1995 California Avocado Research Symposium pages 67-72
California Avocado Society and University of California, Riverside

BIOLOGICAL CONTROL OF PERSEA MITE

J. A. McMurtry
Department of Entomology

Field studies: Monitoring of persea mite (Oligonychus perseae) and predators was continued in 4 orchards (Escondido, Gopher Canyon, Pala Mesa and East Mission), all of which had releases of Galendromus helveolus in 1993 but not 1994. Some data (Figs. 1-4) are shown for the first 2 orchards. The Escondido orchard has shown a 3-year downward trend in persea mite populations. The population peak in 1994 (Fig. 1) was 57 female mites per leaf, compared to 200 in 1993. The most abundant predaceous mite was Euseius hibisci in the spring, but the dominant species later in the season, when persea mite was more numerous, was the native Galendromus annectens (Fig. 2). G. helveolus made up part of the predator population in August and September. In the Gopher Canyon orchard, persea mite populations peaked at an average of 178 mites/leaf in 1994 (Fig. 3). This level was comparable to the peak mite population in the helveolus release plots in 1993 (155/leaf) and lower than that in the non release plot (250/leaf) in 1993. E. hibisci was the dominant predaceous mite into September, when G. annectens became abundant (Fig. 4). Declines in persea mite numbers were correlated with increases of G. annectens. The Pala Mesa orchard had persea mite population peaks similar to those in 1993 (120 per leaf), and declines were correlated with increases of G. annectens. Only a few G. helveolus were present in the samples. The East Mission orchard showed the lowest spring population of E. hibisci (usually below 0.5/leaf) and the highest early summer populations of persea mite, and the orchard was sprayed with oil. Both annectens and helveolus increased in September and October. A heat wave in August apparently was responsible for mortality of both persea mite and predaceous mites in the 4 study orchards; predaceous mites declined in all 4 orchards during this time, but declines were less consistent for persea mite. Six-spotted thrips were more numerous in 1994 and they may have been an important mortality factor on persea mite in the East Mission orchard.

Results to date suggest the following conclusions: 1. G. helveolus became established in all 4 orchards following the 1993 colonizations. However, in 1994 the native annectens increased sooner and to higher numbers compared to helveolus. and declines in persea mite numbers were correlated more closely with annectens. 2. Augmentative releases of helveolus in sufficient numbers probably could promote earlier increases of this species for persea mite suppression. 3. High spring populations of E. hibisci (a pollen feeder as well as a predator) seem to be important in delaying colonization and rapid buildup of persea mite. 4. When hibisci population densities drop below about 1 per leaf, persea mite infestations tend to intensify; then annectens. and later helveolus. build up and often suppress persea mite. 5. Apart from the effects of hot weather, there are some indications of a declining trend in persea mite

peaks from the initial years of infestations.

Foreign exploration for persea mite predators: Exploration in Costa Rica (where both Oligonychus perseae and the closely related O. peruvianus occur), was conducted by postdoctoral research entomologist Orlando Aponte. Collections were made at 13 sites ranging from 400 to 2600 meters in elevation. Species of predaceous mites introduced were Euseius vivax. Galendromus pilosus and another culture of G. helveolus. G. pilosus. never having been tried before, was emphasized in our production and colonization program. This species readily penetrates the persea mite webbing to gain access to its prey. Releases were made at 7 sites spanning 3 counties (San Diego, Riverside and Ventura). Except for a single recovery at one site two weeks after a release, there was no evidence of establishment of G. pilosus. Additional releases will be made in 1995.

Biological studies on persea mite: The table below shows the average time (in days) required by O. perseae to complete its life cycle and some reproductive parameters (mean no. eggs laid/female and eggs/female/day) at 4 temperatures. Based on generation time and reproductive rate, the potential rate of increase of persea mite is considerably lower than that of some species, such as twospotted spider mite. However, it is probably typical for a species living in a stable habitat (evergreen trees) in protective "nests".

