CONTROL OF THE POTATO LEAFHOPPER, *EMPOASCA FABAE* (HARRIS), AND THE INFLUENCE OF LEAFHOPPER POPULATIONS ON PEANUT YIELDS IN VIRGINIA

by

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To

and

You are the bows from which your

children as living arrows are sent forth.

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I. GENERAL INTRODUCTION

The peanut, *Arachis hypogaea* L., is an important food and oil resource. Ranking third among Virginia field crops, the total dollar volume of the Virginia peanut industry amounts to approximately $125,000,000 annually (Allison 1971) or nearly 10% of the United States peanut production (McGill 1973). The potato leafhopper, *Empoasca fabae* (Harris) (Homoptera:Cicadellidae), has been considered one of the major pests of peanuts in Virginia (Batten and Poos 1938; Miller 1946). As early as 1929, Poos reported the potato leafhopper to be injurious to peanuts. Since then much research has been conducted on this leafhopper's effect on various host plants. Although potato leafhopper control has been achieved using a wide assortment of pesticides, often there is no significant yield increase in response to this control (Howe and Miller 1954; Poos *et al* 1947; Poos 1945). Such data appear to be inconsistent with research showing profitable yield increases with leafhopper control (Poos and Batten 1937; Wilson and Arant 1949; Arant 1954). The economic justification of potato leafhopper control on peanuts is unsubstantiated.

In addition, the work of Dogger (1956) and Arthur and Arant (1954, 1956) has demonstrated little influence upon peanut yields by soil insect control and thrips control. If pesticides are to remain a meaningful and useful tool in peanut crop production, careful evaluation is needed on their ultimate effect on crop yields.

Within any pest management system, it is essential to have a proper sampling technique. To record an accurate account of population size of an insect capable of rapid fluctuations in numbers, frequent samples are needed. Although the sweep-net method of sampling is known to be affected by various factors (Romney 1945; Judge et al 1970), it is a useful tool for promptly estimating leafhopper populations.

During 1975 and 1976, experiments were performed in southeast Virginia to evaluate control of the potato leafhopper by selected new and standard pesticides. In addition to testing these materials for their ability to reduce leafhopper population levels, the experiments were designed to evaluate pesticide rate reductions, timing of applications, and to ascertain the economic practicality of leafhopper control.

II. LITERATURE REVIEW

Empoasca fabae (Harris) was first described by T. W. Harris in 1841. It has been reported in more than thirty states, parts of Canada, and many Central American countries (Poos and Wheeler 1943). The leafhopper has been collected from over one hundred plant species and often reaches economic pest status on many fruits, vegetables, and forage crops (Poos and Wheeler 1943). Ball (1919) suggested the common name, potato leafhopper, while studying its impact on potatoes. Many species within the genera Empoasca are strikingly similar and may only be distinguished by genitalia characteristics (Delong 1948). This broad host range and taxonomic ambiguity hindered careful study until the genus was revised (Delong 1931). Before this revision, the leafhopper had been frequently described as a new insect species (Medler 1942).

Unlike many species of leafhoppers, the potato leafhopper feeds upon phloem tissue and xylem vessels of its host (Johnson 1934). This interferes with the translocation of food materials and water within the plant (Medler 1941). The result is yellowing of the foliage near the leaf tip. If feeding continues, the leaf may become progressively brown and eventually die (Fenton and Ressler 1922). Early researchers mistakenly took this disease-like injury to be the result of infectious organisms transmitted by the leafhopper. Perhaps due to oviposition or a higher feeding rate, the adult female causes the greatest damage to the host (Newton et al 1970).

Early investigators could find no evidence of leafhopper winter survival outside its southern breeding area (Medler 1957). All evidence suggested a spring migration rather than an overwintering stage (Delong and Caldwell 1935). Decker and Cunningham (1968) confirmed that the leafhopper overwinters in a permanent breeding area south of the 31st parallel among the Gulf coast states. Stimulated by falling atmospheric pressure, the leafhopper begins its northward migration in the early spring (Kieckhefer 1962). The insect disperses as far west as the Rocky Mountains. Although found in the southwestern United States and southern California, the potato leafhopper is not economically important in these areas (Delong 1931). Females withstand the trials of migration better than males. Early sex ratios in newly infested regions favor females over males 4:1 (Medler *et al* 1966). In Virginia, the first migrants arrive by late spring. Most females arrive fertilized (Medler *et al* 1966). Because of its great prolificacy, this insect soon becomes established in large numbers (Delong 1928). At an optimum temperature of 23.9°C, the reproductive rate is 54.5 nymphs per female (Decker *et al* 1971).

The potato leafhopper is preyed upon by certain spiders, mites, chrysopid and coccinellid larvae, and ants (Poos 1942). Fenton and Hartzell (1923) described a parasitic fungus, *Entomophthora sphaerosperma* Fresenius, as well as an egg parasite, *Anagrus armatus* Ashm, of considerable importance in Iowa. Although all stages of the leafhopper's development may be vulnerable, no known biological agent is capable of keeping the growing populations under control. Prior to the development of resistant hosts, the only successful control of the potato leafhopper was through the use of pesticides (Sprague and Dahms 1972).

Poos (1929) first suggested the leafhopper could be injurious to the peanut, *Arachis hypogaea* L. The economic justification of leafhopper control has been less certain. Early research using Bordeaux mixture (4:4:50) gave significant increases in peanut yields (Poos 1934). These increases were so dramatic, even in the absence of large leafhopper populations, that additional yield influencing factors were suspected (Poos and Batten 1937). Thrips injury on peanuts was originally attribued to toxins injected by *E. fabae* (Metcalf 1936; 1937). Poos (1941) proved the tobacco thrips, *Frankliniella fusca* (Hinds), was responsible for the injury.

The potato leafhopper has been considered one of the most important pests of peanuts in Virginia (Batten and Poos 1938; Miller 1946). Attempts to correlate significant insect control with peanut yield increases have often been lacking. Significant yield increases did not result from either thrips control (Arthur and Arant 1954; Dogger 1956) or soil insect control (Arthur and Arant 1956). Miller (1942) called leafhopper injury spasmodic and he received profitable yield increases when leafhoppers and *Cercospora* leafspot were controlled jointly. Howe and Miller (1954) obtained significant leafhopper control without affecting peanut yields. At times, this lack of association between insect control measures and plant yields has been attributed to irregular field conditions or to low infestation levels (Poos 1945; Poos *et* al 1947). Contrary to the above results, profitable yield responses in conjunction with leafhopper control have been demonstrated by some researchers (Wilson and Arant 1949; Arant 1954).

III. GENERAL MATERIALS AND METHODS

All experiments used a randomized block design replicated four times. Plots in 1975 were 12 feet (3.7m) by 20 feet (6.1m) and contained four peanut rows planted 36 inches (91cm) apart. Plot size during 1976 varied with each test. Within a row, seeds were planted 2 to 3 inches (5.0 to 7.6cm) apart and 1-1/2 or 1.5 inches (3.8cm) deep at a rate of approximately 100 lbs per acre on May 21 in 1975 and on May 25 in 1976. Except for one test at Emporia, Va., all tests were conducted at the Tidewater Research and Continuing Education Center, Suffolk, Virginia. Peanut variety VA 61R was used in all tests; this variety grows well in the fine sandy loam soils of the test area. Control plots remained untreated except for standard herbicides for weeds and Benlate[R] and Manzate[R] sprays for *Cercospora* leafspot control applied at the recommended rates to all plots.

