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SEASONAL DISTRIBUTION AND MOVEMENT OF *AMBLYSEIUS FALLACIS* (GARMAN) IN THE GROUND COVER OF MICHIGAN COMMERCIAL APPLE ORCHARDS

By

Dennis Lee McGroarty

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INTRODUCTION

After World War II, phytophagous mites became important pests in a number of crop ecosystems including deciduous tree fruits. Their rise in pest status was correlated with the use of insecticides, particularly parathion and DDT. It was concluded that mite problems were due to the destruction of the natural enemies of mites by chemicals. Other hypotheses were that it was not the loss of the natural enemies by poisoning that resulted in mite outbreaks, but that chemicals affected the physiology of the pest mites, modified the nutritional quality of the plant, or altered the behavior of the spider mites (van de Vrie, et al., 1972). Huffaker, et al., (1970) suggested that detailed ecological studies were needed to quantify the importance of the natural enemies or other factors operating in the crop ecosystems, and he postulated that once their importance was firmly established, steps could be taken to manage spider mites more effectively and reduce the emphasis on chemical control measures.

In apple ecosystems of the midwestern states, large numbers of phytophagous arthropods including plant-feeding mites, are pests. Oatman, et al. (1964) surveyed

Wisconsin apple orchards and found 43 species of economic importance. Croft (1975) listed as key pests in Michigan the codling moth, Lespryresia pomonella (L.), apple maggot, Rhagoletis pomonella (Walsh), and plum curculio, Conotrachelus nenuphar (Herbst). The codling moth is an introduced apple pest of world importance and the other two are native to North America. Each can cause damage to apple fruit and cause economic loss if not controlled. Historically, chemical control measures have been the principal means of suppressing these pests. DDT was used first in Michigan in 1942 (Janes, 1972). Although the important apple pests were easily controlled for a time, new problems soon arose. For example, by 1947 the red-banded leafroller, Argyrotaenia velutinana (Walker) had ascended to key pest status and large spider mite populations were causing damage in apple orchards where DDT was used (Janes, 1972).

Spider mites, especially the European red mite, Panonychus ulmi (Koch), are still serious secondary pests in Michigan apple orchards. They feed on the leaf chlorophyll and at high densities cause "bronzing" of the foliage. Large populations, when present early in the growing season, can affect the next season's bud-set and tree vigor, and if later in the season, their feeding can affect fruit color. Problems with chemical mite control have increased during the past 30 year period. Following the development of resistance to DDT, there have been 22 different compounds recommended for spider mite control in Michigan spray calendars (Croft and McGroarty, 1973). Since chemical control of spider mites was unsatisfactory, a program of integrated control was developed in Michigan during the period 1970 to 1974 (Croft, 1975a). This program involved selecting selective chemicals to apply to the orchard, so that biological control agents could be utilized in regulating spider mite numbers.

In establishing an integrated mite control program for spider mites in Michigan commercial apple orchards, Croft and McGroarty (1975) observed that the phytoseid mite, Amblyseius fallacis (Garman), was the most effective natural enemy. This predaceous mite has been commonly reported feeding on European red mites and was described from apple leaves collected in Connecticut (Garman, 1948). Its biology was studied by Ballard (1954) and Smith and Newsom (1970). It has been recognized as an efficient predator of many pest mites (Smith, 1965; Putman and Herne, 1966; Malcolm, 1955) and is known to feed on alternate foods such as pollen (Ahlstrom and Rock, 1973) and scale crawlers (Poe and Enns, 1960). In addition to its effectiveness, A. fallacis has developed resistance to many broad-spectrum chemicals (Croft and Nelson, 1972). Oatman and Legner (1962) found the first indication of resistance in heavily sprayed orchards in Wisconsin. Since that time, studies have demonstrated resistance to a number of organophosphate (OP) compounds (Motoyama, et al., 1970; Rock and Yeargan, 1971; Croft and Stewart, 1973) and carbamates (Croft and Meyer, 1973). Croft and Brown (1975) mapped the distribution of OP resistant populations which extended throughout the midwest and eastern regions of the United States.

Amblyseius fallacis is a cosmopolitan species which occurs on a variety of plant species. Putman and Herne (1964) found it associated with spider mites on herbaceous plants under peach trees in Canada and later (1966) inferred that those found in the trees had moved up from the ground cover, apparently after a DDT residue on the tree decreased to a non-toxic level. Asquith and Horsburgh (1968) noted that predator mites over-wintered in the orchard ground cover and suggested that growers manage the weed growth to supply an early season habitat for the predators. Croft and McGroarty (1973) observed definite fluctuations in the number of *A. fallacis* in the orchard ground cover which corresponded to increases and decreases in the densities of populations within apple trees and speculated that mites on the ground cover probably served as the source of the in-tree population. Meyer (1974) indicated that the orchard ground cover was important as an over-wintering habitat for *A. fallacis* in Illinois and that this vegetation played a role in protecting the predator from sprays applied to the tree.

Although it has been implied by several research groups studying plant-feeding mites in orchards that the dynamics of ground cover populations of *A. fallacis* are important in relation to effective control of spider mite pests in the trees, very little quantitative research has been reported on this subject. The object of this study was to determine the density of *A. fallacis* in the ground cover of nine commercial orchards in Michigan and to observe factors which might influence it. Other objectives were (1) to develop sampling techniques for *A. fallacis*, (2) to evaluate the spatial and temporal distribution of the *A. fallacis* population in the ground cover including the searching pattern of the mite in the area under the tree canopy, (3) to demonstrate the relationship between the tree and the ground densities with respect to how changes in the number of *A. fallacis* in the ground cover affect migration into the tree, and (4) to relate this information to ground cover management which may contribute to effective biological control of the pest mites in the tree.

MATERIALS AND METHODS

Population estimates of *A. fallacis* in the apple orchard ground cover of nine western Michigan orchards (see description of each in a later section) were obtained from the sample universe, the orchard floor, by subsampling the area under the canopy of individual trees. This area was selected because preliminary observations indicated that *A. fallacis* was active there throughout the season, whereas it was rarely found outside the shelter of the tree canopy in the early or mid portions of the season. As detailed later, experiments were conducted in the course of this study to measure the preference of *A. fallacis* for this habitat.

A relative density estimate, approximating an absolute density measurement of *A. fallacis* in the ground cover, was obtained by extracting sod samples from beneath the apple trees. Initially, several sample unit sizes of different diameter were evaluated. In preliminary tests, four replicated sample units of six and 18 inch diameters were extracted from under five randomly selected apple trees early in the growing season, April 10 and 19, 1973. Mites were extracted and data for each replicated sample size was evaluated to determine the optiminal trade off between excessive zero counts, time involved in extracting mites, and limitations of processing equipment.

In processing each sod sample, collected material was placed in polyethylene bags and cooled during transport to the laboratory. The material was suspended on a wire screen beneath a 40 watt light bulb in an 11 inch diameter berlese funnel. Amblyseius fallacis escaped the heat by moving down the funnel and was collected on lima bean leaves blocking the funnel opening. Bean leaves infested with two-spotted spider mites, Tetranychus urticae (Koch), a prey of A. fallacis were maintained with stems in a water-filled ointment jar. This system essentially acted as a trapping medium for A. fallacis. Samples were held in the funnel for three days before the bean leaves were examined under a 30X binocular microscope and A. fallacis counted. This technique was evaluated with respect to its efficiency in release and recapture experiments at a variety of predator densities, and the data compared to similar experiments made with alcohol-filled jars as a collection medium.

The total area within the drip-line of an average apple tree in the experimental orchards ranged from 292 to 382 square feet. This area under each tree was subdivided into four equal strata by cardinal direction (Figure 1). Strata were further subdivided into two

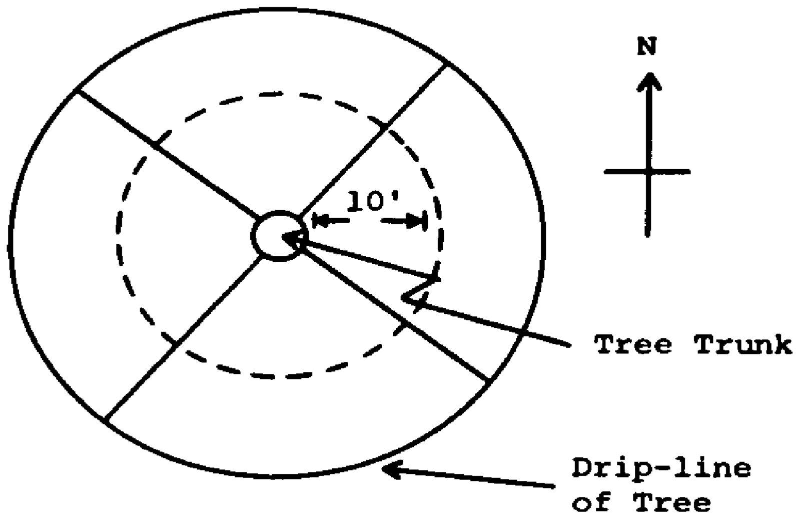

Figure 1.--The ground cover strata within the drip-line of the trees in the experimental orchards.

areas--one within ten feet of the tree trunk and other beyond ten feet. Strata were selected to provide data on the directional distribution of A. fallacis and its distribution in proximity to the tree trunk. Statistical treatment of these data and those obtained in preliminary sampling studies (see earlier discussion) were obtained by analysis of variance (ANOVA) and chi-square (χ^2) comparisons between sampling units. ANOVA procedures were also used to obtain variance components for each subplot and to determine the optimal sample number for various densities of A. fallacis at acceptable precision levels.

In each directional stratum, two samples were collected per sample date--one composed primarily of grasses and the other of broad-leaf forbs. In alternate directional strata, samples of both types, either in the close or outer subdivision, were taken. Litter from each vegetation sample was processed independently by Berlese extraction procedures. Samples similar to those described above were also collected between trees or beyond the tree canopy to estimate the proportion of the *A. fallacis* population distributed in this area. In these studies, four samples were collected per tree from each of the cardinal directions at a point randomly selected beyond the tree canopy.

Since the extraction method required excessive time for processing, several relative density techniques also were evaluated and compared with the extraction method. One, two and three minute timed vegetation counts were obtained by visually examining broad-leaf forbs for *A. fallacis*. After randomly selecting a tree, the experimenter randomly threw a plastic disc under the canopy and selected the nearest forb to where the disc landed. This plant and other nearby plants of the same species were examined for the appropriate time interval for *A. fallacis*. As before, data collected by these methods in different sampling strata (e.g., tree, orchard) were analyized by ANOVA. A dispersion statistic associated with the distributions of *A. fallacis* on the broad-leaf foliage was determined using the Taylor's b analysis (Taylor, 1961). This parameter describes the relationship between sample means and variances. The sampling of the broad-leaf forbs also provided information on density changes in the *A. fallacis* population in the nine experimental orchards during the period of this study. By recording the plants examined during the sampling, host-plant preferences of *A. fallacis* were compared.

Another relative density estimate was obtained by taking predator counts on apple sucker growth which occurred in the ground cover. Whereas in 1972 apple sucker growth was included in the timed vegetation analysis, in 1973 and 1974, apple suckers were sampled independently by selecting ten apple leaves from the apple sucker growth under ten randomly selected trees in each orchard. Apple leaves were examined on both sides under maximal light conditions making *A. fallacis* readily visible as it moved across the leaf. At low temperatures, encountered in autumn, *A. fallacis* was often found in the depression formed at the junction of the midveins. However, when this area of the leaf was gently touched, the mites would move rapidly across the leaf surface. Data collected using this method were compared to density changes with the one-minute count method. They also provided density estimates which had sample units comparable with those samples taken from within the apple tree density measurements (i.e., *A. fallacis*/apple leaf). The relationships between the relative density estimates listed above and the extraction density measurement technique originally described were compared by linear regression analysis.

Certain temporal and spatial features of the searching activity of _A. fallacis_ were measured by placing lima bean plants, which were at the two-leaf stage of development and infested with two-spotted spider mites, on the ground beneath the apple trees. These plants essentially acted as a trapping medium since once _A. fallacis_ found abundant prey, they seldom left the plant. Bean plants were placed under trees so they were not in contact with other plants. Under these conditions, _A. fallacis_ could obtain entry to the prey infested leaves only by climbing the stem. After a seven day sample period, the plants were examined under a binocular microscope and the number of adult _A. fallacis_ recorded. Five trees in each experimental orchard were randomly selected and plants were placed in each of the four cardinal directional quadrants. Plants in opposite quadrants were placed either close, within three feet of the tree trunk or inward, from three feet from the edge of the canopy. Data collected with this method were tested by a chi-square analysis to evaluate differences in the searching distribution of _A. fallacis_ with respect to direction and proximity to the tree.

RESULTS AND DISCUSSION

Less than complete extraction of all *A. fallacis* from sod samples was probable due to moisture variations and differential escape rates by each life stage of the mite. However, a relatively constant recovery rate was achieved by using the lima bean extraction method, which was more efficient in detecting low densities of *A. fallacis* than a 70 percent isopropyl alcohol method. In replicated release and recovery tests with densities of two, four, eight and 12 mites per sample, which includes density levels most commonly encountered in field samples, recoveries averaged 77 ± 23 percent with the lima bean method, whereas with alcohol only 15 ± 13 percent of the released mites were recovered. Croft and Hoying (unpublished data) made release and recovery tests to measure overwintering populations of *A. fallacis* and obtained recovery rates which were consistently efficient for densities of two, five, ten, 25 and 60 mites per sample with the lima bean method. Another advantage of the bean leaf method was a reduced counting time. Mites collected on the bean leaves also could be concentrated and maintained alive and thereafter, transferred to rearing units for laboratory culture and experimentation.

Sod sample unit studies to determine the most effective sample size indicated that units smaller than six inches produced excessive zero counts at low mite densities. Data comparison between six-inch and 18-inch diameters produced 1.5 ± .43 mites and .50 ± .19 mites per sample, respectively. The larger sample unit did not reduce the number of zero counts significantly, but in fact gave lower mean values per sample than did the six-inch size. This decline in efficiency was attributed to limitations of the extraction method when working with the larger volumes of vegetation.

ANOVA comparisons taken in preliminary samples of four, six-inch diameter samples of sod extracted from five randomly selected trees (t) in six experimental orchards are presented in Table 1 for the sample dates of November 21 and 22, 1972. The actual data used in constructing Table 1 are listed in the Appendix, Table 7. Because this data did not meet the assumptions for an ANOVA (i.e., normality, see later discussion), they were transformed by log (x + 1).

In Table 1 there was a significant difference ($\alpha = 0.01$) between orchards. This would be expected since densities between orchards were highly variable throughout the period of this study (see later discussion of

Table 1.--Analysis of variance, two-level nested, of extraction density measurements of *A. fallacis* in six-inch diameter sod samples from six Michigan apple orchards, November 21 and 22, 1972.

Sources	df	SS	MS	F
Among Orchards	5	1.5[illegible]5	.30551	3.90**
Among Trees w/i Orchards	24	1.88274	.07845	1.13
Within Trees	90	6.23743	.06845	

**Significant F-test to 1 percent level.

individual orchard densities of *A. fallacis*). There was no significant variance component among trees. From the observed mean square, the variances were estimated by the following formulae (Snedecor and Cochran, 1967):

$$\text{Within trees (Error M.S.)} = s_s^2 = .068$$

$$\text{Among tree w/i orchards} = s_t^2 = \frac{\text{M.S.}_{\text{tree}} - \text{M.S.}_{\text{sample}}}{\text{Number of samples (n)}} = .002$$

$$\text{Among Orchards} = s_o^2 = \frac{\text{M.S.}_{\text{orchard}} - \text{M.S.}_{\text{tree}}}{\text{n} \quad \text{t (No. of trees)}} = .011$$

The optimum number of sample units per tree determined from the relationship between intra- (s_s^2) and interplant (s_t^2) variance components was determined by the formula: $n = \sqrt{(s_s^2 / s_t^2)\ (c_t / c_s)}$, where c_t was the time required to move from one tree to another, and c_s was the time needed to collect samples from one tree (LeRoux and

Reimer, 1959). The cost of moving from one tree to another was approximately one minute and the cost of collecting the four sample units from each tree was five minutes in these studies. The number of sample units required from each tree was determined by $n = \sqrt{30 \cdot .20}$ or 2.4. Since four sample units were used to determine the variance components of the original samples, the actual number of samples per tree was calculated to be ten.

Using the same data, the number of trees required for a precision of 25 percent standard error of the mean was derived from the coefficient of inter-tree variation, C.V. Using the formula, C.V. = 100/Mean $\sqrt{s_s^2 + s_t^2}$, with the mean expressed as a logarithm, the C.V. is 33 percent. Thus, the number of trees required per orchard was derived from the formula, $n = (C.V./25)^2$, to be two trees per orchard. As will be discussed later, this value may have been excessively low due to the low inter-tree variance associated with the preliminary sample set (Table 1).

Table 2 shows the more extensive data from 11 extraction density samplings (see Appendix, Tables 9-19), made under four randomly selected trees from different orchards throughout the season. The number of trees sampled per orchard in this experiment was four instead of two, because additional samples were needed to accurately estimate the number of *A. fallacis* collected in different strata and vegetation types. The mean density

Table 2.--Extraction density estimates of *Amblyseius fallacis* (Garman) from six-inch cod samples collected in Michigan apple orchards, Summer 1973.

Date	Orchard	No. of *A. fallacis* per sample under the tree canopy[a,b]	No. of *A. fallacis* per sample outside of the tree canopy[a,c]	Percent of total mites collected in area outside the canopy
6/15	Rasch	2.21 ± .40	--	--
6/22	Klackle	2.10 ± .42	--	--
7/1	Kraft	.84 ± .22	--	--
7/10	Dowd	3.66 ± .29	.75 ± .82	18.3
7/17	Babcock	.28 ± .10	.06 ± .09	18.2
7/17	Peachy I	1.65 ± .30	.19 ± .22	10.2
7/25	Dowd	3.25 ± .64	.31 ± .36	8.4
7/27	Klackle	6.38 ± .98	.44 ± .50	6.4
8/14	Peachy I	10.09 ±1.30	1.12 ± .40	10.0
8/24	Rasch	6.81 ±1.28	--	--
9/11	Kraft	7.31 ±1.03	1.38 ± .49	15.8

[a] ± Standard Error

[b] Based on 32 sample units

[c] Based on 16 sample units

of *A. fallacis* per six-inch sample ranged from .28 to 10.09. In all cases, variances were greater than the mean, indicating that *A. fallacis* has a slightly aggregated distribution. Standard errors ranged from 7.9 to 37 percent of the mean, but only two of the samples were above 25 percent indicating that the larger number of sample trees was probably closer to the optimal number needed for the precision level specified.

On seven of the sample dates, sod samples were taken in the area between trees. After correcting for the difference between the number of samples taken beneath vs beyond the canopy of the tree, the percentage of the total mites collected in each area was compared (Table 2). Values for samples taken from beyond the tree canopy ranged from only 6.4 to 18.3 percent of the total mite population in the orchard and these figures remained relatively constant throughout the growing season.

Figure 2 shows the relationship between the sample means and variances in relation to the expected values of the Poisson series, $s^2 = m$, for the extraction counts taken on 11 sample dates. Data deviated from the random Poisson series, especially at high densities. Taylor (1961) observed that the mean-variance relationship between population density estimates was proportional to a fractional power of the arithmetic mean, m, and could be described by the power law, $s^2 = am^b$, where a was a

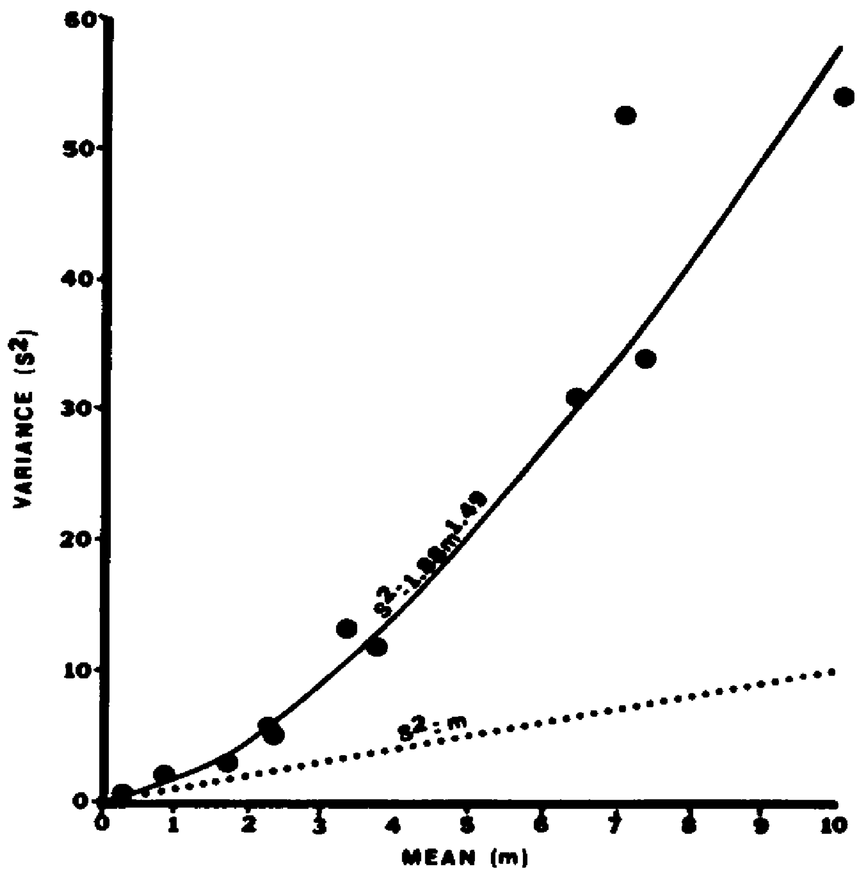

Figure 2.--The relationship between sample means and variances of extraction densities of *Amblyseius fallacis* from Michigan orchard ground covers, Summer, 1973.

sampling factor depending on the size of the sample unit, and the exponent b was an index of aggregation, which varied from 0 for a regular distribution to infinity for a highly aggregated distribution. Data were analyzed by a Model II ANOVA (Table 3) and showed that a significant difference between trees was found only in one of the 11 samples, Dowd Orchard on July 10, indicating that inter-tree differences did not contribute significantly to the overall variances as measured in this study. This data agreed closely with the preliminary samples (Table 1). Only in one orchard, Peachy I on July 17, was a significant difference observed between quadrants. However, in comparison to between tree values it appeared that a greater variance was within quadrants as indicated in nine of the 11 samples (Table 3).

Table 4 presents the results of a chi-square test to evaluate whether equal numbers of A. fallacis were found in the samples from the various directional and distance quadrants. The hypothesis tested was that equal numbers of mites would be found in each site if A. fallacis was searching randomly throughout the entire area. Significant differences were found in four of the individual orchard samples with three having more mites in the north quadrant than in the other three quadrants, and in the other case, more were found in the west quadrant. In most cases, the number of mites in the four quadrants was very

Table 3.--Mean square and estimates of variance components[a] in extraction density estimates[b] of *Amblyseius fallacis* (Garman) in Michigan apple orchards, Summer 1973.

Date	Orchard	M.S. (tree)	s^2_{tree}	M.S. (quadrant)	$s^2_{quadrant}$	M.S. (within quadrant)
6/15	Rasch	.15622	.00852	.08805	0	.10849
6/22	Klackle	.08861	0	.14536	.03635	.07267
7/2	Kraft	.04690	0	.04902	0	.07522
7/10	Dowd	.35438[c]	.03802	.05024	0	.10650
7/17	Peachy I	.02153	0	.17419[c]	.07994	.01431
7/17	Babcock	.00440	0	.02348	0	.02652
7/25	Dowd	.17558	.01076	.08950	0	.15711
7/27	Klackle	.21731	.01858	.06868	.00606	.05657
8/14	Peachy I	.28851	.02046	.12485	.03224	.06038
8/24	Rasch	.33736	.02695	.12178	0	.96029
9/11	Kraft	.15986	.00740	.10066	.00487	.09092

[a]Data transformed to log (x + 1)

[b]32 sample units per orchard sample

[c]Significant F-test to 1 percent level

Table 4.--Extraction samples of *Amblyseius fallacis* in ground cover of Michigan commercial apple orchards, 1973 and Chi-square Test of numbers found in directional quadrants and either close or far from the tree trunk.

Date	Orchard	DIRECTIONAL COMPONENT				χ^2	DISTANCE		χ^2
		North	South	East	West		Close	Far	
6/15	Rasch	19	18	14	20	1.16	47	24	7.45**
6/22	Klackle	15	21	16	18	1.20	44	26	4.63*
7/2	Kraft	3	8	6	10	3.96	13	14	.04
7/10	Dowd	44	24	31	18	12.81**	66	51	1.92
7/17	Babcock	2	4	0	3	3.89	6	3	1.00
7/17	Peachy I	21	8	12	12	6.85	34	19	4.25*
7/25	Dowd	40	10	27	27	17.46**	43	61	3.12
7/27	Klackle	81	40	39	44	23.80**	83	121	7.08**
8/14	Peachy I	75	58	82	107	15.24**	163	160	.03
8/24	Rasch	65	49	61	43	5.78	67	151	32.37**
9/11	Kraft	64	65	48	57	3.16	89	145	15.50**

*Significant χ^2-test to 5 percent level

**Significant χ^2-test to 1 percent level similar. Comparing the distance values, significant differences were found close to the three trunk early in the season, but by mid season the numbers were almost equal. Later, more mites were found out near the edge of the canopy coinciding with the predator leaving the tree after its prey had been reduced in number.

Figure 3 shows the proportion of mites found on samples containing either grass, broad-leaf forbs, or in the litter beneath the vegetation samples. The proportion of A. fallacis in all three habitats remained relatively uniform through the season. An average of 48 percent of the mites collected occurred on grass, 42 percent on broad-leaf plants, and only ten percent of the total was in the litter samples at all sample dates. Some variations were expected in these data since samples were collected in orchards containing different plant compositions at various densities.

One-Minute Counts

Figure 4 is a plot of the mean-variance relationship of the one-minute examples of A. fallacis collected from broad-leaf forbs and apple sucker growth in 1972 (see Appendix, Tables 21 to 29). An expected Poisson ($s^2 = m$) and a calculated Taylor's power law ($s^2 = am^b$) fit to the data are plotted. The Taylor's b of 1.46 indicated that A. fallacis had an aggregated distribution as measured by

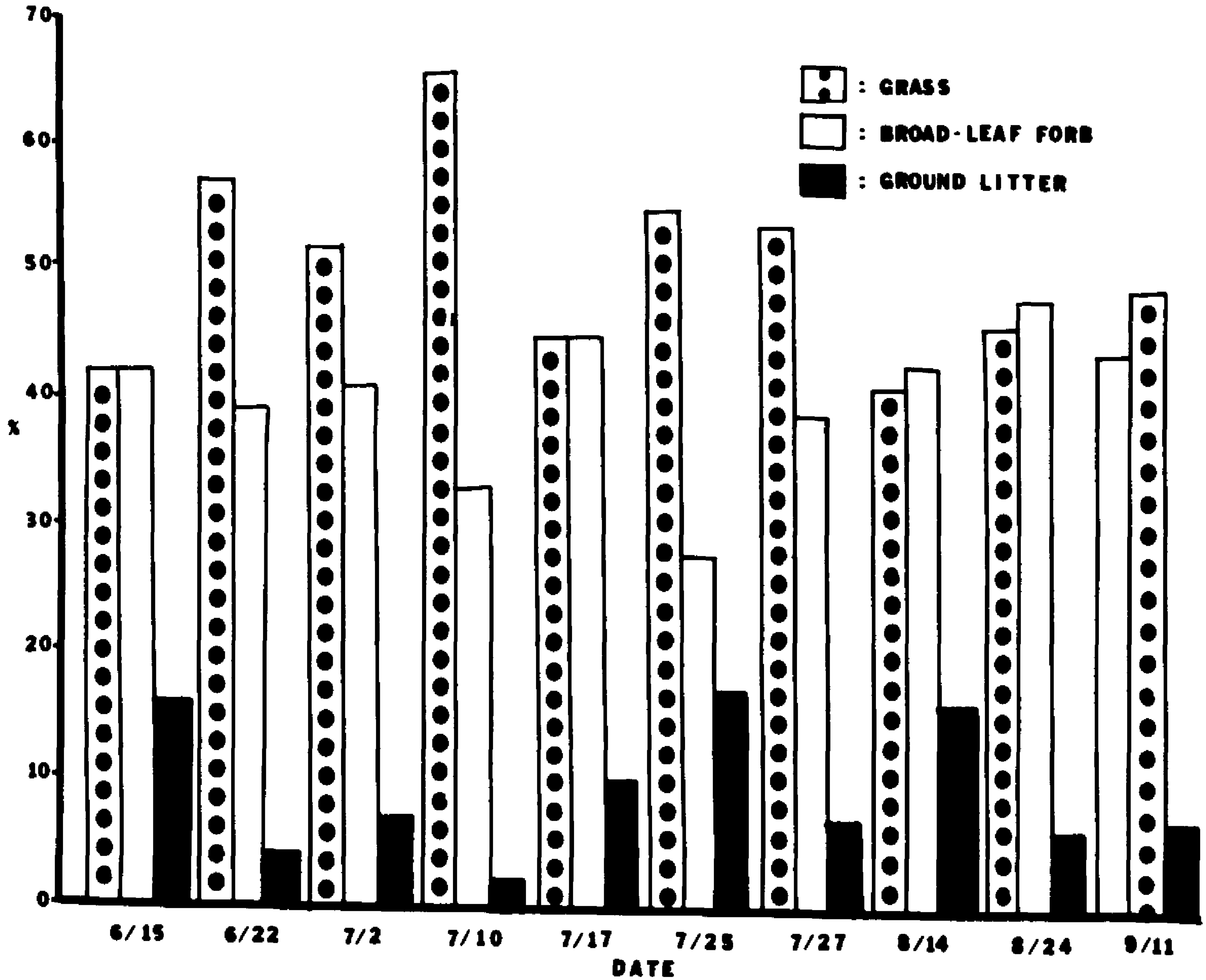

Figure 3.--The proportion of A. fallacis population found on different vegetation in Michigan apple orchards.

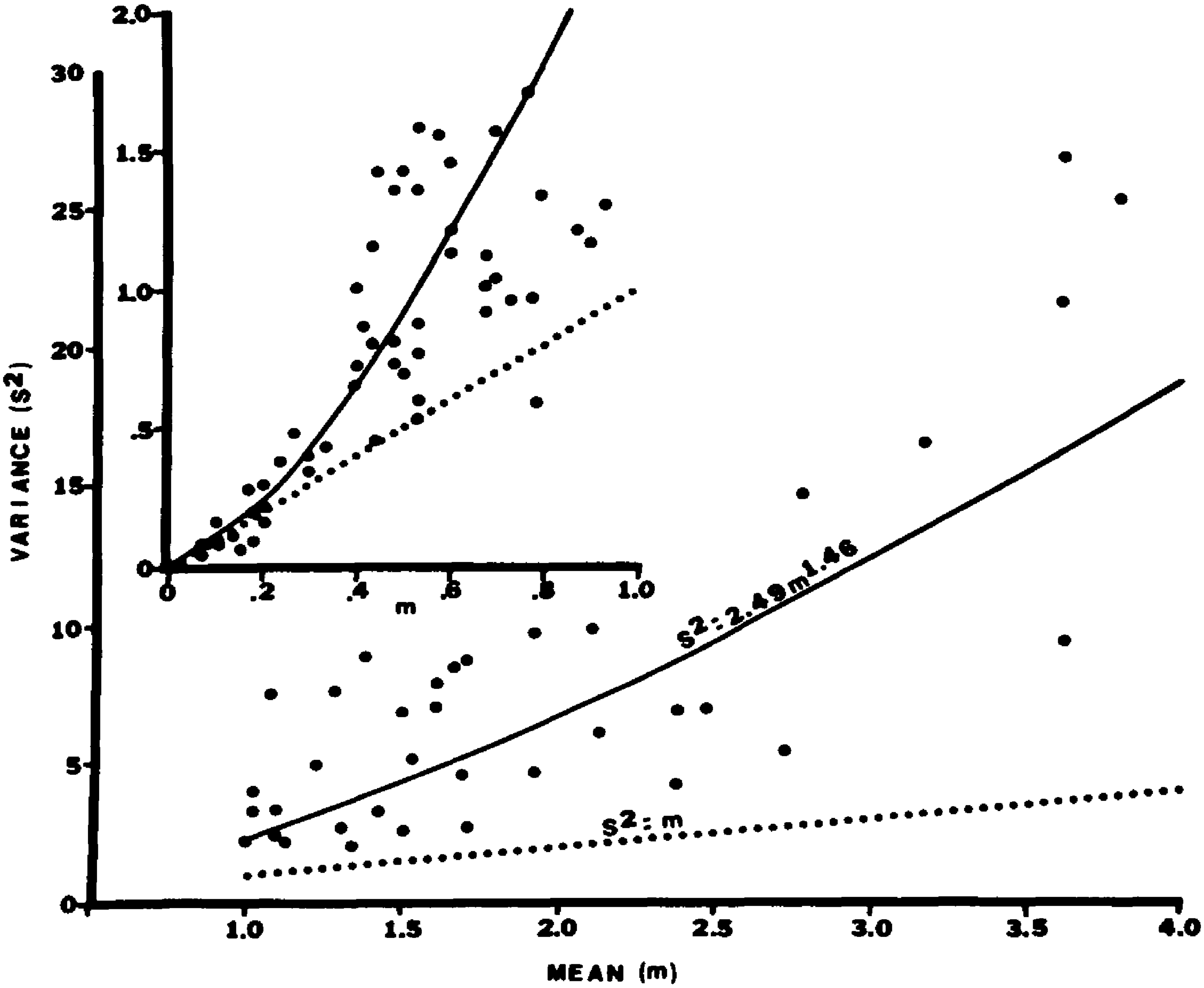

Figure 4.--The relationship between means and variances of one-minute samples collected in 1972.

this technique. This value also was very close to that obtained by the extraction method (Figure 2). ANOVA comparisons of 1972 one-minute count data (see Appendix, Table 20), also gave results similar to those obtained in the extraction data analysis in that significance (.05 level) between trees in orchards throughout the season was found in only one case. Based on the ANOVA variance components and sampling time constraints, the optimal number of sample units required per tree was estimated at three. The number of trees to be sampled at various densities of A. fallacis was obtained using the formula, $n = (C.V./D)^2$, with the level of precision, D, being equal to both 10 and 25 percent for all samples (Figures 5 and 6, respectively). As can be seen, samples of three, one-minute counts taken from ten trees (= 30 one-minute counts/orchard) were adequate for a 25 percent level of precision, but not for 10 percent at the lower predator densities.

Figure 7 presents the mean-variance relationship for the one-minute sample data collected in 1973, which excluded apple sucker foliage. As indicated, A. fallacis was still aggregated, but the calculated Taylor's b of 1.28 was considerably less than the 1972 value when apple suckers were included. Although optimal sample size values were not calculated for these data, it is certain that variance components based on these data were less

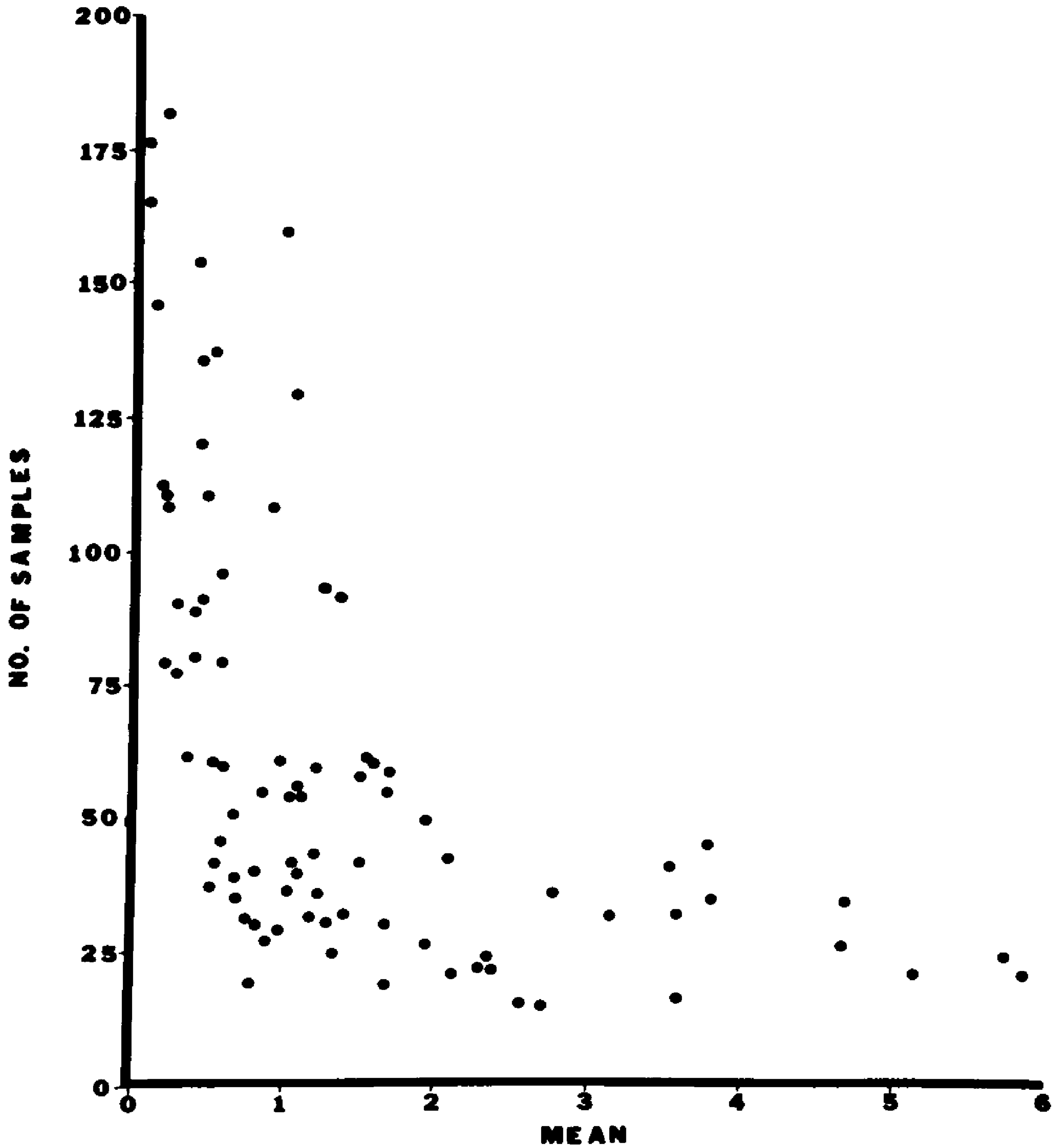

Figure 5.--Number of one-minute samples needed for ten percent standard error using formula $\left(\frac{t}{D}\right)^2 \frac{\alpha^2}{\bar{X}^2}$.

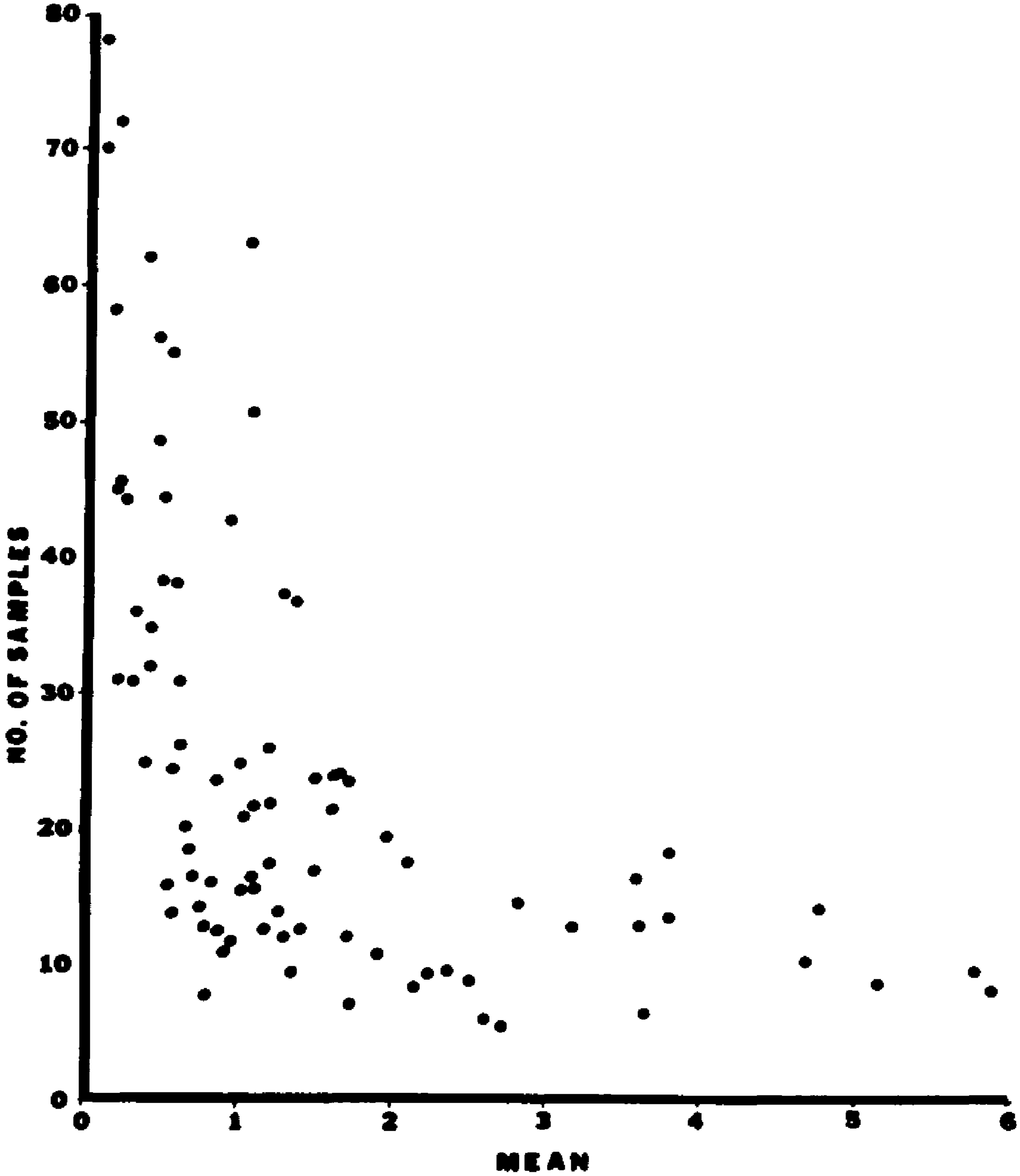

Figure 6.--Number of one-minute samples needed for 25 percent standard error of the mean, calculated using the formula $\left(\frac{t}{D}\right)^2 \quad \frac{\alpha^2}{\bar{X}^2}$.

