

IDENTIFICATION AND BIOLOGICAL PARAMETERS
OF ACYRTHOSIPHON KONDOI

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Identification

Although several aphid species may commonly colonize California alfalfa, only two, Acyrtosiphon pisum (Harris) (pea aphid) and A. kondoi Shinji ("blue alfalfa aphid") are sufficiently similar in appearance to create possible problems in identification and recognition. Kono (1975) presented an excellent description of the two species and reference should be made to his paper for details regarding positive identification. The descriptions provided here are to assist those workers in the field who must make a determination of the species present and the relative abundance of each. The reader is reminded to keep in mind the variability which exists among the individuals within a population. The following may assist in separating the two species.

Size. The blue alfalfa aphid is somewhat smaller in size than the pea aphid. This is most noticeable with adult alate and apterous individuals. The criterion of size is not particularly useful where the population is composed largely of immature individuals since most people lack the ability to distinguish between the various instars present.

Color. The blue alfalfa aphid appears somewhat darker than the pea aphid and the former has a bluish-green cast while the latter is more yellowish-green or light green in color. The dorsum of the blue aphid thorax is darker than that of the pea aphid and also serves as a useful character.

Antennae. The antennae of the pea aphid appear banded, whereas those of the blue alfalfa aphid are of uniform color.

Biological Parameters

Developmental Times. Developmental times were determined for 11 constant temperatures ranging from 40°F to 90°F at 5°F intervals. No development occurred at 40°F or at 90°F. Between these two temperature extremes, the rate of development increased with increasing temperature. Minimum developmental time (5.82 days) occurred at 80°F. Development at 85°F required slightly longer (6.20 days) indicating that the temperature optimum had been passed.

Longevity. The average length of life span decreased with increasing temperature. Aphids reared at 45°F lived an average of 68 days (birth to death) and an average of 43 days (adult to death). Individuals reared at 85°F lived an average of only 5 days (birth to death). Maximum survival at 45°F was 124 days while at 85°F it was only 13 days.

Fecundity. As with longevity, the average number of reproductive days decreased with increasing temperature. At 45°F the average female reproduced offspring for 34 days while at 80°F the average female reproduced young for only 6 days. Aphids reared at 85°F failed to produce any offspring. Fecundity increased with increasing temperature, reaching a maximum at 60°F. Above 60°F, fecundity decreased rapidly.

Phenology. The blue alfalfa aphid has several generations per year with peak numbers occurring during April. Unlike the pea aphid, which has a major population peak in both the spring and the fall, the blue alfalfa aphid appears to peak only in the spring.

Behavior. Summers (1975) reported that the blue alfalfa aphid appeared (by observation) to prefer the more active meristematic areas of the plant while the pea aphid was distributed more at random. Additional experimentation has shown that this observed relationship between the two species is valid.

Predators and Parasites. The common aphid predator Hippodamia convergens Guerin showed no preference for pea aphid or blue alfalfa aphid, attacking and consuming both species equally.

Preliminary experiments have shown that there is no apparent preference on the part of the aphid parasite, Aphidius smithi Sharma and Rho, for either aphid species (pea aphid or blue alfalfa aphid). Likewise, the parasite has been successfully reared from both aphid species in the laboratory.

References Cited

- Kono, T. 1975. Distribution and identification of the blue alfalfa aphid. Proc. 5th Calif. Alfalfa Symp. pp. 24-7. Fresno, CA, Dec. 10-11, 1975.
- Summers, C. G. 1975. The blue alfalfa aphid - biology and economic thresholds. Ibid. p. 28.