparison of moth catches among trapping sites is difficult, however, because trap placement, exposure, and the surrounding topography were different at each location. Since these factors can affect the efficiency of individual traps, the number of moths captured cannot be readily related to the actual number of moths in the grove or to the level of damage. In 1980, for example, a San Diego County grove had very high trap catches of omnivorous looper but sustained only light foliar damage. In contrast, the Ventura County grove incurred fairly heavy damage early in the year, but blacklight catches were low.

Conclusion

The results of our three-year blacklight trapping study indicate that there are typically two to three *A. cuneana* generations per year and three to four omnivorous looper generations in southern California avocado groves. The early-summer omnivorous looper flight (May-June) was generally the largest. Consequently, producers should be more attentive to potential damage in groves following this flight.

Supplemental releases of the egg parasite *T. platneri* to aid in control of *A. cuneana* or the omnivorous looper should be made only during seasonal moth flights, when eggs are most abundant. These seasonal flights can be readily identified with blacklight traps, as this study has indicated, or by the use of pheromone traps. The sex pheromones of both of these avocado pests have been identified and are in the final phases of development for eventual commercial use.

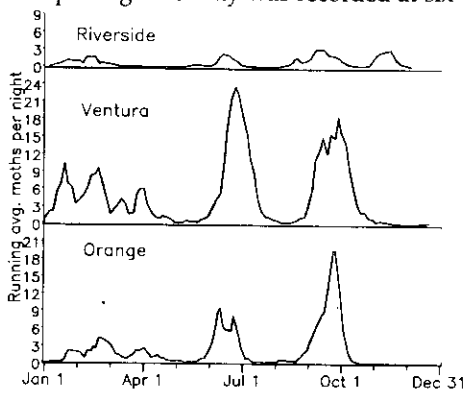

Fig. 1. Three flights of *Amorbia cuneana* were typically recorded in Orange, Riverside, and Ventura counties. (Only 1981 data are depicted here and in fig. 2.)

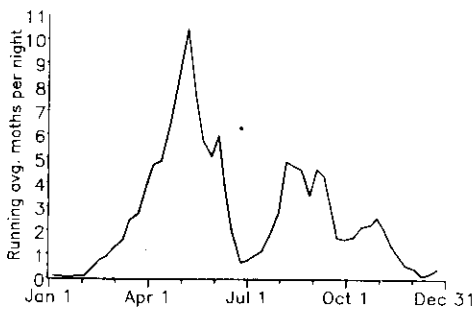

Fig. 2. Two flights of *A. cuneana* were detected in Santa Barbara County.

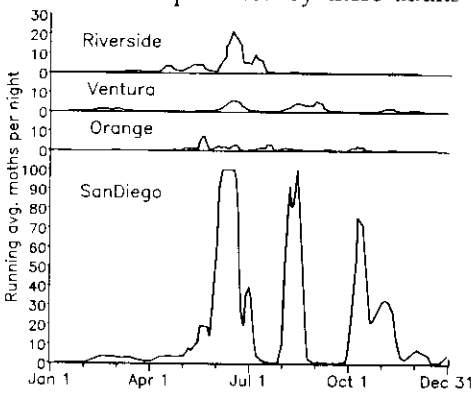

Fig. 3. The largest omnivorous looper flight occurred during May and June. This period in San Diego County is indicated by a flattened peak, because average trap catch exceeded 100 moths per day. (Only 1980 data are depicted here and in fig. 4.)

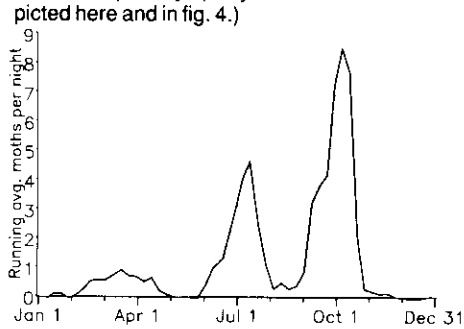

Fig. 4. Three omnivorous looper flights were recorded at this site in Santa Barbara County.

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