DEVELOPMENT AND REPRODUCTION
OF *OLIGONYCHUS PERSEAE*
A. Aponte and J. McMurtry (in preparation)

Temp. (C)	Generation Time (Days)	Eggs/Fem.	Eggs/Fem. Per day
15	41.4	17.9	0.6
20	19.5	37.1	1.2
25	15.6	45.8	2.2
30	11.2*	20.7	1.8

* Significant mortality of all developmental stages

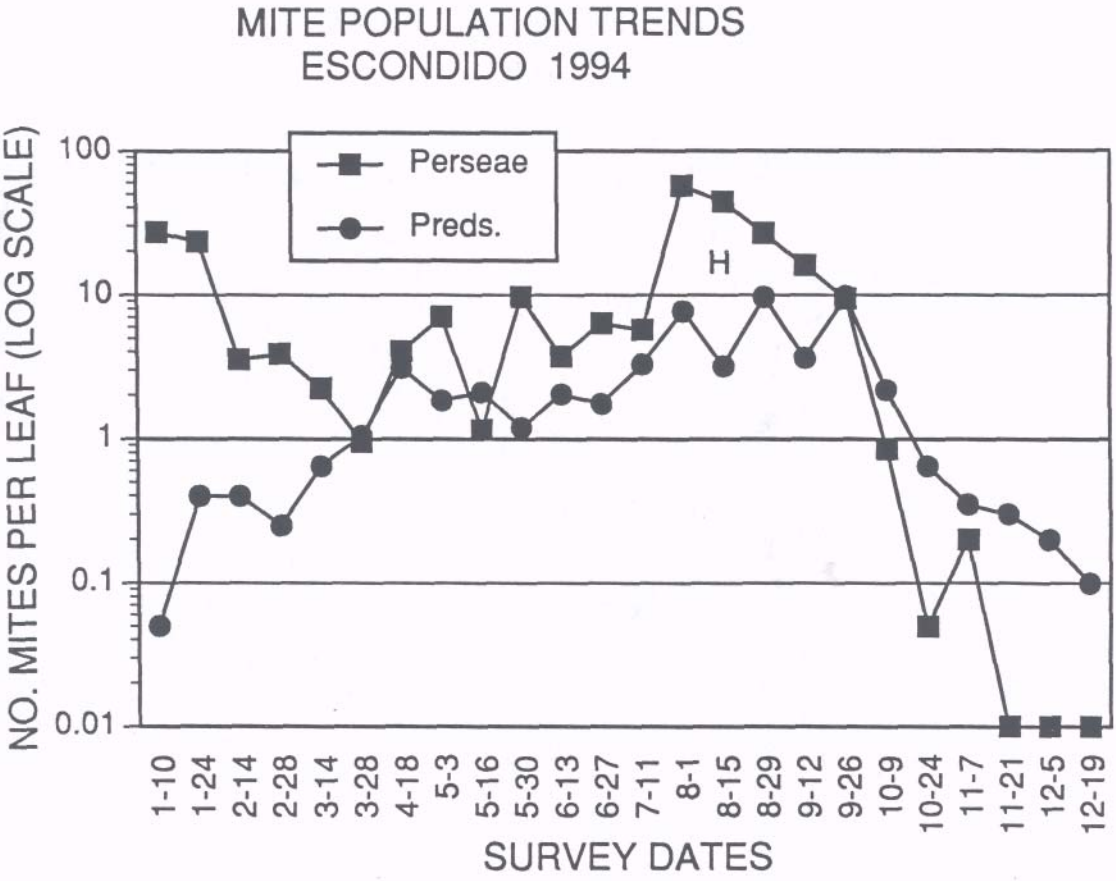

Fig. 1. Persea mite and predaceous mite population trends in a plot in Escondido, San Diego County, 1994. The symbol "H" indicates when a heat wave occurred.