I surveyed for leafhopper infestations weekly using a 12-inch mesh-cloth sweep net. All population counts were based upon 20 sweeps per plot. To avoid edge effect, insect pest information and yield data were taken from two inside rows. I sampled by sweeping an inside row of each plot ten times until the entire test was covered and then repeated the process on another inside row. Sweep net samples were taken in mid-morning or early afternoon. When the peanut foliage was wet or high winds occurred, no sampling was attempted. Insects collected in the sweep net were immobilized by wringing the net through a lightly clenched fist; the net was then opened and the dead or stunned insects were counted and recorded in the field.

In addition to potato leafhopper counts, I collected data on other insect populations and their injuries during certain tests in 1976. The percentage of injured fruits caused by the southern corn rootworm, Diabrotica undecimpunctata howardi Barber, was determined by hand-digging two plants from each of two inside plot rows. Peanut fruit was inspected and separated into mature and immature, and uninjured and injured categories.

The incidence of leafhopper caused leaf necrosis (hopperburn) was recorded by visual rating. Tobacco thrips, Frankliniella fusca (Hinds), feeding effects on plant growth was also visually rated.

Grade, yield, and value data were determined for all experiments in 1975 and 1976. Matured peanuts were dug using a Kelly[R] 2-row digger. Re-shaking before combining helped to remove soil. A Lilliston[R] peanut combine removed pods from plants and placed them into separate bags for each plot. After drying down to 10% moisture content, the plot samples were weighed and the pounds per acre for each plot was calculated. A one-pound sample of dried pods from each plot was used to determine the percentage of extra large kernels (ELK) and sound mature kernels (SMK).

The value per pound was computed using a value table of the Peanut Growers Cooperative Marketing Association. I determined value (dollars/acre) by multiplying the per acre yield of each plot by its pound value. Statistical analysis was performed using Duncan's Multiple Range Test.

To determine the degree to which peanut values were dependent upon certain variable independent factors (i.e., pest populations and injuries), I used the coefficient of determination (r^2). The values of r^2 range between 0 and 1; the maximum value showing complete dependence of peanut values upon pest populations or injuries and the minimum value showing a complete lack of dependence.

IV. APPLICATION OF GRANULAR PESTICIDES AT PLANTING

Methods and Materials

Granular pesticides applied at planting time were evaluated for their leafhopper control performance during 1975 and 1976. Materials tested in 1975 were applied either as 12-inch (30.5cm) band treatments or in-furrow treatments. Plot groups were separated by 2.1 meter alleys. In-furrow treatments in 1-inch (2.54cm) bands were applied using a hand-pushed, pre-calibrated Gandy^R Model 901-2 granular applicator. Band treatments were applied with the Gandy^R applicator equipped with two 6-inch (15.2 cm) spreaders per row. Both treatments were incorporated with a garden tiller.

Five insecticides were tested in 1976, each at three different rates: 0.25, 0.5, and 1.0 lb Al/acre (Table 1). The materials were applied at Emporia, Va., to twelve row plots (10.9m by 9.1m). Alley size was increased to 3.05 meters. After marking the rows with a modified cultivator, I applied the insecticides using a commercial tractor with mounted pre-calibrated Gandy^R applicators. The peanuts were harvested on October 26. Seven potato leafhopper samples were collected in 1975 and 14 samples were collected in 1976.

Results and Discussion

Of the materials tested in 1975, only treatments using Furadan, Counter, or Mocap-plus @ 3.0 lb AI/acre resulted in seasonal mean leafhopper populations significantly lower than the untreated control

Table 1. Applications of Granular Pesticides at Planting - 1976. Potato leafhopper counts on peanuts receiving planting-time applications of granular pesticides. TRACEC, Emporia, Va.

Treatment lb AI/acre		Mean number of leafhoppers/20 sweeps (ave. of 4 reps)														Seasonal mean*
		7/15	7/23	7/27	8/5	8/12	8/18	8/26	8/31	9/7	9/14	9/22	9/29	10/6	10/15	
1. Furadan 10G	1.0	1.0	3.0	1.3	2.3	0.8	1.0	3.8	2.0	0.3	0.3	1.8	2.0	1.5	0.5	1.5 e
2. Furadan 10G	0.5	2.0	3.8	1.3	3.3	4.5	1.5	2.3	3.5	0.5	0.3	1.5	2.0	2.8	0.0	2.1 e
3. Furadan 10G	0.25	0.5	7.5	4.0	2.5	5.2	5.3	7.8	5.0	0.8	0.5	2.2	6.5	4.5	0.3	3.8 cde
4. Disyston 15G	1.0	3.0	13.8	14.5	8.3	10.3	10.0	14.0	9.3	0.3	1.0	2.8	5.5	2.5	0.5	6.8 bc
5. Disyston 15G	0.5	4.5	7.8	12.0	5.3	14.5	11.3	13.3	7.5	0.5	1.0	4.3	6.3	3.3	0.0	6.5 bcd
6. Disyston 15G	0.25	2.5	12.3	14.8	11.8	14.5	14.8	15.3	9.3	0.5	1.0	5.5	14.0	3.8	0.0	8.6 ab
7. Thimet 15G	1.0	0.3	2.3	1.3	2.0	3.0	3.3	3.3	2.0	1.5	0.0	2.5	2.5	1.3	0.0	1.7 e
8. Thimet 15G	0.5	1.3	3.5	3.5	3.3	3.8	4.8	7.0	3.8	1.3	0.3	1.8	5.0	4.0	0.0	3.2 cde
9. Thimet 15G	0.25	1.8	4.0	6.3	3.8	8.5	7.3	17.8	12.0	0.5	0.3	2.8	9.0	3.8	0.3	5.6 bcde
10. Temik 15G	1.0	0.3	1.0	1.3	2.3	2.0	2.5	6.8	4.3	0.0	1.3	2.5	4.0	2.8	0.0	2.2 e
11. Temik 15G	0.5	0.5	2.0	0.8	2.8	3.3	4.8	6.0	4.3	0.8	0.8	2.5	7.0	1.5	0.0	2.6 de
12. Temik 15G	0.25	0.8	0.3	2.3	2.5	3.8	5.8	11.3	12.0	1.3	0.8	3.3	9.0	5.0	0.5	4.2 cde
13. Counter 15G	1.0	2.8	2.0	3.8	0.8	3.0	1.0	4.5	2.3	0.3	0.0	1.5	1.3	1.5	0.3	1.8 e
14. Counter 15G	0.5	0.8	5.0	13.5	3.8	4.8	4.0	9.3	4.5	1.0	0.5	3.8	4.5	1.5	0.0	4.0 cde
15. Counter 15G	0.25	3.5	2.3	7.3	7.5	7.2	11.3	13.8	9.8	0.3	0.8	5.5	7.5	5.0	1.3	5.8 bcde
16. Untreated		4.8	18.5	24.3	11.0	14.3	16.8	21.0	26.0	0.8	0.8	4.5	7.8	2.3	0.5	10.9 a

*Means not sharing a common letter are significantly different at the 5% level of probability.

(Table 2); however, all pesticides tested in 1976, except for Disyston 15G @ 0.25, had significantly lower populations in comparison to the control (Table 3). Although there was a general increase in leafhopper numbers with a decrease in rate of applications, no significant differences were seen in pesticide groups during 1976 (Table 1). Reducing the rate of application did not significantly reduce the ability of a pesticide to control potato leafhopper populations. Populations within untreated plots increased in magnitude until August 9, 1975 (Figure 1), and August 31, 1976 (Figure 2).