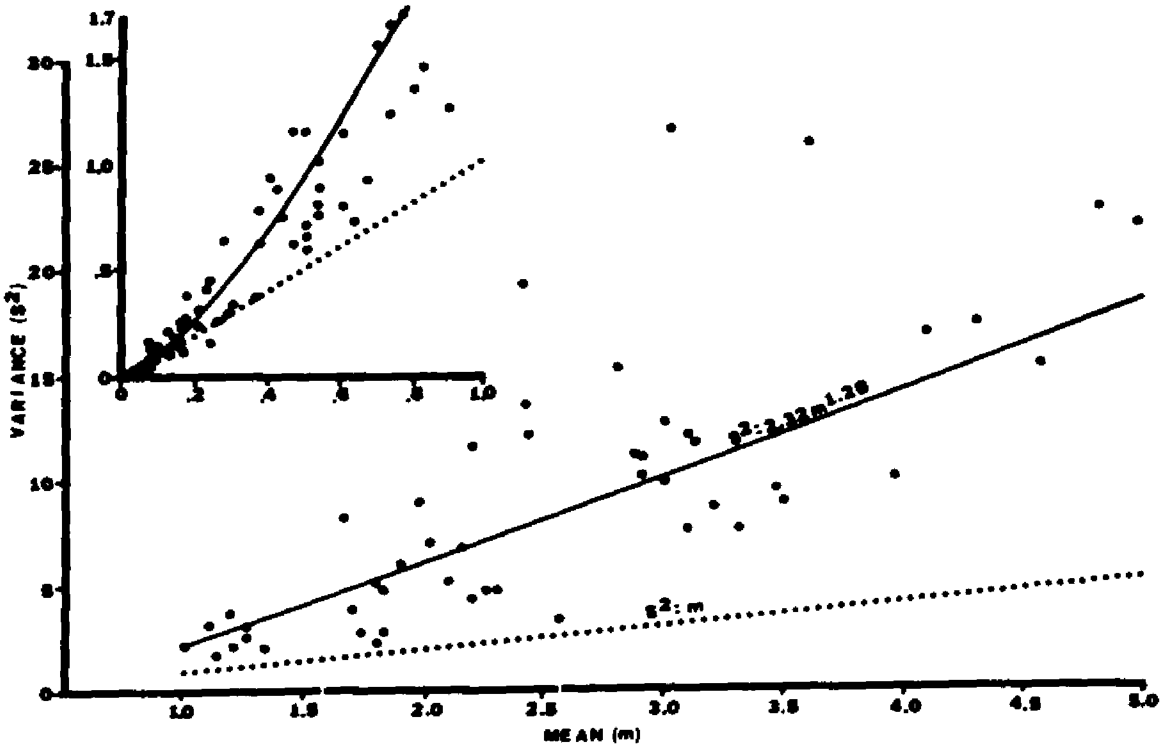

Figure 7.--The relationship between means and variance of one-minute samples collected in 1973.

than in 1972 and thus the sample size values reported in Figures 5 and 6 would be more than adequate.

Table 5 presents data on the plants most frequently sampled in the nine experimental orchards and gives the cases where significantly more or less A. fallacis were found on a given plant during the growing season (see Appendix, Tables 30-48). An obvious preference was shown for apple in 1972. This was probably due to both a preference for the plant and also to the fact that apple is the only host plant in the ground cover which will sustain P. ulmi, a principle prey of A. fallacis. Beyond the preference for apple, significantly greater values were obtained for Virginia creeper and grape in 1972 and for dandelion, Virginia creeper, milkweed, nightshade, and grape in 1973. Significantly fewer mites were recorded on broadleaf dock, daisy fleabane, and wild lettace in 1972, and on dandelion, daisy fleabane, and broadleaf dock in 1973. In general, the data in Table 5 indicated that A. fallacis had little preference for any host plant and it appeared that its distribution was related to the presence of the prey mite, T. urticae, and P. ulmi on ground cover plants.

An additional comparison of the timed counts was made to determine if there was a significant bias added by either of the three minutes (sample units) collected from individual trees. Using the means and variances of

Table 5.--Chi-square analysis of the number of *A. fallacis* collected on different ground cover plants during one-minute counts in all orchards.

	Carpenter	Dowd	Babcock	Peachy I	Peachy II	Rasch	Klackle	Kraft	Gavin
1972									
apple	>*	>**	N.S.	>**	N.S.	N.S.	>**	N.S.	> **
dandelion	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Virginia Creeper	N.S.	N.S.	>**	N.S.	>**	**	--	--	--
broad-leaf dock	N.S.	<**	N.S.	N.S.	<**	N.S.	N.S.	--	--
goldenrod	--	N.S.	N.S.	N.S.	N.S.	--	N.S.	N.S.	N.S.
daisy fleabane	--	<**	N.S.	N.S.	N.S.	--	N.S.	N.S.	--
milkweed	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
nightshade	N.S.	N.S.	--	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
grape	N.S.	--	>**	>**	>**	N.S.	N.S.	N.S.	--
wild lettace	--	<*	N.S.	N.S.	N.S.	N.S.	--	--	--
1973									
dandelion	>**	N.S.	N.S.	N.S.	N.S.	>**	N.S.	<**	N.S.
daisy fleabane	--	<**	N.S.	<*	<**	--	N.S.	<*	N.S.
broad-leaf dock	<**	N.S.	N.S.	N.S.	*	N.S.	N.S.	N.S.	N.S.
goldenrod	--	N.S.	--	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.
Virginia Creeper	>**	N.S.	N.S.	N.S.	>**	>*	--	--	--
black raspberry	--	N.S.	--	N.S.	N.S.	N.S.	N.S.	--	--
milkweed	N.S.	>**	N.S.	--	N.S.	N.S.	N.S.	N.S.	N.S.
nightshade	--	N.S.	--	N.S.	N.S.	N.S.	N.S.	N.S.	>*
grape	N.S.	N.S.	N.S.	>**	>**	N.S.	N.S.	N.S.	--
wild lettace	--	N.S.	N.S.	N.S.	N.S.	N.S.	--	N.S.	N.S.

*Significance to .05 level
**Significance to .01 level
N.S.= the chi-square value was not significant
- = plant not found in significant numbers in orchard
> = more mites than expected
< = fewer mites than expected

the first, second and third minutes, a linear regression analysis was made of the variance to mean to determine whether each timed interval was giving like estimates. The regression analysis produced a slope for the first minute of 4.79 ± 1.83, the second minute of $4.52 \pm .97$ and for the third, 5.82 ± 1.69. The overlap of the regression slope of the three minutes indicates that they were sampling like parameters.

Apple Sucker Count

Figure 8 shows the mean-variance relationship for the apple sucker data collected for both the 1973 and 1974 seasons (see Appendix Tables 48-55). The plotted lines are the expected Poisson series, $s^2 = m$, and the Taylor's power law, $s^2 = am^b$, calculated for the observed data. The Taylor's b, 1.10 was less than that obtained by the other sampling techniques indicating that the distribution of *A. fallacis* in this habitat was more random than samples taken from the more hetergeneous ground cover. This probably was related to the fact that the apple leaves were a more uniform sample unit. Another factor contributing to the less aggregated distribution may be related to the predator's searching pattern which may differ on the apple leaf as compared to the broadleaf plants. Specific comparisons of data points to the calculated line indicated that aggregations were rare on apple leaves. Those

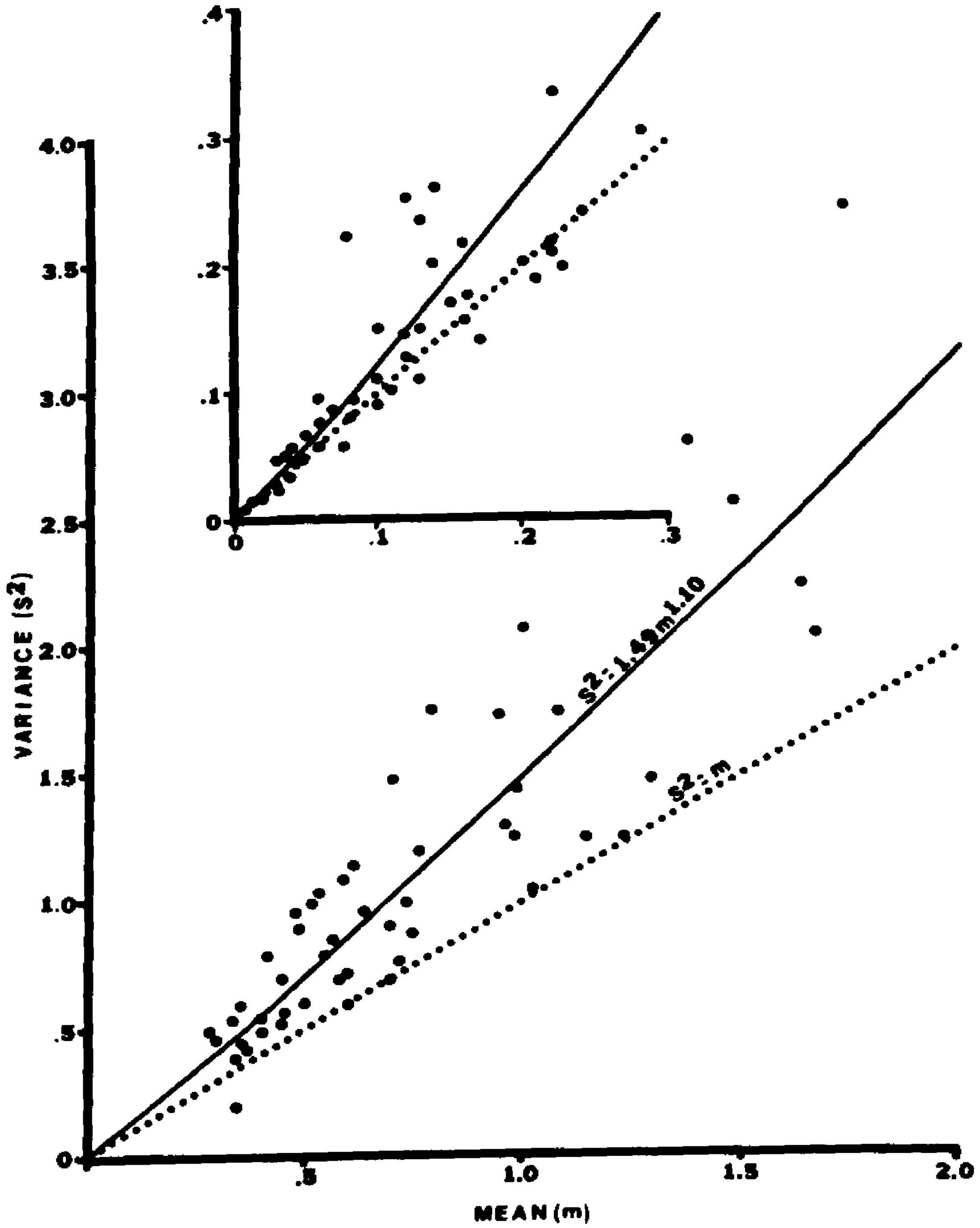

Figure 8.--The relationship between means and variances from apple sucker samples collected in 1972 and 1973.

observed were correlated with the tendency of *A. fallacis* to clump around *P. ulmi* populations which had fallen from the tree or in late season, they were caused by small numbers of predators concentrating in the junction of the mid and branch veins of the apple leaves prior to entering diapause.

Figure 9 shows the number of sample units needed to provide a standard error of 25 percent of the mean at various densities for the apple sucker count method. The number, n, was calculated using the formula, $n=(t \cdot s/D \cdot m)^2$, where s = standard deviation, D = the required level of accuracy expressed as a decimal (i.e., .25), and t is a quantity, depending on the number of samples, and is obtained from a table of t-values (Southwood, 1966). Figure 9 shows that a total of 100 units was sufficient for most densities.

Comparison of Relative Density Sampling Methods

Both the one-minute count and apple sucker data were compared by linear regression analysis with the extraction sample data taken on the same day to show their relationships. Between the one-minute and extraction data, a positive regression slope and correlation coefficient of .93 were obtained (Figure 10), indicating that both methods gave comparable results. The Y-intercept of 1.4 indicated that the extraction method was more

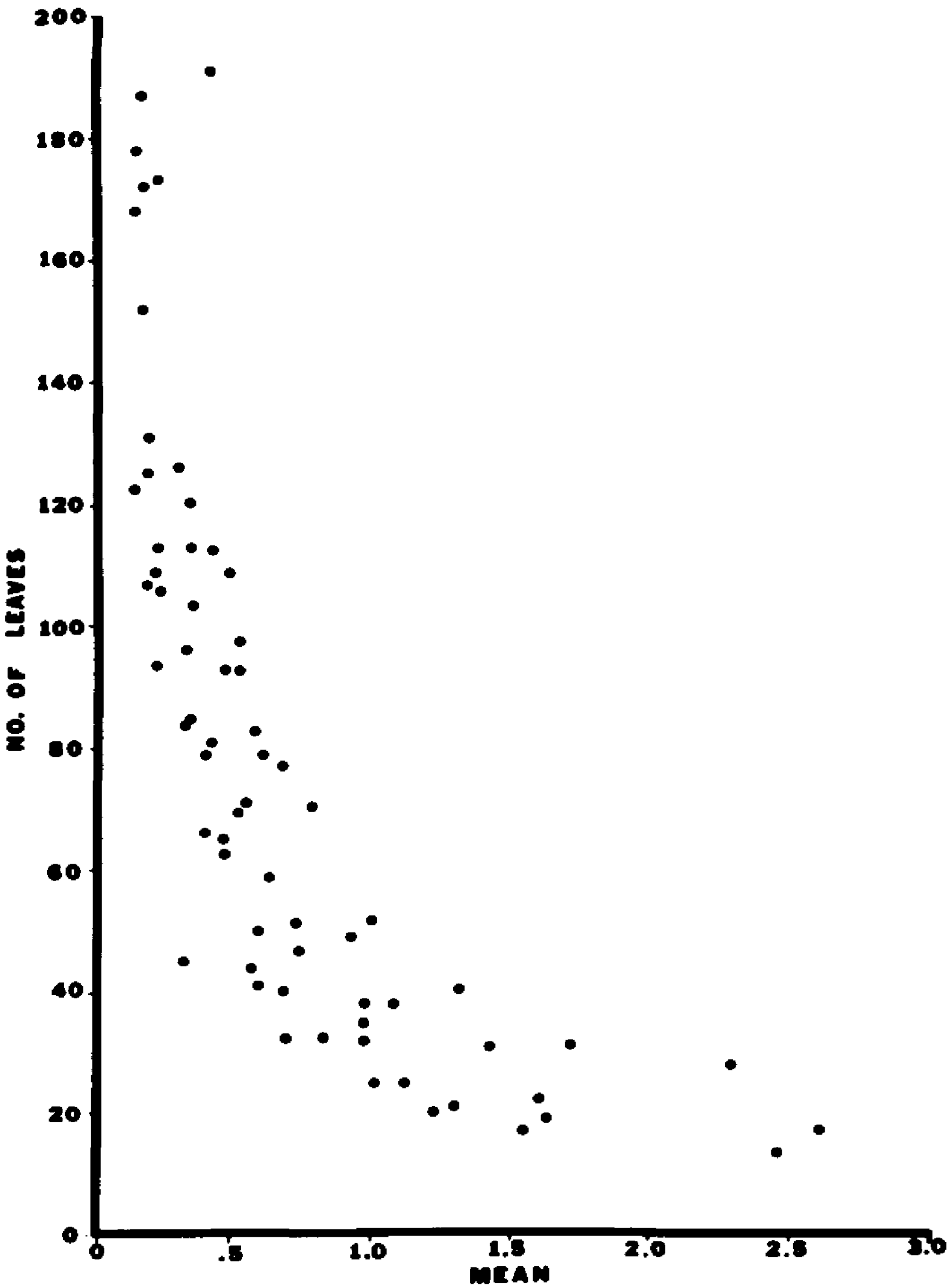

Figure 9.--The number of sample units (apple sucker leaves) needed per orchard for different mean densities as calculated using the formula $n = (t\text{-}s/D \cdot \overline{X})^2$, when D = .25 + t .05 [α] = 1.96.

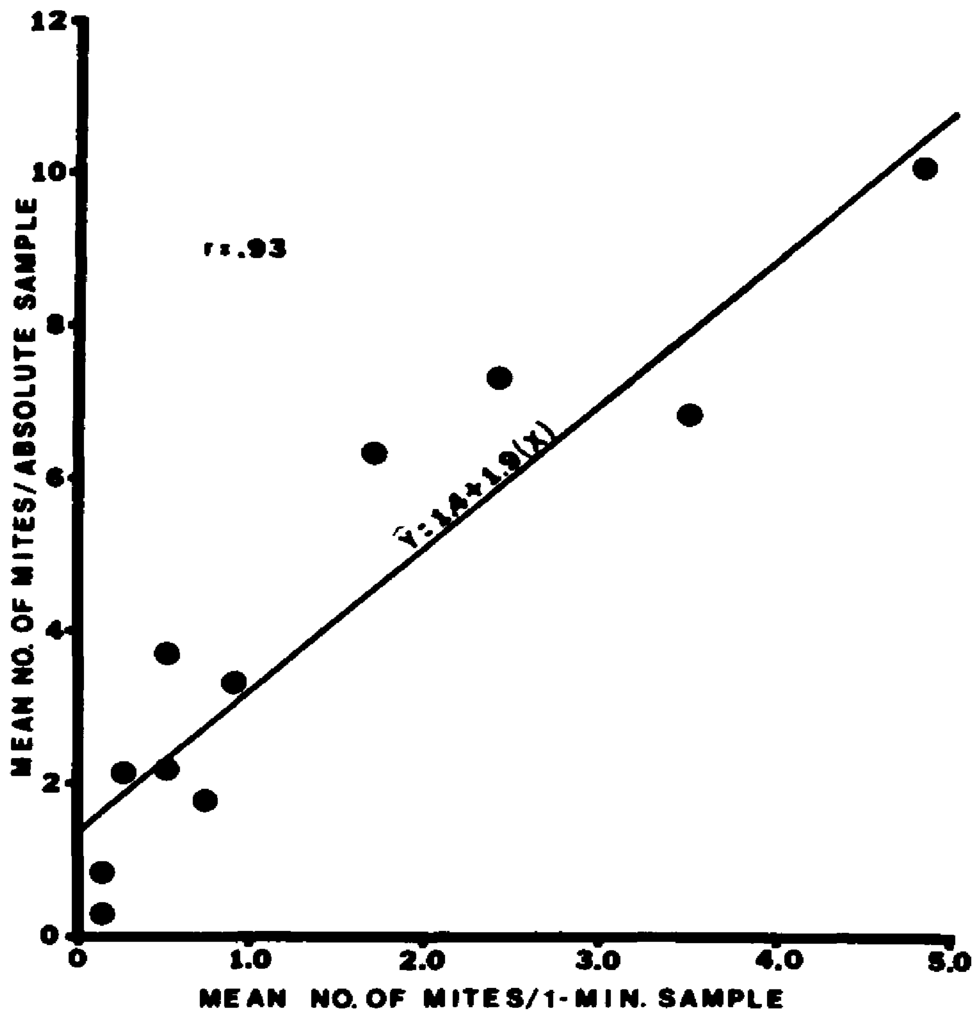

Figure 10.--Regression analysis showing the relationship between the mean extraction density of A. fallacis and the mean one-minute count.

efficient in detecting low density population of *A. fallacis*. This was to be expected since in one-minute of time, only a portion of a six-inch diameter sample could be examined.

Similar results were also obtained by comparing data from apple sucker counts with extraction density estimates (Figure 11). A significant correlation of .86 was observed and the Y-intercept was at 1.4 units. Although neither the one-minute nor the apple sucker methods provided satisfactory estimates of *A. fallacis* populations at extremely low densities, their comparable slopes and similar Y-intercept values indicated that they provided similar types of relative density estimates. This was confirmed by comparing population curves in actual orchard samples (see later discussions of individual orchard populations) and by the correlation between the two relative density estimates which is presented in Figure 12 (r=.81). The predictive equation of $\hat{Y}$ + .36 + 2.46 (x) where $\hat{Y}$ is the predicted mean of the one-minute count and x, the number of mites/apple sucker leaf, indicated that slightly more mites were found in the ground cover counts than on the apple sucker leaves on the same date. The extreme deviations from the regression line of Figure 10 were due to anomalies observed during the studies. For example, on occasion, high densities of *A. fallacis* would be recorded on apple sucker leaves which were infested with

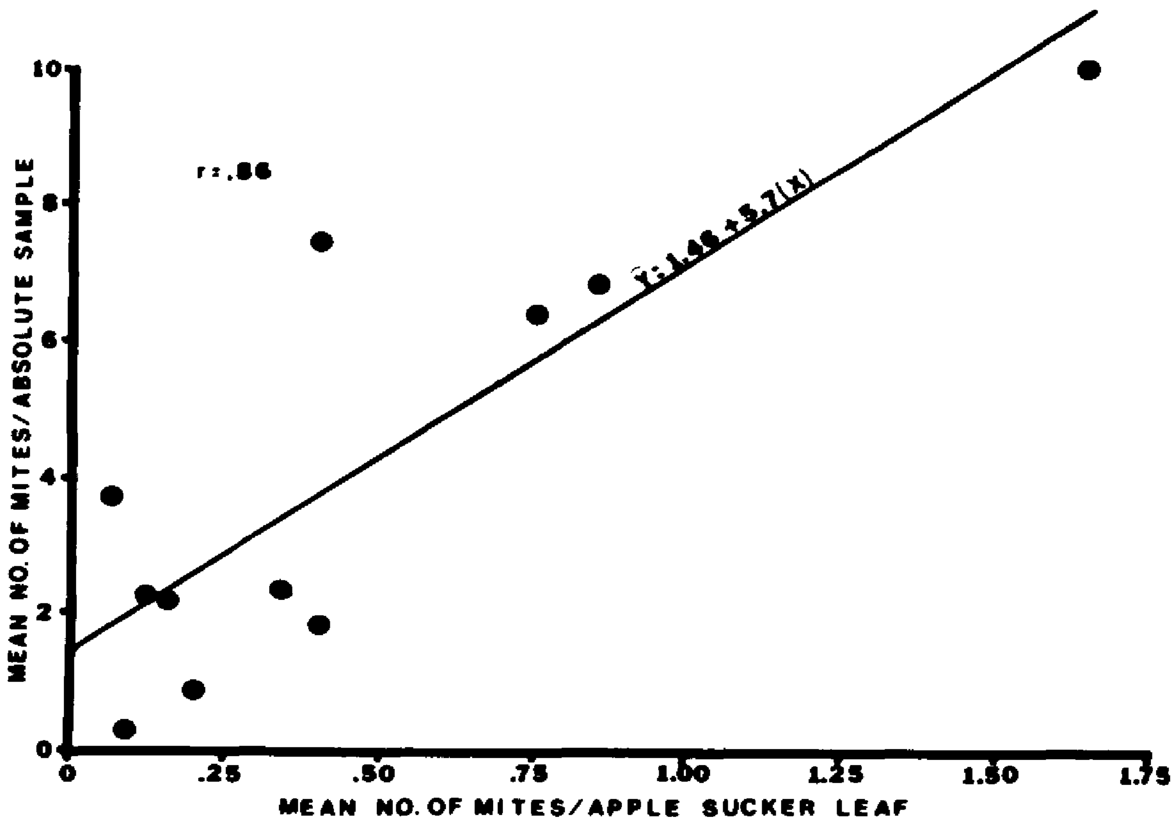

Figure 11.--Regression analysis showing the relationship between the mean and extraction density of the mean number of *A. fallacis* per apple sucker leaf.

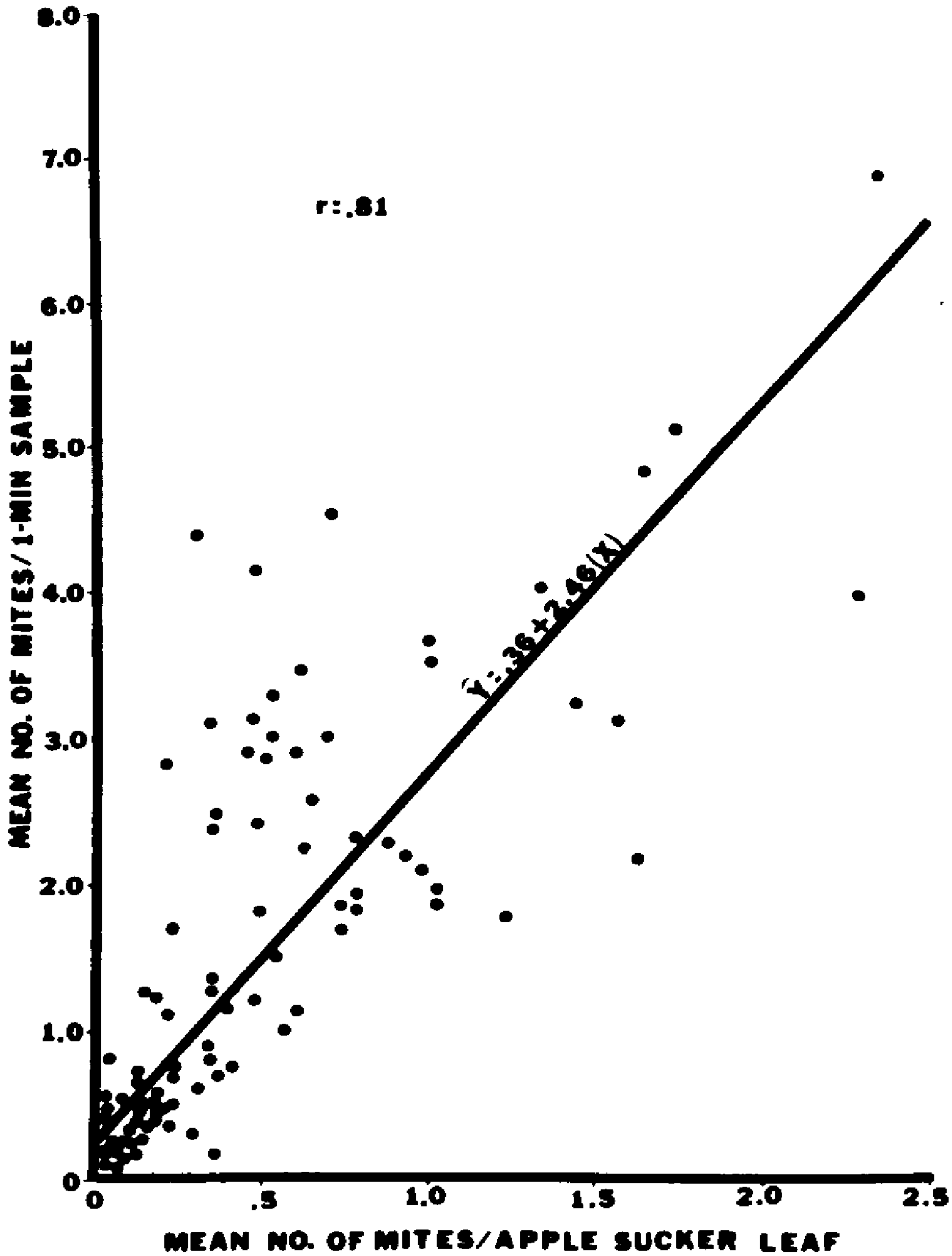

Figure 12.--Regression analysis showing the relationship between the mean apple sucker density and the mean one-minute density of A. fallacis.

P. ulmi, but A. fallacis was simultaneously rare in the ground cover since P. ulmi did not inhabit other ground cover foliage.

Measurement of Amblyseius fallacis Activity

The bean plant sampling technique was used in the nine experimental orchards throughout the 1972 growing season and early in the 1973 season. A total of 1936 sample units was collected during this time period. Numbers of A. fallacis found on individual plants ranged from 0 to 66 with higher numbers collected late in the summer (see Appendix, Tables 56-73).

Figure 13 shows the mean-variance relationship of the bean samples. The Poisson series, $s^2 = m$, and the Taylor's power law, $s^2 = am^b$, are also plotted on this figure. The Taylor's b, 1.34, and the divergence from the Poisson series indicated that A. fallacis had an aggregated distribution on most sample dates.

Analysis of the number of mites captured with this method with respect to cardinal direction and distance from the tree trunk tested the hypothesis that A. fallacis was randomly searching the habitat beneath the tree canopy. Table 6 gives the mean number of A. fallacis collected in all nine orchards at various sampling dates. Analysis of individual orchard means were not significantly different from pooled comparisons. Only

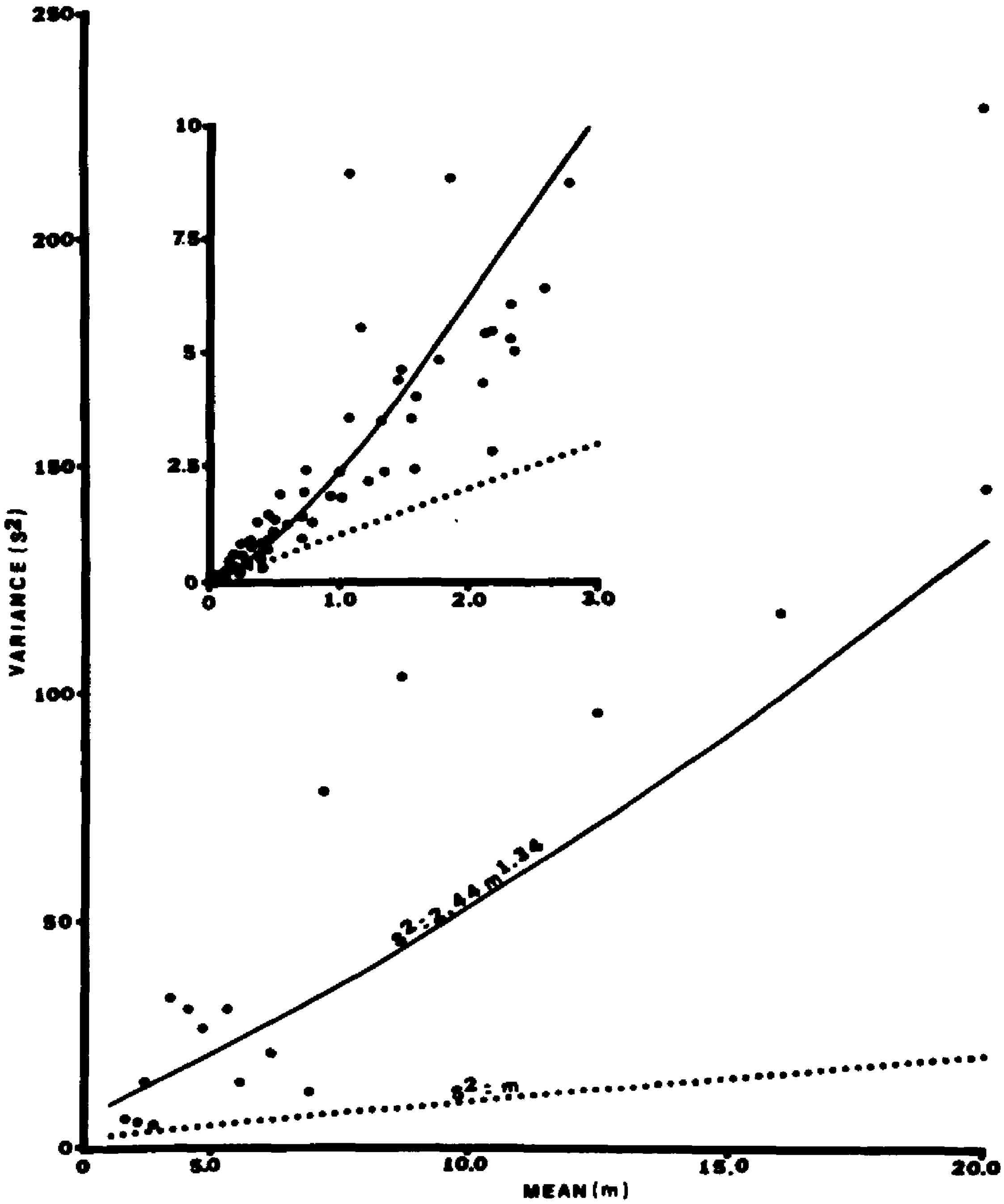

Figure 13.--The relationship between the means and variance of bean plant samples collected in 1972 and 1973.

Table 6.--Chi-square analysis of the number of *Amblyseius fallacis* found on bean plants in the four cardinal directional quadrants and either far or close to the tree trunks under apple trees in western Michigan orchards, 1972-1973.

Direction	5/24 - 6/20/73		χ^2	6/8 - 6/28/72		χ^2	7/12 - 7/26-72		χ^2	8/3 - 8/22/72		χ^2	8/29 - 10/3/72		χ^2
	# Mites	Corrected		# Mites	Corrected		# Mites	Corrected		# Mites	Corrected		# Mites	Corrected	
North	79 (183)	78	.09	30 (62)	22	.02	121 (77)	114	9.50	172 (74)	167	1.89	479 (91)	479	1.19
South	71 (183)	69	.64	19 (60)	14	2.47	80 (73)	80	.4	206 (73)	203	1.60	479 (90)	479	1.19
East	93 (185)	92	3.16	33 (63)	32	5.44	75 (74)	74	1.55	193 (73)	190	.10	447 (91)	447	.17
West	65 (182)	65	1.59	17 (61)	17	.85	78 (77)	74	1.55	183 (72)	183	.04	418 (91)	418	3.13
TOTAL			5.48			8.78*			13.00**			3.63			5.68
Distance															
Close	196 (369)	196	11.45	58 (123)	58	1.46	194 (149)	194	2.06	340 (138)	340	.63	1046 (175)	1046	29.48
Far	112 (369)	112	11.45	41 (123)	41	1.46	160 (152)	156	2.06	414 (154)	370	.63	777 (188)	723	29.48
TOTAL			22.90**			2.92			4.12*			1.26			58.97**

* Significant χ^2-test to 5 percent level.

**Significant χ^2-test to 1 percent level.

( ) = number of sample units included.

small differences between direction were noted at two sampling periods, 6/8 to 6/28, 1972 when significantly more predators were collected in the east quadrant and 7/12 to 7/26, 1972 when the north quadrant had significantly more mites. Dispersal of A. fallacis from the apple trees with the prevailing wind (from the SW to NE) was believed to be the main factor contributing to the differential distribution.

Analysis of samples differing in proximity to the tree base reflected seasonal differences. In early spring, more mites were found close to the tree trunk. During midseason, mites were numerous close to the trunk, but differences were not exceptionally great and may have simply reflected the cline of microhabitat which must extend from the margin of the tree canopy to the trunk region. Late in the season, more mites were more common in the inner region of the canopy suggesting that a significant number migrate from the tree via the tree trunk and that it apparently maintains its distribution close to the tree trunk throughout the winter, until early in the following spring.

Summary of Sampling Procedures and the Distribution of A. fallacis in the Ground Cover Habitat

Sampling ground cover populations of A. fallacis in apple orchards having different vegetation types and compositions with methods which are not time or cost prohibitive and yet maintaining accuracy and precision is at best a compromise solution. An additional constraint is that the techniques must be adapted to the small size of the mite (300 X 100 microns). In these experiments, accuracy or the absence of bias was regulated by eliminating errors as they were recognized and by representing all sources of variation in the sampling design. Precision, the reproducability of an estimate, was ensured by taking a sufficient number of samples as needed for a specific level.

Although the extraction method provided a constant recovery rate for A. fallacis population estimations from the orchard ground cover and it probably most accurately reflected the absolute density, it was a very labor intensive and cost prohibitive operation. The timed estimation was much faster, but there was concern that a differential counting time (i.e. handling time, Holling, 1965) would be associated with estimating different densities of A. fallacis. However, the sampler was required only to make a mental note of the number of mites observed and recorded that value after the sample period, so the error present was considered to be minimal. In 1972 a significant bias arose in the timed vegetational analysis from the inclusion of apple sucker leaves, which usually contained greater numbers of A. fallacis than did other ground cover plants. In 1973, apple suckers were sampled independently and the data obtained was also very closely correlated with the extraction density estimates. Overall, mites sampled by the apple sucker count showed the least degree of aggregation, so precision was obtained with the smallest sample size as compared to the other sampling methods. This could be expected from a sample unit which had a relatively uniform size and retained a constant density throughout the season. A major limitation of the apple sucker method was that the presence of sucker growth in an orchard often was subject to removal by the grower, so one could not count on this habitat being consistently available for sampling.

A comparison of the Taylor's b, calculated from each sample method, indicated that the measured distribution of _A. fallacis_ was often a function of the sample method. The b value of the extraction method was 1.49. This value reflected an aggregated distribution which more likely was due to the diverse plant habitat from which the sample was taken than to the intrinsic distribution of _A. fallacis_, which appears to search at random throughout the ground cover. An aggregated distribution was also reflected by the Taylor's b, 1.46, obtained from the one-minute count data in 1972, which included both broad-leaf forbs and apple sucker growth in the analysis. In 1973, apple suckers were omitted from the one-minute counts and a Taylor's b of 1.28 was obtained indicating that the degree of aggregation was reduced significantly. Furthermore, the Taylor's b, 1.10, obtained from the apple sucker data indicated an even greater tendency toward a random distribution when a sample unit with a uniform size and number was analysed.

Data collected from the directional and distance (from the tree trunk) strata also tended to confirm the preliminary observations that A. fallacis randomly searched for its prey under the tree canopy and its occurrence in any stratum or on a particular plant was uniform or related to the frequency with which it was sampled. Data from the extraction samples gave uniform densities of A. fallacis in the strata, although there were exceptions with respect to early or late season in relation to proximity to the tree trunk or directional preference. These anomalies were attributed to the dispersal of A. fallacis into and from the tree via wind and the tree trunk. With respect to vegetation types, the one-minute count data showed no general preference of A. fallacis, although some exceptions may have been due to leaf pubescence or relative size. Numbers of A. fallacis collected on bean plants infested with T. urticae reflected similar distribution results (Taylor's b of 1.34) as did the other sample methods. The chi-square analysis of the directional and distance components showed very little preference during the entire season, but also reflected aggregations in late and early season as observed in data collected by the extraction sample method.

Results and Discussion of Individual Orchard Sampling

This section contains data collected in nine western Michigan apple orchards, 1972 to 1974, including a description of each orchard, its ground cover, and the population dynamics of *A. fallacis*, both in the tree and in the ground cover. The principle plants found in the ground cover are listed with the estimated percentage of each in parentheses, as determined by its frequency in the random vegetation samples. A figure details the mite populations for each year in each orchard, with graphs representing the in-tree and under-tree populations of *A. fallacis*. The in-tree data were collected by B.A. Croft by methods described by Croft and McGroarty (1972), and are included because of the close relationship between the numbers of *A. fallacis* found in the two habitats. In each figure, the upper graph shows the mean number of *A. fallacis* per apple leaf on the left ordinate, and the density of the European red mite on the right ordinate. The lower graph shows the number of *A. fallacis* per one-minute count on the left ordinate and the number of *A. fallacis* per apple sucker leaf on the right ordinate except in 1972 when sucker leaf samples were not taken.

The abscissa common to both graphs indicates the time of year. The symbol, ⊛, on the graph indicates only the presence of two-spotted spider mites in the ground cover or in the three, since they were usually few in number and were not quantitatively sampled. Spray applications are also indicated by arrows and an appropriate letter as defined on the graph. Since these orchards were managed under the integrated mite control program of Croft (1975) and so the chemicals applied did not effect the mite populations, only spray applications not in harmony with the integrated program are designated.