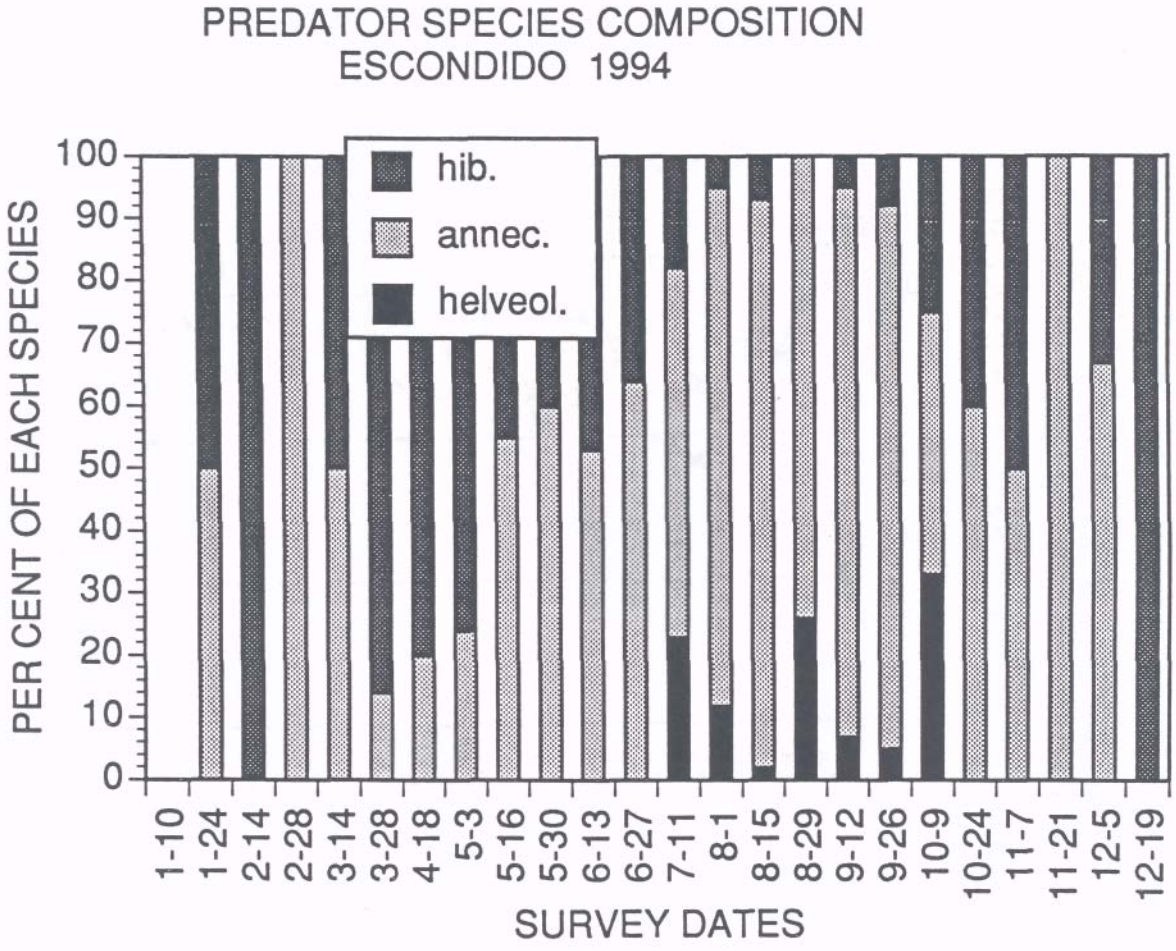

Fig. 2. Approximate percentages of the predaceous mites *Euseius hibisci, Galendromus annectens* and *Galendromus helveolus* in a plot in Escondido, San Diego County, 1994.

