

THE "BLUE ALFALFA APHID" - BIOLOGY AND ECONOMIC THRESHOLDS

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The apparent establishment of a new aphid pest of alfalfa, Acyrtosiphon sp. which is known locally as the "blue alfalfa aphid", has caused concern among growers in California and throughout most of the western states. Large populations, at times causing severe damage, were reported during the spring of 1975 from the Imperial and San Joaquin Valleys of California. Because of the relatively short time we have had to study this aphid, there are presently few quantitative data available. Disagreement among taxonomists as to the specific epithet which should be applied to this aphid places severe constraints on even a literature search which might clarify some of the problems concerning biology and economic thresholds. Much of what is known, or suspected, concerning both biology and economic threshold levels is based on observations. Likewise, only 6 months has passed since the "discovery" of this aphid and we are thus without the benefit of observing a complete years' phenology. The reader is cautioned to keep both of these facts in mind.

Biology and Behavior

The biology of the "blue alfalfa aphid" appears to be somewhat similar to that of the pea aphid, A. pisum (Harris). It is apparently a cool weather adapted species, with maximum population levels occurring in late winter or early spring. Following the advent of hot summer temperatures, populations decline rapidly and in 1975 I was unable to find individuals in the field (in the San Joaquin Valley) after 1 June. The spring population peak coincided closely to that of pea aphid, however, the fall peak of pea aphid occurred in late September (Fresno, Tulare, Kings counties) without a noticeable increase in "blue alfalfa aphid" numbers. Currently, (1 November, 1975) <1% of the aphid population in the fields we are sampling in Fresno and Tulare counties is composed of this species. An apparent behavioral difference between the "blue alfalfa aphid" and pea aphid has been observed by a number of individuals. The "blue alfalfa aphid" tends to prefer the rapidly expanding alfalfa terminals while pea aphid is more likely to distribute itself randomly along an individual stem.

Economic Threshold Levels

No quantitative data are currently available regarding either economic threshold or economic injury levels of the "blue alfalfa aphid". Observations made by many reputable entomologists during the spring of 1975 seem to indicate that this species is capable of causing damage at population levels lower than what would normally be considered an economic infestation of pea aphid. It must be remembered, however, that weather condition in the San Joaquin Valley during the spring of 1975 was not particularly conducive to good alfalfa growth and it is thus difficult to separate poor growth due to cold conditions from that possibly caused by the "blue alfalfa aphid". Likewise, the possibility of a toxin cannot be ruled out at present. Many of the symptoms, e. g. short inter-nodes, yellowing, deformed and misshapened leaves, observed in heavily infested fields suggest that a toxin may be involved. Confirmation of this, like most other aspects concerning the "blue alfalfa aphid" awaits the completion of laboratory and greenhouse studies.

Current Research

Research is currently underway on both the laboratory and field biology of the "blue alfalfa aphid". Life table, temperature thresholds and competition studies between the "blue alfalfa aphid" and pea aphid are currently being conducted. Fields in Fresno and Tulare counties are being sampled weekly to determine the phenology of the "blue alfalfa aphid". Greenhouse studies are underway on economic threshold and index levels. I have developed a technique for regulating aphid populations in field plots that will be used this winter and spring in further defining the economic levels of this species. All phases of this research will be closely coordinated with other individuals working on chemical control, biological control and the development of host plant resistance.