Of the thirty granular treatments applied during the two seasons, only three - Mocap-plus @ 3.0 (Table 4), Temik 15G @ 0.5, and Furadan 10G @ 0.5 (Table 3), resulted in peanut values lower (not significantly lower) than the untreated groups. Except for Furadan 10G @ 1.0 applied during 1976, no treatments resulted in peanut values significantly greater than the untreated controls.

Because of the lack of significant differences in peanut values during both seasons, I performed r^2 analyses between potato leafhopper counts and peanut values to determine the degree of influence leafhoppers were exerting on peanut value. The r^2 value for data collected in 1975 was 0.02. Analyses between peanut yields values and leafhopper populations at various dates during the 1976 season resulted in r^2 values less than 0.04. In addition, the r^2 value between the seasonal mean leafhopper numbers and peanut yield values was 0.016. These results show the lack of association between peanut yield values and potato leafhopper infestation levels in my tests.

Table 2. Application of Granular Pesticides at Planting - 1975. Potato leafhopper counts on peanuts receiving planting-time applications of granular insecticides. TRACEC, Suffolk, Va.

Treatment - lb AI/acre	Mean number potato leafhopper/20 sweeps - 4 reps.							
	Date							
	7/10	7/18	7/26	8/3	8/9	8/18	8/26	Seasonal mean*
1. Counter 15G @ 0.75 - in furrow	6.8	14.5	9.5	11.5	3.8	4.0	6.3	8.0 b-f
2. Counter 15G @ 1.5 - in furrow	5.8	9.3	8.0	7.0	3.5	4.3	5.0	6.1 a-e
3. Thimet 15G @ 0.75 - in furrow	21.8	23.5	25.8	22.3	8.8	7.8	6.0	16.5 gh
4. Untreated control	20.3	16.5	18.8	26.3	26.8	3.3	2.0	16.3 gh
5. Furadan 10G @ 1.0 - in furrow	6.0	6.0	3.8	3.3	2.8	5.5	3.5	4.4 a-d
6. Furadan 10G @ 2.0 - 12" band	4.3	6.3	0.5	5.0	2.5	4.0	5.3	3.9 abc
7. Furadan 10G @ 3.0 - 12" band	1.3	5.5	0.8	1.5	1.5	2.5	3.8	2.4 a
8. Furadan 10G @ 4.0 - 12" band	1.3	2.3	0.8	3.5	2.3	5.3	5.3	2.9 ab
9. CGA 12223 - 20G @ 1.0 - furrow	27.3	23.8	33.3	32.8	24.5	4.5	2.5	21.2 h
10. CGA 12223-20G @ 2.0 - 12" band	11.5	24.0	18.0	23.0	22.5	3.8	2.3	15.0 g
11. CGA 12223-20G @ 4.0 - 12" band	20.0	24.3	20.0	23.0	17.5	3.5	3.5	15.9 gh
12. Mocap-plus @ 2.0 (Mocap) - band	11.8	14.8	16.3	13.5	13.5	5.8	4.8	11.5 efg
13. Mocap-plus @ 3.0 (Mocap) - band	9.5	15.0	7.8	10.8	11.5	5.8	4.8	9.3 c-f
14. Temik 15G @ 0.5 - furrow	9.8	17.0	31.5	28.8	21.0	4.3	2.3	16.4 gh
15. Temik 15G @ 1.0 - furrow	7.3	13.0	14.8	19.0	17.8	7.3	3.0	11.7 fg
16. Temik 15G @ 2.0 - 12" band	3.8	14.5	15.3	19.5	20.3	8.3	2.8	12.0 fg

*Treatment means not sharing a common letter are significantly different at the 5% level of probability.

Table 3. Application of Granular Pesticides at Planting - 1976. Leafhopper counts and values from plots receiving granular pesticides.

Treatment-lb AI/acre			Seasonal mean leafhopper counts*	Value $/acre*
1. Furadan	10G	1.0	1.5 e	785.7 a
2. Furadan	10G	0.5	2.0 e	560.1 c
3. Furadan	10G	0.25	3.8 cde	673.4 abc
4. Disyston	15G	1.0	6.8 bc	671.5 abc
5. Disyston	15G	0.5	6.5 bcd	629.5 abc
6. Disyston	15G	0.25	8.6 ab	655.8 abc
7. Thimet	15G	1.0	1.7 e	643.6 abc
8. Thimet	15G	0.5	3.2 cde	631.3 abc
9. Thimet	15G	0.25	5.6 bcde	629.2 abc
10. Temik	15G	1.0	2.1 e	614.1 bc
11. Temik	15G	0.5	2.6 de	566.9 bc
12. Temik	15G	0.25	4.1 cde	661.0 abc
13. Counter	15G	1.0	1.7 e	629.9 abc
14. Counter	15G	0.5	4.0 cde	665.8 abc
15. Counter	15G	0.25	5.8 bcde	724.6 ab
16. Untreated			10.9 a	567.6 bc

*Means not sharing a common letter are significantly different at the 5% level of probability.

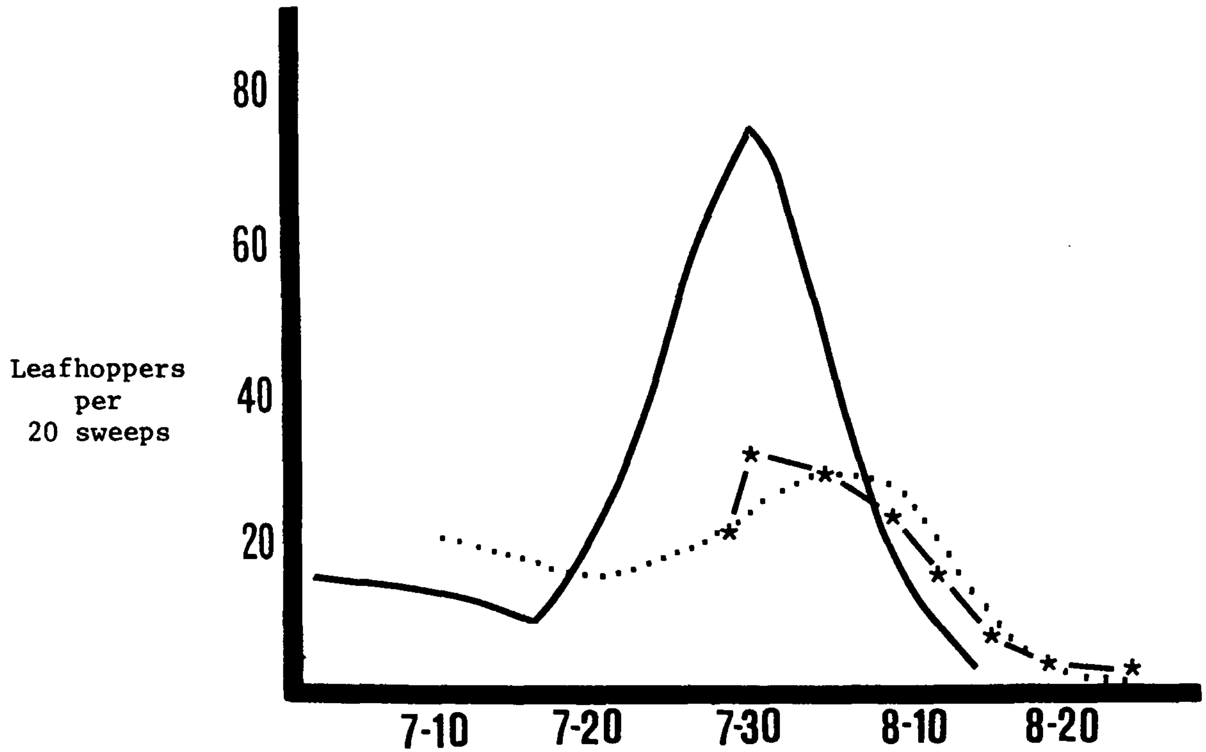

Fig. 1. POTATO LEAFHOPPER CONTROL TESTS - 1975. Populations on untreated plots - ave. 4 reps.

