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# PRELIMINARY STUDIES ON RELEASING STETHORUS BEETLES FOR CONTROL OF THE AVOCADO BROWN MITE

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It has been indicated previously that most avocado pests are under satisfactory natural control (Fleschner 1954, Fleschner *et al.,* 1955). However, the avocado brown mite *Oligonychus punicae* (Hirst) sometimes searches damaging numbers. Since chemical control might result in undesirable side effects, such as resistance or outbreaks of other potential pests, it is important to develop ways of increasing the effectiveness of biological control of the brown mite.

The lady beetle Stethorus Picipes Casey. Actual size—1/16 inch.

McMurtry and Johnson (1966) observed that the lady beetle *stethorus picipes* Casey often suppressed populations of the avocado brown mite before damage became severe. In other cases, however, *Stethorus* did not start to increase until mite populations were quite high, resulting in severe leaf damage. These studies suggested that if more *Stethorus* were present when mite populations started to increase, heavy infestations might be prevented. It appears possible that artificial releases of *Stethorus* could achieve this result. Therefore, a pilot project was started in San Diego County in the summer of 1966 to determine the feasibility of releasing *Stethorus* in avocado orchards. The results of the initial trials are summarized in this report.

## METHODS

For the initial study it was decided to use small plots and release relatively large numbers of beetles per acre. Four Hass avocado orchards in the Fallbrook area of San Diego County (Beck, Chaikins, McMillin, and Von Normann orchards) were used for the experiment. *Stethorus* beetles were liberated on a block of 6-8 trees in each orchard. The beetles were produced in the insectary of the Department of Biological Control, University of California, Riverside, and transported to the field in small straws. The straws were attached to the leaves and the stoppers removed. Several releases were made at weekly intervals, resulting in a total of several hundred *Stethorus* per release tree. In the Chaikins orchard, releases were made when only a few mites could be found in an intensive search. In the other orchards the brown mite population averaged several mites per leaf before releases were started. Population of avocado brown mite and *Stethorus* were sampled at weekly intervals as described previously (McMurtry and Johnson 1966) on each release tree and a similar number of "check" trees on which no *Stethorus* were released.

## RESULTS

Results in the Chaikins orchard indicated that if *Stethorus* were released when the mite population was still extremely low, there was no significant effect since there was insufficient food to retain the beetles.

The best results were obtained in the McMillin orchard where the first releases of *Stehorus* were made when the brown mite population averaged 2.3 adult females or about 10 total mites (excluding eggs) per leaf. Figure 1 shows trends of mite and *Stethorus* populations on the release plot compared to the check plot where no *Stethorus* were released. The mite population on the release trees built up considerably slower and reached a peak only about one-half as high as that on the check trees. *Stethorus* started increasing in numbers much sooner on the release trees even though there were fewer mites than on the check trees. Eventually, the *Stethorus* became more numerous on the check trees because of the higher mite population, but this did not occur until the mites had severely damaged the foliage. Therefore, it was concluded that the releases of *Stethorus* had a significant effect in suppressing the avocado brown mite population.

Similar trends were evident in the Beck and Von Normann orchards, but the differences in mite populations between release and check trees were not as great. This was apparently the result of less favorable timing of the releases.

## DISCUSSION

The most encouraging results were obtained in the orchard where the smallest number of beetles were released (400 per tree). The timing of the releases was apparently the important factor. There was a sufficient density of mites for the predators to remain on the tree and reproduce. If the releases were made too soon, as in the Chaikins orchard, even larger numbers were ineffective since the beetles apparently left the trees in search of food. On the other hand, if the releases were delayed too long, even though

the beetles remained on the trees, they could not multiply fast enough to "catch up" with the already high mite population.

Obviously some of the released beetles will fly to other trees under any conditions. It is not known how far they are able to disperse. This is probably affected by wind conditions since they appear to be relatively weak fliers.

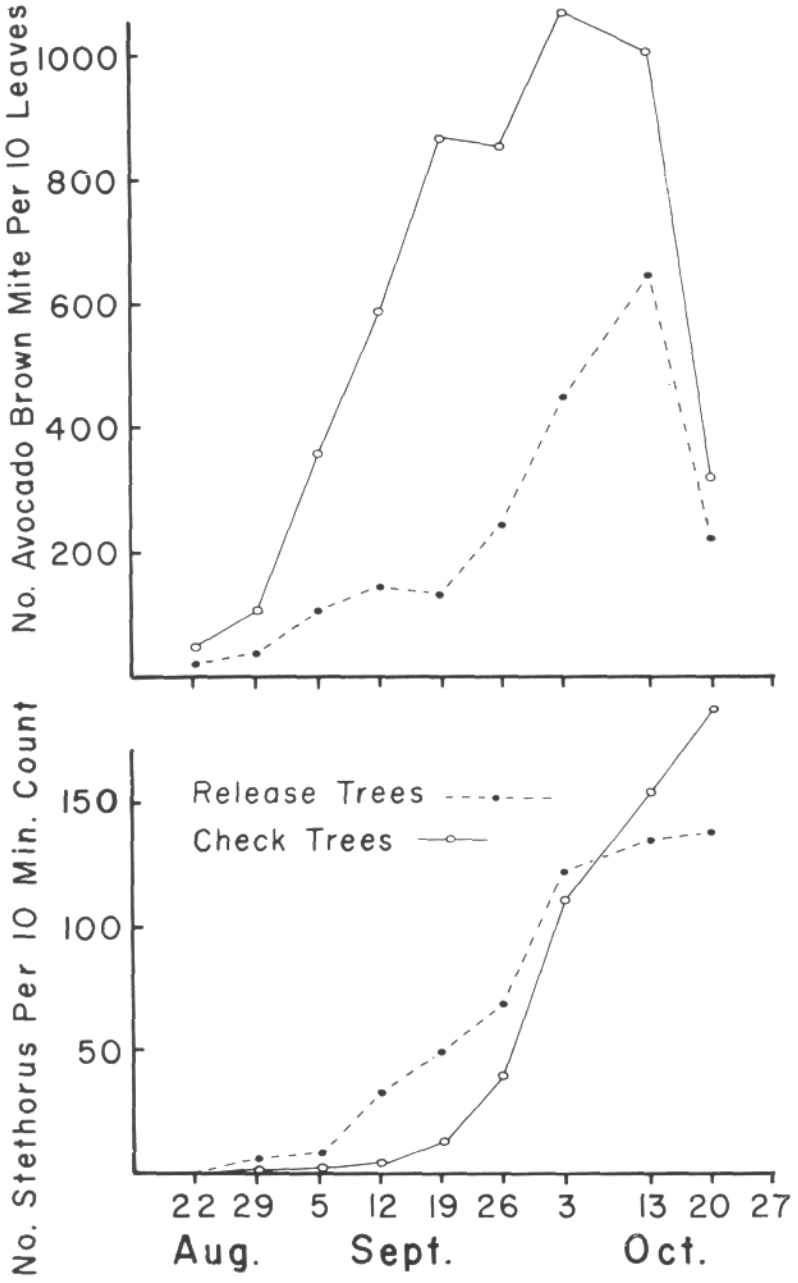


Figure 1. Population trends of avocado brown mite and Stethorus on trees where Stethorus were released compared to check trees where no releases were made.

Results of the 1966 study were sufficiently encouraging to conduct trials on a more extensive and refined basis. Release and check blocks of 16 or more trees will be employed. A major obstacle not yet overcome is to produce large numbers of *Stethorus* beetles. Many hours of technical and routine work are required to produce several thousand beetles for field release. However, further research should solve many of the difficulties.

## LITERATURE CITED


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