Klackle Orchard, located five miles west of Belding, Michigan, contained red delicious apple trees approximately 15 feet high. The experimental block, containing 12 trees, was surrounded by blocks of other apple varieties. The ground cover was composed almost entirely of grass with only scattered forbs, i.e., dandelion, <u>Taraxacum</u> <u>officinale</u> (59), night-flowering catchfly, <u>Silene</u> <u>noctiflora</u>, (6), field peppergrass, <u>Lepidium</u> <u>campestre</u>, (4), smartweed, <u>Polygonum</u> sp. (4), and red clover, <u>Trifolium</u> <u>pratense</u> (3).

Figure 14 shows the population dynamics of <u>A</u>. <u>fallacis</u> in Klackle Orchard, 1972. During the months of June and July, few predators were found in the ground cover, suggesting that those present were only able to find enough prey to allow only enough offspring to be produced to replace the parents. In the tree, <u>A</u>. <u>fallacis</u>

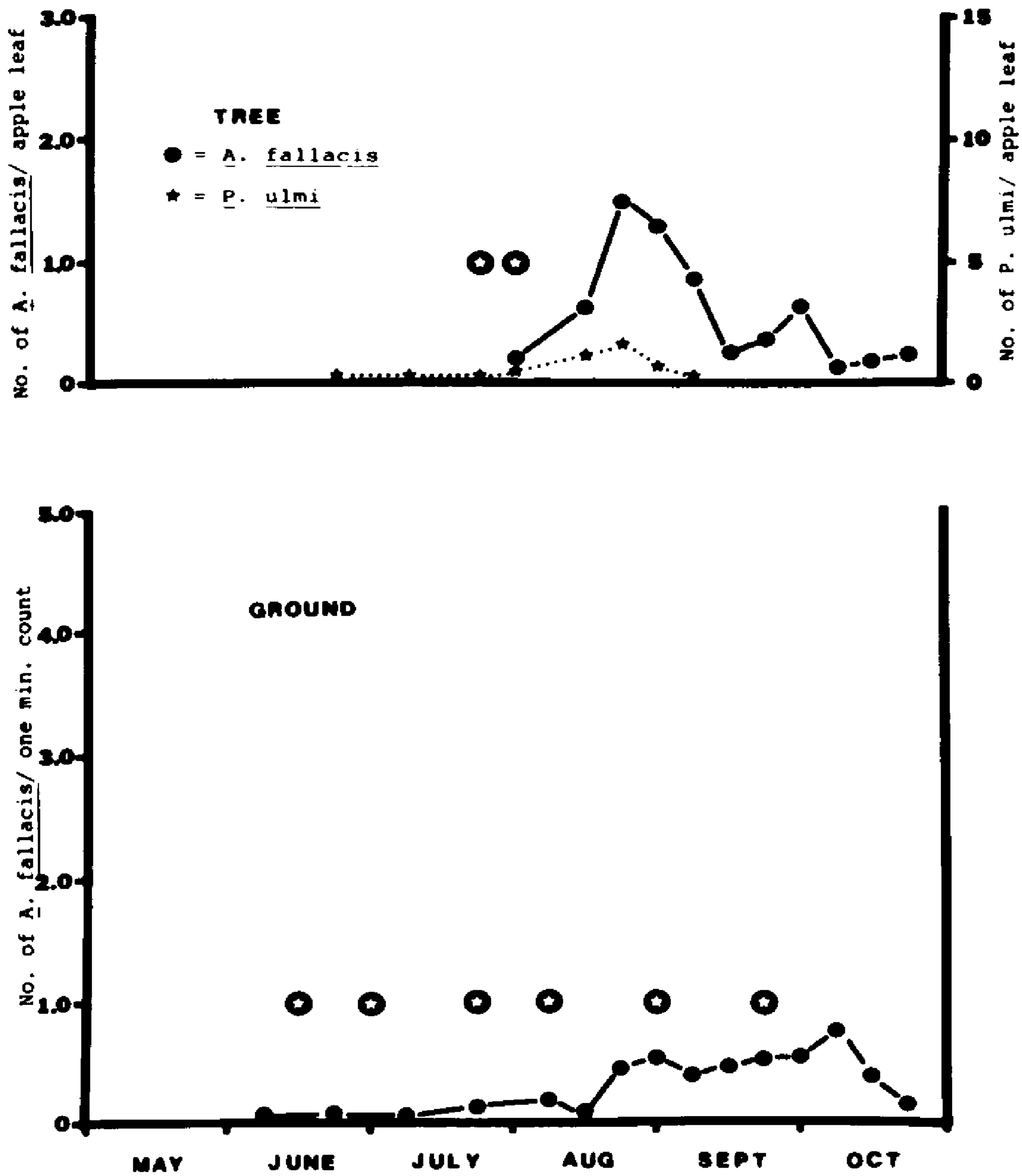

Figure 14.--Population dynamics of A. fallacis in Klackle Orchard, 1972.

was first collected during the third week of July. By the end of August, A. fallacis had increased in the tree and controlled the European red mite. After reducing the number of prey in the tree, A. fallacis dispersed back to the ground cover. The uniform number of A. fallacis in the ground cover from late August through September indicated that the mite did not disperse from the tree en mass, but left in small numbers perhaps as the number of prey mites decreased in a specific region of the tree.

Figure 15 shows the population dynamics of A. fallacis in Klackle Orchard, 1973. In early season, a few A. fallacis were observed associated with two-spotted spider mites in the ground cover. Because two-spotted spider mites were present in the ground cover and European red mites were abundant on the apple sucker leaves, the density of A. fallacis increased rapidly and some were already found in the tree in June. The number of A. fallacis, collected in the tree, increased while they fed on rust mites, Aculus schlectendeli (Nalepa). This prey species is not shown on Figure 15, but its density was approximately 250 per apple leaf. In late August, decrease in the population of A. fallacis indicates they left the tree, first increasing in number on the sucker growth and then in the ground cover. The low number of A. fallacis in the ground cover during September

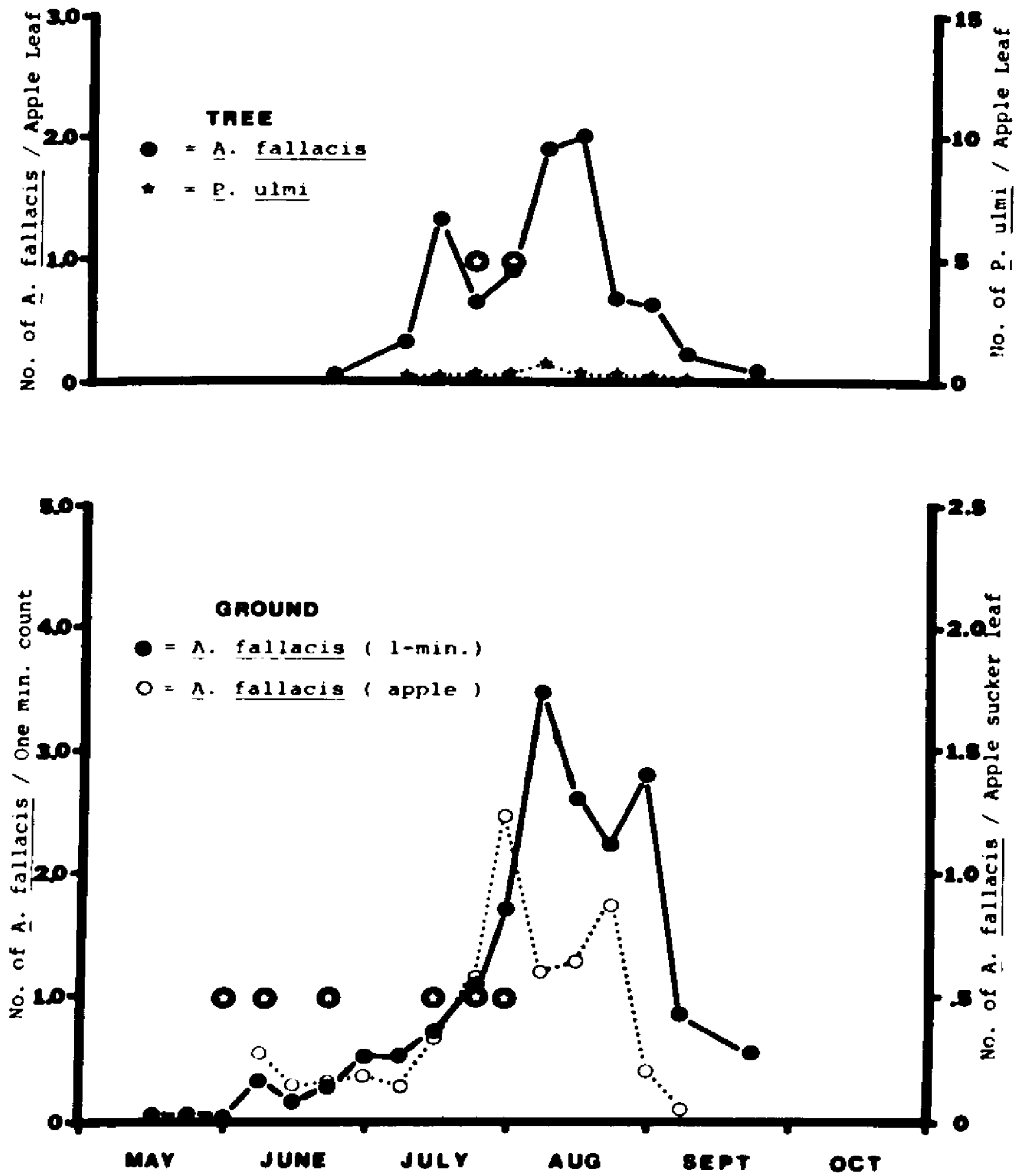

Figure 15.--Population dynamics of A. fallacis in Klackle Orchard, 1973.

implies that most of the predators had entered diapause or dispersed to other areas by that time.

Figure 16 shows the population dynamics of A. fallacis in Klackle Orchard, 1974. In June, many were observed associated with two-spotted spider mites. Some dispersed into the tree by mid-July, but the number was not high enough to control the European red mite, and an application of Plictran® was required. Following the spray, A. fallacis regulated the European red mite until the end of the season.

Rasch Orchard, located five miles west of Belding, Michigan, was composed of 35 to 40 foot northern spy apple trees. This block was adjacent to a mature hardwood stand on the north, and other varieties of apple on the other sides. Under the trees, a deep layer of humus was indicative of the orchard's old age. The drooping branches of these trees blocked most of the sun, so shad tolerants plants thrived and grass was inhibited. Ground cover plants included dandelion, Taraxacum officinale (34), black raspberry, Rubus occidentalis (11), Virginia creeper, Parthenocissus quinquefolia (10), common nightshade, Solanum nigrum (9), sweet cicily, Osmorhiza claytoni (8), grape, Vitus sp. (8).

Figure 17 shows the population dynamics of A. fallacis in the Rasch Orchard, 1972. In early season, a small number of predators was observed associated with

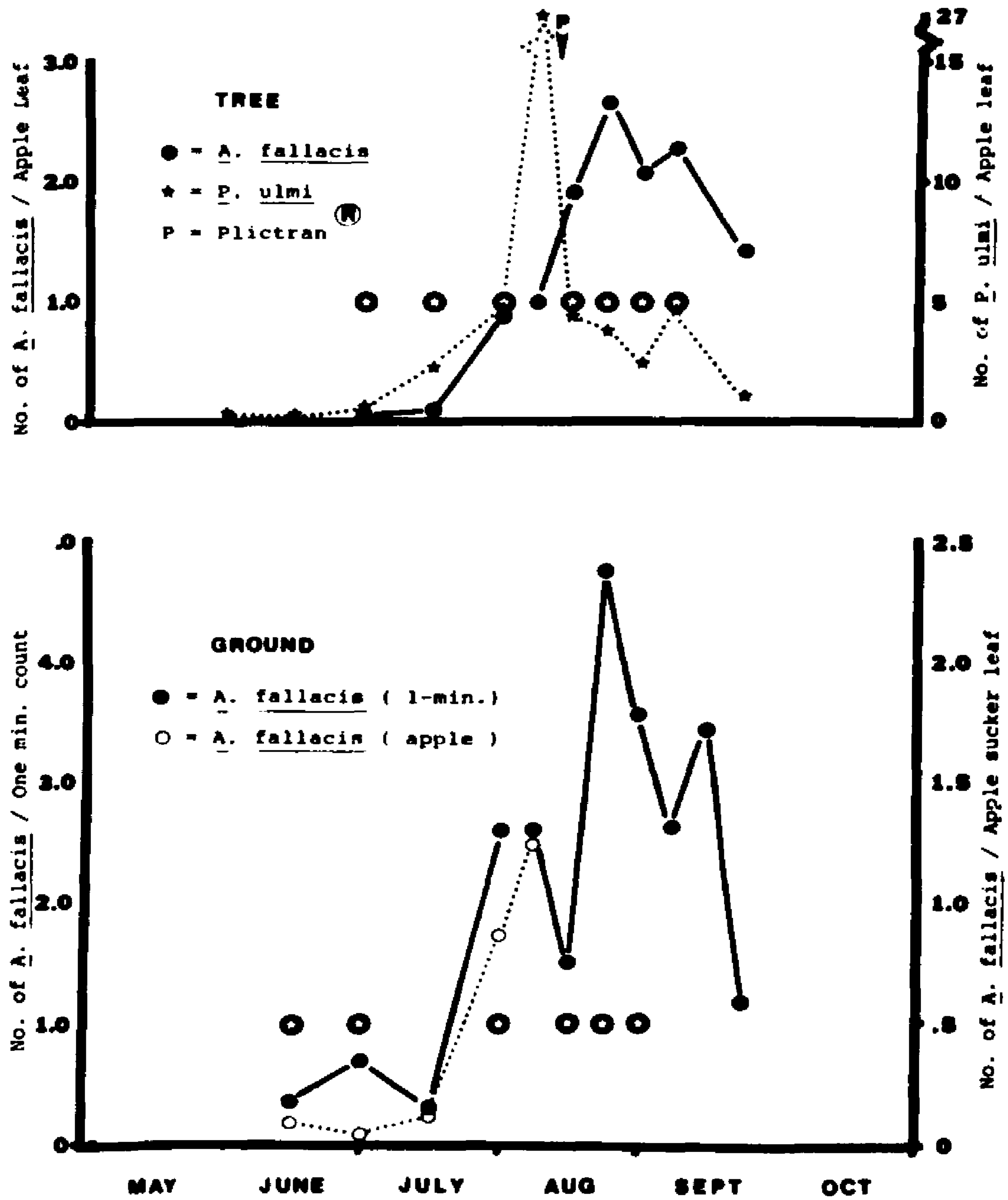

Figure 16.--Population dynamics of A. fallacis in Klackle Orchard, 1974. (P = Plictran®)

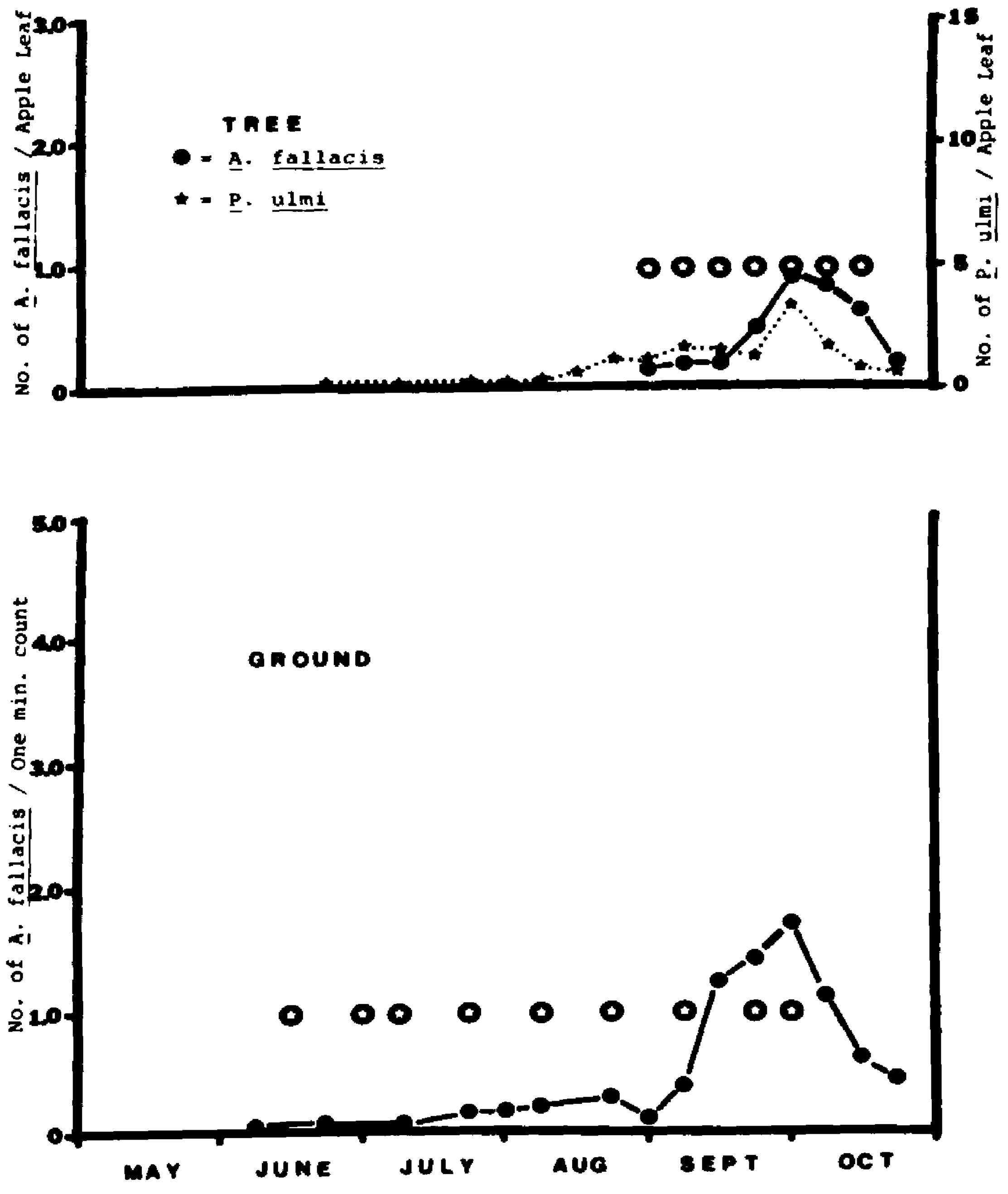

Figure 17.--Population dynamics of A. fallacis in Rasch Orchard, 1972.

scattered two-spotted spider mites. In August, the first predator was collected in the tree and biological control of the European red mite was successful. Under the tree, numbers of A. fallacis increased in September as they left the tree seeking over-wintering sites.

Figure 18 shows the population dynamics of A. fallacis in Rasch Orchard, 1973. Amblyseius fallacis increased in early season, but an application of Phosamidon® reduced their numbers both in the tree and ground cover. The European red mite increased in July and was controlled with an application of Plictran®. Thereafter, A. fallacis regulated the European red mite through the end of the season. In August, the number of A. fallacis increased on the ground as they left the tree after reducing the spider mite numbers.

An application of Sevin® in mid-September reduced the ground cover population of A. fallacis, but did not affect those found on the apple sucker leaves, since they were probably in diapause and, therefore, were not as likely to contact the chemical as those on the ground which were still seeking over-wintering sites.

Figure 19 shows the population dynamics of A. fallacis in Rasch Orchard, 1974. Predators were found in the ground cover throughout the season, but they did not move into the tree until August when it was too late for them to affect European red mite numbers. An application

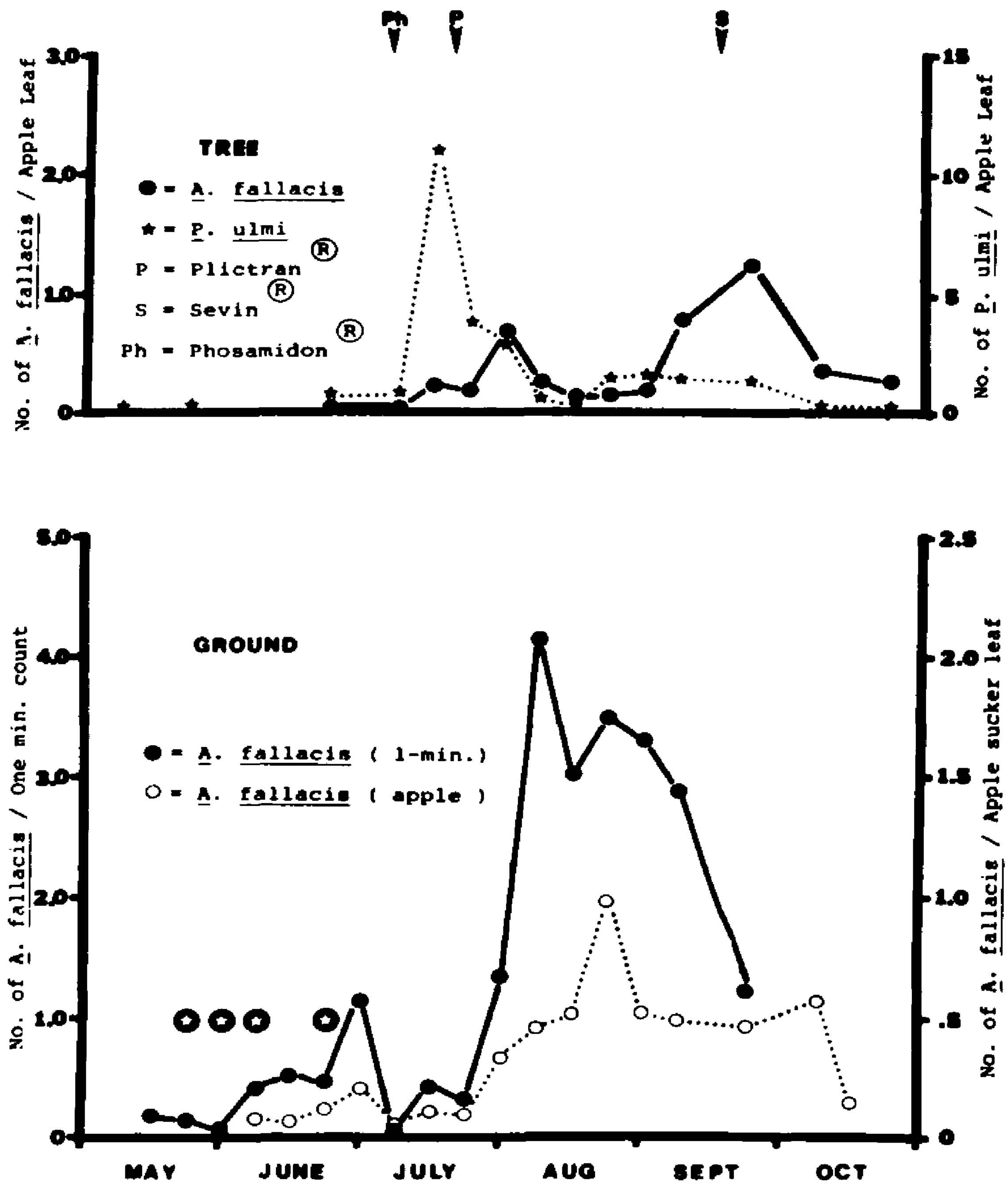

Figure 18.--Population dynamics of A. fallacis in Rasch Orchard, 1973.

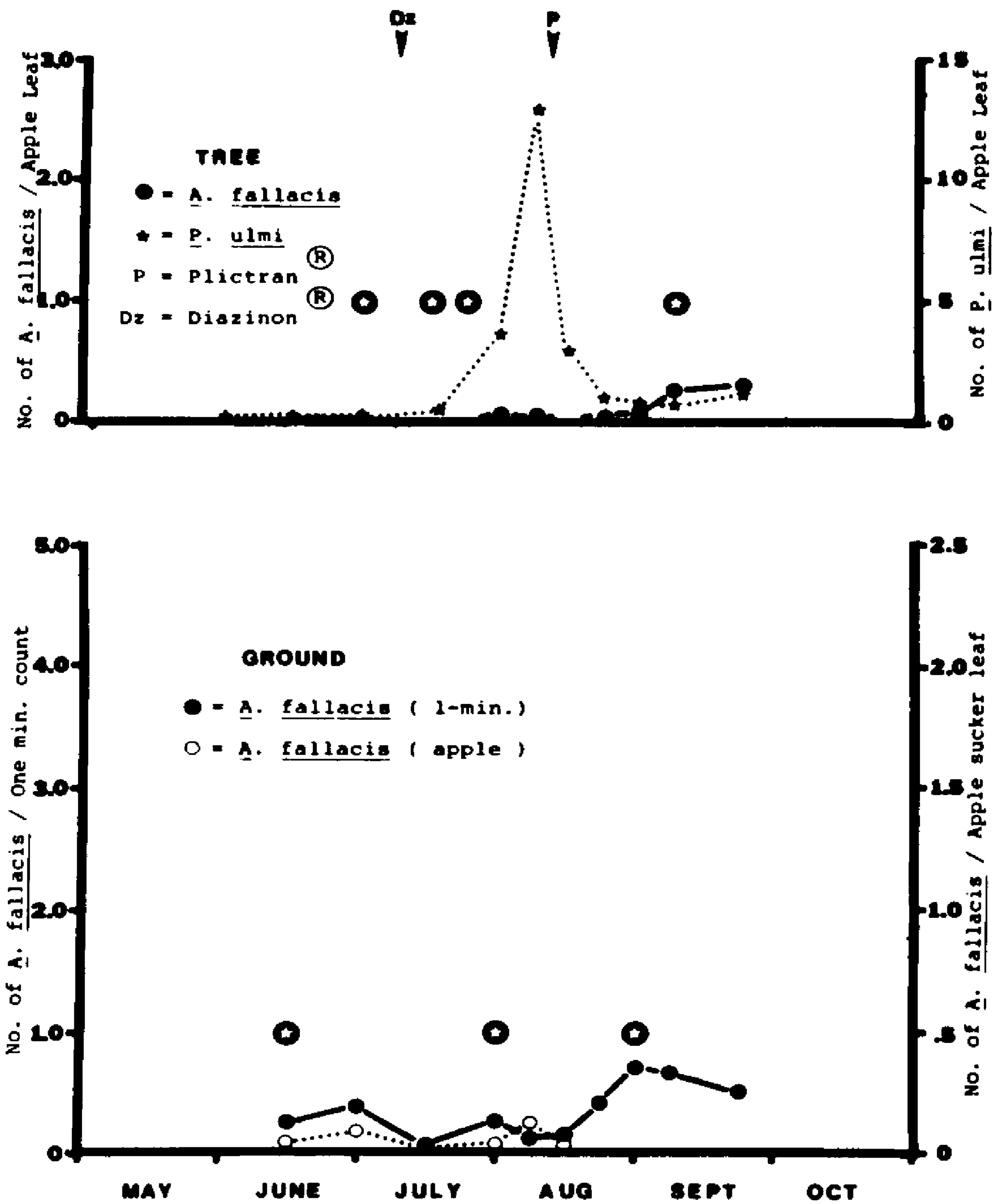

Figure 19.--Population dynamics of A. fallacis in Rasch Orchard, 1974.

of Diazinon® in July may have been responsible for keeping *A. fallacis* out of the tree, because a noticeable reduction in predator numbers was observed the following week. A few predators survived under trees with heavy ground cover, but where ground cover was sparce, predators were not found; therefore, a very aggregated distribution was produced. In August, the apple sucker growth was cut and numbers of *A. fallacis* increased both in the tree and ground cover, perhaps because of the loss of that habitat.

Kraft Orchard, located four miles southwest of Sparta, Michigan, contained 35 foot red delicious apple trees. This block of 100 trees was divided with one half of the trees managed under the integrated mite system and the other half under the more traditional spray calendar management plan. This block was bordered on the north by a road and a larger block of apple trees, a fallow field on the east, a corn field on the west, and the other half of the block on the south. This orchard was not usually mowed until late in June because of water accumulations in the low areas, which also prevented early season oil applications for European red mite control. Since this orchard was old, a heavy layer of litter was present under the ground cover vegetation. Grass grew thickly between the trees, but under the canopy, broadleaf forbs dominated. Ground cover plants included daisy fleabane, *Erigeron annuus* (31.8), goldenrod, *Solidage* sp., (23.9), dandelion, Taraxacum officinale, (21.1), common nightshade, Solanum nigrum, (7.2), and milkweed, Asclepias syriaca, (4.3).

Figure 20 shows the population dynamics of A. fallacis in Kraft Orchard, 1972. During June and July, two-spotted spider mites and a tydeid mite, Protonema sp., were observed in the ground cover and might have provided a sufficiently large food source to allow A. fallacis to increase in number. Amblyseius fallacis was first found in the tree during the third week of July, but by that time, the European red mite had already increased to economic levels and required chemical control. Once the European red mite density was decreased, A. fallacis was able to maintain it at low levels through the remainder of the season. Late in September, A. fallacis numbers increased in the ground cover as they left the tree seeking over-wintering sites.

Figure 21 shows the population dynamics of A. fallacis in Kraft Orchard, 1973. A few A. fallacis were found in May, having survived the winter. However, its density remained low through July, except for a slight increase in early July on apple suckers probably in response to large numbers of European red mites, which had fallen there from the tree above. Because of wet weather, no oil had been applied to this block during early season, so the European red mite density increased to economic

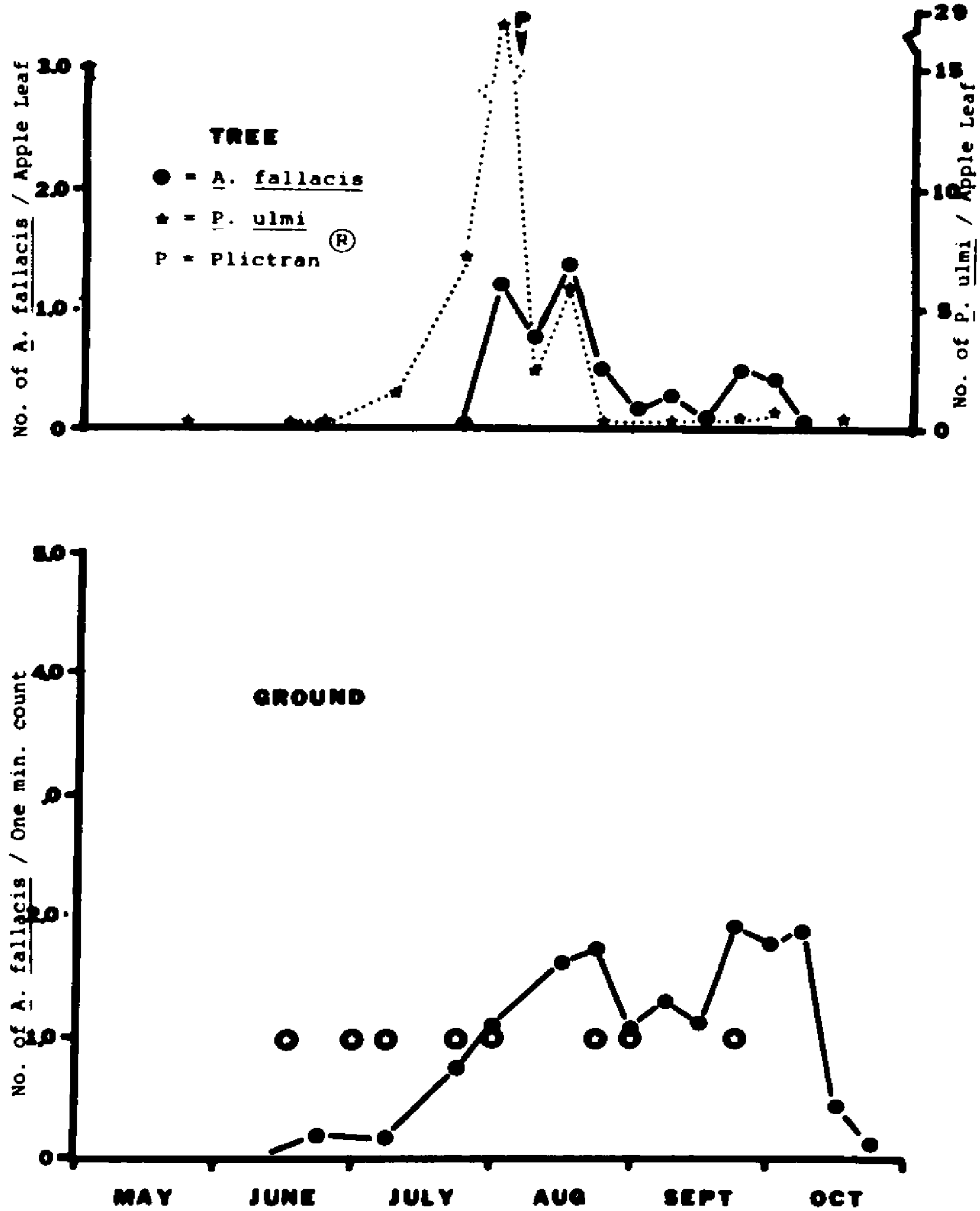

Figure 20.--Population dynamics of A. fallacis in Kraft Orchard, 1972.

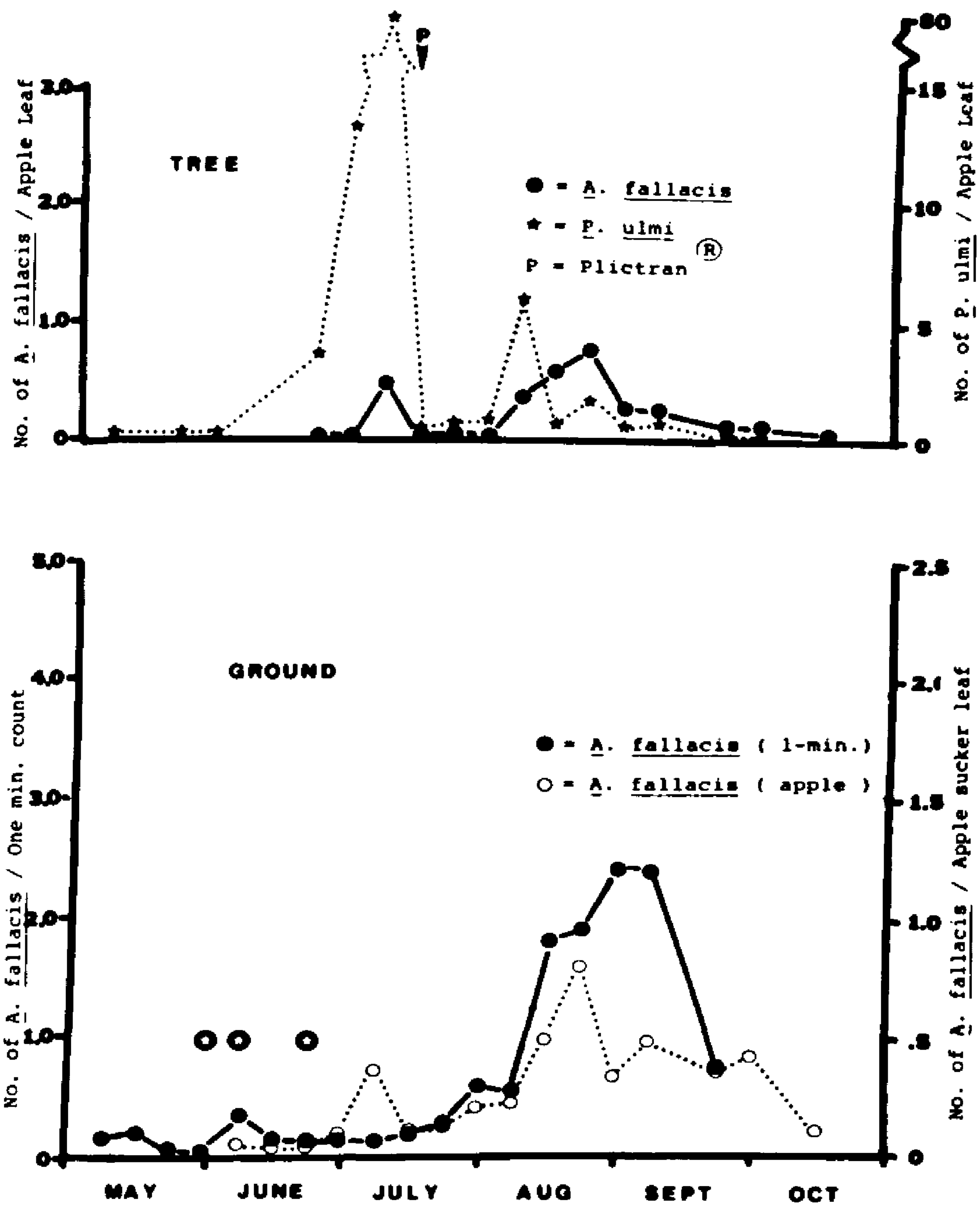

Figure 21.--Population dynamics of A. fallacis in Kraft Orchard, 1973. (P = Plictran®)

levels by mid-July. Plictran® was applied and the pest levels were reduced to a lower level where *A. fallacis* was able to maintain it through the end of the season. In August, numbers of *A. fallacis* increased in the ground cover as they begain leaving the trees.

Figure 22 shows the population dynamics of *A. fallacis* in Kraft Orchard, 1974. Since only a few *A. fallacis* were observed early in the season, it was deduced that over-wintering mortality must have been high. By July, the European red mite population had increased and some were observed on the sucker growth and the ground cover, having fallen from trees, probably during a heavy rain. This prey source allowed *A. fallacis* to increase in the ground cover, but the predator never moved into the tree. The European red mite population was controlled by two applications of Plictran®, since biological control was not possible. In September, an application of Sevin® for white apple leafhopper control did not seem to affect the numbers of *A. fallacis* either in the ground cover or on the apple sucker growth.

Gavin Orchard, located five miles east of Coopersville, Michigan, contained 15 foot red delicious apple trees. This block was adjacent to a block of Jonathan apples on the east, yellow delicious on the south, a cornfield on the west, and a fallow field on the north. The soil contained a high percentage of clay, which dried out

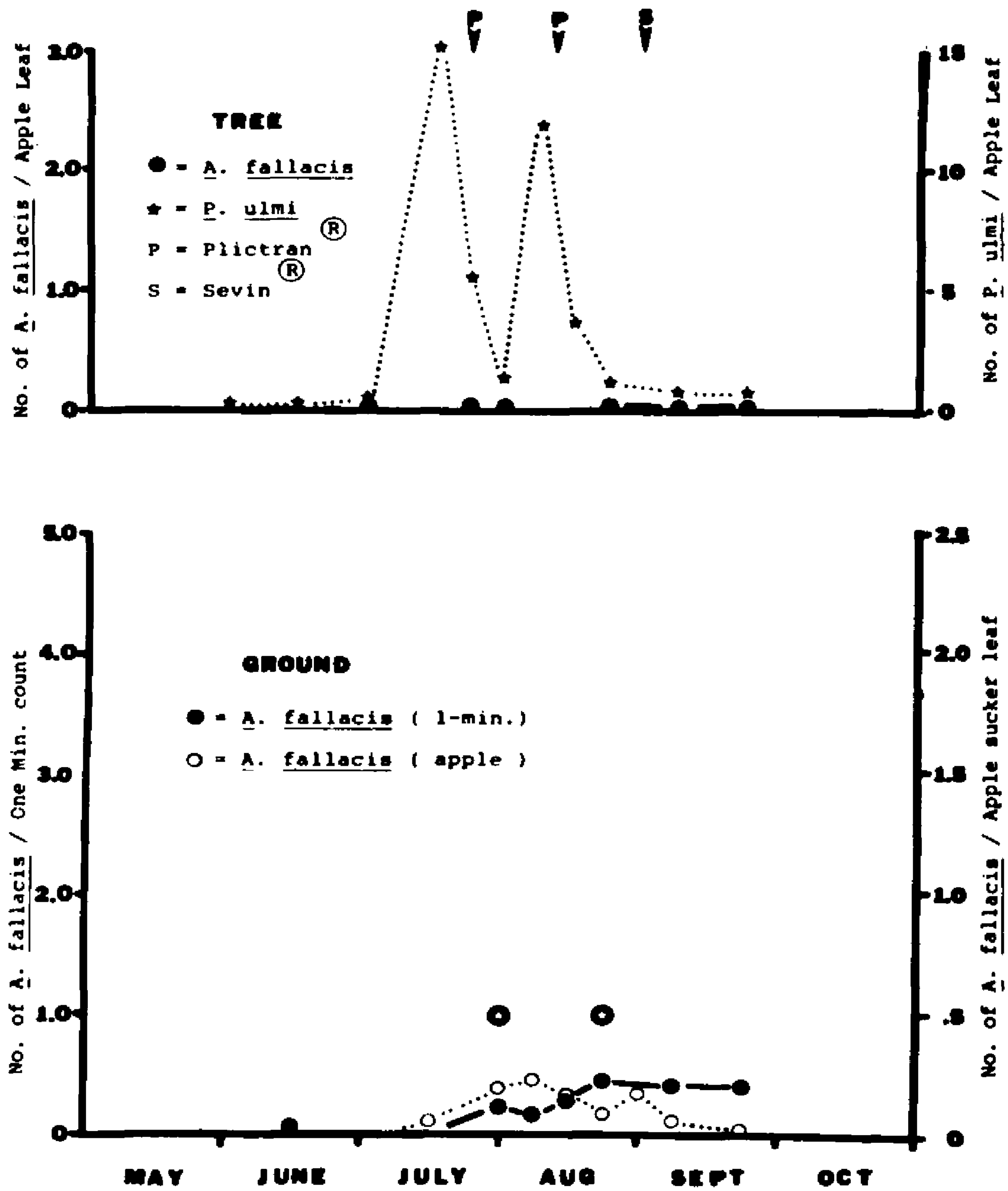

Figure 22.--Population dynamics of A. fallacis in Kraft Orchard, 1974.

in the summer and held water in the spring. Very little litter was found under the ground cover vegetation. A little grass grew between the trees, but under the canopy, chickory, Cichorium intybus (43.2) and apple sucker growth predominated. Other ground cover plants included dandelion, Taraxacum officinale, (11.4), red clover, Trifolium pratense (11.2), English plantain, Plantago lanceolate, (8.5), and alfalfa, Medicago sativa (5.2).