.... APPLICATION OF GRANULAR PESTICIDES AT PLANTING - 1975
—— APPLICATION OF GRANULAR PESTICIDES AT PEGGING - 1975
——— LEAFHOPPER FOLIAR SPRAY TEST - 1975

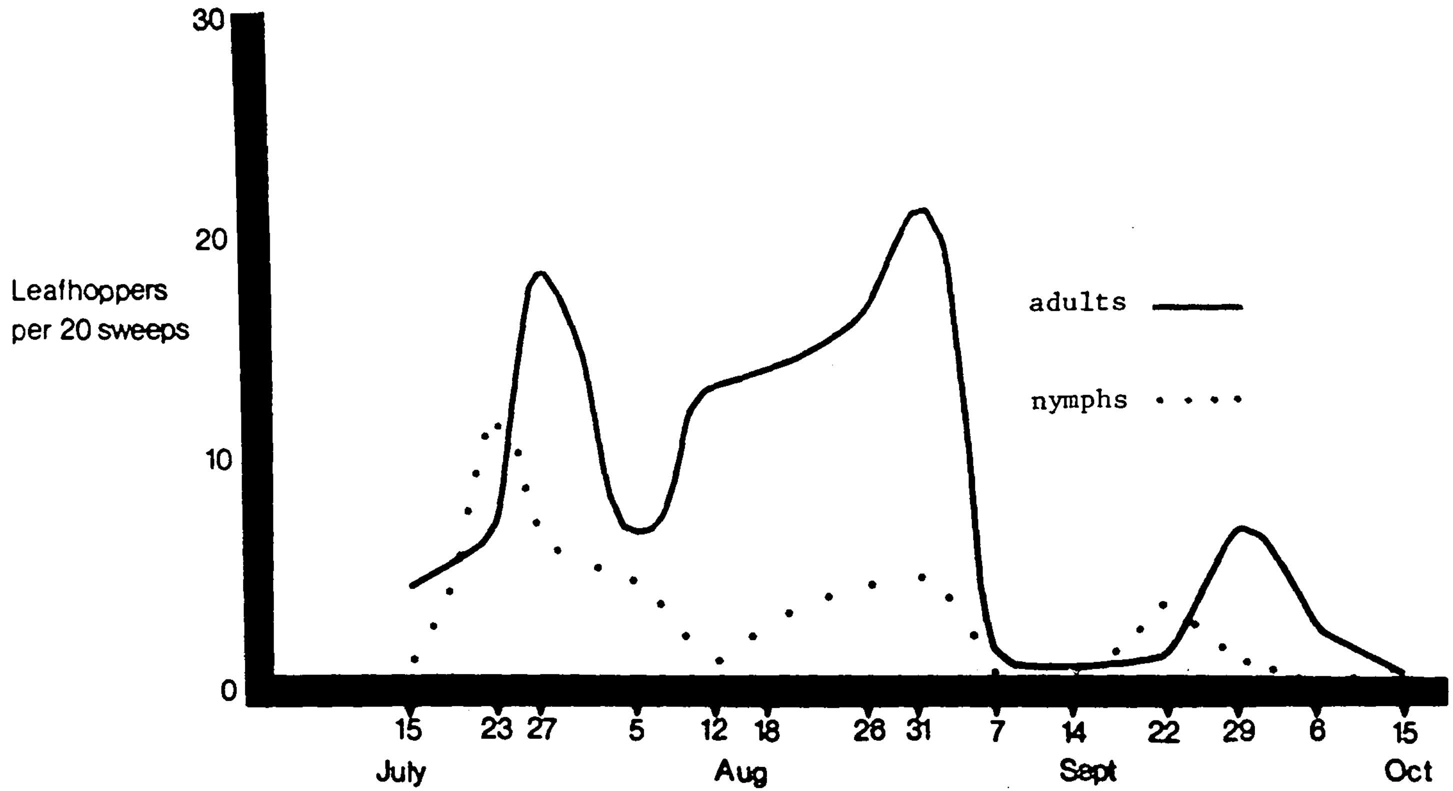

Fig. 2. APPLICATION OF GRANULAR PESTICIDES AT PLANTING - 1976. Potato leafhopper populations on untreated plots - ave. 4 reps.

Table 4. Application of Granular Pesticides at Planting - 1975. Grade, yield, and value of peanuts treated with various insecticides at planting. TRACEC, Suffolk, Va.

Treatment - Lb. AI/Acre	Mean*			
	% ELK	% SMK	Yield-Lb/Acre	Value-$/Acre
1. Temik 15G @ 0.5 - furrow	28.7 a	68.5 a	3512.0 a	671.3 a
2. CGA 12223 - 20G @ 4.0 band	28.0 ab	68.7 a	3439.4 a	670.5 a
3. Temik 15G @ 1.0 (f)	25.0 a-d	67.7 abc	3439.4 a	664.1 a
4. Counter 15G @ 0.75 (f)	25.0 a-d	66.0 abc	3475.7 a	648.3 a
5. Temik 15G @ 2.0 (b)	27.2 abc	68.0 ab	3176.2 a	617.2 ab
6. CGA 12223 - 20G @ 1.0 (f)	26.7 a-d	67.5 abc	3212.5 a	616.9 ab
7. Counter 15G @ 1.5 (f)	23.7 bcd	64.0 cd	3394.0 a	614.3 ab
8. Mocap-plus @ 2.0 (Mocap) (b)	24.7 a-d	65.2 abc	3285.1 a	608.3 ab
9. Furadan 10G @ 2.0 (b)	23.5 cd	68.2 ab	3149.0 a	606.6 ab
10. Furadan 10G @ 4.0 (b)	25.5 a-d	68.2 ab	3076.4 a	600.5 ab
11. Furadan 10 G @ 1.0 (f)	25.2 a-d	66.7 abc	3130.8 a	590.2 ab
12. Thimet 15G @ 0.75 (f)	27.2 abc	64.5 bcd	3194.4 a	585.6 ab
13. Furadan 10G @ 3.0 (b)	22.7 d	66.7 abc	2976.6 a	560.2 ab
14. CGA 12223 - 20G @ 2.0 (b)	26.2 a-d	67.2 abc	2786.0 a	533.8 ab
15. Untreated	25.5 a-d	65.7 abc	2840.4 a	526.8 ab
16. Mocap-plus @ 3.0 (Mocap) (b)	24.2 bcd	61.5 d	2967.5 a	444.6 b

*Treatment means sharing a common letter are not significantly different at the 5% level of probability.

ELK - extra large kernels, SMK - sound mature kernels.

V. APPLICATION OF GRANULAR PESTICIDES AT PEGGING

Methods and Materials

Seventeen different pesticides were tested as pegging-time applications in 1975. Except where indicated (Table 5), materials were applied in granular formulation using an electric motor-driven Ezee-flow applicator mounted upon an Economy Garden Tractor. Granular pesticides were pre-calibrated and applied on July 22 as 14-inch bands. A shallow cultivation achieved a degree of incorporation. Foliar spray treatments were applied on July 28. Potato leafhopper populations were sampled 7 times at weekly intervals from July 27 to August 25.

