ASPECTS OF THE BIOLOGY AND ECOLOGY OF *ACYRTHOSIPHON KONDOI* SHINJI (HOMOPTERA: APHIDIDAE)

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Nabis maoricus feeding on Acyrthosiphon kondoi.

ABSTRACT

The biology and ecology of the blue-green lucerne aphid, Acyrthosiphon kondoi Shinji, was studied in the Palmerston North area for one year.

Observations on the morphology of the developmental stages and morphs of A. kondoi are presented. Winter and spring peaks in the A. kondoi numbers occurred and the aphid can survive on lucerne all year round. The aphid colonies undergo a population cycle involving a population build up, high numbers, a decline in numbers, and a period of low numbers which persists until the next population build up. The stage of the cycle is apparent from the pattern of dispersion of the aphids on the plant and the number of alates present. A. kondoi appears to be continuously viviparous and parthenogenetic throughout the year, as no sexual forms were found.

High numbers of A. kondoi migrate by flying. A distinct spring peak in flight was observed with periods of lesser flight at other times. Some synchrony between the periods of flight and the number of aphids and alates on the plants was observed.

Factors controlling the A. kondoi population were studied. The predators, and an entomophthorous fungi which attacked A. kondoi were identified, but no evidence of parasitism of A. kondoi in the field was observed. The predators did not prevent the spring population peak of A. kondoi, because of the low predator numbers and their poor synchronisation with the aphid population. Predator exclusion cage studies indicated that predators, especially Nabis maoricus, prevented a summer-autumn A. kondoi population peak. N. maoricus consumed on average 11.25 A. kondoi per day in the laboratory.

The state of host plant growth is important in the occurrence of population cycles, and lucerne management practices can affect this considerably. Growing lucerne appears most suitable. Flowering of lucerne is not unfavourable to A. kondoi. A decline in the plant condition is partially involved in the population decline.

Cycles of the A. kondoi population occur independently of climate, though the maximum number of aphids reached in each cycle is probably dependent on climatic factors. Local, extreme weather conditions may temporarily affect A. kondoi numbers.

The population cycle involves self-regulation and can probably occur independently of extrinsic factors. It involves a rise and fall in the fecundity and reproductive rate, and the production of increasing numbers of alates as the cycle progresses. These changes could account for a considerable part of the population decline observed in a population cycle.

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