Figure 23 shows the population dynamics of A. fallacis in Gavin Orchard, 1972. In June, a series of applications of Dikar® seemed to inhibit the development of a predator population until July. However, two-spotted spider mites flourished in the ground cover and moved into the tree in August. The predator was observed in early August, and by the end of September, it had controlled the spider mites both in the tree and ground cover. Amblyseius fallacis remained active until late October, when many were still observed searching the ground cover. Therefore, it was suspected that a large number of A. fallacis was present in the ground cover during the winter.

Figure 24 shows the population dynamics of A. fallacis in Gavin Orchard, 1973. Because fruit did not set well, chemicals, except of an early season oil and fungicide, Cyprex®, were not applied this season. Only a few predators were found in the ground cover in May

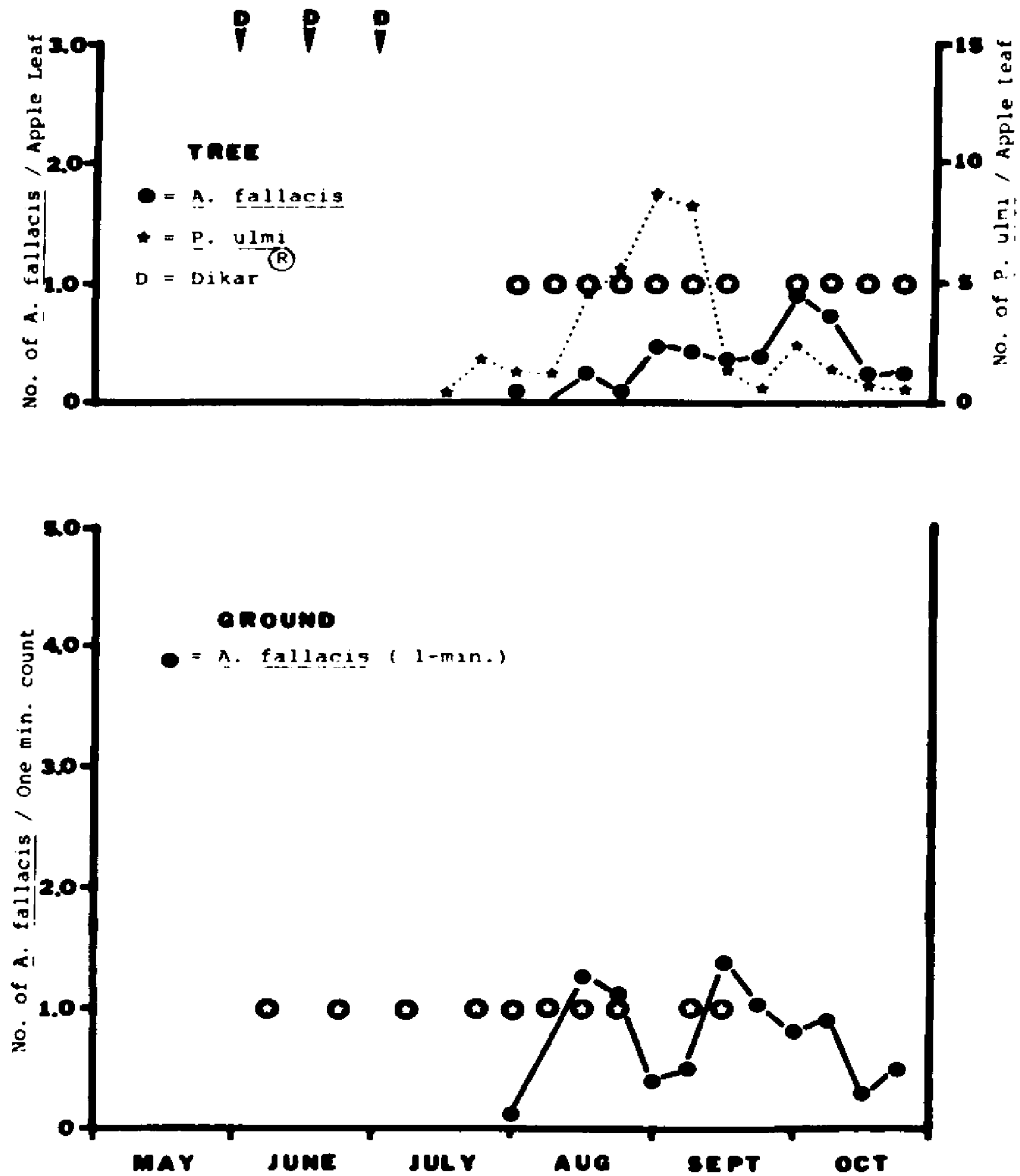

Figure 23.--Population dynamics of A. fallacis in Gavin Orchard, 1972.

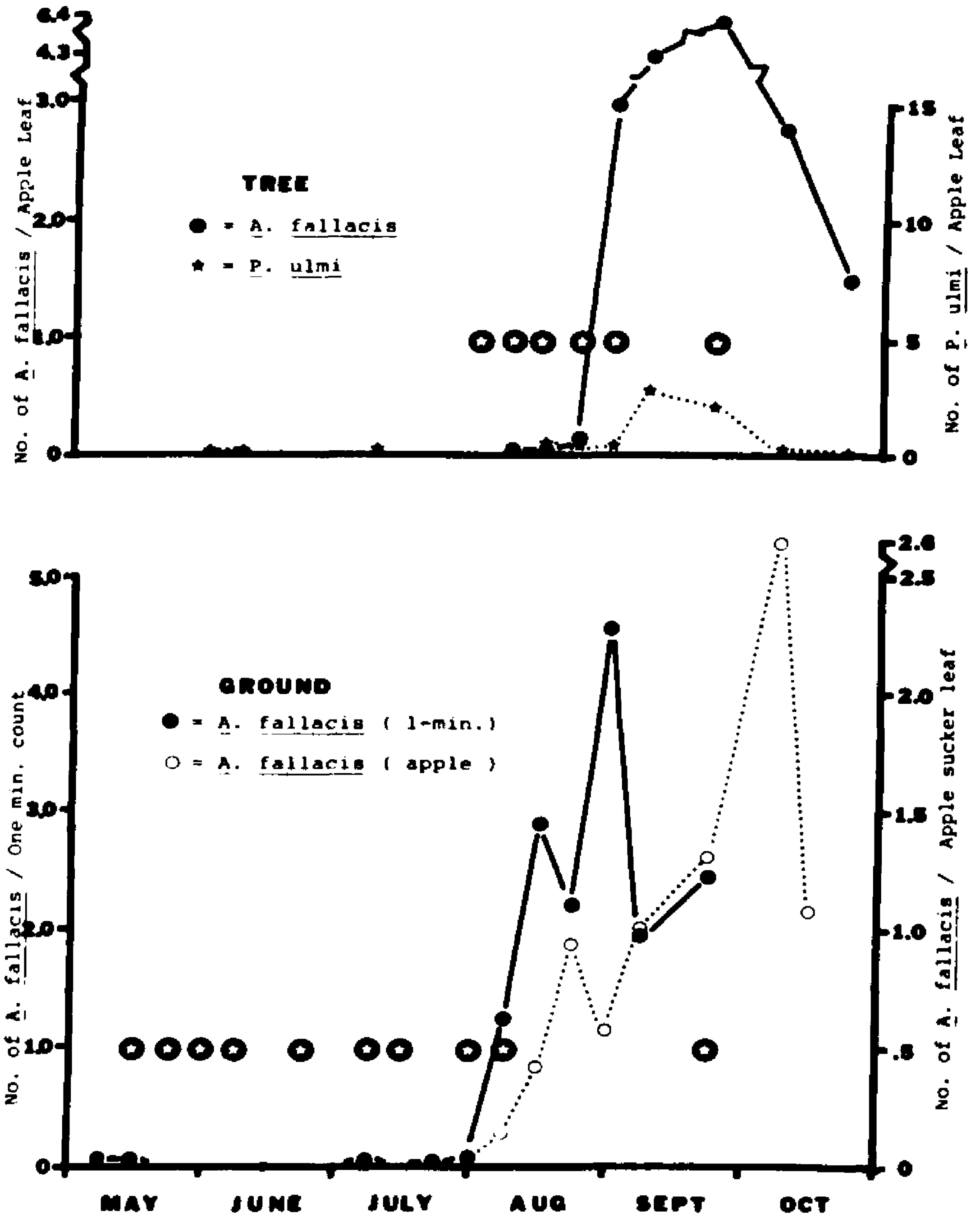

Figure 24.--Population dynamics of A. fallacis in Gavin Orchard, 1973.

indicating a high over-wintering mortality, and none were found in June. The lack of predators in June may have been caused by cool and rainy weather which may have affected the predator by producing an unfavorable habitat on the bare clay surface. In other orchards, where a protective layer of litter existed, weather was not found to have inhibited the predator increase. Two-spotted spider mites were active and increased. The predator responded in August and quickly reduced their numbers. Subsequently, the predator moved into the tree where large numbers of rust mites and a few European red mites were found. Large numbers of A. fallacis were found in the tree in September. In October, they left the trees for the sucker growth where they sought over-wintering sites.

Figure 25 shows the population dynamics of A. fallacis in Gavin Orchard, 1974. Once again, over-wintering mortality was very high, since no predators were observed in early season. Only one A. fallacis was found in the ground cover through August. However, pest mites were not present until August, so chemical control was not necessary.

Carpenter Orchard, located three miles northwest of Lawrence, Michigan, contained 15 foot red delicious apple trees. This block was adjacent to a vineyard on the south, fallow fields on the east and west, and a block

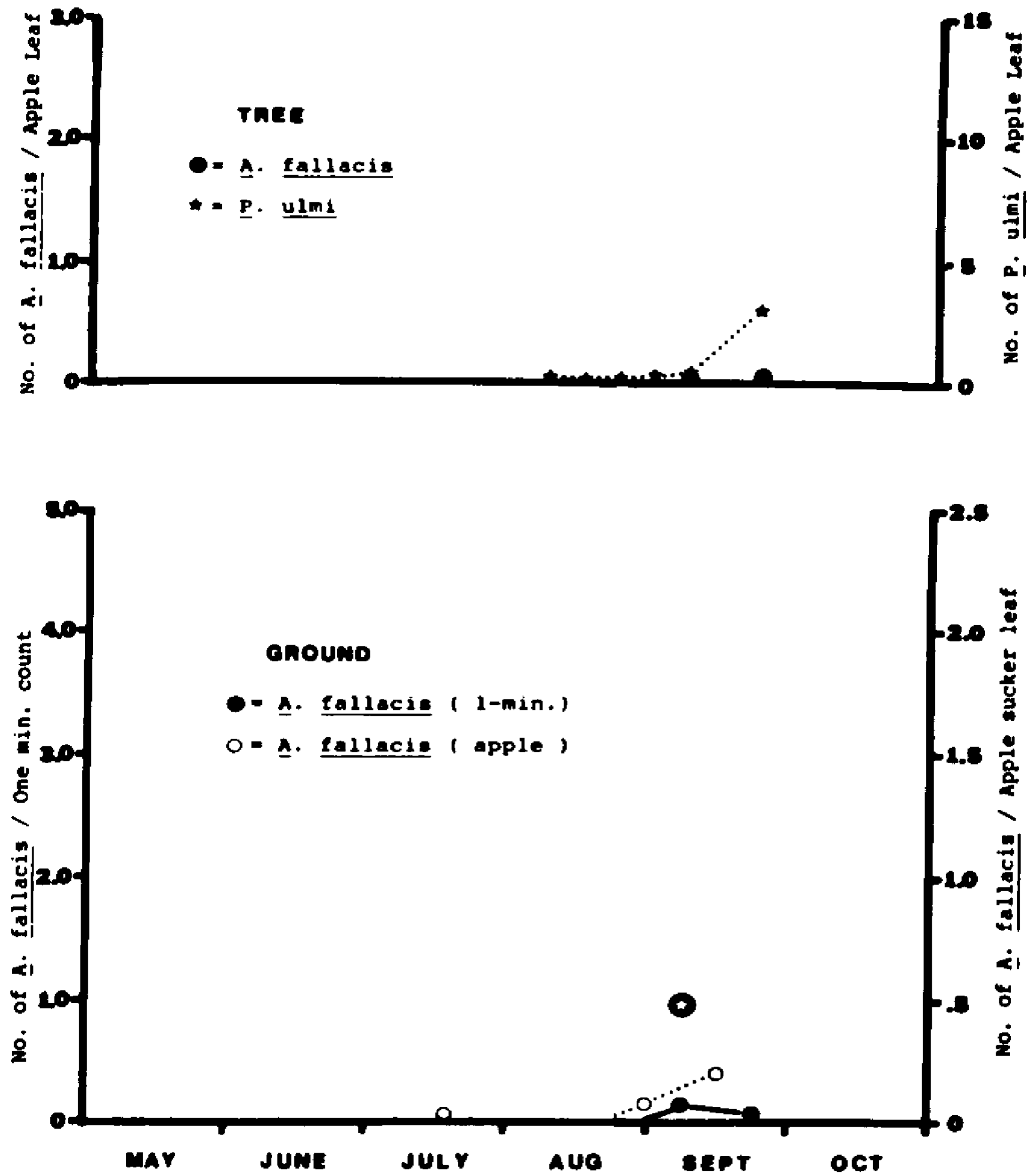

Figure 25.--Population dynamics of A. fallacis in Gavin Orchard, 1974.

of Jonathan apples on the north. This block was intensively managed with frequent mowing, herbicide application, and cutting of apple sucker growth. Between trees, the vegetation was exclusively grass, but under the trees, plants were sparce and included dandelion, Taraxacum officinale, (50.8), broad dock, Rumex obtusifolius (28.8), grape, Vitus sp. (5.3), pigweed, Chenopodium album (2.8), red clover, Trifolium pratense, (2.9), and milkweed, Ascleoias syriaca (2.6). Although the herbicide treatments usually destroyed most of the plants, by July most of the herbs had reestablished themselves.

Figure 26 shows the population dynamics of A. fallacis in Carpenter Orchard, 1972. Spray applications of Zolone R and Dikar® inhibited the development of a predator population during the early part of the season. By mid-July, the European red mite had increased to economic levels and was controlled with Plictran®. A. fallacis was first found under the tree in August. Because large numbers of two-spotted spider mites were also on the ground, A. fallacis did not move into the tree in great numbers. Despite the lack of predators, the European red mite did not increase greatly, but a large number of winter eggs were observed in October.

Figure 27 shows the population dynamics of A. fallacis in Carpenter Orchard, 1973. The European red mite eggs hatched and required an application of Plictran®

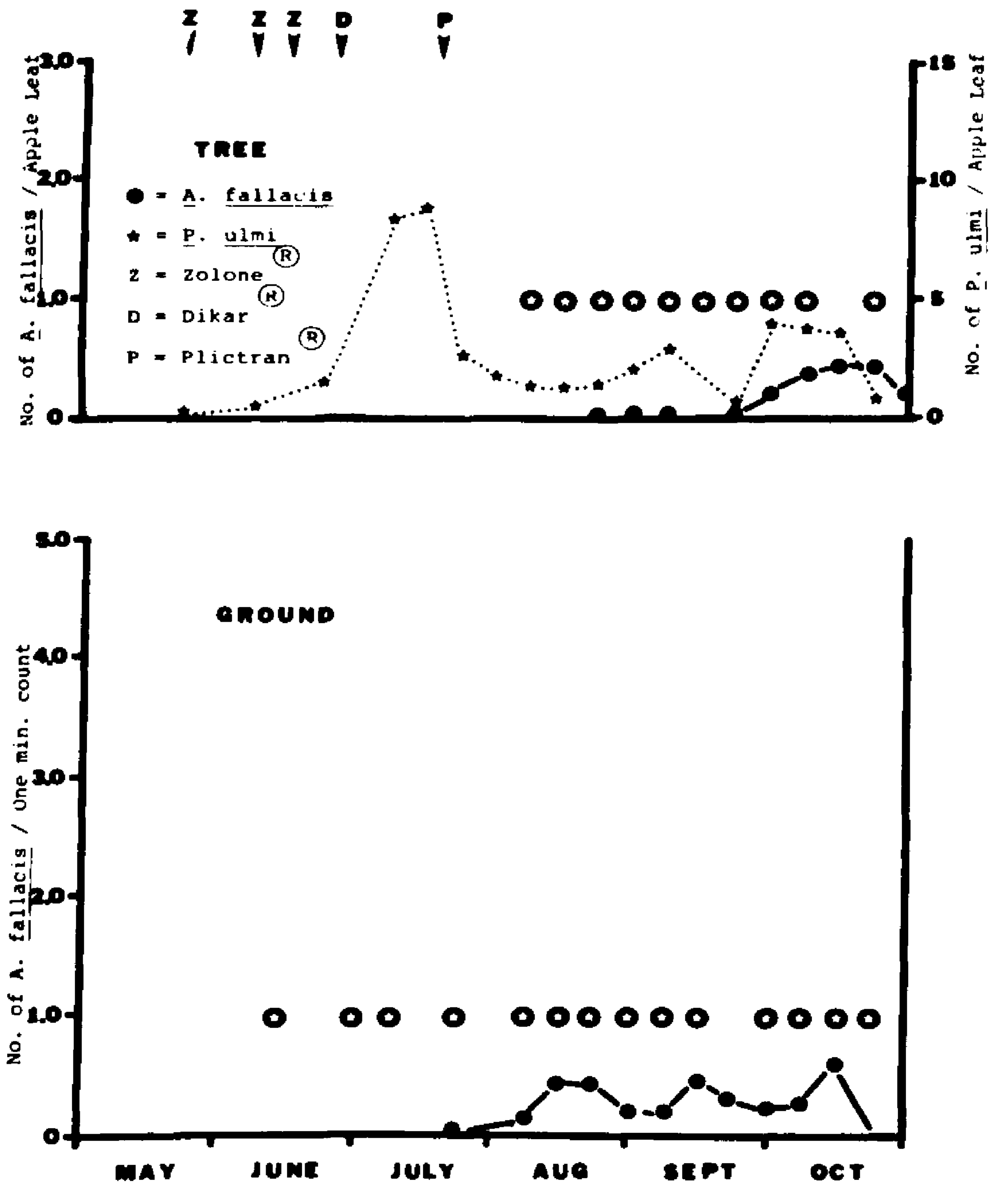

Figure 26.--Population dynamics of A. fallacis in Carpenter Orchard, 1972.

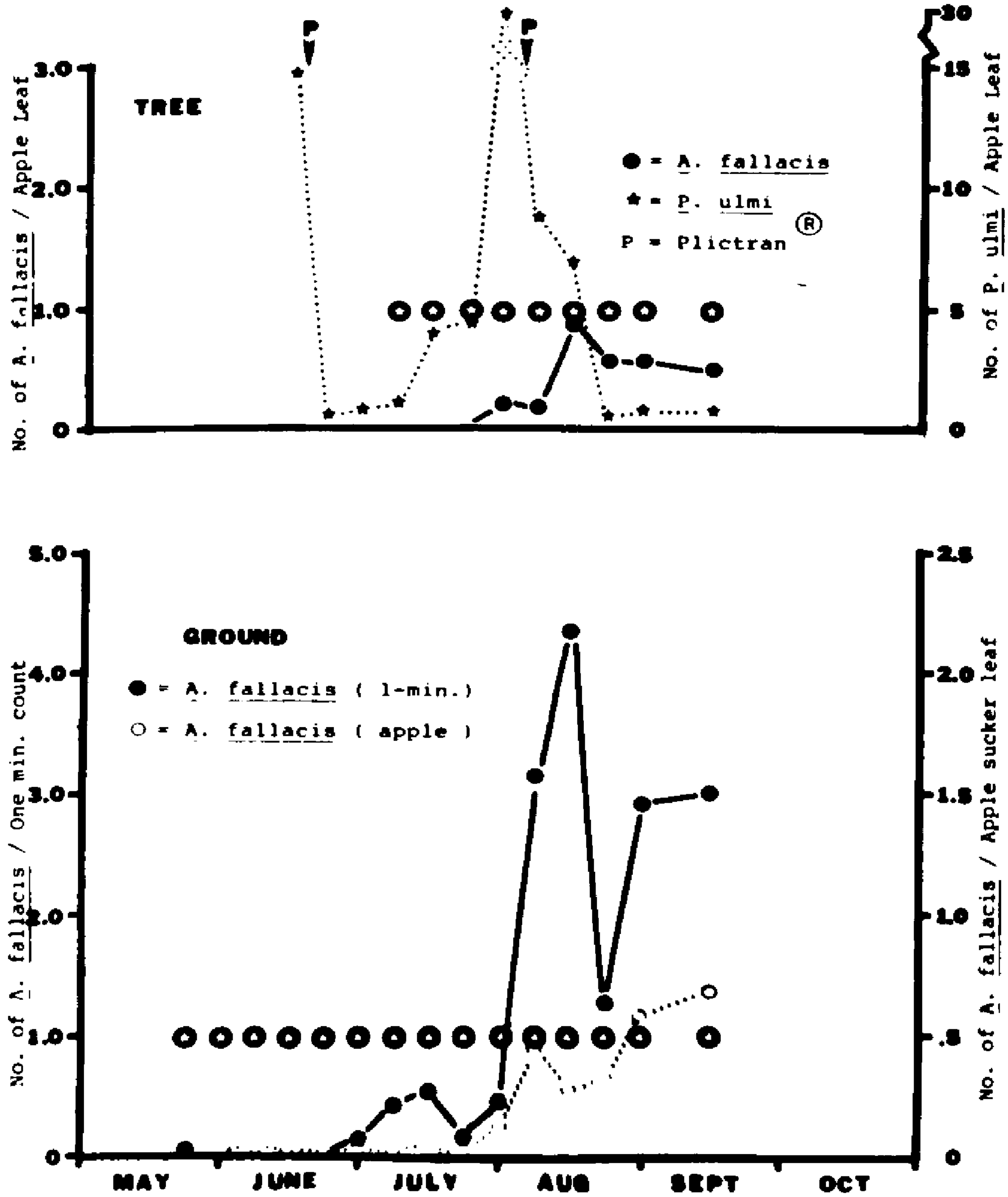

Figure 27.--Population dynamics of A. fallacis in Carpenter Orchard, 1973.

in June. A few predators were observed associated with two-spotted spider mites in the ground cover, but once again they did not move into the trees. Therefore, the European red mites increased and had to be controlled with chemicals in early August.

Figure 28 shows the population dynamics of A. fallacis in Carpenter Orchard, 1974. Many predators were observed on apple suckers in early June. The sucker growth was then cut, so it was not possible to use this sample technique until August. In June, a few predators were found in the tree, but they did not increase in number. Instead, the number of A. fallacis decreased both in the tree and in the ground cover. The European red mite increased and was chemically controlled with Plictran®. In August, Systox® was applied for leafhopper control, and subsequently, the tree population of A. fallacis decreased. However, since the ground population increased following the spray application, the chemical probably did not destroy the predator, but may have forced them from the tree.

The Babcock Orchard, located one mile north of Keeler, Michigan, contained 15 foot red and yellow delicious apple trees. This small block of 50 trees was divided equally between the two apple varieties, and was surrounded by extensive acreages of vineyards. The ground cover contained a thick grass sod between trees, and

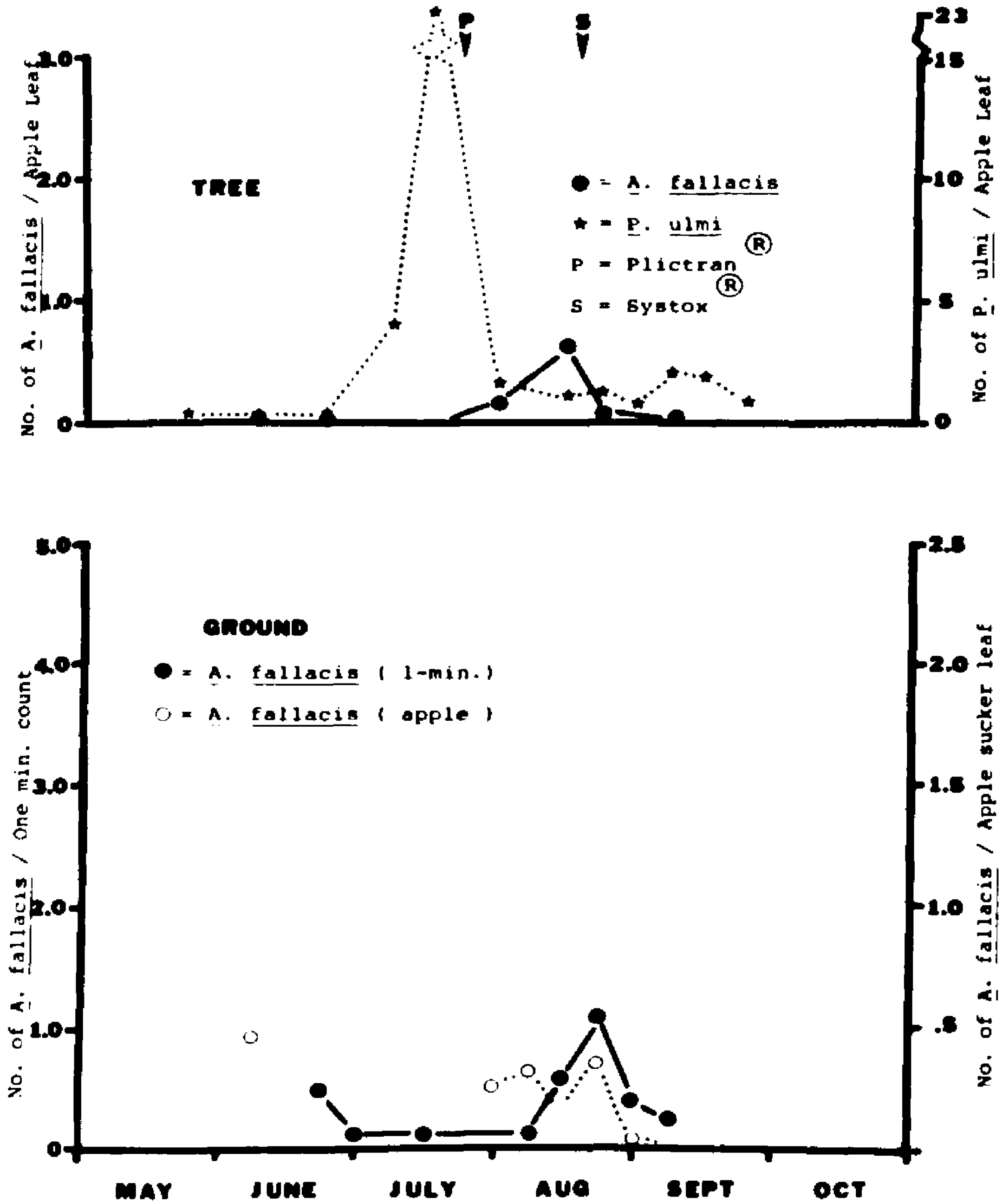

Figure 28.--Population dynamics of A. fallacis in Carpenter Orchard, 1974.

under the canopies, poison ivy, Rhus radicans, was especially abundant, indicating that the orchard floor had not been disturbed for many years. Other ground cover plants included milkweed, Asclepias syriaca, (18.6), dandelion, Taraxacum officinale, (9.4), horse nettle, Solanum carolinense (5.5), broad dock, Rumex obtusifolius (5.5), Virginia creeper, Parthenocissus quinquefolia (5.2), and wild lettace, Lactuca canadensis (3.7).

Figure 29 shows the population dynamics of A. fallacis in Babcock Orchard, 1972. Amblyseius fallacis was observed in the ground cover associated with two-spotted spider mites in June and July. Some moved into the tree in June, but they were unable to control the European red mite, so Plictran® was applied in August. Then, predators increased both in and under the tree, reducing the number of spider mites in both habitats. In September, A. fallacis began dispersing from the tree, seeking prey and over-wintering sites in the ground cover.

Figure 30 shows the population dynamics of A. fallacis in Babcock Orchard, 1973. Only a few predators were observed in early season. Although two-spotted spider mites were present, A. fallacis did not increase. In the tree, A. fallacis was first found in July, and its density increased as they fed on abundant prey, spider mites and rust mites. In September, the European red mite decreased, but the A. fallacis population continued to increase while

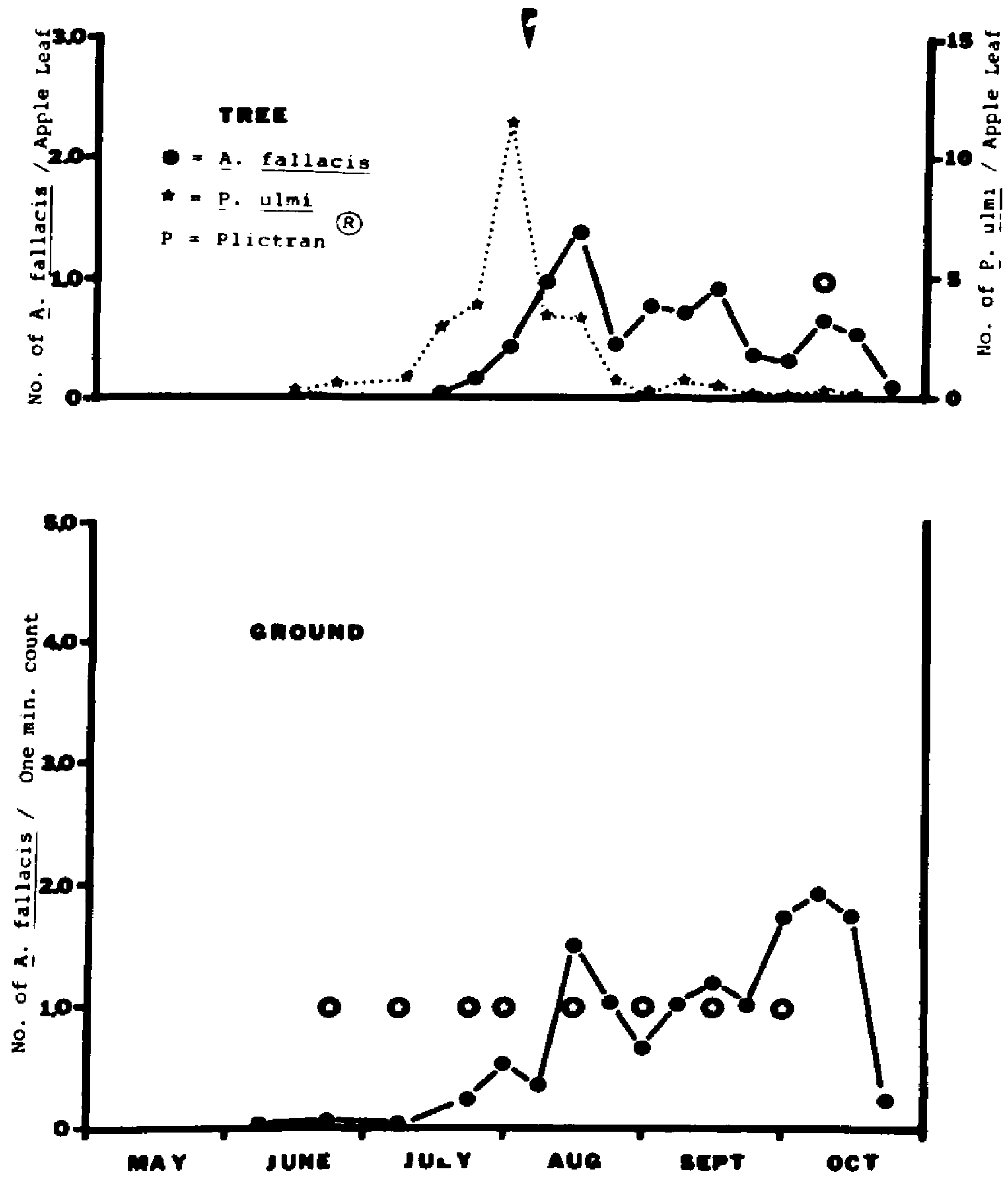

Figure 29.--Population dynamics of A. fallacis in Babcock Orchard, 1972.

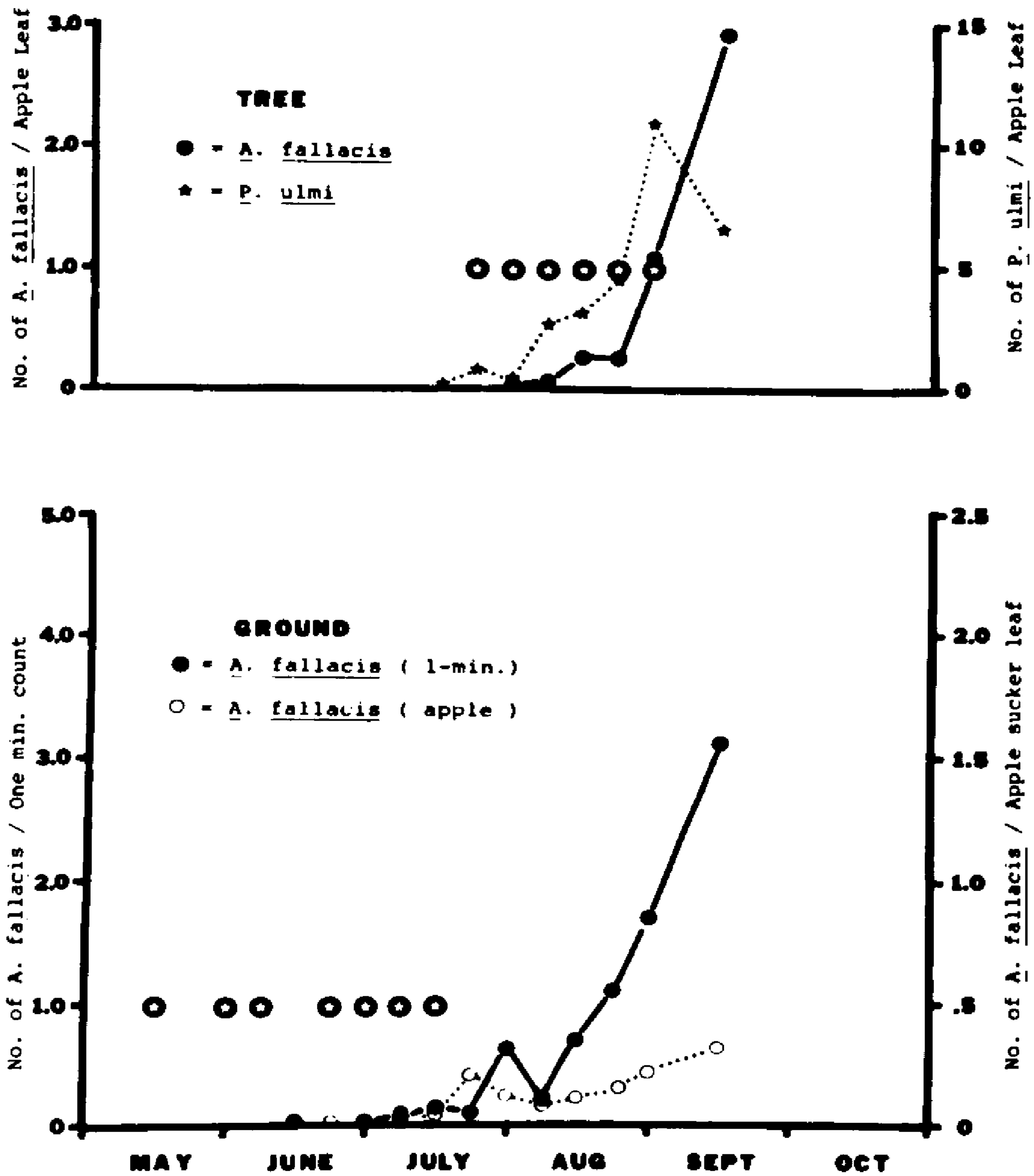

Figure 30.--Population dynamics of A. fallacis in Babcock Orchard, 1973.

feeding on rust mites. The large number of *A. fallacis* in the ground cover indicates that a high density population entered the winter season.

Figure 31 shows the population dynamics of *A. fallacis* in Babcock Orchard, 1974. Two-spotted spider mites were conspicuously absent from the early season ground cover, and although *A. fallacis* was present, it did not increase until August when the prey was again observed in the ground cover. Since an oil was not applied, the European red mite population reached an economic level in August and Plictran® was applied for control. Although a few *A. fallacis* were in the tree when the spray was applied, they were unable to control the pest and another application of Plictran® was necessary in September. Because suitable forbs and apple suckers were not present in September, ground cover numbers were not determined after the first week.

Dowd Orchard, located five miles south of Hartford, Michigan, contained 25 foot red delicious and ten foot Jonathan apple trees. This block was surrounded by fallow fields except for the north border, where a block of Northern Spy apples was located. There was grass between the trees, but under the canopy, broad-leaf herbs and apple sucker growth dominated. The most abundant herbs included daisy fleabane, *Erigeron annuus* (31.2), dandelion, *T. officinal* (27.7), broad dock, *R. obtusifolius*, wild

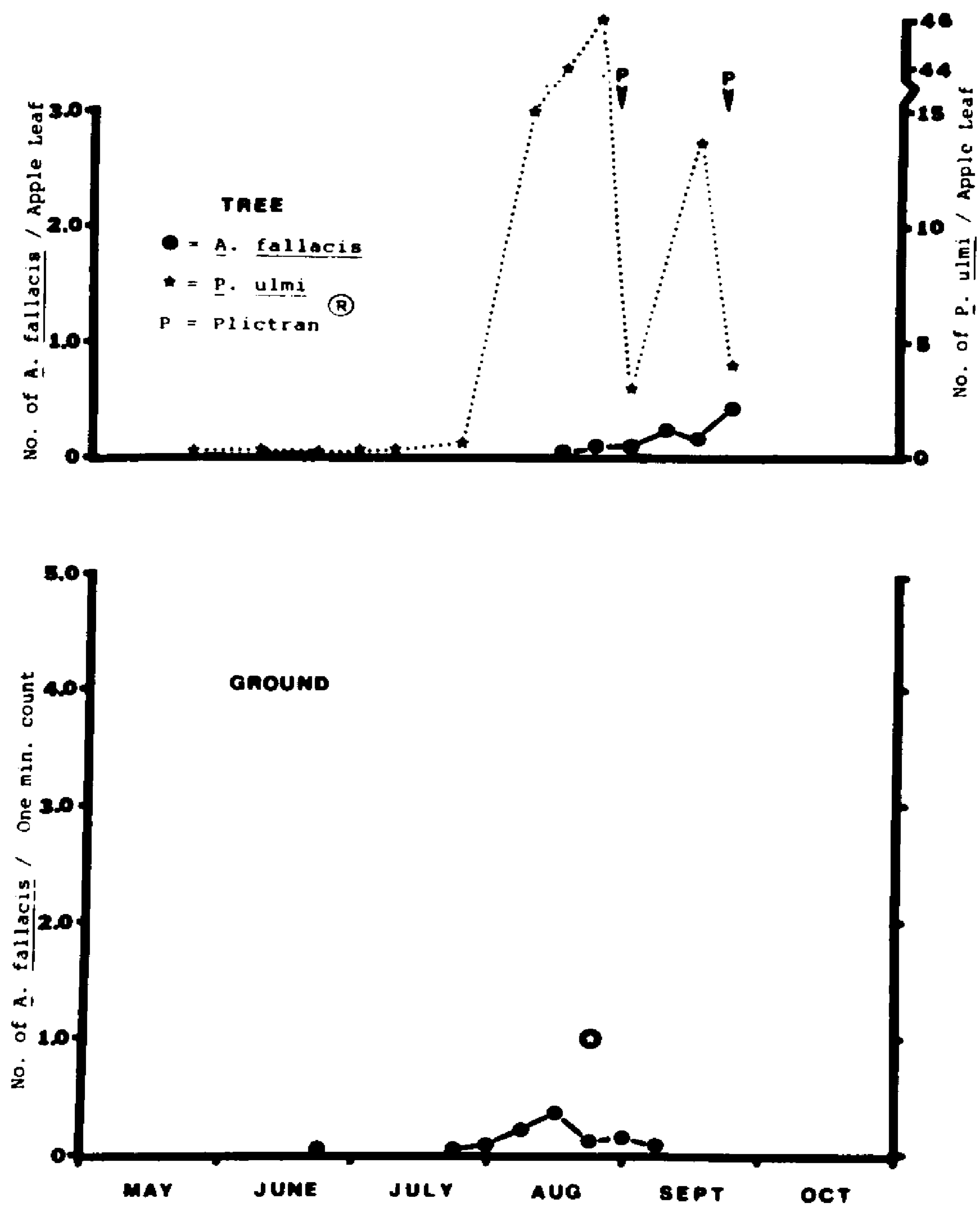

Figure 31.--Population dynamics of A. fallacis in Babcock Orchard, 1974.

lettace, L. canadensis (5.8), milkweed, A. syriaca (3.3), and goldenrod, Solidago sp. (3.2). Under the herbs was a thick layer of litter.