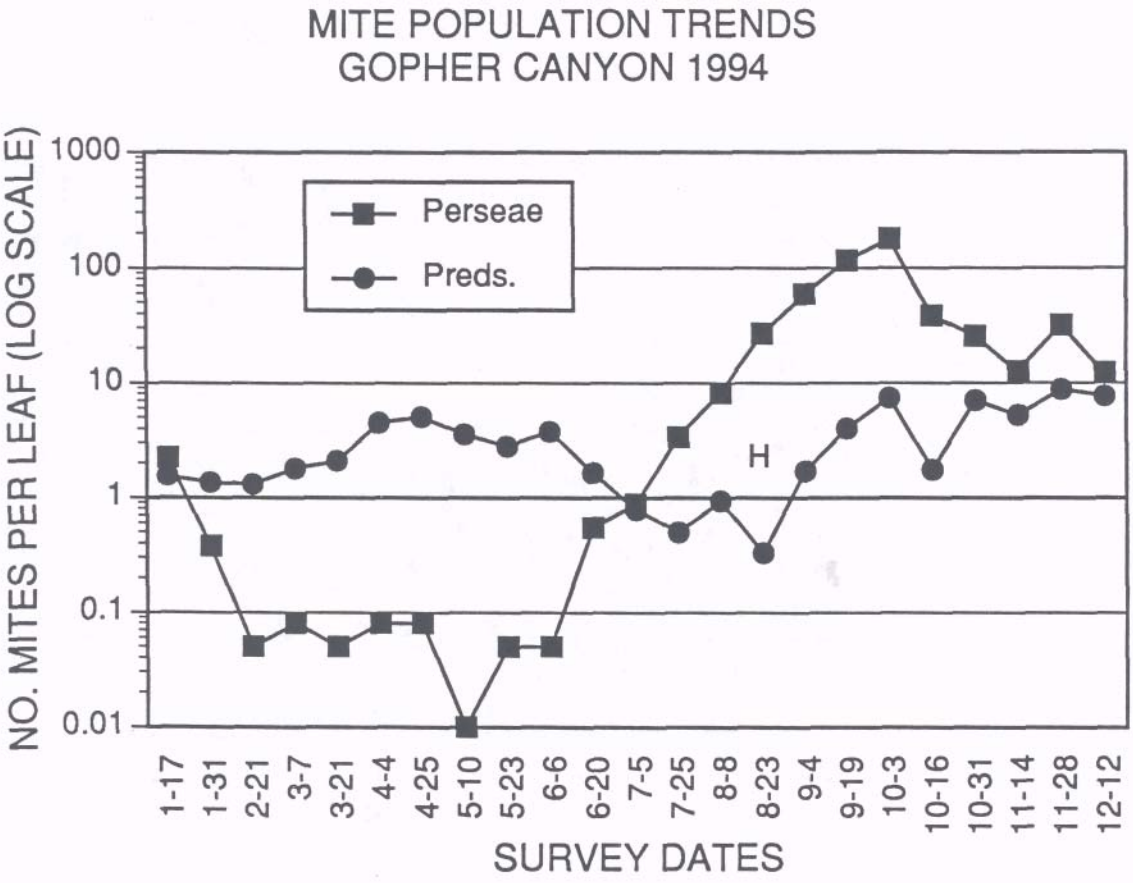

Fig. 3. Persea mite and predaceous mite population trends in a plot in Gopher Canyon, San Diego County, 1994. The symbol "H" indicates when a heat wave occurred.

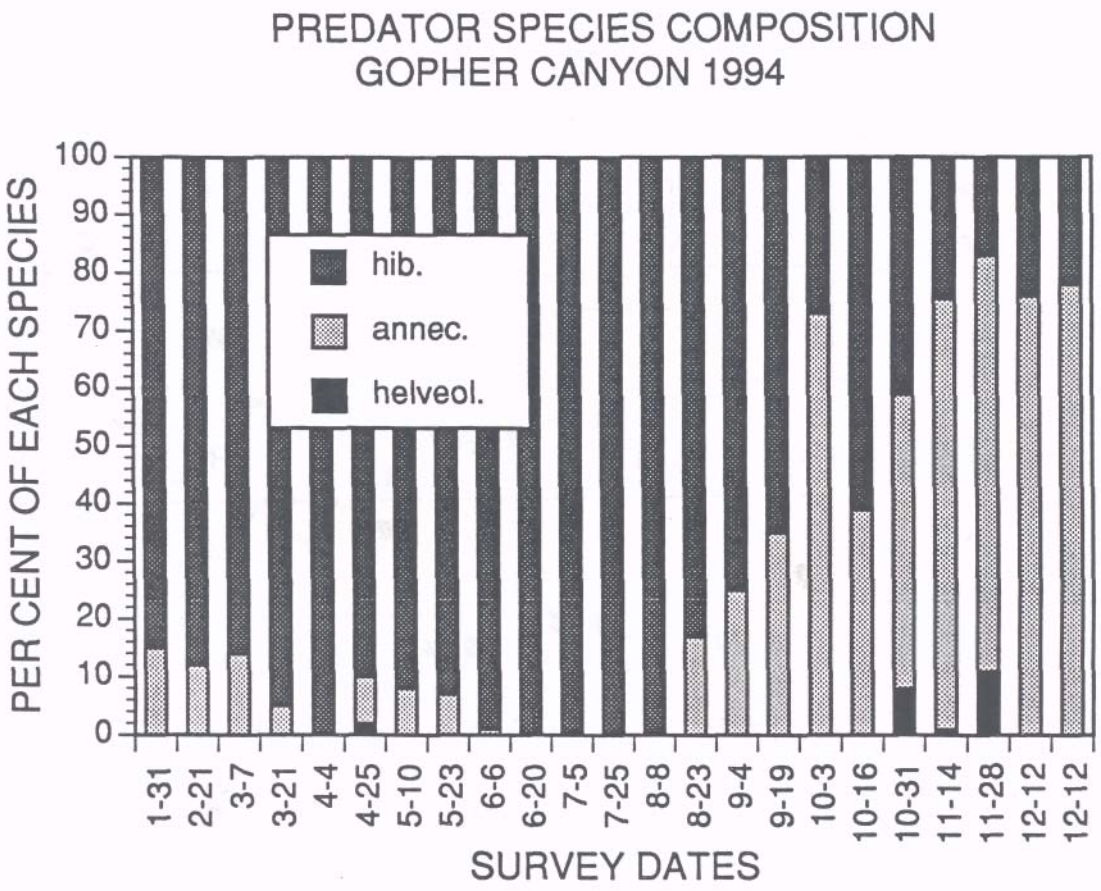

Fig. 4. Approximate percentages of the predaceous mites *Euseius hibisci, Galendromus annectens* and *Galendromus helveolus* in a plot in Gopher Canyon, San Diego County, 1994.