Results and Discussion

Potato leafhopper populations in untreated control plots increased until early August (Figure 1). The sample variance among replications of the control plots was high on most dates. Nearly all materials tested had lower mean leafhopper counts than the two untreated groups. After August 14 all populations had decreased to no more than five leafhoppers per 20 sweeps (Table 5).

Subsequent value data showed only Diazinon 14G to be significantly lower than: Dowco 275 10G @ 2.0, Sevin 80W @ 2.0, Omite 10G @ 2.0, Omite 10G @ 1.0, Temik 15G @ 2.0, Furadan 4F @ 2.0, SD 43775 2.4E @ 2.0, and Mocap 10G @ 2.0 (Table 6). The untreated control groups' yield values were not significantly lower than any group treated with pesticides.

Table 5. Application of Granular Pesticides at Pegging - 1975. Mean potato leafhopper populations on peanuts receiving granular pesticides at pegging. TRACEC, Suffolk, Va.

Treatment lb AI/acre	Mean No. potato leafhoppers/20 sweeps - Ave. 4 reps.						
	7/27	7/31	8/8	8/14	8/21	8/27	Seasonal mean***
1. SD 43775 - 2.4EC @ 1.0*	9.3	0.5	0.8	0.3	0.5	0.5	0.5 a
2. Temik 15G @ 2.0	0.5	0.3	0.0	1.5	1.0	1.0	0.9 a
3. Bay 92114 - 6EC @ 3.6*	7.8	0.0	0.0	3.0	1.3	1.0	0.9 a
4. SD 43775 - 2.4EC @ 2.0*	2.8	0.3	3.5	0.5	0.3	0.5	1.0 a
5. Furadan 4F @ 2.0*	15.5	0.5	2.0	2.0	1.0	2.3	1.6 a
6. Furadan 10G @ 1.0	2.3	2.3	2.3	2.5	2.5	1.0	2.1 a
7. Bay 92114 - 15G @ 3.6	2.5	2.0	4.3	3.0	2.8	2.5	2.4 ab
8. Furadan 10G @ 2.0	2.3	1.0	4.5	3.0	4.8	2.3	3.1 ab
9. Mocap-plus 15G @ 2.0	4.0	1.5	4.0	5.0	1.3	3.8	3.1 ab
10. Dyfonate 10G @ 2.0	2.3	2.0	2.0	4.3	2.8	4.0	3.2 ab
11. N 2596 - 10G @ 2.0	0.5	3.8	3.0	2.5	3.3	4.0	3.3 ab
12. Counter 15G @ 2.0	0.3	2.0	1.0	1.5	1.8	1.3	3.3 ab
13. Lorsban 15G @ 2.0	1.0	2.3	2.3	5.3	2.8	2.5	3.3 ab
14. Counter 15G @ 1.0	3.0	1.5	1.3	2.5	3.3	0.8	1.8 ab
15. Sevin 80S @ 2.0*	18.0	1.3	4.5	5.0	5.0	2.8	3.7 ab
16. Mocap 10G @ 2.0	1.0	1.5	4.8	7.0	3.3	2.8	3.9 ab
17. CGA 12223 - 20G @ 2.0	2.5	1.3	7.0	8.0	4.8	3.0	4.0 ab
18. Thimet 15G @ 2.0	0.3	0.3	0.8	4.0	2.0	1.0	4.5 ab
19. Dowco 275 - 10G @ 2.0	1.8	3.5	7.5	6.8	2.0	2.8	4.5 ab
20. Diazinon 14G @ 2.0	2.8	4.5	7.5	10.5	2.5	1.3	5.1 ab
21. SD 41706 - 10G @ 2.0**	1.0	0.5	3.5	4.0	3.0	3.3	5.8 ab
22. Omite 10G @ 1.0	6.0	5.5	11.8	12.0	4.0	4.5	7.6 ab
23. Untreated	4.5	7.3	18.3	14.3	2.3	1.8	8.8 ab
24. SD 41706 - 10G @ 1.0	6.0	8.0	17.3	18.5	4.0	4.2	10.4 ab
25. Untreated	20.5	31.5	24.0	10.0	3.0	3.3	14.3 bc
26. Omite 10G @ 2.0	20.0	36.5	21.8	20.8	2.5	2.5	23.0 c

Sample on 7/27 was not used in calculating the Seasonal mean. Granular applications applied July 22.
*Spray applications as 16 inch band applied July 28.
**Averages of only 2 replications as 16 inch band applied July 28.
***Treatments not sharing a common letter are significantly different at the 5% level of probability.

Table 6. Application of Granular Pesticides at Pegging - 1975. Grade, yield and value of peanuts treated with various insecticides at pegging. TRACEC, Suffolk, Va.

	Mean*			
Treatment - lb AI/acre	% ELK	% SMK	Yield- lb/acre	Value $/acre
1. Dowco 275 - 10G @ 2.0	27.5 a-d	66.5 abc	3575.5 a	$668.7 a
2. Sevin 80W @ 2.0	28.0 abc	66.2 a-d	3548.3 ab	666.5 a
3. Omite 10G @ 2.0	28.7 ab	65.7 a-d	3557.4 ab	664.2 a
4. Omite 10G @ 1.0	29.0	65.5 a-d	3557.4 ab	662.2 a
5. Temik 15G @ 2.0	27.2 a-d	67.5 ab	3448.5 ab	659.5 a
6. SD 41706 - 10G @ 2.0**	26.5**	65.5**	3539.2**	646.6**
7. Furadan 4F @ 2.0	26.0 a-d	67.7 a	3366.8 abc	646.3 a
8. SD 43775 - 2.4E @ 2.0	24.2 cd	63.5 bcd	3593.7 a	645.8 a
9. Mocap 10G @ 2.0	25.7 a-d	65.5 a-d	3475.7 ab	644.0 a
10. Untreated	28.0 abc	64.2 a-d	3448.5 ab	630.5 ab
11. SD 41706 - 10G @ 1.0	26.7 a-d	63.2 cd	3512.0 ab	630.5 ab
12. SD 43775 - 2.4F @ 1.0	25.0 a-d	62.2 d	3530.1 ab	623.4 ab
13. Dyfonate 10G @ 2.0	27.0 a-d	65.2 a-d	3357.7 abc	620.6 ab
14. Mocap-plus @ 2.0 (Mocap)	27.2 a-d	64.0 a-d	3394.0 abc	618.7 ab
15. Untreated	26.2 a-d	64.5 a-d	3366.8 abc	614.4 ab
16. Furadan 10G @ 2.0	23.7 d	63.5 bcd	3394.0 abc	610.8 ab
17. Bay 92114 - 15G @ 3.6	25.7 a-d	64.7 a-d	3276.0 abc	602.2 ab
18. Lorsban 15G @ 2.0	26.0 a-d	64.2 a-d	3230.7 abc	595.3 ab
19. Furadan 10G @ 1.0	23.7 d	64.7 a-d	3248.8 abc	593.2 ab
20. Bay 92114-6E @ 3.6	25.5 a-d	67.0 abc	3058.2 abc	579.5 ab
21. Thimet 15G @ 2.0	26.7 a-d	63.7 a-d	3167.1 abc	574.2 ab
22. CGA 12223 - 20G @ 2.0	25.5 a-d	66.0 a-d	3049.2 abc	570.4 ab
23. Counter 15G @ 1.0	24.7 bcd	63.0 cd	3167.1 abc	565.3 ab
24. Counter 15G @ 2.0	25.0 a-d	64.7 a-d	3021.9 abc	555.6 ab
25. N 2596 - 10G @ 2.0	25.2 a-d	65.0 a-d	2985.6 bc	542.7 ab
26. Diazinon 14G @ 2.0	28.7 ab	63.5 bcd	2849.5 c	515.2 b

*Treatment means sharing a common letter are not significantly different at the 5% level of probability.