Figure 32 shows the population dynamics of A. fallacis in Dowd Orchard, 1972. In the ground cover, predators were observed in June associated with two-spotted spider mites. A. fallacis increased in number during July and some moved into the tree where they eventually controlled the European red mite. After the density of European red mites decreased during September, A. fallacis began leaving the tree as indicated by the increase in the ground population. Through the fall, the number of A. fallacis in the ground fluctuated as some entered diapause and others left the tree.

Figure 33 shows the population dynamcis of A. fallacis in Dowd Orchard, 1973. In May, only a few predators were observed. Amblyseius fallacis, associated with two-spotted spider mites, increased in number and moved into the trees during July. Once again, the European red mite was regulated by A. fallacis, and as the prey decreased in the tree, A. fallacis dispersed to the ground.

Figure 34 shows the population dynamics of A. fallacis in Dowd Orchard, 1974. Only a few predators were present in early season and they were located only under a few trees. They remained in a fairly restricted

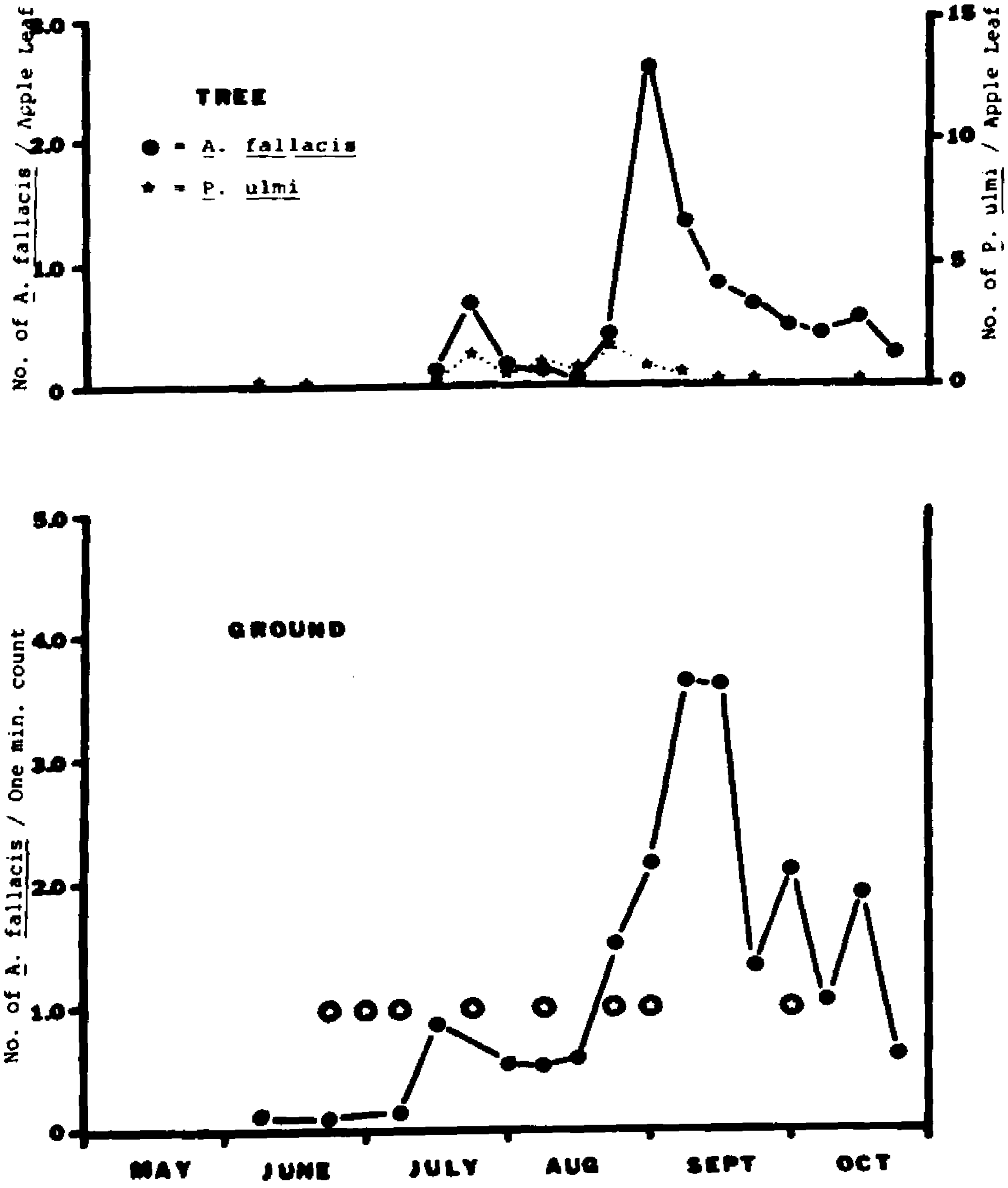

Figure 32.--Population dynamics of A. fallacis in Dowd Orchard, 1972.

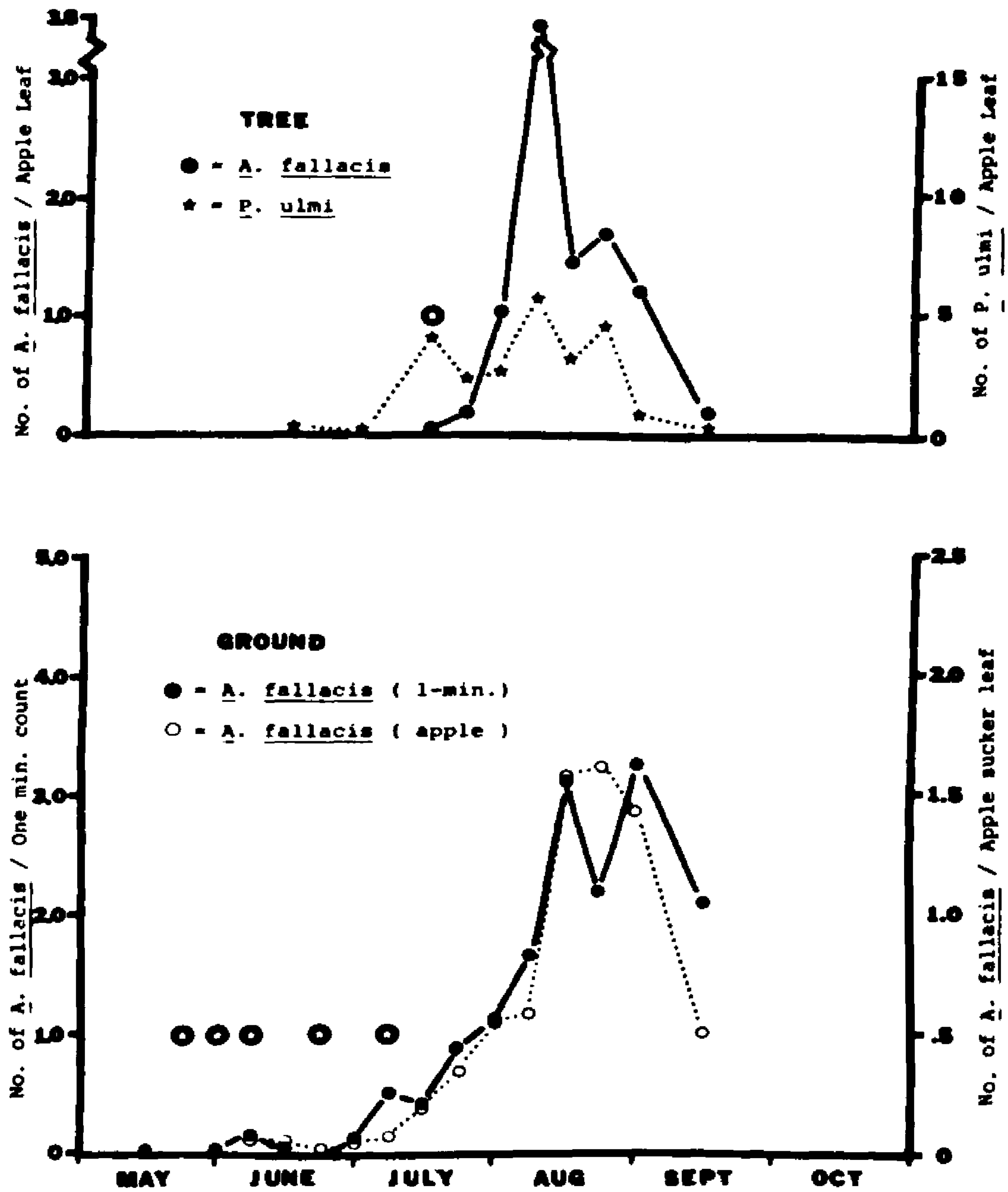

Figure 33.--Population dynamics of A. fallacis in Dowd Orchard, 1973.

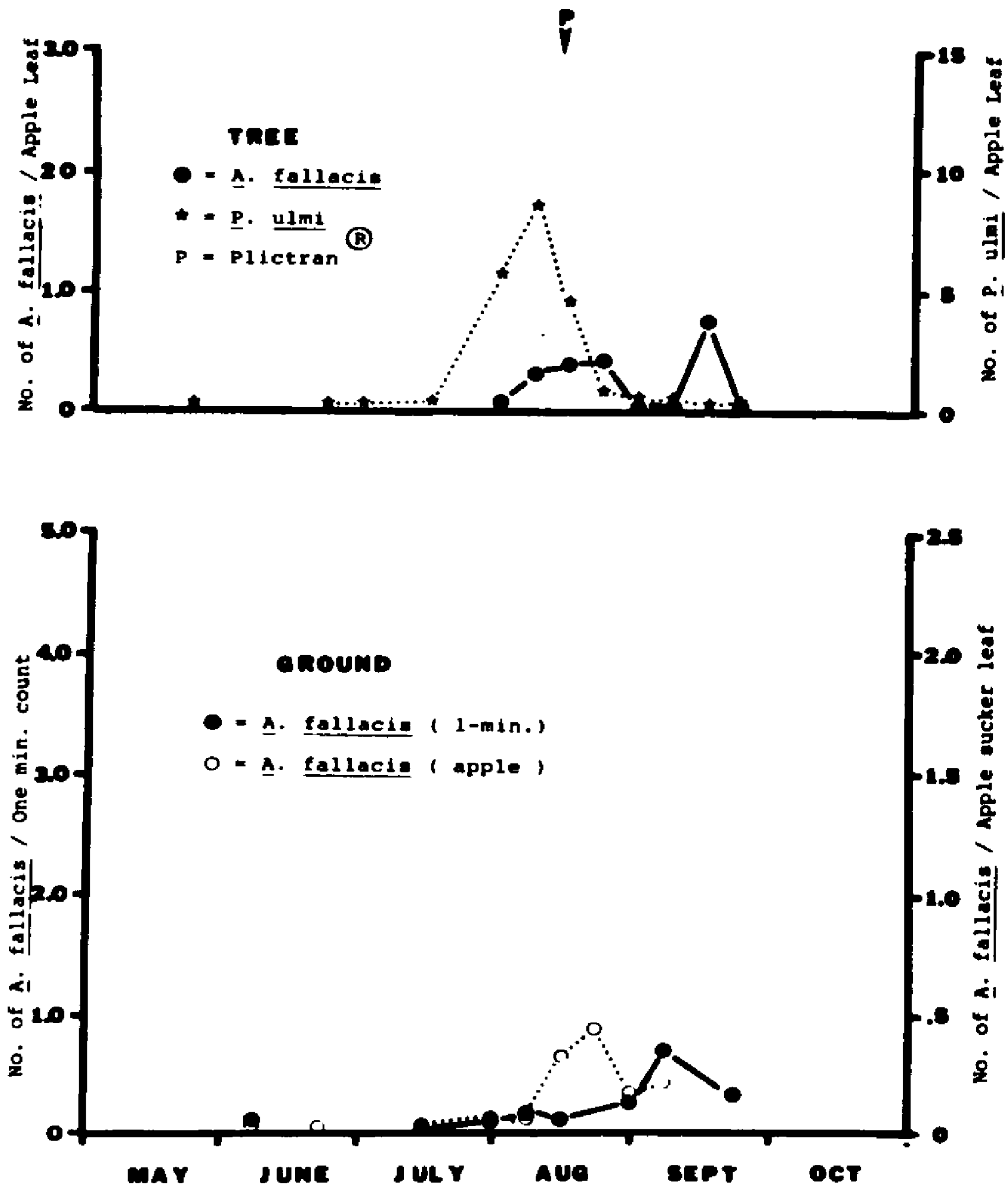

Figure 34.--Population dynamics of A. fallacis in Dowd Orchard, 1974.

area through most of the summer. In August, a few were found in the tree, but they were not abundant enough to control the European red mite, which was controlled with Plictran®. After the chemical was applied, the European red mite was regulated by A. fallacis until the end of the season.

Peachy I Orchard, located on the southeast edge of Eau Claire, Michigan, contained a number of apple varieties including Red Delicious, Rome Beauty, Jonathan, and Northern Spy. This block was adjacent to a field of currents on the west, a fallow field on the south, a tomato field on the east, and a residential area on the north. Ground cover was predominantly broad-leaf herbs with a few scattered grass plants, because the area was mulched at least twice a season. Principle herbs included dandelion, T. officinale (21.7), broad dock, R. obtusifolius (14.6), daisy fleabane, E. annuus (13.9), smartweed, Polygonium sp. (7.1), and wild lettace, L. canadensis (6.9).

Figure 35 shows the population dynamics of A. fallacis in Peachy I Orchard, 1972. In June, A. fallacis was observed associated with two-spotted spider mites in the ground cover. A few were also collected in the tree, but there were not enough to prevent the European red mite from reaching economic levels. After Plictran® was applied, many predators left the tree as indicated by the

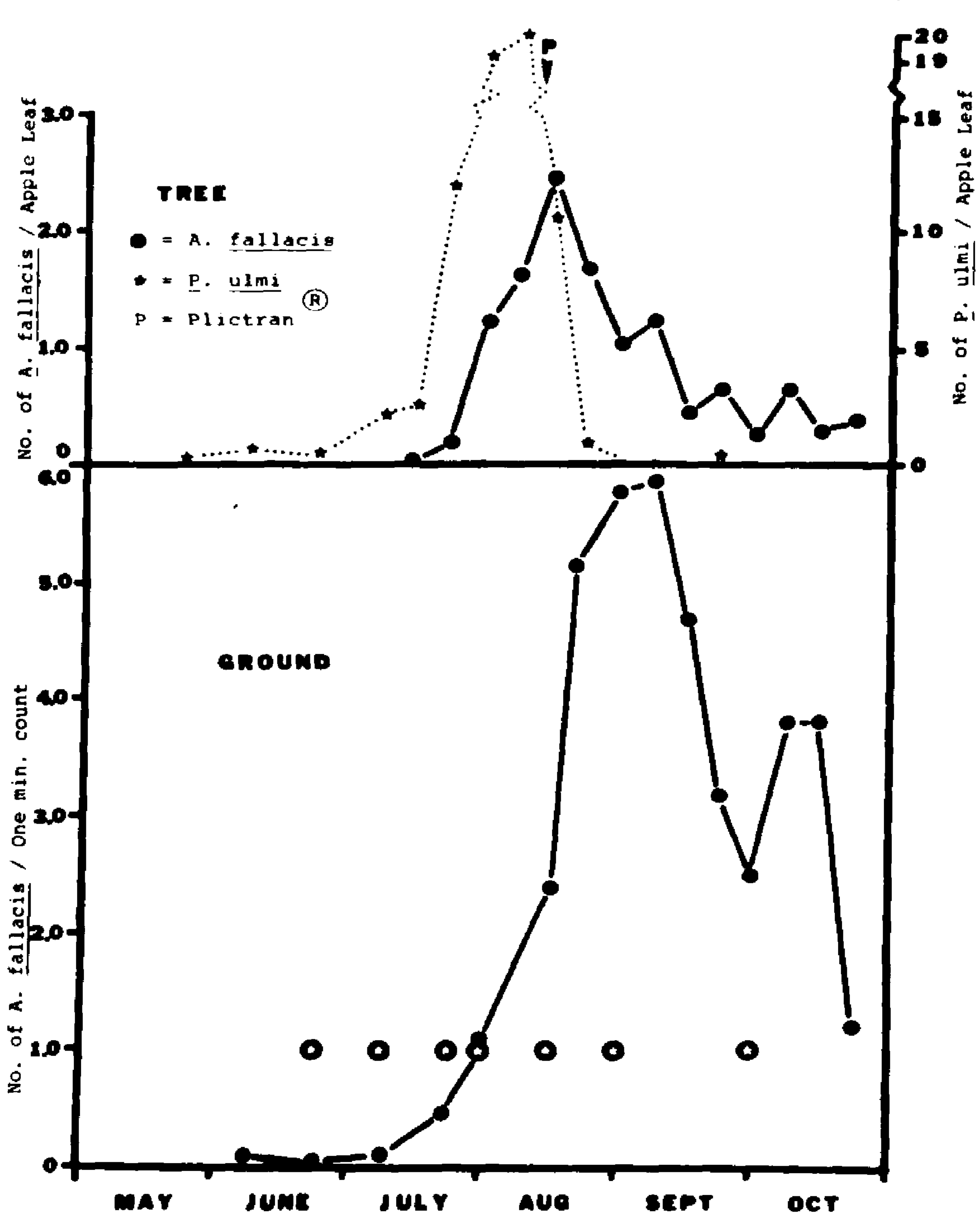

Figure 35.--Population dynamics of A. fallacis in Peachy I Orchard, 1972.

increase in number on the ground. The extremely high numbers found in the ground samples were probably caused by a bias in sampling caused by A. fallacis aggregating on the herbs, whereas in other orchards, a large proportion of the population was usually found on grass.

Figure 36 shows the population dynamics of A. fallacis in Peachy I Orchard, 1973. A few predators were observed in May, but the number did not increase until mid-June when the population began a steady increase. They moved into the tree in mid-July and increased in number while feeding on rust mites. Later, large numbers were found in the ground as they left the tree after reducing the pest mites.

Figure 37 shows the population dynamics of A. fallacis in Peachy I Orchard, 1974. In the ground cover, only a few predators were found in early season, and their number did not increase through July. In the tree, A. fallacis was first collected in August, but by then the European red mite population had already been controlled with Plictran®. In September, a few predators were found in the ground cover as they sought over-wintering sites. However, they were not nearly as abundant as in the previous years.

Peachy II Orchard, located east of Peachy I, contained Red Delicious, Jonathan, and Northern Spy apple trees. This block was also periodically mulched, but

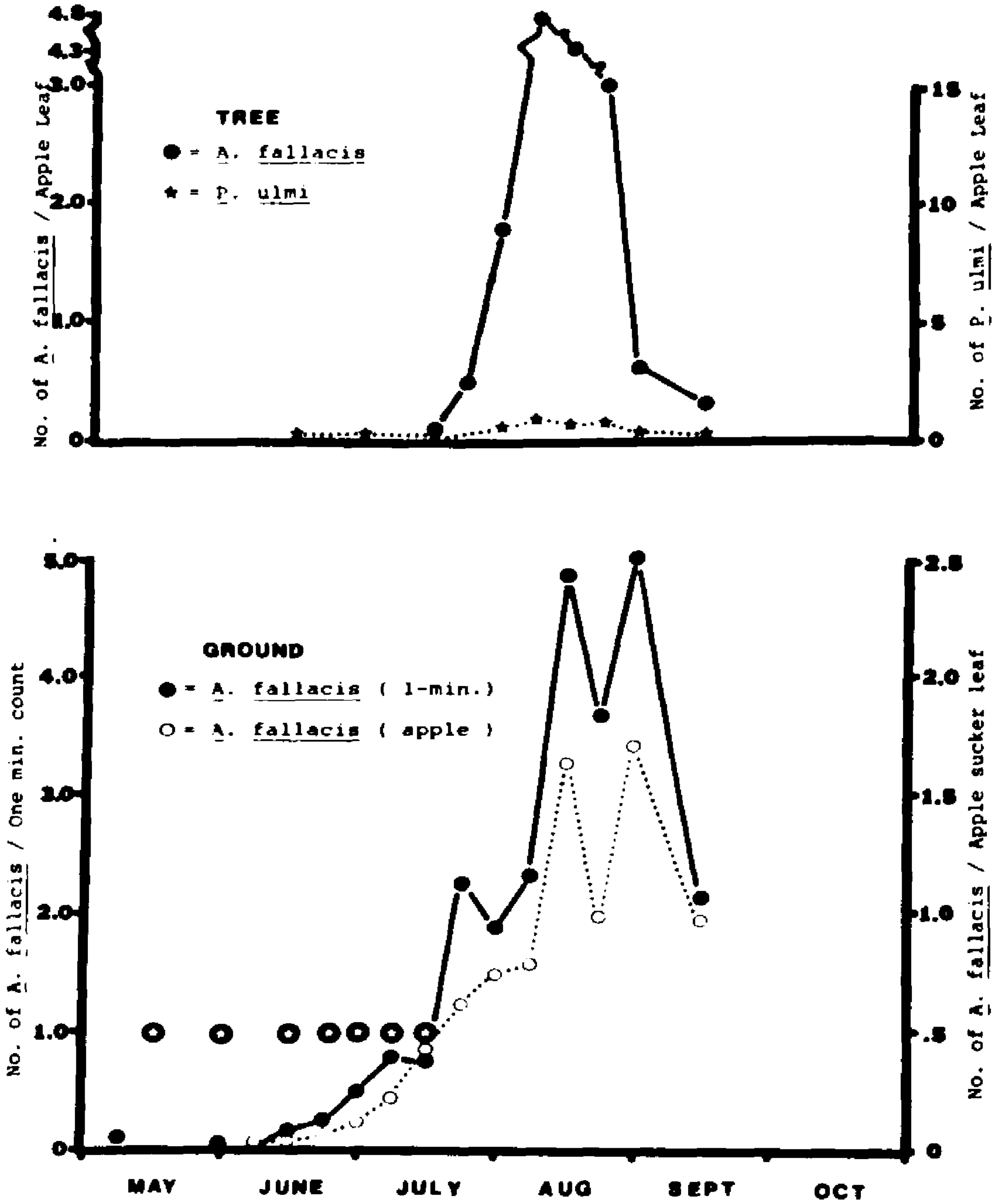

Figure 36.--Population dynamics of A. fallacis in Peachy I Orchard, 1973.

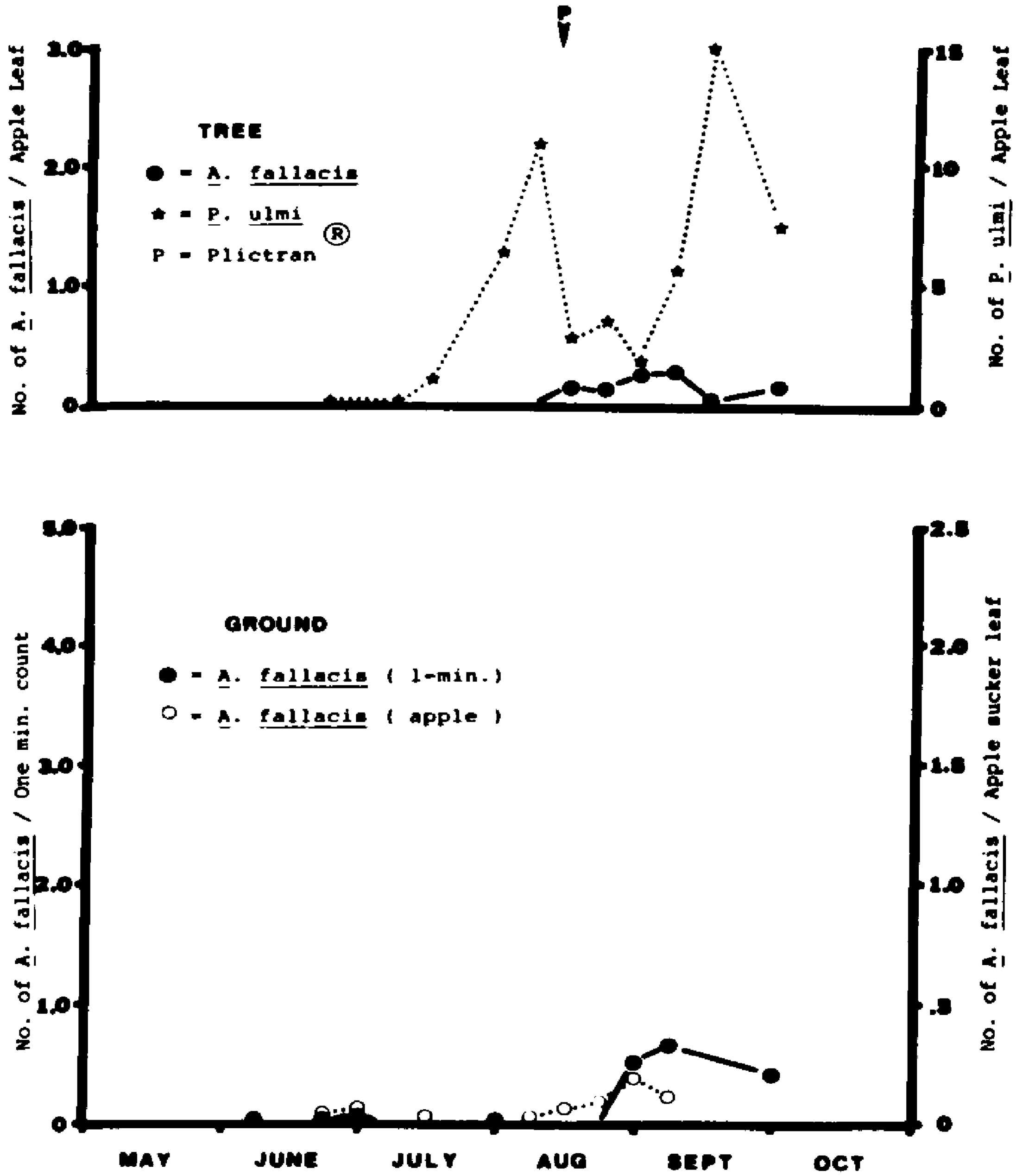

Figure 37.--Population dynamics of A. fallacis in Peachy I Orchard, 1974.

grass was present between the trees. Principle ground cover plants included broad dock, R. obtusifolius (23.5), dandelion, T. officinale (12.7), wild lettace, L. canadensis, (10.6), daisy fleabane, E. annuus (11.8), and goldenrod, Solidago sp. (10.0).

Figure 38 shows the population dynamics of A. fallacis in Peachy II Orchard, 1972. In late June, A. fallacis was found both in the tree and ground cover. In the tree, A. fallacis increased and controlled the European red mite during July. In the ground cover, a few A. fallacis were found associated with two-spotted spider mites during July, and in August, the density increased as some dispersed from the tree.

Figure 39 shows the population dynamics of A. fallacis in Peachy II Orchard, 1973. Only a few A. fallacis were observed in early season, indicating that winter mortality was high. A few were observed in June, and some moved into the trees during July. In the tree, A. fallacis increased while feeding on rust mites and European red mites and regulated both pest populations. In August, A. fallacis left the tree and was found in increasing numbers in the ground cover.

Figure 40 shows the population dynamics of A. fallacis in Peachy II Orchard, 1974. Amblyseius fallacis was observed in June, but it did not increase until July. The apparent increase was caused by the predator

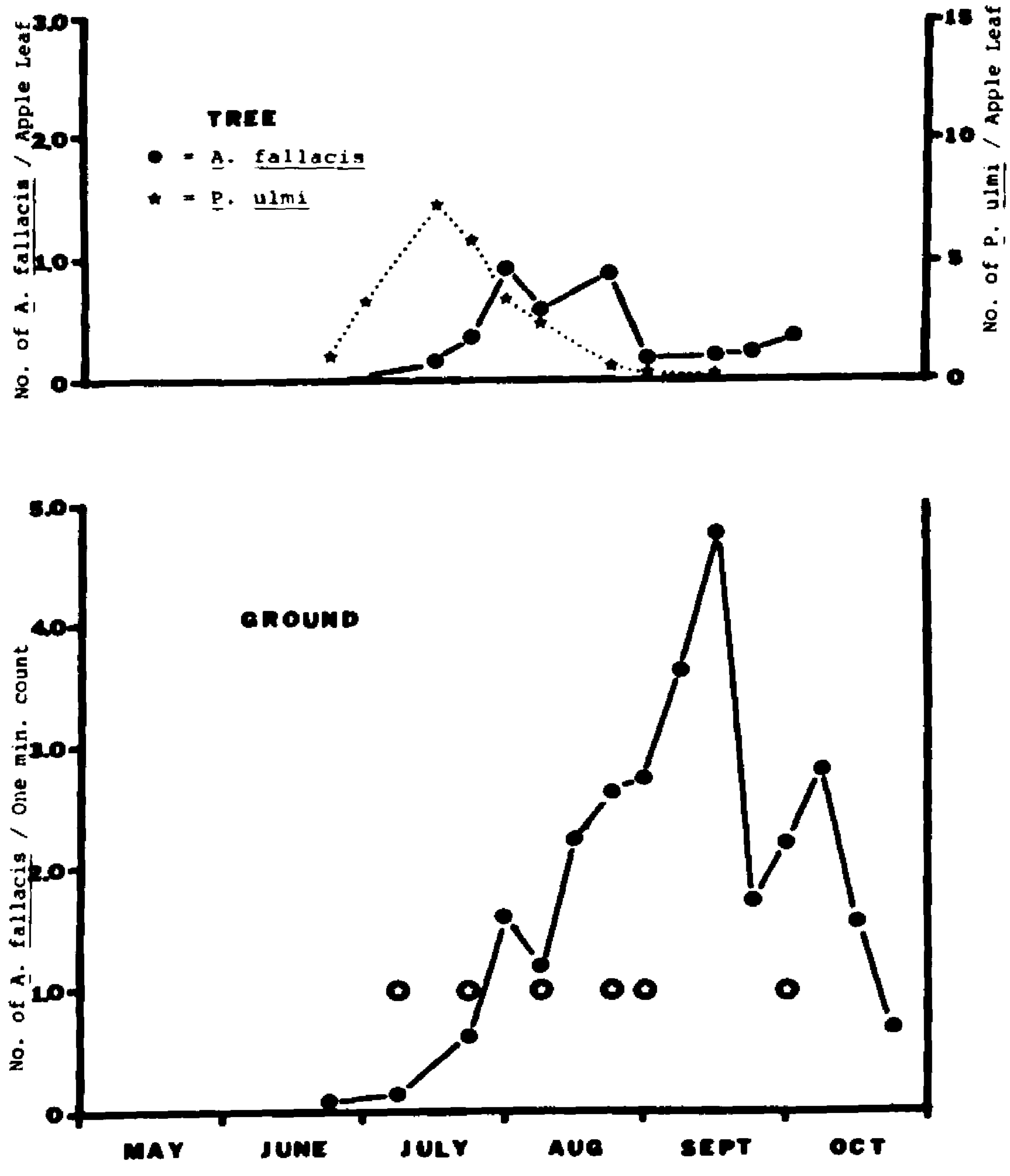

Figure 38.--Population dynamics of A. fallacis in Peachy II Orchard, 1972.

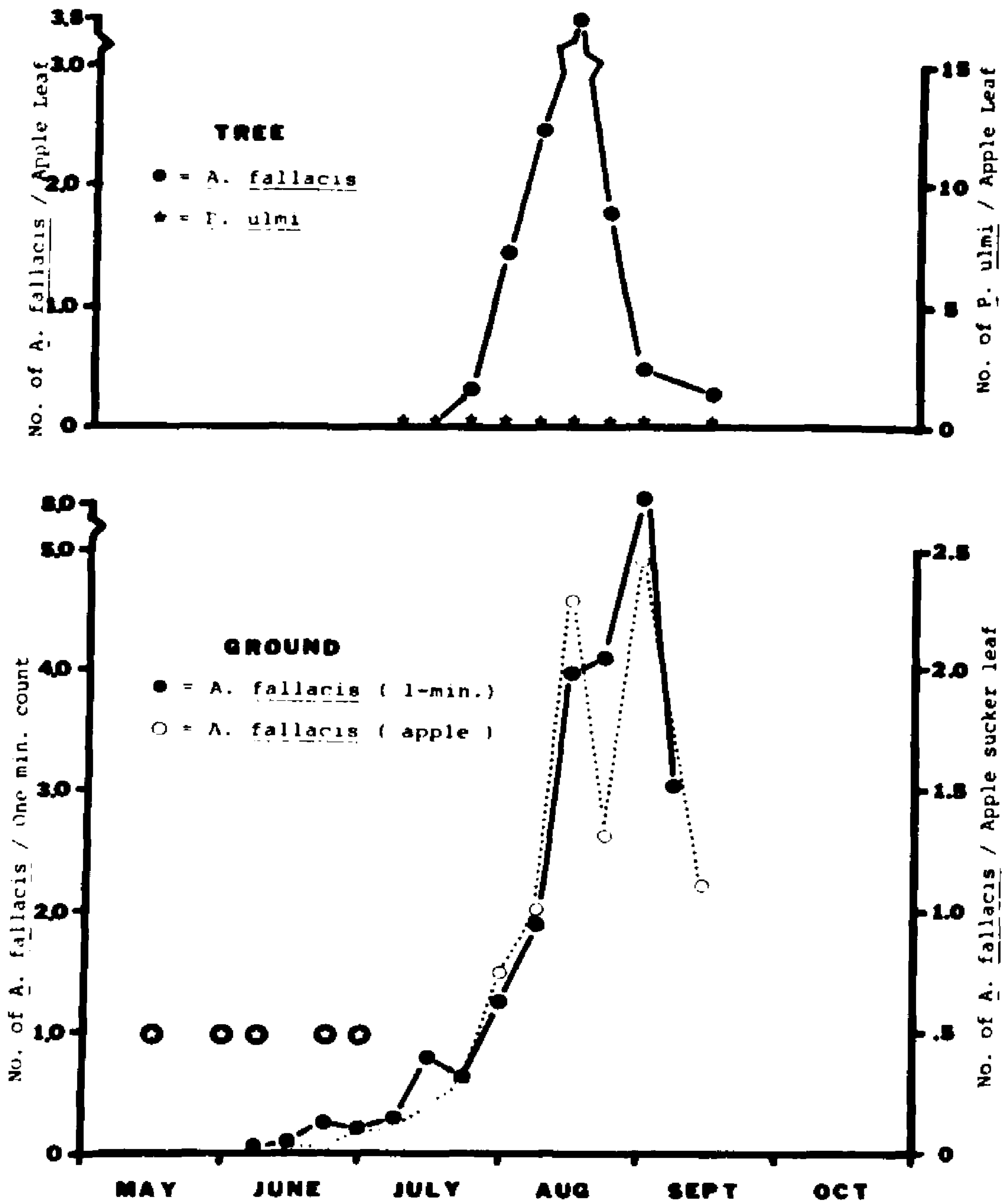

Figure 39.--Population dynamics of A. fallacis in Peachy II Orchard, 1973.

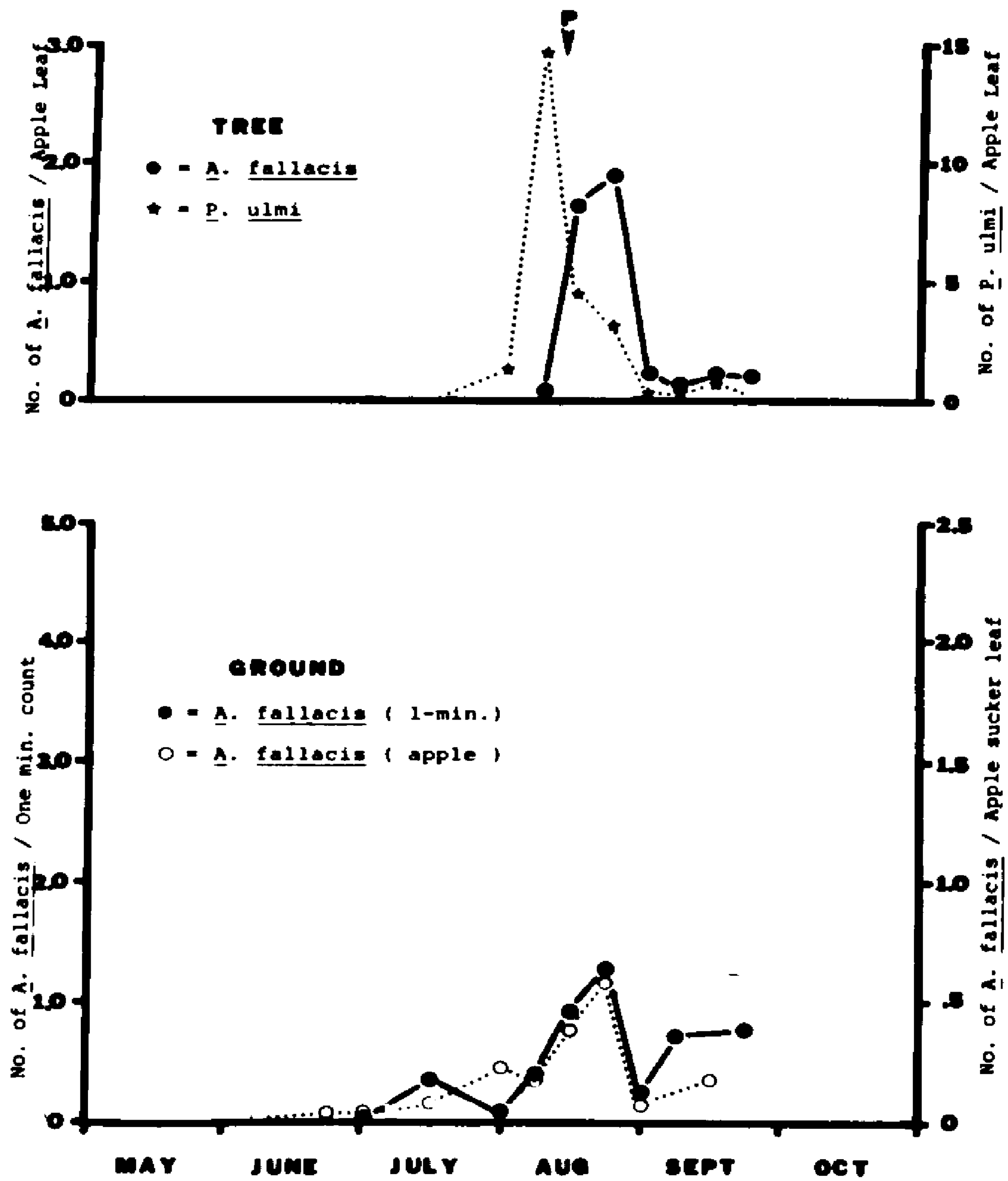

Figure 40.--Population dynamics of A. fallacis in Peachy II Orchard, 1974.

aggregating and increasing in number under a few trees where the European red mite was abundant. Following an application of Plictran®, the predator moved into the trees and reduced the remaining European red mites to an economically insignificant number.

Summary of the Dynamics of Tree and Ground Cover Populations of *A. fallacis* and Plant-Feeding Mites

By sampling individual orchards through the growing seasons, the density of *A. fallacis* was observed to change under the influence of a number of different factors. In most years, only a few predators were found during the early part of the season. By the end of June, the density of *A. fallacis* in the ground cover usually increased. The density was primarily determined by the presence or absence of a food source when the overwintering females left diapause. In certain orchards, i.e. Klackle, 1973 and 1974; Rasch, 1973 and 1974, large numbers of two-spotted spider mites were found associated with *A. fallacis* early in the season. In this situation, *A. fallacis* increased in number during June and unless influenced by other factors, they moved into the tree after eliminating the food source on the ground. The importance of the two-spotted spider mite as an early season food source was observed, but other foods such as pollen, honey dew, and other mite species are probably important and may be more readily available at certain times during the season.

Since most of the growers involved in this study followed the integrated mite control program (Croft, 1975), only chemicals found non-toxic to the predator were usually used. However, at times, the number of A. fallacis was observed to decrease following the use of an insecticide not recommended in the mite control program. In orchards, i.e. Rasch, 1973 and 1974; Carpenter, 1972, chemicals toxic to A. fallacis prevented an increase in their density and destroyed any chance for biological control of the European red mite in the apple tree.

During the study, biological control of the European red mite was observed a number of times and in each case, a prior increase of A. fallacis was observed in the ground cover. In some orchards, i.e. Klackle, 1973 and 1974; Dowd, 1972 and 1973, an early density increase of A. fallacis in the ground cover was followed by a slight decrease which, although not statistically significant, was found to correlate with an increase in the number of predators in the tree. This decrease in the ground cover density was probably due to the dispersal of females into the tree where prey was available. It was observed that the timing of the movement of predators into the tree determined whether or not the European red mite could be biologically controlled. If the predator moved into the tree before sufficient numbers of spider mites were available or before undetermined environmental conditions were favorable, *A. fallacis* did not persist. If they left the ground after the European red mite increased to sizable numbers, i.e. Kraft, 1972; Dowd, 1974, chemicals were needed to decrease the pest numbers. However, in this situation, if sufficient numbers of *A. fallacis* were present in the tree and ground cover when the chemicals were used subsequent sprays were not necessary because the predator regulated the pest density until the end of the season. If predators were not present in the ground cover, i.e. Kraft, 1974; Carpenter, 1973; Babcock, 1974, repeated sprays were necessary because, in the absence of *A. fallacis*, the European red mite had the biotic potential to increase to very large numbers in a very short time.

