

Section I
Mites and Sap-Sucking Insects

ECONOMIC INJURY LEVEL AND POPULATION DEVELOPMENT
STUDIES OF THE PEA APHID ON GREEN PEAS

G. C. Yencho and L. W. Getzin

Western Washington Research and Extension Center, Puyallup, WA 98371

MATERIALS AND METHODS

Field studies to determine an economic injury level for the pea aphid in western Washington were conducted during 1983-1984. Four experiments, consisting of two 0.11 ha plantings of 'Puget Variety' peas per season, were conducted. Each experiment consisted of 12 treatments and 6 replications. Various aphid densities, simulating those in commercial plantings were established and population development was monitored weekly. The relationship between accumulated aphid feeding days, and pea yield and quality components at harvest, was determined.

RESULTS AND DISCUSSION

Aphid population development in experimental plots typically approximated an exponential growth curve. Population development in 1983 was characterized by an early migration of aphids into experimental plots, a rapid increase to 72.4 aphids/plant (A/P) at bloom time in control plots and a decline to 1.7 A/P at harvest due to an Erynia neoaphidis epizootic. Population development was delayed in 1984. At bloom time aphid populations in control plots averaged 1.8 A/P. At harvest, approximately 21 days post bloom, populations averaged 135.4 A/P. Large differences in the temporal positioning and magnitude of peak aphid densities were probably a result of environmental conditions and mortality factors present prior to, and during the growing season. A mild winter and cool, moist summer in 1983 were probably largely responsible for early aphid migration and the occurrence of an epizootic, respectively. Environmental conditions during summer 1984 did not promote the occurrence of an epizootic.

A model relating accumulated aphid feeding days (ACCAFD) to crop loss was derived for 1983 and 1984. The model is as follows:

$$Y = a + bx_1 + cx_1^2 + dx_2$$

where Y is yield in kg/ha, x_1 is $\ln(\text{ACCAFD})$, and x_2 is tenderometer level, a measure of pea maturity. The constants a, b, c, d are derived statistically. Based on this model, a tentative economic injury level of ca. 95 ACCAFD has been calculated. Action thresholds for the pea aphid at bloom time were determined by regressing yield on average A/P at bloom time. Action threshold levels of approximately 10 A/P and 1 A/P were calculated for 1983 and 1984, respectively. Differences in these values were probably largely a result of growing season differences rather than temporal changes in aphid stress. These values are preliminary and further validation is required.