**Average of 2 replicates only - not statistically analyzed.

The coefficient of determination between the seasonal mean leafhopper counts and peanut yield values was 0.07. This low r^2 value indicates a lack of association between the two variables; that is, peanut yield values were not significantly influenced by potato leafhopper infestations.

VI. FOLIAR SPRAY TESTS

Methods and Materials

During 1975 and 1976 I applied standard and experimental pesticides as foliar sprays for evaluating potato leafhopper control on peanuts. Four row plots were used in 1975; however, I enlarged the plot size in 1976 to eight rows (7.3m by 9.1m) to reduce any influence of pesticidal drift, decrease inter-plot effects, and increase the available sampling area.

A CO_2 pressure-regulated single nozzle backpack sprayer calibrated to deliver 18 gallons per acre at 50 psi was used in 1975. This sprayer was modified in 1976 to three nozzles per row and calibrated to deliver 30 gallons per acre at 75 psi. I felt this change gave improved coverage of the foliage, especially to the under-surface of leaves. Drift was minimized by spraying on nearly windless days.

Because of a late season population build-up in 1975, a second treatment was needed; this was applied at 1/2 the rate of the first application. Leafhoppers arrived in southeast Virginia later in 1976 than in 1975; therefore, the first treatment was applied nearly six weeks later in the second season and no additional applications were required.

Many pesticides applied in 1975 (Table 7) were again applied in 1976 (Table 8). Application rates for many of these materials were purposely varied in order to observe the effect on leafhopper infestations. In addition to post-treatment leafhopper counts taken during

Table 7. Foliar Spray Test - 1975. Potato leafhopper counts on peanuts receiving foliar sprays. TRACEC, Suffolk, Va.

Treatment* lb AI/acre		Mean No. potato leafhoppers/20 sweeps - 4 reps.							
		Date							Seasonal
		7/2	7/10	7/17	7/25	8/1	8/8**	8/14	mean***
1.	Bay 92114 - 6E @ 3.6	0.0	3.5	5.0	10.0	23.0	1.3	0.0	6.1 a
2.	Furadan 4F @ 1.0	0.0	3.8	3.8	10.8	26.3	0.5	1.3	6.6 a
3.	Monitor	0.0	1.8	2.5	11.3	41.5	0.3	1.0	8.3 ab
4.	Nemacur 3SC @ 1.0	0.0	5.5	5.5	17.0	34.0	0.3	1.0	9.0 ab
5.	Orthene 75S @ 0.5	0.0	2.5	3.3	16.8	34.0	0.5	0.5	8.2 ab
6.	Orthene 75S @ 1.0	0.0	1.5	4.0	14.0	29.5	0.0	0.5	7.1 ab
7.	Lorsban 4E @ 0.5	0.5	11.5	6.5	19.5	56.8	0.5	1.8	13.7 b-e
8.	Lorsban 4E @ 1.0	0.3	4.5	2.8	17.0	44.8	0.8	1.0	10.1 abc
9.	Nudrin 1.8E @ 0.9	0.0	11.8	6.8	28.5	89.8	0.0	0.5	19.6 ef
10.	Nudrin 1.8E @ 1.8	0.8	4.3	6.5	13.5	51.8	0.0	0.8	11.1 a-d
11.	Malathion 57E @ 1.0	0.0	10.8	8.8	23.5	75.8	1.8	1.8	17.5 ef
12.	Lannate 1.8E @ 0.9	0.8	13.0	10.0	25.0	66.3	0.0	2.3	16.8 def
13.	Sevin 80S @ 1.0	0.0	6.0	8.3	23.0	80.5	1.0	1.8	17.2 ef
14.	Azodrin 3.2E @ 0.5	0.5	0.3	4.0	15.5	31.0	0.0	0.3	7.4 ab
15.	Diazinon 4E @ 1.0	0.0	10.3	5.5	21.0	64.5	2.0	3.5	15.3 c-f
16.	Bay 9306 - 6E @ 1.0	0.8	3.5	2.3	13.8	40.3	0.3	0.3	8.7 ab
17.	Untreated control	14.0	12.5	9.3	27.8	72.8	17.3	3.3	22.4 f

*First spray applied @ 18 gpa @ 50 psi on 6/30/75 - #17 applied 7/2/75.
**Second spray applied on 8/5/75 at 1/2 the AI/acre rate of the first application.
***Treatments not sharing a common letter are significantly different at the 5% level of probability.

Table 8. Foliar Spray Test - 1976. Potato leafhopper counts on peanuts receiving various foliar sprays. TRACEC, Suffolk, Va.

Treatment - lb AI/acre	Mean number leafhopper/20 sweeps										Seasonal mean*
	8/13	8/19	8/25	9/1	9/8	9/14	9/21	9/28	10/7	10/14	
Furadan 4F @ 0.5	0.0	0.0	3.3	3.5	0.8	0.3	0.0	0.8	1.5	0.8	1.0 b
Furadan 4F @ 1.0	0.0	0.0	1.3	0.5	0.0	0.5	0.0	0.3	2.0	0.5	0.5 b
Orthene 75S @ 0.25	0.3	0.0	1.5	3.5	0.5	1.5	0.3	0.3	1.3	0.8	0.9 b
Orthene 75S @ 0.5	0.0	0.0	1.3	1.3	0.3	1.3	0.3	0.8	0.5	0.5	0.6 b
Nudrin 1.8E @ 0.45	0.0	0.0	4.8	12.5	0.5	1.0	1.0	1.3	3.3	2.0	2.6 b
Nudrin 1.8E @ 0.9	0.5	0.0	5.8	8.3	1.0	2.8	1.3	3.3	2.5	2.3	2.7 b
Azodrin 3.2E @ 0.25	0.3	1.3	3.0	3.5	1.3	0.8	0.3	2.0	0.3	1.0	1.3 b
Azodrin 3.2E @ 0.5	0.0	0.3	1.5	2.8	1.3	0.8	0.5	1.0	1.0	1.3	1.0 b
Diazinon 4E @ 0.5	0.0	0.0	3.0	13.3	1.0	0.8	0.5	0.5	0.8	0.5	2.1 b
Diazinon 4E @ 1.0	0.0	0.8	4.3	25.5	2.5	0.8	0.8	1.8	2.5	1.0	3.9 b
Lannate 1.8E @ 0.45	1.0	0.0	1.8	14.5	1.0	0.0	0.0	1.0	2.5	2.3	2.8 b
Sevin 80S @ 1.0	0.0	0.3	4.5	4.5	0.8	0.8	0.3	1.8	1.5	1.5	1.2 b
SD 41706 2.4E @ 0.05	0.8	0.0	6.5	19.8	3.3	2.8	1.5	4.8	6.0	3.5	4.9 b
SD 43775 2.4E @ 0.07	0.3	0.0	2.3	8.0	1.3	1.0	1.5	1.3	1.3	2.0	1.9 b
Monitor 4WM @ 0.5	0.0	0.0	2.0	1.0	0.0	0.0	1.3	0.5	0.3	0.3	0.4 b
Untreated - control	8.8	19.0	36.0	105.3	6.3	4.0	2.8	3.5	3.8	3.5	19.2 a

*Treatments not sharing a common letter are significantly different at the 5% level of probability.

Treatments applied 8/10/76.

both seasons, six pre-treatment samples were made in 1976. The mean number of leafhoppers collected on each plot was calculated only from post-treatment counts. Information was also collected on the percentage of southern corn rootworm injured fruit in 1976.