In 1974, predators in most orchards were not able to control the pest mites, probably because of unusual weather in early spring. Weather data showed that temperatures were above normal in the orchards from April 27 to May 2. These temperatures and the prevailing photoperiod were sufficient to bring *A. fallacis* out of diapause (Rock, et al., 1971). A low pressure center then brought falling temperatures and rain through the 7th of May, when a frost occurred. It was suspected that this situation, especially the freezing temperatures, destroyed most of the over-wintering predators and the result was a low level of natural control in orchards throughout the state.

A suitable over-wintering habitat in an orchard seemed to be very important to A. fallacis. In Gavin Orchard, predators were still active in the ground cover in late October, almost a month after they had ceased activity in other orchards. This was perhaps due to the lack of over-wintering habitat in this orchard. In this orchard, ground cover was sparse and over-layed a bare clay soil completely lacking a humus layer. Observations indicated that A. fallacis needed the protection of a humus layer. In orchards with the greatest survivial of A. fallacis, most of the mites were found in the vicinity of the tree trunk where a thick layer of humus was found. The density of A. fallacis in Gavin Orchard was always very low in early summer although high numbers had been present the preceding fall. This reduction was probably due to a high winter mortality in the inadequate ground cover habitat. In other orchards, i.e. Rasch and Klackle, winter mortality was less severe, perhaps because a thick layer of humus existed under the ground cover. This suggests that the presence of a humus layer was important in the survival of orchard mites.

APPENDIX

Table 7.--Extraction density measurements of A. fallacis from six-inch diameter sod samples collected in six Michigan apple orchards, November 1972.

Sample	TREES 1	2	3	4	5
Kraft Orchard, Nov. 21, 1972					
1	1	1	1	0	3
2	0	0	9	19	7
3	3	0	1	1	2
4	1	1	0	5	7
Total	5	2	11	25	19
Klackle Orchard, Nov. 21, 1972					
1	1	0	1	0	1
2	6	1	0	0	1
3	0	5	0	2	2
4	0	0	0	0	0
Total	7	6	1	2	4
Rasch Orchard, Nov. 21, 1972					
1	0	0	0	0	0
2	1	1	1	0	1
3	2	1	0	0	0
4	0	0	0	0	4
Total	3	2	1	0	5
Babcock Orchard, Nov. 22, 1972					
1	0	1	0	0	2
2	0	2	4	0	0
3	0	0	0	0	0
4	0	3	0	2	0
Total	0	6	4	2	2
Dowd Orchard, Nov. 22, 1972					
1	0	0	0	0	0
2	0	3	0	0	0
3	0	0	1	0	1
4	0	0	0	0	1
Total	0	3	1	0	2
Peachy II Orchard, Nov. 22, 1972					
1	0	0	2	0	0
2	0	2	0	10	3
3	0	0	0	1	1
4	0	1	0	1	1
Total	0	3	2	12	5

Table 8.--Extraction density measurements of *A. fallacis* in the ground cover of Rasch Orchard, June 15, 1972.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C = 0	Br - F = 3	Br - C = 2	Br = F = 0
	Lit.= 0	Lit.= 1	Lit.= 0	Lit.= 0
	Gr - C = 5	Gr - F = 0	Gr - C = 7	Gr - F = 1
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
South	Br - C = 4	Br - F = 0	Br - C = 0	Br - F = 0
	Lit.= 0	Lit.= 0	Lit.= 3	Lit.= 0
	Gr - C = 5	Gr - F = 1	Gr - C = 2	Gr - F = 2
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 1
East	Br - F = 6	Br - C = 2	Br - F = 1	Br - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 0	Gr - C = 1	Gr - F = 1	Gr - C = 2
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 1
West	Br - F = 2	Br - C = 6	Br - F = 4	Br = C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 0	Gr - C = 3	Gr - F = 0	Gr - C = 0
	Lit.= 1	Lit.= 4	Lit.= 0	Lit.= 0
Total	23	21	20	7

Br = Broad-Leaf Forb Sample
Gr = Grass Sample
C = Sample taken within ten feet of trunk
F = Sample taken further than ten feet of trunk
Lit = Litter from below vegetation sample

Table 9.--Extraction density measurement of <u>A. fallacis</u> in the ground cover of Klackle Orchard, June 22, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C = 3	Br - F = 2	Br - F = 0	Br - F = 1
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 1
	Gr - C = 2	Gr - F = 2	Gr - F = 0	Gr - F = 4
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
South	Br - C = 2	Br - F = 0	Br - F = 0	Br - F = 3
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 2	Gr - F = 4	Gr - F = 0	Gr - F = 5
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
East	Br - F = 0	Br - C = 7	Br - C = 1	Br - C = 1
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 0	Gr - C = 1	Gr - C = 5	Gr - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
West	Br - F = 3	Br - C = 0	Br - C = 1	Br - C = 3
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 0	Gr - C = 1	Gr - C = 9	Gr - C = 5
	Lit.= 0	Lit.= 0	Lit.= 1	Lit.= 1
Total	12	17	17	24

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample Taken within Ten Feet of Tree Trunk
F = Sample Taken further than Ten Feet of Tree Trunk
Lit = Litter Sample

Table 10.--Extraction density measurement of *A. fallacis* in the ground cover of Kraft Orchard, July 2, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C = 0	Br - F = 0	Br - C = 2	Br - F = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 0	Gr - F = 1	Gr - C = 0	Gr - F = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
South	Br - C = 0	Br - F = 3	Br - C = 1	Br - F - 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 0	Gr - F = 0	Gr - C = 2	Gr - F = 1
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 1
East	Br - F = 0	Br - C = 1	Br - F = 0	Br - C = 3
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 0	Gr - C = 0	Gr - F = 2	Gr - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
West	Br - F = 0	Br - C = 0	Br - F = 1	Br - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 1
	Gr - F = 5	Gr - C = 0	Gr - F = 0	Gr - C = 3
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
Total	5	5	8	9

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample taken within ten feet of tree trunk
F = Sample taken further than ten feet of tree trunk
Lit = Litter sample

Table 11.--Extraction density measurement of *A. fallacis* in the ground cover of Dowd Orchard, July 10, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C = 1	Br - F = 3	Br - C = 2	Br - F = 6
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C =13	Gr - F =12	Gr - c = 5	Gr - F = 2
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
South	Br - C = 2	Br - F = 7	Br - C = 0	Br - F = 1
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 6	Gr - F = 4	Gr - C = 1	Gr - F = 3
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
East	Br - F = 3	Br - C = 3	Br - F = 0	Br - C = 5
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 1
	Gr - F = 0	Gr - C = 3	Gr - F = 3	Gr - C =12
	Lit.= 0	Lit.= 1	Lit.= 0	Lit.= 0
West	Br - F = 2	Br - C = 0	Br - F = 1	Br - C = 2
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 0	Gr - C = 5	Gr - F = 4	Gr - C = 4
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
Total	27	38	16	36

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample taken within ten feet of tree trunk
F = Sample taken further than ten feet of tree trunk
Lit = Litter sample

Table 12.--Extraction density measurement of *A. fallacis* in the ground cover of Peachy I Orchard, July 17, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C = 0	Br - F = 0	Br - C = 6	Br - F = 2
	Lit.= 0	Lit.= 1	Lit.= 0	Lit.= 0
	Gr - C = 5	Gr - F = 2	Gr - C = 4	Gr - F = 1
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
South	Br - C = 3	Br - F = 0	Br - C = 0	Br - F = 1
	Lit.= 1	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 2	Gr - F = 0	Gr - C = 0	Gr - F = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 1
East	Br - F = 0	Br - C = 2	Br - F = 3	Br - C = 2
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 0	Gr - C = 5	Gr - F = 0	Gr - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
West	Br - F = 3	Br - C = 1	Br - F = 1	Br - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 1
	Gr - F = 2	Gr - C = 2	Gr - F = 1	Gr - C = 0
	Lit.= 1	Lit.= 0	Lit.= 0	Lit.= 0
Total	17	12	15	8

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample taken within ten feet of tree trunk
F = Sample taken further than ten feet of tree trunk
Lit = Litter sample

Table 13.--Extraction density measurement of *A. fallacis* in the ground cover of Babcock Orchard, July 17, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C = 0	Br - F = 1	Br - C = 0	Br - F = 0
	Lit.= 1	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 0	Gr - F = 0	Gr - C = 0	Gr - F = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
South	Br - C = 1	Br - F = 0	Br - C = 1	Br - F = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - 2 = 2	Gr - F = 0	Gr - C = 0	Gr - F = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
East	Br - F = 0	Br - C = 0	Br - F = 0	Br - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 0	Gr - C = 0	Gr - F = 0	Gr - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
West	Br - F = 0	Br - C = 0	Br - F = 0	Br - C = 0
	Lit.= 0	Lit.= 1	Lit.= 2	Lit.= 0
	Gr - F = 0	Gr - C = 0	Gr - F = 0	Gr - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
Total	4	2	3	0

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample taken within ten feet of tree trunk
F = Sample taken further than ten feet of tree trunk
Lit = Litter sample

Table 14.--Extraction density measurement of _A. fallacis_ in the ground cover of Dowd Orchard, July 25, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C = 9	Br - F = 4	Br - C = 0	Br - F = 1
	Lit.= 1	Lit.= 1	Lit.= 1	Lit.= 0
	Gr - C = 1	Gr - F = 2	Gr - C = 9	Gr - F = 9
	Lit.= 0	Lit.= 0	Lit.= 2	Lit.= 0
South	Br - C = 1	Br - F = 0	Br - C = 0	Br - F = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 1	Gr - F = 2	Gr - C = 2	Gr - F = 2
	Lit.= 1	Lit.= 0	Lit.= 1	Lit.= 0
East	Br - F = 3	Br - C = 1	Br - F = 8	Br - C = 0
	Lit.= 0	Lit.= 0	Lit.= 1	Lit.= 0
	Gr - F = 1	Gr - C = 1	Gr - F = 0	Gr - C = 2
	Lit.= 0	Lit.= 0	Lit.=10	Lit.= 0
West	Br - F = 0	Br - C = 0	Br - F = 2	Br - C = 0
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 6	Gr - C = 2	Gr - F = 9	Gr - C = 8
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
Total	24	13	45	22

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample taken within ten feet of tree trunk
F = Sample taken further than ten feet of tree trunk
Lit = Litter sample

Table 15.--Extraction density measurement of _A. fallacis_ in the ground cover of Klackle Orchard, July 27, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - F =12	Br - F = 3	Br - F = 4	Br - F =23
	Lit.= 1	Lit.= 0	Lit.= 0	Lit.= 2
	Gr - F = 5	Gr - F = 4	Gr - F = 4	Gr - F =22
	Lit.= 1	Lit.= 0	Lit.= 0	Lit.= 0
South	Br - F = 7	Br - F = 2	Br - F = 1	Br - F = 5
	Lit.= 0	Lit.= 2	Lit.= 0	Lit.= 0
	Gr - F = 5	Gr - F = 2	Gr - F =10	Gr - F = 2
	Lit.= 0	Lit.= 0	Lit.= 1	Lit.= 3
East	Br - C = 3	Br - C = 1	Br - C = 2	Br - C = 4
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 3	Gr - C = 3	Gr - C = 8	Gr - C =13
	Lit.= 0	Lit.= 0	Lit.= 2	Lit.= 0
West	Br - C = 2	Br - C = 4	Br - C = 1	Br - C = 6
	Lit.= 1	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 6	Gr - C =10	Gr - C = 3	Gr - C = 9
	Lit.= 0	Lit.= 0	Lit.= 2	Lit.= 2
Total	46	31	38	89

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample taken within ten feet of tree trunk
F = Sample taken further than ten feet of tree trunk
Lit = Litter sample

Table 16.--Extraction density measurement of _A. fallacis_ in the ground cover of Peachy I Orchard, August 14, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C =15	Br - F =20	Br - C = 8	Br - F = 0
	Lit.= 0	Lit.= 0	Lit.= 2	Lit.= 0
	Gr - C = 6	Gr - F = 8	Gr - C = 5	Gr - F = 4
	Lit.= 0	Lit.= 6	Lit.= 2	Lit.= 0
South	Br - C =14	Br - F = 1	Br - C = 8	Br - F = 3
	Lit.= 0	Lit.= 3	Lit.= 0	Lit.= 2
	Gr - C = 8	Gr - F = 3	Gr - C = 4	Gr - F = 0
	Lit.= 4	Lit.= 3	Lit.= 1	Lit.= 4
East	Br - F =13	Br - C = 3	Br - F = 3	Br - C = 2
	Lit.= 1	Lit.= 1	Lit.= 4	Lit.= 2
	Gr - F = 6	Gr - C =13	Gr - F =21	Gr - C = 1
	Lit.= 1	Lit.= 7	Lit.= 1	Lit.= 3
West	Br - F =20	Br - C = 7	Br - F = 1	Br - C =22
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F =28	Gr - C =16	Gr - F = 3	Gr - C = 5
	Lit.= 1	Lit.= 3	Lit.= 0	Lit.= 1
Total	117	94	63	49

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample taken within ten feet of tree trunk
F = Sample taken further than ten feet of tree trunk
Lit = Litter Sample

Table 17.--Extraction density measurement of <u>A</u>. <u>fallacis</u> in the ground cover of Rasch Orchard, August 24, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C = 6	Br - F =10	Br - C = 1	Br - F =15
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 3
	Gr - C = 0	Gr - F =26	Gr - C = 0	Gr - F = 4
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
South	Br - C = 3	Br - F = 3	Br - C = 1	Br - F = 5
	Lit.= 2	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 5	Gr - F = 2	Gr - C = 2	Gr - F =21
	Lit.= 2	Lit.= 1	Lit.= 1	Lit.= 1
East	Br - F =27	Br - C = 3	Br - F = 1	Br - C = 8
	Lit.= 0	Lit.= 0	Lit.= 1	Lit.= 1
	Gr - F = 2	Gr - C = 1	Gr - F = 8	Gr - C = 8
	Lit.= 0	Lit.= 1	Lit.= 0	Lit.= 0
West	Br - F =15	Br - C = 4	Br - F = 2	Br - C = 1
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F = 1	Gr - C = 8	Gr - F = 3	Gr - C = 9
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
Total	63	59	20	76

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample taken within ten feet of tree trunk
F = Sample taken further than ten feet of tree trunk
Lit = Litter Sample

Table 18.--Extraction density measurement of *A. fallacis* in the ground cover of Kraft Orchard, September 11, 1973.

Quadrant	Tree #1	Tree #2	Tree #3	Tree #4
North	Br - C = 6	Br - F = 8	Br - C = 5	Br - F = 1
	Lit.= 0	Lit.= 1	Lit.= 0	Lit.= 0
	Gr - C =13	Gr - F =26	Gr - C = 1	Gr - F = 1
	Lit.= 1	Lit.= 1	Lit.= 0	Lit.= 0
South	Br - C = 6	Br - F =16	Br - C = 7	Br - F =17
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - C = 1	Gr - F =11	Gr - C = 1	Gr - F = 6
	Lit.= 0	Lit.= 0	Lit.= 0	Lit.= 0
East	Br - F =11	Br - C = 1	Br - F = 6	Br - C = 5
	Lit.= 0	Lit.= 3	Lit.= 1	Lit.= 2
	Gr - F = 2	Gr - C = 4	Gr - F = 3	Gr - C = 5
	Lit.= 2	Lit.= 1	Lit.= 2	Lit.= 0
West	Br - F = 0	Br - C =10	Br - F =13	Br - C = 3
	Lit.= 1	Lit.= 0	Lit.= 0	Lit.= 0
	Gr - F =14	Gr - C = 6	Gr - F = 2	Gr - C = 6
	Lit.= 0	Lit.= 2	Lit.= 0	Lit.= 0
Total	57	90	41	46

Br = Broad-Leaf Sample
Gr = Grass Sample
C = Sample taken within ten feet of tree trunk
F = Sample taken further than ten feet of tree trunk
Lit = Litter sample

Table 19.--One-minute counts of *Amblyseius fallacis* in the ground cover of nine commercial apple orchards in Michigan, 1972.

Sample	Tree 1	2	3	4	5	6	7	8	9	10
Klackle Orchard, Oct. 3, 1972										
1	1	0	1	1	0	0	1	2	0	0
2	1	0	2	0	0	1	2	2	2	1
3	0	2	0	0	1	1	0	1	0	1
Total	2	2	3	1	1	2	3	5	2	2
Rasch Orchard, Oct. 3, 1972										
1	4	1	0	1	3	3	0	0	3	1
2	0	3	3	7	1	0	0	0	2	8
3	0	1	0	0	1	4	0	0	3	3
Total	4	5	3	8	5	7	0	0	8	12
Kraft Orchard, Sept. 9, 1972										
1	0	2	4	3	9	2	5	0	2	6
2	0	0	4	1	3	0	0	2	2	3
3	0	0	2	0	4	1	2	0	0	2
Total	0	2	10	4	16	3	7	2	4	11
Gavin Orchard, Sept. 21, 1972										
1	3	1	1	0	3	0	0	2	0	0
2	0	0	0	0	0	1	0	0	0	1
3	3	0	0	3	1	8	2	0	2	0
Total	6	1	1	3	4	9	2	2	2	1
Carpenter Orchard, Sept. 14, 1972										
1	0	2	0	0	1	4	0	1	0	1
2	0	0	1	0	0	0	0	2	1	0
3	0	0	0	0	0	0	0	0	0	0
Total	0	2	1	0	1	4	0	3	1	1
Babcock Orchard, Oct. 5., 1972										
1	0	0	1	1	0	5	0	11	0	2
2	0	0	0	0	3	0	0	1	0	3
3	0	4	1	1	10	2	10	0	0	3
Total	0	4	2	2	13	7	10	12	0	8

Table 19.--Continued.

Sample	Tree 1	2	3	4	5	6	7	8	9	10
1	2	3	0	3	2	5	1	3	1	3
2	2	0	1	1	0	3	0	1	0	0
3	0	0	0	1	0	0	5	0	1	2
Total	4	3	1	5	2	8	6	4	2	5
Peachy I Orchard, Sept. 28, 1972										
1	5	8	9	3	5	1	3	0	3	1
2	3	2	1	1	1	5	1	0	0	1
3	8	1	1	0	1	0	7	1	2	0
Total	16	11	11	4	7	6	11	1	5	2
Peachy II Orchard, Sept. 28, 1972										
1	4	1	6	1	0	3	4	3	4	7
2	1	0	0	1	6	1	5	1	3	4
3	0	0	0	0	0	0	0	1	5	3
Total	5	1	6	2	6	4	9	5	12	14

Table 20.--The average number[a] of *Amblyseius fallacis* found in one-minute counts at Klackle Orchard, 1972, 1973 and 1974.

1972 Samples		1973 Samples		1974 Samples	
Date	No. of *A. fallacis*	Date	No. of *A. fallacis*	Date	No. of *A. fallacis*
6/8	.07 ± .05	5/10	.03 ± .03	6/11	.33 ± .13
6/21	.10 ± .08	5/17	.03 ± .03	6/27	.67 ± .18
7/5	.07 ± .05	5/24	0	7/11	.27 ± .13
7/20	.13 ± .06	5/31	0	7/25	2.60 ± .54
8/1	.20 ± .07	6/7	.30 ± .08	8/6	2.60 ± .73
8/15	.10 ± .07	6/14	.13 ± .05	8/15	1.50 ± .26
8/22	.47 ± .22	6/20	.25 ± .06	8/22	4.73 ± .65
8/29	.53 ± .14	6/28	.50 ± .15	8/29	3.54 ± .52
9/5	.40 ± .16	7/5	.50 ± .15	9/5	2.59 ± .50
9/12	.47 ± .16	7/12	.70 ± .23	9/12	3.45 ± .52
9/21	.53 ± .23	7/19	1.00 ± .27	9/19	1.16 ± .32
9/26	.53 ± .13	7/26	1.70 ± .37		
10/3	.77 ± .14	7/31	1.73 ± .32		
10/10	.40 ± .18	8/9	3.47 ± .56		
10/17	.17 ± .08	8/16	2.57 ± .34		
10/24	.10 ± .05	8/23	2.27 ± .62		
		8/29	2.80 ± .71		
		9/7	.83 ± .22		
		9/19	.53 ± .17		

[a]= Mean ± Standard Error.

Table 21.--The average number[a] of *Amblyseius fallacis* found in one-minute counts at Rasch Orchard 1972, 1973, and 1974.

1972 Samples		1973 Samples		1974 Samples	
Date	No. of *A. fallacis*	Date	No. of *A. fallacis*	Date	No. of *A. fallacis*
6/8	.07 ± .05	5/10	.20 ± .06	6/11	.27 ± .10
6/21	.10 ± .06	5/17	.17 ± .07	6/27	.37 ± .14
7/5	.07 ± .05	5/24	.07 ± .05	7/11	.07 ± .05
7/20	.20 ± .09	5/31	0	7/25	.27 ± .13
8/1	.20 ± .09	6/7	.42 ± .12	8/6	.13 ± .08
8/15	.27 ± .13	6/14	.53 ± .11	8/15	.17 ± .08
8/22	.30 ± .12	6/20	.47 ± .10	8/22	.40 ± .15
8/29	.13 ± .06	6/28	1.13 ± .28	8/29	.70 ± .22
9/5	.40 ± .15	7/5	.08 ± .04	9/5	.67 ± .20
9/12	1.23 ± .31	7/12	.43 ± .16		
9/21	1.43 ± .33	7/19	.30 ± .11	9/19	.50 ± .14
9/26	1.67 ± .53	7/26	.67 ± .17		
10/3	1.70 ± .39	7/31	1.33 ± .38		
10/10	1.10 ± .28	8/9	4.13±1.05		
10/17	.60 ± .31	8/16	3.00 ± .65		
10/24	.43 ± .20	8/23	3.50 ± .54		
10/31	.60 ± .22	8/29	3.30 ± .50		
		9/27	2.87 ± .61		
		9/19	1.20 ± .26		

[a]= Mean ± Standard Error

Table 22.--The average number[a] of *Amblyseius fallacis* found in one-minute counts at Kraft Orchard, 1972, 1973 and 1974.

1972 Samples		1973 Samples		1974 Samples	
Date	No. of *A. fallacis*	Date	No. of *A. fallacis*	Date	No. of *A. fallacis*
6/8	0	5/3	.15 ± .04	6/11	.07 ± .05
6/21	.20 ± .10	5/10	.20 ± .07	6/27	0
7/5	.17 ± .08	5/17	.03 ± .02	7/11	.03 ± .03
7/20	.73 ± .18	5/24	.07 ± .03	7/25	.23 ± .10
8/1	1.07 ± .33	5/31	.07 ± .03	8/6	.17 ± .11
8/15	1.60 ± .52	6/7	.37 ± .11	8/15	.27 ± .13
8/22	1.73 ± .31	6/14	.14 ± .05	8/22	.43 ± .18
8/29	1.00 ± .32	6/20	.12 ± .05	9/5	.40 ± .46
9/5	1.30 ± .30	6/28	.12 ± .06	9/19	.40 ± .13
9/12	1.10 ± .34	7/5	.15 ± .05		
9/21	1.93 ± .40	7/12	.17 ± .06		
9/26	.77 ± .18	7/19	.28 ± .07		
10/3	.87 ± .28	7/26	.60 ± .03		
10/10	.43 ± .12	7/31	.37 ± .11		
10/17	.10 ± .06	8/9	.53 ± .18		
10/24	.53 ± .21	8/16	1.80 ± .92		
10/31	.20 ± .09	8/23	1.90 ± .45		
		8/29	2.43 ± .67		
		9/7	2.40 ± .80		
		9/19	.73 ± .29		

[a]= Mean ± Standard Error

Table 23.--The average number[a] of *Amblyseius fallacis* found in one-minute counts at Gavin Orchard, 1972, 1973, and 1974.

1972 Samples		1973 Samples		1974 Samples	
Date	No. of *A. fallacis*	Date	No. of *A. fallacis*	Date	No. of *A. fallacis*
6/8	0	5/3	.07 ± .05	6/11	0
6/21	0	5/10	.03 ± .02	6/27	0
7/5	0	5/17	0	7/11	0
7/20	0	5/24	0	7/25	0
8/1	.10 ± .06	5/31	0	8/6	0
8/15	1.27 ± .51	6/7	0	8/15	0
8/22	1.07 ± .50	6/14	0	8/22	0
8/29	.37 ± .12	6/20	0	8/29	0
9/5	.50 ± .22	6/28	0	9/5	.17 ± .14
9/12	1.37 ± .55	7/5	.03 ± .02	9/19	.10 ± .06
9/21	1.03 ± .31	7/12	0		
9/26	.80 ± .21	7/19	.03 ± .02		
10/3	.90 ± .20	7/31	.13 ± .42		
10/10	.93 ± .40	8/9	1.23 ± .35		
10/17	.27 ± .13	8/16	2.90 ± .61		
10/24	.53 ± .26	8/23	2.20 ± .38		
10/31	.43 ± .22	8/29	4.57 ± .71		
		9/7	1.97 ± .56		
		9/19	2.47 ± .63		

[a]= Mean ± Standard Error

Table 24.--The average number[a] of *Amblyseius fallacis* found in one-minute counts at Babcock Orchard, 1972, 1973, and 1974.

1972 Samples		1973 Samples		1974 Samples	
Date	No. of *A. fallacis*	Date	No. of *A. fallacis*	Date	No. of *A. fallacis*
6/7	0	5/8	0	6/20	0
6/22	.03 ± .03	5/15	0	7/2	0
7/6	0	5/22	0	7/16	0
7/19	.20 ± .11	5/29	.03 ± .03	7/30	.07 ± .05
8/2	.53 ± .26	6/5	0	8/8	.20 ± .07
8/9	.33 ± .12	6/12	.03 ± .02	8/13	.33 ± .11
8/16	1.50 ± .48	6/19	0	8/20	.10 ± .06
8/23	1.03 ± .27	6/26	.03 ± .02	8/27	.13 ± .10
8/30	.67 ± .19	7/3	.08 ± .05	9/4	.07 ± .05
9/6	1.07 ± .27	7/10	.17 ± .08		
9/14	1.20 ± .33	7/17	.15 ± .07		
9/20	1.03 ± .54	7/25	.37 ± .14		
9/28	1.73 ± .67	8/2	.63 ± .16		
10/5	1.93 ± .58	8/8	.23 ± .12		
10/12	1.73 ± .86	8/14	.73 ± .20		
10/19	.23 ± .15	8/21	1.10 ± .32		
10/26	.30 ± .24	8/28	1.70 ± .35		
11/2	.10 ± .06	9/13	3.10 ± .51		

[a]= Mean ± Standard Error

Table 25.--The average number[a] of *Amblyseius fallacis* found in one-minute counts at Carpenter Orchard, 1972, 1973, and 1974.

1972 Samples		1973 Samples		1974 Samples	
Date	No. of *A. fallacis*	Date	No. of *A. fallacis*	Date	No. of *A. fallacis*
6/7	0	5/8	0	6/20	.50 ± .13
6/22	0	5/15	0	7/2	.10 ± .06
7/6	0	5/22	.05 ± .03	7/16	.13 ± .08
7/19	.03 ± .03	5/29	0	7/30	.13 ± .06
8/2	.13 ± .06	6/5	.07 ± .02	8/8	.13 ± .06
8/16	.43 ± .22	6/12	.02 ± .02	8/13	.57 ± .18
8/23	.43 ± .22	6/19	.10 ± .04	8/27	1.07 ± .29
8/30	.20 ± .07	6/26	.15 ± .06	9/4	.37 ± .18
9/6	.20 ± .09	7/3	.47 ± .27	9/25	.27 ± .13
9/14	.43 ± .16	7/10	.43 ± .16		
9/20	.30 ± .15	7/17	.53 ± .16		
9/28	.23 ± .11	7/25	.17 ± .09		
10/5	.27 ± .11	8/2	.47 ± .19		
10/12	.60 ± .27	8/8	3.13 ± .62		
10/19	0	8/14	4.33 ± .76		
10/26	0	8/21	1.27 ± .30		
		8/28	2.90 ± .58		
		9/13	3.00 ± .58		

[a]= Mean ± Standard Error

Table 26.--The average number[a] of *Amblyseius fallacis* found in one-minute counts at Dowd Orchard, 1972, 1973, and 1974.

1972 Samples		1973 Samples		1974 Samples	
Date	No. of *A. fallacis*	Date	No. of *A. fallacis*	Date	No. of *A. fallacis*
6/7	.13 ± .06	5/15	.03 ± .03	6/6	.10 ± .07
6/22	.10 ± .06	5/22	0	6/20	0
7/6	.13 ± .06	5/29	.03 ± .03	7/2	0
7/19	.87 ± .20	6/5	.17 ± .08	7/16	.07 ± .05
8/2	.53 ± .18	6/12	.05 ± .03	7/30	.03 ± .03
8/9	.53 ± .17	6/19	0	8/8	.17 ± .11
8/16	.57 ± .23	6/26	.08 ± .03	8/13	.10 ± .06
8/23	1.50 ± .29	7/3	.12 ± .04	8/27	.23 ± .11
8/30	2.13 ± .45	7/10	.50 ± .19	9/4	.67 ± .17
9/6	3.63 ± .56	7/17	.40 ± .18	9/25	.33 ± .11
9/14	3.57 ± .95	7/25	.90 ± .20		
9/20	1.33 ± .27	8/2	1.13 ± .24		
9/28	2.10 ± .58	8/8	1.67 ± .52		
10/5	1.03 ± .37	8/14	3.10 ± .63		
10/12	1.93 ± .56	8/21	2.17 ± .47		
10/19	.63 ± .32	8/28	3.23 ± .54		
10/26	.20 ± .09	9/13	2.07 ± .48		
11/2	.40 ± .23				

[a]= Mean ± Standard Error

Table 27.--The average number[a] of *Amblyseius fallacis* found in one-minute counts at Peachy I Orchard, 1972, 1973, and 1974.

1972 Samples		1973 Samples		1974 Samples	
Date	No. of *A. fallacis*	Date	No. of *A. fallacis*	Date	No. of *A. fallacis*
6/7	.10 ± .06	5/8	.10 ± .05	6/6	.07 ± .05
6/22	.07 ± .05	5/15	0	6/20	.10 ± .07
7/6	.10 ± .06	5/22	0	7/2	.03 ± .03
7/19	.47 ± .16	5/29	.02 ± .02	7/16	0
8/2	.93 ± .21	6/5	0	7/30	0
8/16	2.37 ± .48	6/12	.15 ± .06	8/8	0
8/23	5.13 ± .96	6/19	.22 ± .08	8/13	0
8/30	5.77±1.15	6/26	.25 ± .07	8/20	0
9/6	5.87±1.10	7/3	.50 ± .10	8/27	.50 ± .14
9/14	4.67 ± .98	7/10	.77 ± .24	9/4	.63 ± .21
9/20	3.17 ± .74	7/17	.73 ± .23	9/25	.40 ± .14
9/28	2.47 ± .49	7/25	2.27 ± .40		
10/5	3.80 ± .92	8/2	1.83 ± .40		
10/12	3.80±1.06	8/8	2.33 ± .40		
10/19	1.23 ± .41	8/14	4.83 ± .87		
10/26	.70±1.04	8/21	3.63 ± .94		
11/2	.47 ± .23	8/28	5.10 ± .86		
		9/13	2.10 ± .42		

[a]= Mean ± Standard Error

Table 28.--The average number[a] of *Amblyseius fallacis* found in one-minute counts at Peachy II Orchard, 1972, 1973, and 1974.

1972 Samples		1973 Samples		1974 Samples	
Date	No. of *A. fallacis*	Date	No. of *A. fallacis*	Date	No. of *A. fallacis*
6/22	.07 ± .07	5/8	0	6/6	.03 ± .03
7/6	.13 ± .06	5/15	0	6/20	0
7/19	.60 ± .20	5/22	0	7/2	.03 ± .03
8/2	1.60 ± .48	5/29	0	7/16	.37 ± .16
8/9	1.17 ± .28	6/5	.02 ± .02	7/30	.07 ± .04
8/16	2.23 ± .45	6/12	.10 ± .05	8/8	.40 ± .15
8/23	2.63 ± .42	6/19	.27 ± .10	8/13	.93 ± .23
8/30	2.73 ± .43	6/26	.20 ± .05	8/20	1.27 ± .36
9/6	3.63 ± .85	7/3	.23 ± .07	8/27	.20 ± .09
9/14	4.73±1.15	7/10	.80 ± .21	9/4	.70 ± .22
9/20	1.70 ± .54	7/17	.60 ± .19	9/25	.77 ± .20
9/28	2.13 ± .40	7/25	1.27 ± .33		
10/5	2.77 ± .69	8/2	1.83 ± .30		
10/12	1.53 ± .41	8/8	1.87 ± .28		
10/19	.67 ± .19	8/14	3.97 ± .58		
10/26	.47 ± .21	8/21	4.10 ± .75		
11/2	.83 ± .69	8/28	8.00±1.18		
		9/13	3.03 ± .94		

[a]= Mean ± Standard Error

Table 29.--Vegetation sampled in Klackle Orchard ground cover during one-minute counts, 1973.

Species[a]	5/10	5/17	5/24	5/31	6/7	6/14	6/20	6/28	7/5	7/12	7/19	7/26	7/27	7/31	8/9	8/16	8/23	8/29	9/7	9/19	Total
Dandelion	2/23[b]	1/36	0/20	0/16	2/20	4/30	2/27	6/16	5/21	3/14	11/13	4/14	39/17	40/23	85/20	69/24	51/23	73/24	22/26	12/26	432/443
Mustard	0/10	0/7	0/4	0/4	0/1	0/1	-	-	-	-	0/1	-	0/1	-	-	-	-	-	-	-	0/29
Cockle	0/4	0/6	-	-	8/11	0/4	3/7	4/3	6/3	7/4	1/1	5/2	2/1	-	-	-	-	-	-	-	36/46
Peppergrass	0/2	0/3	0/1	0/4	3/10	0/2	2/5	1/1	-	-	-	-	-	-	-	-	-	-	-	-	6/28
Bl. Raspberry	0/2	-	0/1	-	0/3	4/5	0/1	0/1	0/1	1/3	0/1	1/2	0/1	1/2	4/2	0/1	0/1	0/1	-	-	11/28
Red Clover	0/1	0/3	0/1	0/1	1/6	-	0/2	3/3	1/1	-	3/2	1/2	-	-	-	-	-	-	3/1	0/1	12/24
Smartweed	-	-	-	-	-	-	-	0/1	0/1	-	1/2	1/4	2/3	4/2	11/6	7/4	1/1	0/2	0/1	-	27/27
Cirquefoil	0/1	-	0/1	-	0/3	0/4	2/5	-	1/1	-	0/2	-	-	-	-	-	-	3/2	-	-	6/19
Q-A Lace	-	-	-	-	-	0/4	0/1	0/1	-	0/1	3/3	-	2/3	-	2/1	-	-	-	-	-	7/14
Nightshade	-	-	-	-	3/3	1/3	2/4	-	-	-	-	0/1	0/1	-	-	-	-	-	-	-	7/12
Chickweed	0/2	0/3	0/1	0/4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/10
Grape	-	-	-	-	-	0/2	0/2	0/1	-	0/1	1/1	1/2	-	4/1	-	-	0/1	-	-	-	6/11
Sorrel	0/2	-	-	-	-	0/1	-	-	-	-	0/1	4/2	3/1	1/1	-	-	-	-	-	-	8/8
Sm. Ragweed	-	-	-	-	-	-	-	-	-	2/3	0/1	0/1	-	-	-	-	1/1	-	0/1	0/1	3/8
Sumac	-	-	-	-	-	-	-	1/1	1/1	7/2	7/1	-	-	-	-	-	11/1	-	-	4/1	31/7
D. Fleabane	-	-	-	-	-	-	3/4	-	-	-	-	-	1/1	-	-	-	-	-	-	-	4/5
Goldenrod	-	-	-	-	0/1	0/2	-	-	-	1/2	-	-	-	-	-	-	-	-	-	-	1/5
Curled Dock	0/1	0/1	0/1	-	-	0/1	0/1	-	-	-	-	-	-	1/1	2/1	-	-	-	-	-	3/7
Cress	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1	4/2	-	-	0/1	4/4
Milkweed	-	-	-	-	-	-	0/1	-	1/1	-	3/1	-	-	-	-	-	-	-	-	-	4/3
Dock	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	1/1	0/1	-	1/3
B. Plaintain	-	1/1	-	0/1	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/3
Strawberry	0/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/2
Bull Thistle	-	-	-	-	0/1	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	0/2
Lamb's Quarter	-	-	-	-	-	-	-	1/1	-	-	-	-	-	-	-	-	-	-	-	-	1/1
Rose	-	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	0/1

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of observations

Table 30.--Vegetation sampled in the ground cover of Klackle Orchard during one-minute counts, 1972.

Species[a]	8/1	8/15	8/22	3/29	9/5	9/12	9/21	9/26	10/3	10/10	10/17	10/24	Total
Apple	3/5[b]	2/4	9/6	4/6	2/3	9/4	15/6	10/8	9/9	9/6	5/9	2/7	70/73
Dandelion	0/7	1/4	0/2	4/6	1/5	1/7	0/5	2/9	4/7	0/7	0/9	0/7	13/75
Sm. Ragweed	0/6	0/7	0/4	0/5	1/5	1/4	0/2	0/2	-	-	0/1	-	2/35
Smartweed	2/6	0/5	1/3	1/3	2/3	0/2	0/1	1/3	0/2	0/1	-	-	7/29
Lamb's Quarters	1/2	0/4	0/5	1/1	0/5	0/1	-	0/1	0/1	-	-	-	2/20
Mustard	-	-	-	1/1	0/1	0/3	0/2	0/1	4/2	1/3	0/3	0/5	6/21
Nightshade	-	0/1	0/3	3/1	-	1/1	0/1	-	1/1	0/1	0/1	0/1	5/11
Sorrel	0/2	-	0/1	1/1	0/2	1/3	0/1	0/2	1/3	0/1	-	-	3/16
Curled Dock	-	-	-	-	0/1	0/1	-	2/1	1/1	2/2	0/1	0/2	5/9
Red Clover	-	-	-	-	-	0/1	0/1	-	1/2	0/2	0/3	0/1	1/10
Dock	-	-	0/1	-	1/1	-	0/1	0/1	-	0/1	-	-	1/5
Grape	0/1	-	-	-	1/1	1/2	0/1	0/1	-	-	-	-	2/6
Bl. Raspberry	-	-	-	-	-	-	-	0/1	-	-	0/1	0/2	0/4
B. Plantain	-	-	-	-	-	-	1/2	-	-	0/2	-	-	1/4
Cirquefoil	-	-	-	-	-	-	-	-	-	0/1	0/1	0/1	0/3
Cockle	-	-	-	-	4/1	-	-	-	-	-	-	1/2	5/3
V. Creeper	-	0/1	4/1	1/1	-	-	-	-	-	-	-	-	5/3
Milkweed	-	-	-	-	-	-	-	-	-	0/1	-	-	0/1
Cherry	-	-	0/1	0/1	-	-	-	-	-	-	-	-	0/2
Goldenrod	-	-	0/1	-	-	-	-	-	-	-	-	-	0/1
Rose	-	-	-	-	-	-	-	-	-	-	0/1	-	0/1
D. Fleabane	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1
Strawberry	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of observations.

Table 31.--Vegetation sampled in the ground cover of Rasch Orchard during one-minute counts, 1972.

Species[a]	8/15	8/22	8/29	9/5	9/12	9/21	9/26	10/3	10/10	10/17	10/24	10/31	Total
Apple	1/8[b]	2/7	1/8	0/5	5/6	18/8	13/7	12/7	18/7	4/10	11/11	12/9	97/93
Dandelion	-	-	-	0/1	-	0/1	0/1	-	1/2	0/1	-	0/1	1/7
Grape	2/4	1/6	1/4	1/5	3/6	4/5	7/5	6/4	2/4	2/3	-	-	29/46
Nightshade	-	0/3	0/3	5/2	14/5	3/4	5/4	2/4	4/4	2/5	0/5	0/2	35/41
Cherry	-	-	0/2	1/3	4/3	-	3/3	14/4	3/6	1/5	0/6	2/7	28/39
Oak	0/4	0/4	0/2	1/3	2/3	0/2	1/2	0/3	0/3	0/3	0/2	1/4	5/35
V. Creeper	4/4	2/2	0/4	2/4	4/3	9/3	3/3	9/3	2/4	-	0/1	-	35/28
Bl. Raspberry	0/2	0/4	0/2	0/2	-	0/3	0/1	-	0/1	0/1	0/1	1/4	2/21
Burdock	1/1	-	-	1/1	1/1	5/1	2/1	1/1	3/1	9/1	-	-	23/8
Hickory	-	0/2	0/1	-	3/1	1/1	-	3/2	-	-	-	0/1	7/8
Elm	-	-	1/2	-	-	-	-	-	-	-	1/2	3/1	5/5
Sweet Cicely	-	-	-	-	-	0/1	16/2	0/1	-	-	-	-	16/4
Wild Lettace	0/2	-	0/1	0/1	-	-	-	-	-	-	-	-	0/4
Dock	0/1	-	-	-	0/1	0/1	-	-	-	-	-	-	0/3
Smartweed	0/1	-	-	0/1	-	-	0/1	-	-	-	-	-	0/3
Curled Dock	0/1	0/1	-	-	-	-	-	2/1	-	-	-	-	2/3
Cirquefoil	-	3/1	-	-	1/1	-	-	-	-	-	-	0/1	4/3
Milkweed	-	-	1/1	1/1	-	-	-	-	-	-	-	-	2/2
Maple	-	-	-	-	-	-	-	-	-	0/1	0/1	-	0/2
Cockle	-	-	-	-	-	-	-	-	-	-	1/1	-	1/1
Red Clover	-	-	-	-	-	-	-	-	0/1	-	-	-	0/1

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of Observations.