Results and Discussion

Potato leafhoppers arrived later in 1976 than in 1975, and I was therefore able to take pre-spray counts in 1976. All treatments showed a high level of leafhopper control immediately following pesticide application (Tables 7 and 8). Comparing pre-spray counts on untreated plots in 1976 with leafhopper counts on these same plots two days later showed a drastic reduction in numbers (Figure 3). Apparently these infestations were reduced by the pesticides applied to neighboring plots. Pesticides modify the natural balance between immigration and emigration among the test plots. These inter-plot effects reduced the number of immigrants into untreated groups while leafhopper emigrants drained the populations from the same groups.

Population build-ups following treatment in both years' tests were due in part to leafhopper immigration. In 1976, populations dropped after September 1st and remained. This drop was apparent in other test fields during 1976 and appeared to coincide with particularly cold temperature at the beginning of September. During 1975, I applied a second treatment to the field but at 1/2 the rate of the first application. This additional treatment appeared to have given a high degree of control although infestation reductions may have been

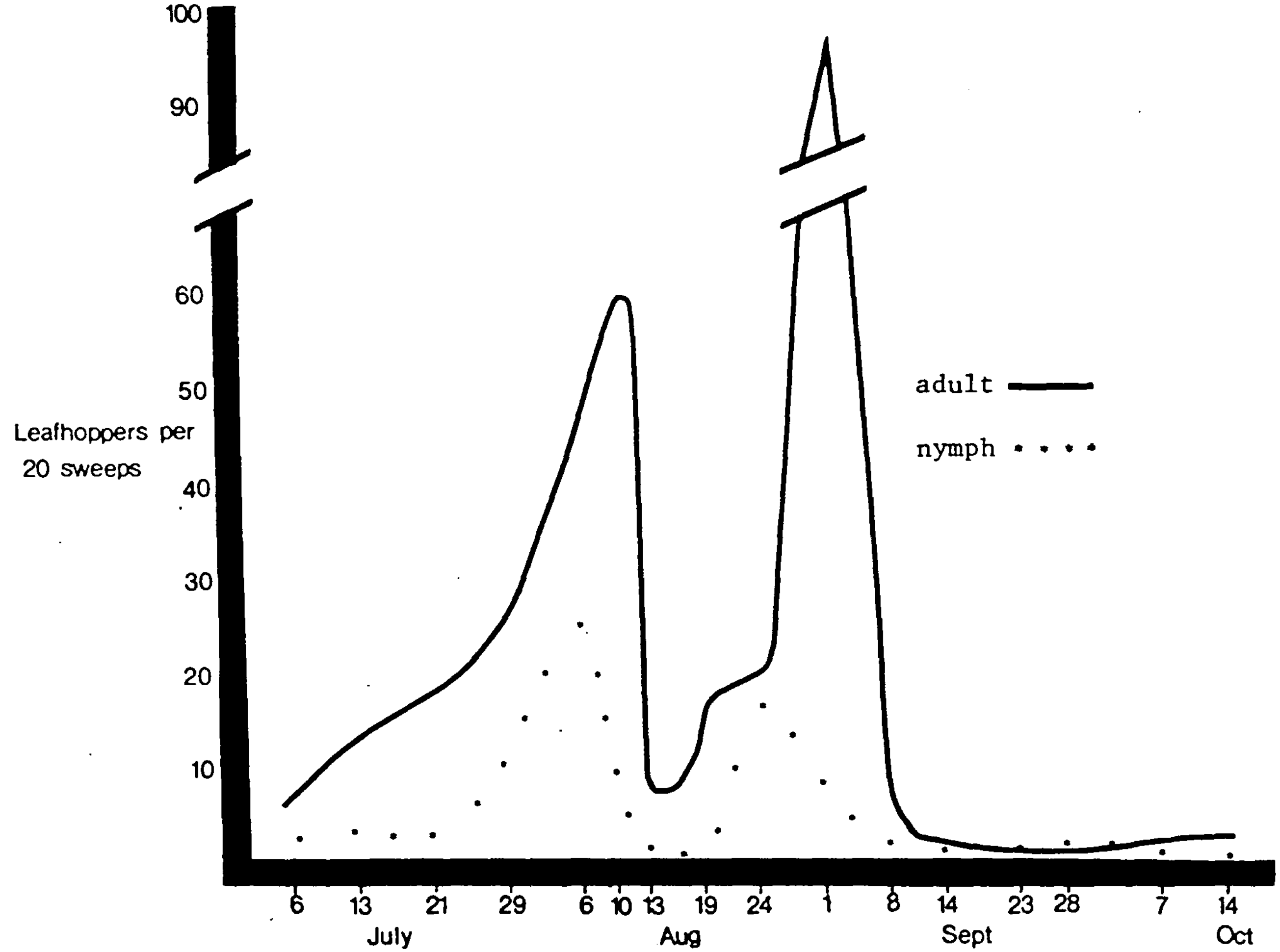

Fig. 3. FOLIAR SPRAY TEST - 1976. Potato leafhopper populations on untreated control plots - ave. 4 reps.

compounded by naturally declining populations. Potato leafhopper populations did not again increase to high levels.

Mean leafhopper infestations were generally higher in 1975 than 1976. This may have resulted from collecting fewer samples in 1975 and taking these samples during the time of greatest abundance. Most foliar spray applications resulted in significantly lower leafhopper populations in comparison to the untreated controls (Tables 7 and 8). Varying the rate of application in 1976 did not significantly affect a pesticide's ability to control the leafhoppers.

Peanuts treated with 0.9 lb AI/acre of Nudrin 1.8E suffered the most injury by the southern corn rootroom in 1976 (Table 9).

Peanut yield values determined for both years showed little significant difference between groups (Tables 9 and 10). The yield values for the untreated control groups were not significantly lower than any of the treated groups.

Because I found no apparent association between peanut values and pest populations or injuries, I used the coefficient of determination to compare these variables for both years' data. An r^2 of 0.03 for 1975 confirmed this lack of association. The r^2 values between 1976 peanut yield values and leafhopper counts on specific dates during the season or the seasonal mean leafhopper counts were less than 0.04. Additionally, the r^2 value between peanut values and southern corn rootroom injury data was less than 0.05. These low r^2 values demonstrated a lack of influence exerted upon peanut yield values by any of these independent variables.

Table 9. Foliar Spray Test - 1976. Leafhopper counts, rootworm injury, and peanut values. TRACEC, Suffolk, Va.

Treatment - lb AI/acre			Mean*		
			Seasonal mean leafhopper counts	Southern corn rootworm % injured fruit	Value $/acre
Furadan	4F	0.5	1.0 b	4.2 ab	704.1 abc
Furadan	4F	1.0	0.5 b	2.6 a	738.4 abc
Orthene	75S	0.25	0.9 b	8.9 ab	700.8 abc
Orthene	75S	0.5	0.6 b	9.5 ab	744.5 abc
Nudrin	1.8E	0.45	2.6 b	4.7 ab	670.6 bc
Nudrin	1.8E	0.9	2.7 b	15.9 a	677.2 bc
Azodrin	3.2E	0.25	1.3 b	8.1 ab	701.8 abc
Azodrin	3.2E	0.5	1.0 b	3.3 b	665.3 c
Diazinon	4E	0.5	2.1 b	2.1 b	738.1 abc
Diazinon	4E	1.0	3.9 b	4.9 ab	748.4 abc
Sevin	80S	1.0	1.2 b	2.5 b	784.6 a
Lannate	1.8E	0.45	2.8 b	5.7 ab	701.6 abc
SD 41706	2.4E	0.05	4.9 b	4.5 ab	718.1 abc
SD 43775	2.4E	0.05	1.9 b	9.9 ab	769.5 ab
Monitor	4WM	0.5	0.4 b	4.1 ab	728.2 abc
Control-Untreated			19.2 a	6.6 ab	712.3 abc

*Treatment means not sharing a common letter are significantly different at the 5% level of probability.