Table 32.--Vegetation sampled in the ground cover of Rasch Orchard during one-minute counts, 1973.

Species[a]	5/10	5/17	5/24	5/31	6/7	6/14	6/20	6/28	7/5	7/12	7/19	7/26	7/31	8/9	8/16	8/23	8/29	9/7	9/19	Total
Dandelion	6/29[b]	4/29	1/36	0/14	0/24	3/18	7/18	3/9	1/15	3/7	1/4	2/4	12/10	40/7	29/11	20/10	23/9	15/8	9/7	179/269
Bl. Raspberry	0/4	0/6	0/4	0/3	1/6	0/6	1/6	0/2	0/9	0/6	0/3	3/5	3/3	14/6	20/3	6/1	18/6	1/3	4/5	71/87
Dock	1/3	1/3	3/3	-	3/2	0/1	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1	8/14
V. Creeper	0/4	0/2	0/2	0/2	12/9	11/14	0/3	5/3	0/9	3/4	3/3	5/3	11/6	23/2	11/3	13/3	19/5	10/3	1/2	127/82
Sweet Cicely	1/2	2/7	-	-	5/4	2/3	4/9	9/4	1/3	1/2	1/3	2/3	6/2	15/3	3/2	32/5	14/3	8/2	13/3	119/60
Grape	-	-	-	-	0/1	3/4	5/7	6/4	0/5	1/2	0/3	5/2	-	10/3	6/2	2/1	5/2	3/2	5/4	51/42
Smartweed	-	0/2	-	-	-	1/1	0/1	2/1	0/5	2/3	0/3	0/2	1/2	0/2	-	3/2	-	0/1	0/1	9/26
Oak	-	-	0/1	0/1	-	2/2	0/4	1/1	0/2	-	0/2	1/1	0/1	0/1	-	-	4/2	-	0/1	8/19
Curled Dock	0/2	0/2	0/3	-	1/3	1/1	0/1	0/1	0/2	-	-	-	-	-	-	-	-	-	-	2/15
Goldenrod	1/2	0/3	-	-	1/2	0/1	-	-	2/2	0/1	-	-	-	3/1	-	-	-	-	-	7/12
Wild Lettuce	-	0/2	-	-	1/1	4/3	0/1	1/1	0/1	-	1/1	-	-	-	-	-	-	-	-	7/13
Bull Thistle	0/1	0/1	0/1	-	0/1	0/1	2/1	-	-	-	-	-	-	-	-	4/1	-	4/1	1/1	11/9
Cinquefoil	-	-	-	-	-	3/3	0/1	1/1	-	3/2	0/1	0/1	-	-	-	-	-	-	-	7/9
Lamb's Quarters	-	-	-	-	0/1	-	-	0/1	0/1	-	-	0/1	0/1	3/1	0/1	1/1	-	-	-	4/8
Cherry	-	0/1	0/1	-	-	2/1	0/1	-	0/1	-	1/1	-	-	-	1/1	-	-	-	-	4/7
Burdock	-	3/1	-	-	-	-	4/1	-	-	0/1	-	-	-	9/2	-	1/2	-	-	-	17/7
Cockle	1/2	-	0/1	0/1	-	0/1	-	-	-	-	2/1	-	-	-	1/1	1/1	-	-	-	4/7
Nightshade	2/9	-	0/5	0/7	0/4	-	4/3	6/2	1/5	0/2	0/3	0/4	8/4	7/2	10/5	13/3	7/1	35/6	3/2	96/67
Cress	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9/1	-	2/1	9/2	0/1	20/5
Sorrel	0/1	-	0/1	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/3
Ash	-	0/1	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	1/1	-	1/3
Strawberry	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	7/1	-	0/1	7/3
Motherwort	-	-	-	-	-	-	-	-	-	-	-	2/3	-	-	-	-	-	-	-	2/3
Elderberry	-	-	-	-	-	-	-	-	-	-	0/2	-	-	-	-	11/1	-	-	0/1	11/4
Milkweed	-	-	-	-	-	-	1/1	-	1/1	-	-	-	-	-	-	-	-	-	-	2/2
Bedstraw	-	-	0/1	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/2
Pepperstraw	-	-	0/1	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/2
Sm. Ragweed	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1	-	-	-	-	-	-	0/2
Maple	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Red Clover	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of observations.

Table 33.--Vegetation sampled in the ground cover of Kraft Orchard during one-minute counts, 1972.

Species[a]	8/15	8/22	8/29	9/5	9/12	9/21	9/26	10/3	10/10	10/17	10/24	10/31	Total
Apple	23/7[b]	24/9	12/8	7/7	7/9	28/8	13/8	7/9	8/7	2/10	9/10	5/9	145/101
Dandelion	-	0/1	1/1	6/1	0/3	0/3	1/3	1/5	1/2	0/2	1/3	0/4	6/29
Goldenrod	0/6	14/8	8/8	16/8	21/9	10/10	4/8	3/6	2/5	0/6	0/6	0/1	78/81
Milkweed	15/3	3/3	4/5	3/4	0/3	8/3	3/3	3/2	0/1	-	1/1	0/1	40/29
Nightshade	1/1	4/2	1/1	2/4	4/2	1/3	2/4	2/2	1/6	0/3	0/2	0/2	18/32
Grape	7/1	-	2/2	-	0/1	5/2	1/2	0/1	1/2	0/1	-	-	17/12
Red Clover	-	-	1/1	6/1	1/2	-	0/2	-	0/2	0/1	-	0/1	8/10
Elm	-	2/1	1/1	-	-	-	-	2/1	0/1	-	4/2	0/2	9/8
Honeysuckle	-	-	-	-	-	-	-	-	0/2	1/2	0/2	0/1	1/7
Burdock	-	0/1	-	1/1	-	6/1	-	8/1	-	0/1	-	1/1	15/6
Curled Dock	2/1	-	-	-	-	-	-	-	0/1	0/1	0/1	0/1	2/5
Rose	0/1	-	-	2/1	-	-	-	0/1	-	0/1	-	-	2/4
B. Plantain	-	-	-	-	0/1	-	-	1/2	-	-	0/1	-	1/4
G. Cherry	-	3/1	-	-	-	-	-	-	-	-	1/1	0/3	4/5
Bull Thistle	-	-	-	-	-	-	-	-	-	0/2	-	0/1	0/3
Plantain	-	-	-	-	-	-	-	-	0/1	-	0/1	0/2	0/4
Gt. Ragweed	0/1	-	-	1/1	-	-	-	-	-	-	-	-	0/2
Sm. Ragweed	-	2/1	-	-	-	-	-	-	-	-	-	-	2/1
Maple	-	-	-	-	-	-	-	-	0/1	-	-	-	0/1

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of Observations.

Table 34.--Vegetation sampled in the ground cover of Kraft Orchard during one-minute counts, 1973.

Species[a]	5/3	5/10	5/17	5/24	5/31	6/7	6/14	6/20	6/28	7/5	7/12	7/19	7/26	7/31	8/9	8/16	8/24	8/29	9/7	9/19	Total
Dandelion	0/22[b]	0/10	0/19	0/13	0/19	0/14	0/15	2/14	0/6	1/10	1/2	3/4	5/4	2/7	0/5	7/4	13/7	13/8	7/9	1/6	55/198
D. Fleabane	1/14	11/42	1/17	3/26	0/17	12/28	1/13	1/12	3/21	1/7	0/14	3/17	6/11	3/7	5/9	11/16	10/11	9/9	2/6	3/6	86/298
Goldenrod	3/16	1/2	1/19	0/9	4/16	3/5	7/25	3/15	4/17	1/23	6/31	4/14	6/11	4/8	3/8	21/8	7/5	8/4	9/4	3/7	101/224
Nightshade	-	-	-	-	0/1	1/5	0/2	0/7	0/4	2/8	0/5	3/10	1/2	1/3	0/2	2/4	12/4	13/6	3/2	0/2	38/67
Milkweed	-	-	-	-	-	-	0/1	-	0/4	1/5	3/5	4/7	0/1	1/2	4/5	1/1	1/1	-	7/4	10/4	32/40
Curled Dock	0/2	0/3	0/2	0/8	0/3	1/3	1/2	0/4	0/1	1/2	-	-	-	-	-	-	-	-	-	0/1	2/29
Honeysuckle	0/5	0/2	0/2	0/2	0/1	2/5	0/1	0/3	0/3	0/1	0/1	0/1	-	-	-	1/1	-	-	-	0/1	2/25
Burdock	2/1	0/1	-	-	-	0/2	-	0/1	0/1	0/1	-	-	-	-	-	-	-	-	5/1	-	7/8
Rose	-	-	-	-	-	-	-	0/2	0/2	-	0/1	-	-	-	-	-	-	-	-	2/1	2/6
G. Cherry	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1	0/1	4/1	10/1	12/1	-	-	-	26/6
Bull Thistle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20/2	38/3	3/1	61/6
Grape	-	-	-	-	-	-	-	-	-	0/1	-	0/1	-	0/1	-	-	-	10/1	-	0/1	10/5
B. Plantain	-	-	0/1	-	0/1	-	0/1	-	-	-	0/1	-	-	0/1	-	-	-	-	-	-	0/5
Mustard	0/2	-	-	-	0/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/4
Red Clover	-	-	-	0/1	-	-	-	-	0/1	0/1	-	-	-	-	-	-	2/1	-	-	-	2/4
Cockle	-	-	-	-	-	3/1	-	1/2	-	-	-	-	-	-	-	-	-	-	-	-	4/3
Poison Ivy	-	-	-	0/1	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	0/2
Alfalfa	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Dock	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	0/1
Elm	-	-	-	-	-	-	-	-	-	2/1	-	-	-	-	-	-	-	-	-	-	2/1
Wild Lettace	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	0/1
Sm. Ragweed	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	0/1
Chickory	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	0/1
Lamb's Quarters	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/1	-	1/1

[a]See Table 47 for scientific name.

[b]Number of A. fallacis observed/Number of observations.

Table 35.--Vegetation sampled in the ground cover of Gavin Orchard during one-minute counts, 1972.

Species[a]	8/1	8/15	8/22	8/29	9/5	9/12	9/21	9/26	10/3	10/10	10/17	10/24	10/31	Total
Apple	3/7[b]	13/7	25/5	6/7	8/8	31/7	24/10	14/8	17/10	6/8	6/8	13/8	7/9	173/102
Dandelion	0/3	12/3	0/2	0/1	0/4	0/3	0/2	1/3	1/2	1/5	0/3	0/1	0/6	15/38
Bull Thistle	-	-	-	-	-	-	0/1	-	-	-	0/1	2/5	1/6	3/13
Chickory	0/8	10/9	7/9	3/9	1/6	1/4	3/5	0/2	1/5	1/1	0/3	0/2	0/1	27/64
Red Clover	0/2	1/4	0/1	1/5	1/5	6/6	2/4	3/4	5/7	3/3	0/3	0/1	0/4	22/49
Alfalfa	-	0/1	0/1	-	0/1	0/1	0/1	0/2	0/1	-	0/1	-	-	0/9
Burdock	-	-	-	-	-	0/1	-	0/1	-	-	-	-	-	0/2
Cherry	-	-	0/1	-	-	0/1	-	2/1	-	2/2	0/2	0/2	0/2	4/11
Curled Dock	0/1	-	-	-	-	-	-	1/1	-	0/1	0/1	0/2	-	1/6
Goldenrod	-	-	-	0/1	0/1	-	1/3	2/3	1/1	1/3	0/1	-	-	5/13
Plantain	0/1	-	-	-	0/2	0/2	-	0/1	0/2	0/1	0/1	0/2	0/1	0/13
Elm	-	-	-	-	-	-	-	-	-	-	-	0/1	-	0/1
Nightshade	0/1	2/1	-	-	-	2/1	0/2	0/2	-	-	0/1	0/3	-	4/10
Milkweed	0/3	0/2	0/3	1/5	2/2	0/2	1/2	0/1	-	0/3	0/2	0/1	-	4/25
Strawberry	-	-	-	-	-	-	-	-	-	12/1	-	1/1	5/1	18/3
Sm. Ragweed	-	-	-	0/1	-	-	-	-	-	-	-	-	-	0/1
Sow Thistle	-	-	-	-	-	-	-	-	-	-	2/2	-	-	2/2
Bindweed	-	-	-	-	-	-	-	1/1	-	-	-	-	-	1/1
Cirquefoil	-	-	-	-	-	-	-	-	3/1	-	-	-	-	3/1
Boxelder	-	-	-	-	-	-	-	-	-	-	0/1	-	-	0/1

[a]See Table 47 for scientific name.

[b]Number of A. fallacis observed/Number of Observations.

Table 36.--Vegetation sampled in the ground cover of Gavin Orchard during one-minute counts, 1973.

Species[a]	5/3	5/10[b]	5/17	5/24	5/31	6/7	6/14	6/20	6/23	7/5	7/12	7/19	7/26	8/9	8/16	8/23	8/29	9/7	9/19	Total
Dandelion	0/5[c]	0/9	0/5	0/1	0/4	0/1	0/1	0/2	0/1	0/4	0/3	0/3	0/4	8/4	8/4	10/5	5/1	6/4	22/7	59/68
Bull Thistle	0/2	0/3	0/2	-	-	-	-	-	0/1	0/1	-	0/1	-	-	4/1	-	1/1	-	4/1	10/13
Chickory	2/14	0/20	0/8	0/12	0/11	0/12	0/18	0/5	0/13	1/15	0/13	1/16	4/15	25/15	47/13	40/14	52/18	39/15	27/12	238/259
Red Clover	0/4	0/3	0/6	0/4	0/4	0/3	0/5	0/6	0/4	0/4	-	0/2	0/4	2/3	15/5	3/2	59/9	0/1	1/1	79/67
Alfalfa	0/1	0/8	-	0/4	0/4	0/3	0/1	0/1	0/3	0/1	-	0/2	-	0/1	-	-	-	3/2	-	3/31
Burdock	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Mustard	0/1	-	0/1	0/4	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/7
Cherry	0/1	-	-	-	-	0/1	-	-	-	-	-	0/1	-	-	-	-	-	-	-	0/3
Curled Dock	0/1	0/2	0/1	-	-	0/4	-	0/1	0/1	0/2	0/1	-	0/1	-	-	-	-	-	-	0/14
Goldenrod	-	0/2	-	-	-	0/1	-	-	-	0/2	0/3	0/2	-	0/1	-	-	-	0/3	-	0/14
Cockle	-	0/2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/2
Plantain	-	1/8	0/6	0/4	0/5	0/5	0/1	0/8	0/2	-	0/3	0/1	-	-	-	7/2	-	6/2	3/4	17/51
Sorrel	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
D. Fleabane	-	1/1	-	0/1	0/1	-	0/1	0/2	-	-	0/3	-	0/1	-	1/1	0/1	-	-	0/1	2/13
Elm	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Dock	-	-	0/1	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	0/2
Wild Lettace	-	-	-	-	-	-	0/1	0/5	-	-	-	-	-	-	-	-	-	-	-	0/6
Nightshade	-	-	-	-	-	-	0/1	-	-	-	0/2	-	0/1	-	-	0/1	15/1	-	-	15/6
Milkweed	-	-	-	-	-	-	0/1	-	0/2	-	0/1	-	0/2	0/1	0/2	-	-	-	5/1	5/10
Elderberry	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	0/1
Strawberry	-	-	-	-	-	-	-	-	0/1	-	-	-	0/1	1/1	-	-	-	-	10/1	10/4
Q-A Lace	-	-	-	-	-	-	-	-	0/1	0/3	0/1	0/2	-	1/3	1/2	4/4	-	5/3	0/1	11/20
Sm. Ragweed	-	-	-	-	-	-	-	-	-	-	-	-	0/1	-	1/1	2/1	-	-	-	3/3
Sow Thistle	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1	4/1	-	-	-	2/1	6/3

[a]See Table 47 for scientific name.

[b]Twenty trees sampled.

[c]Number of *A. fallacis* observed/Number of Observations.

Table 37.--Vegetation sampled in the ground cover of Carpenter Orchard during one-minute counts, 1972.

Species[a]	8/2	8/16	8/23	8/30	9/6	9/14	9/20	9/28	10/5	10/12	10/19	10/16	Total
Apple	0/3[b]	1/5	/47	1/5	2/9	8/4	5/4	2/6	5/5	7/7	0/8	0/10	35/73
Dandelion	0/3	6/6	5/3	2/7	0/8	3/7	0/5	2/4	0/5	2/7	0/8	0/8	20/71
Dock	2/6	6/7	4/10	3/7	1/7	1/7	3/10	1/9	2/8	7/6	0/6	0/7	30/90
Grape	1/5	0/4	0/3	0/2	0/2	0/1	0/2	0/4	0/1	1/3	0/1	-	2/28
Horse Nettle	1/5	-	-	-	-	-	0/1	-	0/1	0/1	0/1	-	1/9
Lamb's Quarter	0/3	0/2	0/1	0/2	1/1	0/4	0/2	0/1	0/1	-	-	-	1/17
Milkweed	-	0/3	0/2	0/1	0/1	-	0/1	0/1	0/2	1/1	-	-	1/12
Red Clover	-	-	0/1	-	2/2	0/3	0/2	0/3	0/4	0/3	0/2	0/2	2/22
Sm. Ragweed	-	-	0/1	-	-	-	-	0/1	-	-	-	-	0/2
Sorrel	-	-	-	0/3	-	0/2	-	-	-	0/1	0/2	0/1	0/9
Cockle	-	-	-	-	-	-	-	1/1	-	-	-	-	1/1
Nightshade	-	-	-	-	-	-	-	0/1	-	-	-	-	0/1
Smartweed	-	-	-	-	-	-	-	0/1	0/1	-	-	-	0/2
Mustard	-	-	-	-	-	-	-	0/1	-	0/2	-	-	0/3
V. Creeper	-	-	-	-	-	-	-	-	2/1	-	-	-	2/1
Plantain	-	-	-	-	-	-	-	-	0/1	0/1	-	-	0/4
Bl. Raspberry	-	-	-	-	-	-	-	-	-	-	0/1	-	0/1
Curled Dock	-	-	-	-	-	-	-	-	-	-	0/1	-	0/1

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of Observations.

Table 38.--Vegetation sampled in the ground cover of Carpenter Orchard during one-minute counts, 1973.

Species[a]	5/8	5/15	5/22	5/29	6/5	6/12	6/19	6/26	7/3	7/10	7/17	7/25	8/2	8/8	8/14	8/21	8/28	9/13	Total
Dandelion	0/11[b]	0/17	0/26	0/34	1/25	0/16	2/16	2/23	3/19	9/19	13/18	5/19	12/17	91/23	121/22	22/20	72/21	54/20	407/366
Dock	0/15	0/12	3/24	0/21	1/26	1/32	1/24	5/15	7/7	4/7	0/2	0/3	0/3	3/2	3/3	5/2	10/3	53/6	56/207
Curled Dock	-	-	-	-	-	-	-	-	-	-	3/1	-	-	-	-	-	-	-	3/1
Cockle	0/2	-	0/2	-	0/2	0/1	-	-	-	-	-	-	-	-	-	-	-	-	0/7
Red Clover	0/1	0/1	0/6	0/2	0/5	-	0/2	0/1	1/1	-	-	-	-	-	-	1/2	-	-	2/21
Chickweed	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
B. Plantain	-	-	0/1	0/1	-	-	0/2	-	-	-	-	-	-	-	-	-	-	-	0/4
Vetch	-	-	0/1	-	0/1	-	2/4	2/3	1/1	-	-	-	-	-	-	-	-	-	5/10
W. Geranium	-	-	-	0/2	0/1	-	0/1	-	0/1	-	-	-	-	-	-	-	-	-	0/5
Grape	-	-	-	-	-	0/9	1/6	2/13	-	-	-	0/1	-	0/1	0/2	0/1	2/3	9/2	11/10
Milkweed	-	-	-	-	-	0/2	0/5	-	0/1	0/1	0/2	0/1	0/2	0/2	2/1	1/1	4/1	-	7/19
Horse Nettle	-	-	-	-	-	-	-	0/4	-	0/1	0/2	-	1/3	-	4/2	-	-	-	5/12
Sorrel	-	-	-	-	-	-	-	0/1	-	-	-	0/2	0/1	0/1	-	-	0/1	-	0/6
Lamb's Quarters	-	-	-	-	-	-	-	-	-	0/2	0/5	0/3	1/4	0/1	-	0/2	0/1	14/2	15/20
T. Creeper	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	-	9/2	-	-	9/3

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of Observations.

Table 39.--Vegetation sampled in the ground cover of Babcock Orchard during one-minute counts, 1972.

Species[a]	8/2	8/9	8/16	8/23	8/30	9/6	9/14	9/20	9/28	10/5	10/12	10/19	10/26	11/2	Total
Apple	-	0/1[b]	4/2	2/2	0/1	-	4/3	0/3	7/8	8/6	9/7	3/8	9/9	2/7	48/57
Dandelion	0/1	-	7/3	6/3	2/1	5/2	0/1	1/1	1/2	2/3	0/3	0/4	0/4	0/7	24/36
Sumac	0/2	-	1/2	5/5	1/2	0/4	2/4	0/4	0/2	0/2	0/4	0/3	0/1	0/1	9/36
Sm. Ragweed	0/1	-	2/3	2/5	2/5	-	0/2	0/3	0/1	-	-	-	-	-	9/36
V. Creeper	-	-	10/1	-	4/1	7/2	8/2	18/4	32/3	13/3	7/3	0/1	-	-	99/20
Milkweed	10/7	5/8	18/9	11/8	7/9	15/8	12/8	2/5	1/4	0/1	0/1	0/2	0/1	-	78/71
Poison Ivy	3/1	4/6	-	-	-	-	-	-	-	16/4	5/4	0/4	0/1	0/1	18/21
Horse Nettle	2/5	0/3	3/3	-	-	2/2	-	0/2	1/3	1/3	-	-	-	-	9/21
Dock	0/1	-	0/1	-	2/2	0/2	1/1	-	0/2	0/2	0/2	0/1	0/4	0/3	3/21
Wild Lettace	1/2	0/2	1/2	0/1	0/1	0/3	-	0/2	0/1	-	-	-	-	-	2/14
Grape	-	-	-	5/3	0/1	2/1	9/2	10/2	7/1	5/1	7/1	4/2	-	-	49/14
Red Clover	0/1	-	-	-	2/1	-	0/1	-	-	0/1	0/1	0/1	0/1	0/4	2/11
Curled Dock	0/1	-	-	-	-	-	0/1	-	1/2	0/1	-	0/1	0/2	-	1/8
Strawberry	-	-	-	-	-	1/1	-	-	2/1	3/1	1/1	-	0/2	0/2	7/8
Nettle	0/1	-	-	-	-	-	-	0/1	-	-	-	-	-	0/2	0/4
Goldenrod	0/2	0/1	-	-	-	-	-	-	-	-	-	-	-	-	0/3
Sorrel	-	0/2	-	-	0/1	-	-	-	-	-	-	-	-	-	0/3
Bl. Raspberry	-	-	-	-	-	-	-	-	-	-	-	-	0/1	1/1	1/2
Alfalfa	-	1/1	-	-	-	-	-	-	-	-	-	-	-	-	1/1
Smartweed	-	-	1/1	-	-	-	-	-	-	-	-	-	-	-	1/1
Asparagus	-	-	-	-	-	-	-	-	-	-	-	-	0/1	-	0/1
D. Fleabane	-	-	-	-	-	-	-	-	-	0/1	0/1	0/1	0/2	-	0/5
Plantain	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	0/1
Mustard	-	-	-	-	-	-	-	-	-	-	-	0/1	-	0/1	0/2
Elderberry	-	-	-	-	-	-	-	-	-	-	-	-	0/1	-	0/1

[a]See Table 47 for scientific name.

[b]Number of A. fallacis observed/Number of Observations.

Table 40.--Vegetation sampled in the ground cover of Babcock Orchard during one-minute counts, 1973.

Species[a]	5/8	5/15	5/22	5/29	6/5	6/12	6/19	6/26	7/3	7/10	7/17	7/25	8/2	8/8	8/14	8/21	8/28	9/13	Total
Dandelion	0/13	0/10	0/7	1/9	0/8	0/14	0/1	-	0/7	4/5	3/4	0/2	1/3	0/6	3/5	5/4	11/6	17/6	45/110
Poison Ivy	-	0/3	0/1	0/4	0/2	0/6	0/4	0/8	0/9	0/14	1/13	3/14	-	-	-	-	-	-	4/77
Dock	2/13	0/3	0/5	0/1	0/1	0/7	0/4	0/3	0/2	-	0/1	-	-	-	0/2	-	0/1	-	2/43
V. Creeper	-	-	-	0/1	0/8	0/6	0/4	0/7	2/10	0/7	0/4	-	5/7	-	3/3	5/8	12/7	5/3	34/75
Wild Lettace	0/1	-	0/3	0/2	0/3	0/6	0/2	0/2	0/7	0/5	0/5	0/1	0/1	0/4	0/1	0/1	0/1	0/1	0/46
Curled Dock	0/4	0/3	0/1	0/2	0/2	0/3	-	-	0/1	-	-	-	-	-	-	-	-	-	0/16
Horse Nettle	-	-	-	-	-	-	0/4	0/2	2/3	3/9	2/7	4/4	3/4	3/2	4/5	3/1	24/8	41/7	89/16
Sm. Ragweed	-	-	-	-	-	-	-	0/1	0/2	0/1	0/5	1/3	1/6	0/4	2/5	0/4	0/1	1/1	5/33
Grape	-	-	-	-	-	1/3	-	0/2	0/2	3/2	0/2	-	5/3	2/5	2/1	7/3	2/2	0/1	22/26
Milkweed	-	-	-	-	-	0/6	0/5	0/2	0/3	0/7	1/10	2/6	0/1	1/5	1/4	7/6	1/2	28/9	41/66
Cockle	0/5	-	0/2	0/3	-	0/1	-	-	-	0/3	0/1	0/1	4/2	1/1	1/2	1/1	-	-	7/22
Mustard	0/10	0/3	-	0/1	-	-	-	-	0/2	-	-	-	-	-	-	-	-	-	0/16
Red Clover	0/3	-	-	0/1	0/2	0/1	-	-	-	-	1/1	-	-	-	6/2	11/2	1/1	-	19/13
Nettle	0/3	0/4	-	-	-	0/1	-	-	-	-	0/2	0/1	-	0/1	-	-	-	-	0/12
D. Fleabane	0/3	-	0/3	0/2	0/1	0/1	-	-	0/2	0/2	0/1	0/1	0/1	0/1	-	-	-	-	0/18
B. Plantain	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Strawberry	0/1	-	0/2	-	0/1	1/2	-	-	-	-	-	-	-	-	-	-	-	-	1/6
Bedstraw	0/3	0/3	0/6	0/4	0/2	-	-	-	-	-	-	-	-	-	-	-	-	-	0/18
Sorrel	-	0/1	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	0/2
Sumac	-	-	-	-	-	0/3	0/1	-	-	0/3	0/3	0/1	0/2	0/1	-	-	0/1	0/1	0/16
Chickweed	-	-	-	-	-	-	0/2	-	-	-	-	-	-	-	-	-	-	-	0/2
Vetch	-	-	-	-	-	-	0/1	-	0/1	0/1	-	-	-	-	-	-	-	-	0/3
Bl. Raspberry	-	-	-	-	-	-	0/1	-	0/1	0/1	-	-	-	-	-	-	-	-	0/3
Lamb's Quarters	-	-	-	-	-	-	-	1/3	-	-	1/1	-	-	-	-	-	-	-	2/4
Elderberry	-	-	-	-	-	-	-	-	1/2	-	-	-	-	-	-	-	-	1/1	2/3
Q-A Lace	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	0/1

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of Observations.

Table 41.--Vegetation sampled in the ground cover of Dowd Orchard during one-minute counts, 1973.

Species[a]	5/15	5/22	5/29	6/5	6/12	6/19	6/26	7/3	7/10	7/17	7/25	8/2	8/8	8/14	8/21	8/28	9/13	Total
Dandelion	0/17[b]	1/13	1/12	0/18	0/16	0/6	2/17	2/12	2/12	1/6	7/5	1/4	15/9	31/9	34/10	52/9	21/8	169/183
D. Fleabane	0/29	0/13	0/12	2/16	0/20	0/5	1/19	1/17	1/3	1/6	2/9	8/9	4/7	17/10	8/10	7/9	5/10	57/206
Dock	0/3	0/4	0/4	1/11	2/10	0/2	0/4	1/7	0/1	4/3	10/7	2/1	2/2	12/3	12/4	16/3	22/3	84/72
Milkweed	-	-	-	-	0/1	0/1	0/2	1/6	0/1	-	2/1	-	21/3	10/2	4/1	5/1	8/3	51/22
Goldenrod	-	-	-	-	-	-	1/2	0/4	-	1/3	-	1/3	0/2	0/1	5/2	1/2	1/2	10/21
Wild Lettace	-	-	-	0/3	0/2	-	1/8	1/4	0/4	3/5	2/2	10/5	6/3	-	0/2	-	-	23/38
Spearmint	0/2	-	-	1/3	1/6	0/6	0/3	1/3	4/3	0/2	-	3/3	2/2	-	-	6/3	0/1	18/37
Smartweed	-	-	-	-	-	-	-	-	0/1	0/1	0/2	6/3	-	0/2	2/1	0/1	1/1	9/12
Curled Dock	-	-	-	1/3	0/1	0/1	0/3	-	1/1	1/2	-	0/1	-	-	-	-	-	3/12
Bl. Raspberry	-	-	-	-	-	0/3	-	0/2	1/1	-	2/1	-	-	-	-	-	2/1	5/8
Grape	-	-	-	-	-	0/1	-	0/2	5/1	-	2/2	-	-	-	-	8/1	-	15/7
Sm. Ragweed	-	-	-	-	-	0/2	-	0/1	-	-	-	-	-	0/1	-	2/1	-	2/5
Chickweed	0/4	-	-	-	-	0/3	0/1	-	-	-	-	-	-	-	-	-	-	0/8
Bedstraw	0/2	-	0/1	0/2	-	-	-	-	-	-	-	-	-	-	-	-	-	0/5
Sow Thistle	-	-	-	1/1	-	-	-	-	-	-	-	3/1	-	24/2	-	-	-	28/4
Rose	0/1	-	-	-	-	-	-	-	-	2/1	-	-	-	-	-	-	-	2/2
Poison Ivy	0/1	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/2
Sorrel	-	-	-	0/1	-	-	0/1	-	-	-	-	-	-	-	-	-	-	0/2
Nightshade	-	-	-	-	-	-	-	0/1	0/1	-	-	-	-	-	-	-	-	0/2
B. Plantain	-	-	-	-	-	-	-	0/1	0/1	-	-	-	-	-	-	-	-	0/2
Nettle	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	2/1	2/2
Cockle	-	-	-	-	0/3	-	-	-	-	-	-	-	-	-	-	-	-	0/3
Strawberry	-	-	-	4/1	-	-	-	-	-	-	-	-	-	-	-	-	-	4/1
V. Creeper	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Cirquefoil	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Lamb's Quarters	-	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	0/1

[a]See Table 47 for scientific name.

[b]Number of A. fallacis/Number of Observations

Table 42.--Vegetation sampled in the ground cover of Dowd Orchard during one-minute counts, 1972.

Species[a]	8/2[b]	8/2[c]	8/9	8/16	8/23	8/30	9/6	9/14	9/20	9/28	10/5	10/12	10/19	10/26	11/2	Total
Apple	12/7[d]	10/8	6/7	14/7	27/10	42/8	65/10	29/7	23/8	44/10	24/8	48/10	14/9	3/10	11/10	92/129
Wild Lettuce	1/5	1/4	0/6	0/7	5/5	-	-	1/1	-	-	-	-	-	-	-	6/28
Dandelion	-	-	0/1	0/1	-	8/3	3/2	11/3	1/2	0/1	0/1	1/4	0/6	0/6	0/4	9/34
Milkweed	0/3	1/1	7/5	2/4	3/1	3/3	23/6	29/2	5/4	2/3	0/2	3/3	-	-	-	22/37
Goldenrod	1/2	1/6	1/2	0/4	2/3	0/2	9/5	1/1	1/1	0/1	0/1	3/2	-	-	-	11/30
Dock	0/4	0/3	0/3	1/5	3/1	4/4	4/2	2/5	5/4	9/4	1/6	0/1	5/5	2/7	0/5	17/59
Spearmint	1/1	0/1	2/2	0/1	-	2/2	2/1	4/2	0/1	0/1	1/1	3/1	0/1	0/1	-	9/16
D. Fleabane	-	-	-	-	-	-	-	1/2	2/3	1/3	0/7	0/3	0/5	1/3	0/4	5/30
V. Creeper	0/1	-	-	-	2/1	-	-	3/1	3/3	2/1	-	-	-	-	-	5/7
Curled Dock	0/1	-	-	-	1/2	-	-	-	-	-	2/1	0/1	-	-	-	2/5
Smartweed	-	1/3	0/1	-	-	1/1	0/1	0/2	-	0/2	-	0/3	-	-	-	2/13
Sm. Ragweed	-	-	0/1	-	1/3	-	-	-	-	-	-	-	-	-	-	1/4
Pokeberry	-	2/2	-	0/1	-	-	-	-	0/1	-	-	-	-	-	-	2/4
Poison Ivy	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Red Clover	-	-	-	-	-	3/1	-	-	0/1	-	3/3	0/1	-	0/1	-	6/7
Corn	-	-	-	-	-	1/1	-	-	-	-	-	-	-	-	-	1/1
Plantain	-	-	-	-	-	-	-	1/1	-	-	-	-	-	0/1	-	1/2
Nightshade	-	-	-	-	-	-	-	7/2	-	-	-	-	-	-	-	7/2
Mulberry	-	-	-	-	-	-	-	-	-	2/1	-	0/1	0/1	-	-	2/3
Cirquefoil	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	0/1
Bl. Raspberry	-	-	-	-	-	-	-	-	-	1/1	-	-	-	-	0/2	1/3
B. Plantain	-	-	-	-	-	-	-	-	-	3/1	-	-	0/1	-	-	3/2
Nettle	-	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	0/1
Elm	-	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	0/1
Bull Thistle	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1	0/2
Rose	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1
Cherry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1
Elderberry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1

[a]See Table 47 for scientific name.

[b]Sample collected in morning.

[c]Sample collected in afternoon.

[d]Number of A. fallacis observed/Number of Observations.

Table 43.--Vegetation sampled in the ground cover of Peachy I Orchard during one-minute counts, 1972.

Species[a]	8/2	8/9	8/23	8/30	9/6	9/14	9/20	9/28	10/5	10/19	10/26	11/2	Total
Apple	12/6[b]	25/5	42/5	78/7	84/7	79/9	48/5	29/6	58/9	21/8	15/9	6/8	497/84
Dock	0/6	15/5	18/3	14/4	20/5	21/6	15/7	11/8	19/8	2/8	2/8	6/7	143/75
Grape	3/4	12/4	15/4	11/4	38/5	-	19/3	18/4	11/2	0/2	-	-	132/32
Smartweed	9/7	4/4	17/3	18/4	0/1	2/2	1/3	3/4	4/1	-	-	-	58/29
Nightshade	1/1	0/1	12/2	-	2/2	18/3	1/1	-	7/2	0/1	0/2	0/2	41/17
Wild Lettace	2/3	0/2	2/1	2/1	-	1/3	-	-	-	-	-	-	7/10
Bl. Raspberry	-	0/2	1/2	0/1	6/1	0/1	-	-	1/1	0/4	0/2	0/4	8/18
Lamb's Quarters	-	0/2	-	2/1	0/2	2/4	1/2	1/2	0/1	0/1	-	0/1	6/16
Goldenrod	0/1	-	1/1	0/1	-	-	-	0/1	-	-	-	-	1/4
Sm. Ragweed	1/2	-	0/1	1/1	-	-	-	-	-	-	-	-	2/4
Sumac	-	2/1	-	-	-	-	-	-	-	-	-	-	2/1
Horse Nettle	-	4/1	7/2	2/1	5/2	-	1/1	-	-	-	-	-	19/10
Curled Dock	-	1/1	-	-	-	-	-	-	-	0/1	0/2	0/1	1/5
V. Creeper	-	-	11/2	16/1	-	16/1	-	10/2	17/1	-	-	-	70/7
Currant	-	-	18/2	8/1	10/1	-	-	-	-	-	-	1/1	37/5
Dandelion	-	-	9/1	10/1	6/3	-	0/1	1/1	1/1	-	2/3	1/3	30/14
Milkweed	-	-	-	11/1	-	-	8/1	-	3/1	-	-	-	22/3
Red Clover	-	-	-	-	7/1	-	-	1/1	-	-	-	-	8/2
Bull Thistle	-	-	-	-	0/1	-	-	-	-	-	-	-	0/1
Sorrel	-	-	-	-	-	1/1	-	-	-	-	-	-	1/1
D. Fleabane	-	-	-	-	-	-	1/3	0/1	0/1	0/1	-	0/1	1/7
Mustard	-	-	-	-	-	-	-	-	3/1	-	-	-	3/1
Pokeberry	-	-	-	-	-	-	-	-	0/1	-	-	-	0/1
Burdock	-	-	-	-	-	-	-	-	-	7/1	-	-	7/1
Poison Ivy	-	-	-	-	-	-	-	-	-	5/1	-	-	5/1
G. Cherry	-	-	-	-	-	-	-	-	-	2/2	-	-	2/2
Elderberry	-	-	-	-	-	-	-	-	-	0/1	-	0/1	0/2
Cherry	-	-	-	-	-	-	-	-	-	0/1	-	0/1	0/2
Elm	-	-	-	-	-	-	-	-	-	0/1	-	-	0/1

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of Observations.

Table 44.--Vegetation sampled in the ground cover of Peachy I Orchard during one-minute counts, 1973.

Species[a]	5/8	5/15	5/22	5/29	6/5	6/12	6/19	6/26	7/3	7/10	7/17	7/25	8/2	8/8	8/14	8/21	8/28	9/13	Total
Dandelion	1/18[b]	0/8	0/9	0/17	0/16	1/16	0/14	4/18	4/11	0/5	0/3	9/2	7/3	9/2	4/1	31/3	37/6	3/3	110/155
D. Fleabane	0/6	0/10	0/8	1/12	0/3	1/8	2/7	0/14	1/11	-	1/2	0/2	0/3	7/4	26/5	2/3	7/1	-	43/99
Dock	4/15	0/4	0/7	0/12	0/5	4/15	3/12	3/8	5/11	1/3	2/3	6/1	-	-	2/1	6/2	25/2	8/3	69/104
Curled Dock	0/5	0/2	0/2	0/1	0/1	0/2	0/1	0/1	-	0/15	1/3	0/1	-	-	-	-	0/1	-	1/20
Goldenrod	-	-	-	-	-	0/1	-	0/1	-	-	-	-	-	-	-	-	-	-	0/2
Wild Lettace	-	-	-	0/1	-	0/4	0/3	2/3	9/6	5/3	2/5	8/5	2/3	15/6	2/2	6/5	7/1	2/3	60/50
Red Clover	0/5	0/1	-	0/1	0/1	-	-	-	-	0/1	-	-	-	-	3/2	-	-	-	3/12
Bl. Raspberry	1/6	0/2	0/1	0/4	-	0/2	2/2	-	0/1	1/1	1/2	2/3	3/4	4/2	7/5	1/2	9/3	3/4	34/44
Currant	0/2	0/1	0/1	0/1	-	2/2	0/1	-	2/2	2/2	5/1	3/1	6/1	-	48/4	11/2	-	-	79/21
Grape	0/1	-	-	-	-	-	4/1	3/2	5/3	5/2	5/3	17/5	10/2	2/1	19/3	16/3	19/2	8/3	113/26
Mustard	0/1	-	-	0/1	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	0/3
B. Plantain	0/1	-	-	0/3	0/2	0/1	-	-	0/1	0/1	0/1	-	-	-	-	-	-	-	0/10
Rose	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Elderberry	-	0/1	0/1	0/1	0/1	0/2	-	-	1/1	-	-	-	-	-	-	-	-	-	1/7
Nightshade	-	-	0/1	0/2	-	-	-	1/1	0/1	-	-	12/2	4/1	5/1	9/3	1/1	5/2	3/2	40/17
Gt. Ragweed	-	-	-	0/1	-	-	0/1	0/1	0/1	-	-	-	-	-	-	-	4/2	-	4/6
Bedstraw	-	-	-	0/1	-	-	0/2	-	-	-	-	-	-	-	-	-	-	-	0/3
Cirquefoil	-	-	-	0/1	-	-	0/1	-	1/1	-	-	-	-	-	-	-	-	-	1/3
Smartweed	-	-	-	-	0/1	1/5	2/6	0/1	1/4	1/6	1/4	3/2	12/8	10/7	17/2	3/3	5/1	-	56/51
V. Creeper	-	-	-	-	-	0/1	-	2/4	0/3	-	-	-	-	-	8/1	-	9/1	13/2	31/12
Lamb's Quarter	-	-	-	0/1	-	0/1	-	0/2	0/1	0/1	0/1	6/6	4/3	4/4	0/1	2/4	3/3	5/3	43/31
Chickory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1/1	1/1
Sorrel	-	-	-	-	-	-	0/1	-	-	-	3/1	-	-	-	-	-	-	-	3/2
Cherry	-	-	-	-	-	-	0/1	0/2	-	-	-	-	-	-	-	-	7/1	10/2	17/6
Sm. Ragweed	-	-	-	-	-	-	1/3	0/1	0/1	-	1/2	2/1	0/1	1/1	-	1/1	3/1	1/1	10/13
Pokeberry	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	0/1	-	0/2
Horse Nettle	-	-	-	-	-	-	1/2	0/1	1/1	7/2	3/1	-	7/1	13/2	-	10/1	18/1	8/2	68/14

[a]See Table 47 for scientific name.

[b]Number of A. fallacis observed/Number of Observations.

Table 45.--Vegetation sampled in the ground cover of Peachy II Orchard during one-minute counts, 1972.

Species[a]	8/2	8/9	8/16	8/23	8/30	9/6	9/14	9/20	9/28	10/5	10/12	10/19	10/26	11/2	Total
Apple	7/5[b]	3/3	16/5	10/2	22/5	12/3	31/6	16/6	22/6	23/4	17/7	15/7	10/7	1/7	205/73
Dock	3/4	14/7	6/3	23/5	7/7	10/4	1/4	2/7	10/10	2/4	2/3	0/3	0/4	2/7	92/72
Smartweed	0/1	-	1/1	-	-	-	-	-	-	-	-	-	-	-	1/2
Goldenrod	0/1	2/2	0/1	6/3	0/1	-	3/1	0/1	4/2	1/4	1/2	0/2	0/3	0/1	17/24
Wild Lettuce	4/5	2/5	2/3	8/6	1/1	0/1	-	-	-	-	-	0/1	-	-	17/22
St. Ragweed	13/3	4/3	5/2	1/3	5/1	0/3	0/1	0/2	-	-	-	0/1	0/1	-	28/20
V. Creeper	16/3	3/1	-	5/1	10/2	17/2	31/2	1/1	7/1	18/1	-	-	-	-	108/14
D. Fleabane	1/2	-	-	-	-	-	0/1	0/1	-	1/1	-	0/1	0/1	0/2	2/9
Grape	2/1	-	6/3	11/2	6/1	17/2	30/2	12/1	4/1	7/2	7/2	0/1	-	-	102/18
Bl. Raspberry	1/1	2/1	-	-	b/1	-	-	-	-	-	-	0/2	0/2	0/3	3/12
Milkweed	2/1	0/1	17/1	8/2	7/4	11/2	-	1/1	5/2	3/1	0/1	0/1	0/2	-	54/19
Lamb's Quarter	0/1	-	-	1/1	-	-	-	-	-	-	-	-	-	-	1/2
Horse Nettle	-	5/4	-	-	1/1	1/1	-	0/1	-	0/1	-	-	-	-	7/8
May Apple	-	0/1	9/2	-	-	-	-	-	-	-	-	-	-	-	9/3
Pokeberry	-	-	0/2	-	-	0/1	1/2	0/1	1/1	4/1	0/3	0/1	-	-	6/12
Nightshade	-	-	0/1	2/1	1/2	20/2	1/3	-	1/2	0/2	0/1	-	-	0/1	25/15
Sm. Ragweed	-	-	-	3/1	-	-	-	-	-	-	-	-	-	-	3/1
Elderberry	-	-	-	1/1	4/1	28/2	18/2	18/3	10/2	12/2	9/3	3/3	4/3	1/3	80/25
Motherwort	-	-	-	4/1	-	-	2/1	1/2	-	5/1	-	1/1	-	0/1	13/7
Dandelion	-	-	-	-	2/1	0/1	2/1	0/1	0/2	3/2	1/2	0/2	0/4	0/2	9/18
N.Y. Weed	-	-	-	-	6/1	2/1	20/2	-	-	-	-	-	-	-	28/4
Sumac	-	-	-	-	-	-	2/1	-	-	-	-	-	-	-	2/1
Burdock	-	-	-	-	-	-	0/1	0/1	0/1	2/1	0/1	-	-	-	2/5
Cherry	-	-	-	-	-	-	-	-	-	1/1	-	-	-	-	1/1
Curled Dock	-	-	-	-	-	-	-	-	-	0/1	0/1	0/1	0/1	0/1	0/5
Cinquefoil	-	-	-	-	-	-	-	-	-	1/1	-	-	0/1	-	1/2
Poison Ivy	-	-	-	-	-	-	-	-	-	-	9/3	0/1	-	-	9/4
Currant	-	-	-	-	-	-	-	-	-	-	5/1	-	-	-	5/1
Elm	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1	0/1
Bull Thistle	-	-	-	-	-	-	-	-	-	-	-	-	-	21/1	21/1

[a]See Table 47 for scientific name.

[b]Number of *A. fallacis* observed/Number of Observations.

Table 46.--Vegetation sampled in the ground cover of Peachy II Orchard during one-minute counts, 1973.

Species[a]	5/8	5/15	5/22	5/29	6/5	6/12	6/19	6/26	7/3	7/10	7/17	7/25	8/2	8/3	8/14	8/21	8/28	9/13	Total
Dandelion	0/5[b]	0/12	0/6	0/6	0/8	0/2	0/8	0/7	-	2/4	0/2	9/3	4/4	7/3	2/1	6/2	76/5	10/7	116/85
Elderberry	0/2	0/2	-	-	0/1	1/3	-	0/1	0/1	1/2	1/2	-	2/1	3/1	10/1	29/3	13/1	-	60/21
Curled Dock	0/1	-	0/1	0/1	0/1	-	0/1	0/1	-	-	-	-	-	-	-	-	-	-	0/6
Dock	0/13	0/7	0/9	0/10	0/21	3/23	5/12	5/16	2/11	3/6	0/2	8/6	-	5/5	8/2	15/4	48/4	10/6	111/157
Motherwort	0/1	-	-	-	-	-	0/1	-	-	3/2	0/1	-	-	-	-	-	1/1	-	4/6
D. Fleabane	0/6	0/4	0/4	0/3	1/9	0/12	2/11	0/7	0/2	0/1	1/3	-	6/4	3/2	0/1	6/3	12/2	3/5	34/79
Mustard	0/2	0/2	0/2	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/7
Goldenrod	-	0/2	0/4	0/1	0/6	0/4	0/3	2/11	0/1	3/2	4/4	3/3	20/5	9/4	33/5	23/7	12/3	4/2	113/67
Burdock	-	0/1	-	-	-	0/1	-	0/2	2/1	-	0/1	-	-	-	-	5/1	-	-	7/6
Red Clover	-	-	0/1	0/1	-	-	0/1	0/1	-	-	-	-	-	-	-	-	-	-	0/4
Wild Lettuce	-	-	0/2	0/2	0/6	0/2	1/3	2/8	2/5	11/5	0/2	10/5	3/4	3/4	20/8	5/2	11/4	-	63/71
Sm. Ragweed	-	-	0/1	-	0/1	-	0/1	-	0/1	-	0/1	0/1	1/1	-	4/1	7/1	2/2	-	14/11
Sorrel	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	0/1
Elm	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Cherry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	21/1	21/1
Q-A Lace	-	-	-	-	-	-	-	-	-	-	-	0/1	-	-	-	-	-	-	0/1
Chickweed	-	-	-	0/1	-	-	0/2	-	-	-	-	-	-	-	-	-	-	-	0/3
Cockle	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Nightshade	-	-	-	0/1	-	-	0/1	0/1	-	-	-	-	-	-	-	-	-	-	0/3
Gt. Ragweed	-	-	-	0/1	0/4	0/5	0/2	0/2	0/2	0/2	0/3	2/4	1/1	11/4	6/2	2/2	8/2	1/2	31/38
Plantain	-	-	-	-	0/2	-	-	-	-	-	-	-	-	-	-	-	-	-	0/2
Sow Thistle	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8/1	8/1	16/2
Bedstraw	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	-	-	0/1
Bl. Raspberry	-	-	-	-	-	1/3	0/2	0/1	0/1	1/1	-	-	0/1	0/2	-	6/2	-	-	9/13
V. Creeper	-	-	-	-	-	1/1	5/1	-	1/3	-	-	1/1	-	5/1	6/1	5/1	31/2	13/1	68/12
Smartweed	-	-	-	-	-	0/1	0/2	-	0/1	0/3	0/1	1/1	14/5	4/2	15/2	1/1	8/1	1/1	44/21
Milkweed	-	-	-	-	-	0/1	2/4	1/1	-	-	1/2	-	-	4/1	4/2	13/1	-	2/2	28/15
Grape	-	-	-	-	-	2/2	0/1	-	-	-	3/3	7/2	-	-	5/1	-	-	17/1	34/10
Horse Nettle	-	-	-	-	-	-	0/1	-	0/1	-	3/2	0/3	9/4	2/1	6/3	-	11/2	1/1	32/18
Pokeberry	-	-	-	-	-	-	0/2	-	-	-	5/1	-	-	-	-	-	-	-	5/3
Yarrow	-	-	-	-	-	-	0/1	-	-	-	-	-	-	-	-	-	-	-	0/1
Lamb's Quarters	-	-	-	-	-	-	-	1/1	-	0/1	-	-	-	-	-	-	-	-	1/2

[a] See Table 47 for scientific name.

[b] Number of A. fallacis observed/Number of Observations.

Table 47.--Plants recorded in one-minute counts from the ground cover of Michigan apple orchards, 1972 to 1973.

Alfalfa	Medicago sativa L.
Apple	Pyrus malus L.
Ash	Fraxinus sp.
Asparagus	Asparagus officinalis L.
Bedstraw	Galium sp.
Bindweed, Field	Convolvulus arvensis L.
Black Raspberry	Rubus occidentalis L.
Boxelder	Acer negundo L.
Buckhorn Plantain	Plantago lanceolata L.
Bull Thistle	Cirsium vulgare Tenore
Burdock	Arctium minus Bernh.
Cherry	Prunus spp.
Chickory	Cichorium intybus L.
Chickweed	Stellaria sp.
Cirquefoil	Potentilla sp.
Cockle	Lychnis spp.
Corn	Zea maize L.
Cress	Cardamine sp.
Curled Dock	Rumex crispus L.
Currant	Ribes vulgare Lam.
Daisey Fleabane	Erigeron annuus L.
Dandelion	Taraxacum officinale Weber
Dock, Broad-leaf	Rumex obtusifolius L.
Elderberry	Sambucus canadensis L.
Elm	Ulmus fulva Michx.
Grape	Vitus spp.
Great Ragweed	Ambrosia trifida L.
Ground Cherry	Physalis heterophylla Nees
Goldenrod	Solidago spp.
Hickory	Carya spp.

Table 47.--Continued.

Honeysuckle	*Lonicera* sp.
Horse Nettle	*Solanum carolinense* L.
Lamb's-quarters	*Chenopodium album* L.
Maple	*Acer* sp.
Mayapple	*Podophyllum peltatum* L.
Milkweed, Common	*Asclepias syriaca* L.
Motherwort	*Leonurus cardiaca* L.
Mulberry	*Morus rubra* L.
Mustard	*Brassica* sp.
Nettle, Stinging	*Urtica dioica* L.
Nightshade, Bitter	*Solanum dulcamara* L.
Oak	*Quercus* spp.
Peppergrass	*Lepidium virginicum* L.
Plantain, Broadleaf	*Plantago major* L.
Poison ivy	*Rhus radicans* L.
Pokeberry	*Phytolacca americana* L.
Queen Ann's Lace	*Dacus carota* L.
Ragweed	*Ambrosia artemisiifolia* L.
Red Clover	*Trifolium pratense* L.
Rose	*Rosa* sp.
Smartweed	*Polygonum* spp.
Sorrel, Red	*Rumex acetosella* L.
Sow Thistle	*Sonchus arvensis* L.
Strawberry	*Fragaria virginiana* Duchesne
Sumac	*Rhus* sp.
Sweet Cicely	*Osmorhiza claytoni* (Michx)
Vetch	*Vicia villosa* Roth
Virginia Creeper	*Parthenocissus quinquefolia* L.
Wild Geranium	*Geranium maculatum* L.
Wild Lettace	*Lactuca canadensis* L.
Yarrow	*Achillea millefolium* L.

Table 48.--The average number* of *Amblyseius fallacis* found on 100 apple sucker leaves at Klackle Orchard in 1973.

Date	1973 Sample
6/7	.28 ± .06
6/14	.14 ± .05
6/20	.14 ± .04
6/28	.17 ± .04
7/5	.13 ± .03
7/12	.35 ± .06
7/19	.55 ± .09
7/26	.73 ± .10
7/31	1.24 ± .11
8/9	.60 ± .11
8/16	.64 ± .10
8/23	.86 ± .10

*=Mean ± Standard Error

Table 49.--The average number* of Amblyseius fallacis found on 100 apple sucker leaves at Rasch Orchard, 1973.

Date	1973 Sample
6/7	.08 ± .03
6/14	.06 ± .03
6/20	.12 ± .04
6/28	.21 ± .04
7/5	.06 ± .03
7/12	.11 ± .03
7/19	.10 ± .03
7/26	.24 ± .05
7/31	.34 ± .06
8/9	.45 ± .07
8/16	.51 ± .10
8/23	.99 ± .11
8/29	.52 ± .09
9/7	.49 ± .09
9/19	.46 ± .07
10/4	.57 ± .10
10/16	.14 ± .06

*= Mean ± Standard Error

Table 50.--The average number* of *Amblyseius fallacis* found on 100 apple sucker leaves at Kraft Orchard 1973 and 1974.

Date	1973 Sample	Date	1974 Sample
6/7	.04 ± .02	6/11	.02 ± .01
6/14	.01 ± .01	6/27	0
6/20	.03 ± .02	7/12	.06 ± .03
6/28	.05 ± .02	7/25	.12 ± .04
7/5	.35 ± .07	8/1	.19 ± .03
7/12	.08 ± .03	8/6	.24 ± .05
7/19	.13 ± .05	8/15	.16 ± .04
7/26	.19 ± .04	8/22	.08 ± .03
7/31	.15 ± .04	8/29	.17 ± .04
8/9	.23 ± .04	9/5	.06 ± .03
8/16	.48 ± .08	9/12	.03 ± .02
8/23	.79 ± .13		
8/29	.33 ± .07		
9/7	.47 ± .10		
9/19	.35 ± .07		
10/4	.43 ± .12		
10/16	.10 ± .03		

*= Mean ± Standard Error

Table 51.--The average number* of *Amblyseius fallacis* found on 100 apple sucker leaves at Gavin Orchard 1973 and 1974.

Date	1973 Sample	Date	1974 Sample
6/7	0	6/11	0
6/14	0	6/27	0
6/20	0	7/12	0
6/28	0	7/25	0
7/5	0	8/6	0
7/12	0	8/15	0
7/19	0	8/22	0
7/26	0	8/29	.08 ± .04
7/31	.03 ± .02	9/12	.22 ± .06
8/9	.14 ± .04		
8/16	.42 ± .09		
8/23	.94 ± .13		
8/29	.69 ± .12		
9/7	1.00 ± .14		
9/19	1.31 ± .12		
10/4	2.60 ± .22		
10/16	1.08 ± .13		

*=Mean ± Standard Error

Table 52.--The average number* of *Amblyseius fallacis* found on 100 apple sucker leaves at Babcock Orchard in 1973.

Date	1974 Sample
6/5	0
6/12	0
6/19	.02 ± .01
6/26	0
7/3	.02 ± .01
7/10	.05 ± .02
7/17	.08 ± .05
7/25	.22 ± .06
8/2	.13 ± .04
8/8	.10 ± .15
8/14	.12 ± .05
8/21	.16 ± .05
8/28	.22 ± .05
9/13	.33 ± .04

*=Mean ± Standard Error

Table 53.--The average number* of *Amblyseius fallacis* found on 100 apple sucker leaves at Dowd Orchard, 1973 and 1974.

Date	1973 Sample	Date	1974 Sample
6/5	.07 ± .03	6/6	.01 ± .01
6/12	.06 ± .03	6/20	.01 ± .01
6/19	.01 ± .01	7/2	0
6/26	.04 ± .02	7/16	.04 ± .02
7/3	.04 ± .02	7/30	.05 ± .03
7/10	.06 ± .02	8/8	.07 ± .03
7/17	.16 ± .04	8/13	.33 ± .06
7/25	.34 ± .07	8/20	.47 ± .08
8/2	.60 ± .08	8/27	.17 ± .04
8/8	.57 ± .08	9/10	.21 ± .06
8/14	1.55 ± .13		
8/21	1.62 ± .15		
8/28	1.44 ± .16		
9/13	.51 ± .10		

*=Mean ± Standard Error

Table 54.--The average number* of <u>Amblyseius fallacis</u> found on 100 apple sucker leaves at Peachy I Orchard, 1973 and 1974.

Date	1973 Sample	Date	1974 Sample
6/5	.02 ± .01	6/6	.02 ± .01
6/12	.04 ± .02	6/20	.01 ± .01
6/19	.06 ± .02	7/2	.04 ± .02
6/26	.10 ± .03	7/16	.01 ± .01
7/3	.16 ± .04	7/30	0
7/10	.22 ± .05	8/8	.02 ± .01
7/17	.40 ± .07	8/13	.06 ± .02
7/25	.61 ± .08	8/20	.07 ± .04
8/2	.74 ± .09	8/27	.19 ± .05
8/8	.77 ± .11	9/10	.11 ± .03
8/14	1.64 ± .14		
8/21	.98 ± .12		
8/28	1.72 ± .19		
9/13	196 ± .11		

*=Mean ± Standard Error

Table 55.--The average number* of <u>Amblyseius fallacis</u> found on 100 apple sucker leaves at Peachy II Orchard, 1973 and 1974.

Date	1973 Sample	Date	1974 Sample
6/5	0	6/6	.01 ± .01
6/12	.01 ± .01	6/20	.04 ± .02
6/19	.03 ± .02	7/2	.03 ± .02
6/26	.12 ± .04	7/16	.08 ± .03
7/3	.08 ± .03	7/30	.23 ± .05
7/10	.20 ± .04	8/8	.18 ± .04
7/17	.30 ± .07	8/13	.39 ± .07
7/25	.41 ± .07	8/20	.59 ± .09
8/2	.77 ± .09	8/27	.07 ± .03
8/8	1.01 ± .10	9/10	.18 ± .05
8/14	2.28 ± .24		
8/21	1.31 ± .17		
8/28	2.45 ± .18		
9/13	1.11 ± .11		

*=Mean ± Standard Error

Table 56.--Number of *A. fallacis* collected on bean plants in Klackle Orchard, 1972.

Tree	Direction	Date					
		6/8-14	6/21-28	7/20-26	8/3-8	8/29-9/5	9/26-10/3
#1	N	0	c-0	1	1	2	1
	S	3	c-0	0	0	17	0
	E	c-1	1	c-3	c-1	c-1	c-1
	W	c-4	0	c-0	c-0	c-3	c-2
#2	N	0	0	c-0	-	-	5
	S	0	0	c-0	-	c-7	3
	E	c-1	c-0	1	0	2	c-5
	W	c-0	c-0	1	-	3	c-10
#3	N	c-0	0	1	-	-	c-14
	S	c-0	0	1	-	4	c-0
	E	1	c-3	-	0	-	7
	W	0	c-0	c-3	-	-	0
#4	N	c-2	c-0	0	0	0	1
	S	c-4	c-0	0	0	14	1
	E	2	0	c-1	c-3	-	c-6
	W	0	0	c-3	c-0	c-2	c-1
#5	N	c-0	0	c-5	-	c-9	c-8
	S	c-0	0	c-3	c-0	c-2	c-2
	E	1	c-1	4	2	1	4
	W	1	c-0	3	3	-	4

- = Plant destroyed.
c = Plant located close to tree trunk.

Table 57.--Number of *A. fallacis* collected on bean plants in Klackle Orchard, 1973.

Tree	Direction	Date			
		May 24	May 31	June 7	June 20
#1	N	0	c-0	-	8
	S	0	c-1	c-2	3
	E	c-0	0	0	c-1
	W	c-0	0	-	c-1
#2	N	c-0	0	0	c-1
	S	c-2	0	0	c-4
	E	0	c-0	c-8	0
	W	0	c-1	c-0	4
#3	N	-	c-3	c-5	0
	S	0	c-0	c-1	1
	E	-	0	1	c-2
	W	-	0	0	c-2
#4	N	c-0	0	0	0
	S	c-0	0	1	2
	E	0	c-3	c-4	c-2
	W	0	c-0	c-4	c-7
#5	N	0	c-0	c-1	c-3
	S	0	c-0	c-5	-
	E	c-0	0	2	3
	W	c-0	0	1	0

\- = Plant destroyed
c = Plant located close to tree trunk

Table 58.--Number of A. fallacis collected on bean plants in Rasch Orchard, 1972.

Tree	Direction	Date 6/8-14	6/21-28	7/5-12	7/20-26	8/3-8	8/15-22	8/29-9/5	9/12-21	9/26-10/3
#1	N	0	0	c-0	c-0	0	c-0	0	c-0	5
	S	0	0	c-0	c-0	0	c-0	0	c-3	2
	E	c-0	c-0	0	0	c-0	0	c-0	2	c-0
	W	c-0	c-0	0	0	-	0	c-1	2	c-2
#2	N	c-0	0	c-0	2	c-0	0	c-1	0	c-1
	S	c-1	-	c-1	0	-	0	c-0	0	c-0
	E	7	c-2	1	c-0	0	c-1	0	c-1	0
	W	0	c-1	2	c-1	0	c-0	4	c-0	2
#3	N	c-3	c-1	2	c-4	0	c-0	2	c-0	10
	S	c-0	c-0	2	c-0	1	c-0	2	c-1	1
	E	1	0	c-0	0	c-0	0	c-1	0	-
	W	0	0	c-0	0	c-0	0	c-1	0	c-1
#4	N	1	c-0	c-3	0	c-0	0	-	0	-
	S	0	c-0	c-2	0	c-1	1	c-1	7	c-11
	E	c-5	0	0	c-2	2	c-1	3	c-0	21
	W	c-0	5	1	c-0	1	c-0	2	-	4
#5	N	c-1	c-0	c-0	c-0	0	c-0	1	-	-
	S	c-2	c-0	c-0	c-1	0	c-1	-	-	-
	E	0	0	0	0	c-0	0	c-2	5	-
	W	0	1	0	1	c-0	0	c-12	4	2

- = Plant destroyed.

c = Plant located close to tree trunk.

Table 59.--Number of *A. fallacis* collected on bean plants in Rasch Orchard, 1973.

Tree	Direction	Date May 17	May 24	May 31	June 7	June 20
#1	N	c-0	0	c-0	c-0	1
	S	c-1	0	c-0	c-0	0
	E	0	c-0	0	0	c-0
	W	0	c-3	0	1	c-0
#2	N	c-0	2	c-0	c-0	2
	S	c-0	0	c-0	c-0	0
	E	0	c-0	0	0	c-4
	W	1	c-0	0	0	c-9
#3	N	0	c-0	1	3	c-0
	S	0	c-0	1	3	c-0
	E	c-1	0	c-0	c-0	6
	W	c-0	0	c-0	c-0	0
#4	N	0	0	c-0	2	c-16
	S	0	0	c-0	0	c-0
	E	c-0	c-0	0	c-13	2
	W	-	c-4	0	0	6

- = Plant destroyed
c = Plant located close to tree trunk

Table 60.--Number of <u>A</u>. <u>fallacis</u> collected on bean plants in Kraft Orchard, 1972.

Tree	Direction	Date 6/8-14	6/21-28	7/5-12	7/20-26	8/3-8	8/15-22	8/29-9/5	9/12-21	9/26-10/3
#1	N	1	0	c-7	c-3	0	c-0	c-26	4	c-10
	S	0	-	c-0	c-3	0	c-0	c-22	-	c-1
	E	c-0	c-0	0	1	c-0	6	9	-	1
	W	c-1	c-0	1	3	c-1	2	4	-	1
#2	N	c-0	c-0	0	c-2	c-0	0	c-13	1	c-1
	S	c-0	c-0	0	c-5	c-1	10	c-18	1	c-6
	E	0	0	c-1	2	0	c-1	18	c-1	2
	W	0	0	c-3	1	0	c-2	6	c-3	1
#3	N	c-1	c-0	c-0	1	0	c-1	9	c-7	3
	S	c-0	c-0	c-0	0	0	c-1	1	c-2	1
	E	0	0	1	c-2	c-2	2	c-11	0	c-2
	W	0	0	0	c-5	c-0	1	c-2	2	c-0
#4	N	c-0	c-0	c-2	c-2	0	3	c-17	-	4
	S	c-1	c-1	c-2	c-1	0	2	c-13	-	2
	E	3	0	1	6	c-0	c-1	41	-	c-0
	W	-	0	0	2	c-0	c-1	3	-	c-1
#5	N	0	1	c-7	1	1	2	c-16	8	c-2
	S	0	0	c-2	1	1	2	c-8	1	c-2
	E	c-0	c-0	1	c-1	c-0	c-6	0	c-1	4
	W	c-0	c-0	0	c-5	c-1	c-3	12	-	2

- = Plant destroyed.
c = Plant located close to tree trunk.

Table 61.--Number of A. fallacis collected on bean plants in Kraft Orchard, 1973.

Tree	Direction	Date April 27	May 24	May 31	June 7	June 20
#1	N		c-1	0	0	1
	S		c-0	c-0	1	0
	E		0	0	c-0	c-2
	W	1	0	0	c-0	c-0
#2	N	c-1	c-1	c-0	0	0
	S		c-0	c-0	0	0
	E		0	0	c-1	c-0
	W		0	0	c-0	c-0
#3	N	c-11	0	0	c-1	-
	S		0	0	c-0	-
	E		c-0	c-0	0	-
	W		c-0	c-0	0	-
#4	N		0	0	c-0	c-1
	S		0	0	c-0	c-4
	E		c-0	c-0	0	0
	W		c-0	c-0	0	0
#5	N	c-1	0	0	-	-
	S		0	0	1	1
	E		c-0	c-0	-	c-0
	W		c-0	c-0	-	c-0

- = Plant destroyed
c = Plant located close to tree trunk

Table 62.--Number of A. fallacis collected on bean plants in Gavin Orchard, 1972.

Tree	Direction	Date							
		6/21-28	7/5-12	7/20-26	8/3-8	8/15-22	8/29-9/5	9/12-21	9/26-10/3
#1	N	c-0	0	0	c-0	0	c-4	1	c-1
	S	c-0	0	0	c-1	0	-	0	c-1
	E	0	c-0	c-0	0	c-0	-	c-1	0
	W	0	c-0	c-0	0	c-0	0	c-3	-
#2	N	c-0	0	c-0	c-0	0	0	0	c-0
	S	c-0	0	c-0	c-0	0	1	0	-
	E	0	c-0	1	0	c-0	c-1	c-3	0
	W	0	c-0	0	0	c-0	c-1	c-1	-
#3	N	0	0	c-0	0	c-0	c-0	-	-
	S	0	-	c-0	0	c-0	c-0	-	-
	E	c-0	c-0	0	c-0	0	-	0	-
	W	c-0	c-0	0	c-0	0	0	1	-

- = Plant destroyed
c = Plant located close to tree trunk

Table 63.--Number of *A. fallacis* collected on bean plants in Gavin Orchard, 1973.

Tree	Direction	Date May 17	May 24	May 31	June 17	June 20
#1	N	0	c-0	c-0	0	c-0
	S	0	c-0	c-0	0	c-0
	E	c-0	0	0	c-0	0
	W	c-0	0	0	c-0	0
#2	N	0	c-0	c-0	0	-
	S	0	c-0	c-0	0	-
	E	c-0	0	1	c-0	c-0
	W	c-0	0	0	c-0	c-0
#3	N	c-0	0	0	c-0	c-0
	S	c-0	0	0	c-0	c-0
	E	0	c-0	c-0	0	0
	W	0	c-0	c-0	0	0
#4	N	0	c-0	c-0	-	c-0
	S	0	c-0	c-0	0	c-0
	E	c-0	0	0	c-0	0
	W	c-0	0	0	c-0	0
#5	N	c-0	0	0	c-0	0
	S	c-0	1	0	c-0	0
	E	0	c-0	c-0	0	c-0
	W	0	c-0	c-0	0	c-0

- = Plant destroyed
c = Plant located close to tree trunk

Table 64.--Number of A. fallacis collected on bean plants in Carpenter Orchard, 1972.

Tree	Direction	Date 6/16-22	6/21-28	7/5-12	7/20-26	8/3-8	8/15-22	8/29-9/5	9/26-10/3
#1	N	0	c-0	0	c-0	0	0	c-0	2
	S	0	c-0	0	-	0	0	c-1	0
	E	c-0	0	c-0	0	-	c-0	0	c-1
	W	-	0	-	0	c-0	-	-	c-0
#2	N	c-0	0	c-0	0	c-0	0	0	c-3
	S	c-0	0	c-0	0	c-0	0	0	c-0
	E	0	c-0	0	c-0	0	c-0	c-0	1
	W	0	-	0	c-0	0	c-0	c-0	0
#3	N	c-0	0	-	-	c-0	0	0	c-2
	S	c-0	0	c-0	0	c-0	0	0	c-7
	E	0	c-0	0	c-0	0	c-0	c-0	0
	W	0	c-0	0	c-0	0	c-0	c-0	0
#4	N	0	c-0	0	-	c-0	0	0	c-1
	S	0	c-0	0	c-0	c-0	0	0	c-2
	E	c-0	0	c-0	-	0	c-0	c-0	1
	W	c-0	0	c-0	0	0	c-0	c-0	0
#5	N	c-0	0	c-0	0	c-0	c-3	1	c-4
	S	c-0	0	c-0	0	c-0	c-0	0	c-6
	E	0	c-0	0	c-0	0	0	c-1	2
	W	0	-	0	c-0	0	0	c-1	1

- = Plant destroyed
c = Plant located close to tree trunk

Table 65.--Number of *A. fallacis* collected on bean plants in Carpenter Orchard, 1973.

Tree	Direction	Date May 15	May 29	June 5
#1	N	0	0	c-0
	S	0	-	-
	E	c-0	c-0	0
	W	c-0	c-0	0
#2	N	0	c-0	c-0
	S	0	c-0	c-0
	E	c-0	0	0
	W	c-0	0	0
#3	N	c-0	0	-
	S	c-1	0	0
	E	0	c-0	c-1
	W	0	c-0	c-0
#4	N	0	-	-
	S	0	-	-
	E	c-0		
	W	c-0		
#5	N	0	c-0	c-0
	S	0	c-0	c-0
	E	c-0	0	0
	W	c-0	0	0

- = Plant destroyed
c = Plant located close to tree trunk

Table 66.--Number of _A. fallacis_ collected on bean plants in Babcock Orchard, 1972.

Tree	Direction	Tree							
		6/21-28	7/5-12	7/20-26	8/3-8	8/15-22	8/29-9/5	9/12-21	9/26-10/3
#1	N	c-0	0	c-1	c-2	4	c-6	4	c-0
	S	c-0	0	c-2	c-5	7	c-2	-	c-0
	E	0	c-0	2	1	c-6	-	-	0
	W	0	c-0	0	0	c-2	15	c-4	0
#2	N	c-0	0	c-3	0	1	c-9	-	3
	S	c-0	0	c-0	4	5	c-8	-	1
	E	0	c-0	0	c-0	-	3	c-9	c-3
	W	0	c-1	0	c-2	-	4	c-7	c-2
#3	N	c-0	0	c-5	4	c-5	5	-	0
	S	c-0	0	c-0	4	c-14	1	-	5
	E	0	c-0	1	c-4	0	c-3	3	c-8
	W	0	c-0	0	c-4	5	c-5	2	c-5
#4	N	c-2	0	-	0	c-5	c-13	-	c-3
	S	c-0	0	-	1	c-0	c-5	-	c-0
	E	0	c-0	1	c-1	19	8	1	1
	W	0	-	0	c-1	1	2	-	0
#5	N	0	c-0	c-1	2	2	c-1	-	c-0
	S	1	c-0	c-4	0	0	c-1	-	c-2
	E	c-0	0	1	c-7	c-10	10	-	1
	W	c-0	0	1	c-0	c-1	16	-	1

- = Plant destroyed.
c = Plant located close to tree trunk.

Table 67.--Number of A. fallacis collected on bean plants in Babcock Orchard, 1973.

Tree	Direction	Date May 15	May 29	June 5	June 19	July 3
#1	N	c-0	c-0	c-0	0	-
	S	c-0	c-0	c-0	0	c-2
	E	0	-	-	c-0	0
	W	0	0	0	c-0	0
#2	N	0	c-0	c-2	c-0	0
	S	0	c-0	c-0	c-0	0
	E	c-0	-	-	0	c-0
	W	c-0	0	0	0	c-0
#3	N	c-0	c-0	c-0	-	0
	S	c-0	c-0	c-0	0	0
	E	0	0	0	c-0	c-0
	W	0	0	0	c-0	c-2
#4	N	0	c-0	c-1	0	0
	S	0	c-0	c-0	0	0
	E	c-0	-	-	c-0	c-2
	W	c-0	-	-	c-4	c-2
#5	N	c-0	0	0	0	0
	S	c-0	0	0	0	0
	E	0	c-0	c-0	c-1	c-0
	W	0	c-0	c-1	c-0	c-0

- = Plant destroyed
c = Plant located close to tree trunk

Table 68.--Number of *A. fallacis* collected on bean plants in Dowd Orchard, 1972.

Tree	Direction	Date 6/16-22	6/21-28	7/5-12	7/20-26	8/3-8	8/15-22	8/29-9/5	9/26-10/3
#1	N	c-0	-	5	c-5	c-1	1	c-9	29
	S	c-0	-	0	c-2	c-0	4	c-10	18
	E	1	0	c-0	4	0	c-9	23	c-23
	W	0	0	c-2	2	0	c-4	9	c-3
#2	N	2	0	0	1	1	c-7	8	11
	S	0	1	1	2	0	C-7	12	2
	E	c-0	c-0	c-0	c-1	c-0	10	c-3	c-20
	W	c-0	c-1	c-0	c-1	c-2	3	c-20	c-0
#3	N	c-5	c-0	3	c-3	c-0	15	c-38	c-3
	S	c-1	c-0	3	c-5	c-0	15	c-32	c-9
	E	1	0	c-0	-	0	c-7	15	1
	W	0	1	c-4	6	0	c-3	26	13
#4	N	2	0	c-0	9	c-2	c-4	21	c-1
	S	0	1	c-0	3	c-0	c-0	4	c-0
	E	c-0	c-1	0	c-4	1	5	c-9	0
	W	c-1	c-1	1	c-2	2	13	c-66	0
#5	N	0	c-6	3	c-1	2	c-5	c-38	c-3
	S	1	c-1	0	c-10	5	c-1	c-17	c-3
	E	c-0	0	c-5	-	c-0	5	25	2
	W	c-0	0	c-4	-	c-3	11	33	2

- = Plant destroyed.

c = Plant located close to tree trunk.

Table 69.--Number of A. fallacis collected on bean plants in Dowd Orchard, 1973.

Tree	Direction	Date				
		May 15	May 29	June 5	June 19	July 3
# 1	N	0	c-0	c-1	0	c-0
	S	0	c-0	c-0	3	c-1
	E	c-0	0	0	c-0	4
	W	c-0	0	0	c-1	1
#2	N	0	c-0	c-0	-	c-0
	S	0	c-0	c-0	-	c-0
	E	c-0	0	0	-	5
	W	c-1	0	0	-	0
#3	N	c-0	0	4	-	0
	S	c-1	0	0	-	0
	E	0	c-0	c-0	0	c-0
	W	-	c-1	c-0	0	c-0
#4	N	c-0	0	0	c-0	0
	S	c-0	0	0	-	1
	E	0	c-0	c-0	0	c-0
	W	0	c-0	c-1	0	c-0
#5	N	0	c-0	c-0	0	c-0
	S	0	c-0	c-0	0	c-2
	E	c-0	0	0	c-0	1
	W	c-0	0	0	c-0	0

- = Plant destroyed
c = Plant located close to tree trunk

Table 70.--Number of A. fallacis collected on bean plants in Peachy I Orchard, 1972.

Tree	Direction	Date							
		6/21/28	7/5-12	7/20-26	8/3-8	8/15-22	8/29-9/5	9/12-21	9/26-10/3
#1	N	c-3	0	c-3	5	15	c-15	-	c-14
	S	c-0	-	c-2	2	31	c-23	14	c-27
	E	0	c-4	0	c-3	c-32	6	-	15
	W	0	c-0	6	c-9	c-25	16	c-5	2
#2	N	0	c-1	c-6	1	37	c-17	-	-
	S	0	c-0	-	3	5	c-45	0	c-0
	E	c-0	1	4	c-2	c-6	-	0	c-0
	W	c-0	0	0	c-2	c-4	-	-	-
#3	N	0	1	0	c-1	10	-	1	c-1
	S	0	1	1	c-3	-	12	5	-
	E	c-0	c-0	c-0	2	c-6	c-35	-	2
	W	c-0	c-0	c-1	0	c-5	c-22	-	-
#4	N	c-0	0						
	S	c-0	0						
	E	1	c-0						
	W	0	c-0						
#5	N	0	c-0						
	S	0	c-0						
	E	c-0	0						
	W	c-0	0						

- = Plant destroyed.
c = Plant located close to tree trunk.

Table 71.--Number of _A._ _fallacis_ collected on bean plants in Peachy I Orchard, 1973.

Tree	Direction	Date				
		May 15	May 29	June 5	June 19	July 3
#1	N	0	c-0	c-0	0	4
	S	0	c-0	c-0	-	4
	E	c-0	1	0	c-0	c-0
	W	c-0	0	0	c-0	c-1
#2	N	0	0	0	c-5	1
	S	0	0	0	c-7	1
	E	c-0	c-0	c-0	0	c-1
	W	c-0	c-0	c-0	-	c-0
#3	N	0	c-0	c-0	-	c-0
	S	0	c-0	c-0	0	c-1
	E	c-0	0	0	c-0	1
	W	c-0	0	1	c-0	0
#4	N		c-0	0	c-0	-
	S		c-0	0	c-0	c-0
	E		0	c-0	1	0
	W		0	c-0	0	0
#5	N		c-0	c-0	0	0
	S		c-0	c-0	0	1
	E		2	5	c-6	c-1
	W		0	1	c-0	c-0

- = Plant destroyed
c = Plant located close to tree trunk

Table 72.--Number of A. fallacis collected on bean plants in Peachy II Orchard, 1972.

Tree	Direction	Date 7/5-12	7/20-26	8/3-8	8/15-22	8/29-9/5	9/12-21	9/26-10/3
#1	N	0	c-4	2	3	c-2	0	c-3
	S	0	c-2	4	15	-	0	c-1
	E	c-0	3	c-5	c-7	8	-	2
	W	c-0	2	c-2	c-16	4	c-2	0
#2	N	c-0	8	c-8	8	2	c-1	0
	S	c-1	10	c-8	1	7	c-4	3
	E	0	-	2	c-0	c-17	1	c-1
#3	N	2	c-3	c-0	2	c-4	0	c-2
	S	0	c-3	c-4	3	c-2	0	c-3
	E	c-0	4	4	c-3	6	c-0	0
	W	c-0	6	3	c-1	2	c-2	2
#4	N	c-1	c-2	5	c-0	c-3	0	c-6
	S	c-1	-	1	c-3	c-8	1	c-0
	E	1	5	-	8	11	c-1	0
	W	0	0	c-4	8	2	c-5	1
#5	N	1	c-5	1	0	c-3	0	c-0
	S	1	c-2	6	4	c-6	1	c-1
	E	c-0	5	-	c-0	5	-	0
	W	c-0	3	c-1	c-8	2	c-0	0

- = Plant destroyed
c = Plant located close to tree trunk

Table 73.--Number of *A. fallacis* collected on bean plants in Peachy II Orchard, 1973.

Tree	Direction	Date May 15	May 29	June 5	June 19	July 3
#1	N	0	c-0	c-0	0	c-1
	S	-	c-0	c-1	-	c-0
	E	c-0	0	0	c-0	-
	W	c-0	0	0	c-0	-
#2	N	c-0	c-1	c-0	0	0
	S	c-0	c-0	c-1	0	1
	E	0	0	0	c-0	-
	W	0	0	0	c-0	-
#3	N	c-0	0	0	-	-
	S	c-0	0	0	-	c-0
	E	0	c-0	c-0	0	3
	W	-	c-0	c-0	0	0
#4	N		0	0	c-0	0
	S		0	1	c-0	0
	E		c-0	c-0	0	c-1
	W		c-0	c-0	0	c-4
#5	N		c-0	c-0	0	c-3
	S		c-0	c-0	0	c-6
	E		0	0	-	0
	W		0	0	-	0

- = Plant destroyed
c = Plant located close to tree trunk

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