Table 10. Foliar Spray Test - 1975. Grade, yield, and value data of peanuts receiving various foliar sprays. TRACEC, Suffolk, Va.

	Mean*			
Treatment - lb AI/acre	% ELK	% SMK	Yield-lb/acre	Value-$/acre
1. Furadan 4F @ 1.0	26.0 ab	68.0 abc	4410.4 a	$848.9 a
2. Orthene 75S @ 0.5	23.2 b	66.5 a-d	4446.7 a	832.9 ab
3. Untreated	29.0 a	68.5 ab	4274.3 a	830.7 ab
4. Bay 92114-6EC @ 3.6	27.7 ab	69.2 a	4174.5 ab	820.8 ab
5. Orthene 75S @ 1.0	25.0 ab	67.0 a-d	4319.7 a	818.3 ab
6. Azodrin 3.2E @ 0.5	25.5 ab	65.5 a-d	4283.4 a	795.6 ab
7. Lannate 1.8E @ 0.9	27.0 ab	66.5 a-d	4201.7 ab	792.4 ab
8. Malathion 57E @ 1.0	28.7 a	65.7 a-d	4101.9 ab	764.7 abc
9. Sevin 80S @ 1.0	25.5 ab	65.0 a-d	4083.7 ab	750.3 abc
10. Nudrin 1.8E @ 0.9	26.0 ab	65.7 a-d	4029.3 ab	746.2 abc
11. Lorsban 4E @ 1.0	27.2 ab	65.0 a-d	4002.0 ab	740.7 abc
12. Monitor 4WM @ 0.5	23.0 b	64.2 bcd	3993.0 ab	726.7 abc
13. Nemacur 3SC @ 1.0	25.5 ab	65.2 a-d	3856.8 ab	711.6 abc
14. Nudrin 1.8E @ 1.8	24.5 ab	65.2 a-d	3811.5 ab	704.0 abc
15. Bay 9306 - 6EC @ 1.0	24.7 ab	63.7 cd	3938.5 ab	703.9 abc
16. Lorsban 4E @ 0.5	25.0 ab	63.5 cd	3847.8 ab	693.4 bc
17. Diazinon 4E @ 1.0	24.7 ab	63.0 d	3584.6 b	634.0 c

*Treatment means sharing a common letter are not significantly different at the 5% level of probability.

ELK - extra large kernels, SMK - sound mature kernels.

VII. THRIPS/LEAFHOPPER TEST

Methods and Materials

On May 25, 1976, fourteen pesticide treatments and three untreated control groups were applied in granular form to peanuts at planting time. Using a Gandy[R] 901-2 granular applicator, test materials were applied to randomized 12 by 20 ft plots either as in-furrow treatments or as 12-inch band treatments.

I collected post-treatment leafhopper counts on thirteen separate dates throughout the season. From these counts a seasonal mean leafhopper number was calculated for each treatment (Table 11). Estimates of hopperburn injury were made on July 13 and August 16 (Table 12). Hopperburn was evaluated by rating plots from 0 to 10, with 10 representing maximum injury. A regression analysis (r^2) was performed to determine the fit of these burn estimates with leafhopper populations taken concurrently.

Thrips population and feeding effects on plant growth and appearance were also evaluated by rating plots from 1 to 10 (Table 12). Southern corn rootworm injury was determined for each treatment in late September (Table 13). The peanuts were dug on October 14 and the yields were calculated soon after (Table 11). A regression analysis was performed between peanut values and each of 11 independent variables taken individually and in combinations.

Results and Discussion

The Dacamox treatments sustained the least amount of the leafhopper

Table 11. Thrips/Leafhopper Test - 1976. Mean number potato leafhoppers/20 sweeps. TRACEC, Suffolk, Va.

Treatment - lb AI/acre*	Seasonal mean number of potato leafhoppers/20 sweeps**
1. Nematak 15G @ 0.75 - band	13.9 def
2. Nematak 15G @ 0.5 - in furrow	22.9 abcd
3. Counter 15G @ 1.0 - in furrow	28.2 ab
4. Thimet 15G @ 1.0 - in furrow	24.4 abc
5. Temik 15G @ 0.5 - in furrow	25.8 abc
6. Temik 15G @ 0.75 - in furrow	24.1 abc
7. Temik 15G @ 1.0 - in furrow	17.5 cde
8. Nemacur 15G @ 1.5 - band	30.9 a
9. Nemacur 15G @ 2.5 - band	26.4 abc
10. Furadan 10G @ 1.0 - in furrow	24.3 abc
11. Dacamox 10G @ 0.5 - in furrow	6.4 ef
12. Dacamox 10G @ 1.0 - in furrow	4.4 f
13. SRA 12869 - 15G @ 2.0 - in furrow	19.2 bcde
14. Disyston 15G @ 1.0 - in furrow	25.1 abc
15. Untreated	22.8 abcd
16. Untreated	24.4 abc
17. Untreated	22.1 abcd

*Treatments were applied in the furrow or as 12-inch band treatments at planting with a Gandy 901-2 granular applicator.

**Treatments not sharing a common letter are significantly different at the 5% level of probability.

Table 12. THRIPS/LEAFHOPPER TEST - 1976. Thrips and potato leafhopper injury control on peanuts treated with various systemic pesticides applied at planting. TRACEC, Suffolk, Va.

Treatment - lb AI/acre**	Potato leafhopper injury index* -Date- 7/13	Potato leafhopper injury index* -Date- 8/16	Thrips injury index* 7/13
1. Nematak 15G @ 0.75 (b)	1.50 a-e	5.25 bcd	3.50 e-h
2. Nematak 15G @ 0.5 (f)	2.00 a-d	5.25 bcd	3.75 e-h
3. Counter 15G @ 1.0 (f)	2.75 abc	7.75 a	4.75 c-g
4. Thimet 15G @ 1.0 (f)	2.75 abc	8.25 a	5.50 b-e
5. Temik 15G @ 0.5 (f)	1.50 a-e	6.25 abc	3.75 e-h
6. Temik 15G 0.75 (f)	1.00 cde	6.26 abc	5.25 cde
7. Temik 15G @ 1.0 (f)	1.25 b-e	4.50 cd	4.25 d-h
8. Nemacur 15G @ 1.5 (b)	2.75 ab	8.50 a	6.75 abc
9. Nemacur 15G @ 2.5 (b)	2.25 abc	6.75 abc	5.00 c-f
10. Furadan 10G @ 1.0 (f)	1.25 b-e	7.00 ab	5.50 b-e
11. Dacamox 10G @ 0.5 (f)	0.50 de	1.25 e	2.50 h
12. Dacamox 10G @ 1.0 (f)	0.25 e	0.75 e	2.75 gh
13. SRA 12869-15G @ 2.0 (f)	1.50 a-e	6.25 abc	5.00 c-f
14. Disyston 15G @ 1.0 (f)	3.00 a	8.25 a	7.50 ab
15. Untreated	3.00 a	7.25 ab	7.00 abc
16. Untreated	3.00 a	8.00 a	6.75 abc
17. Untreated	2.50 abc	6.50 abc	7.75 a

*Treatments not sharing a common letter are significantly different at the 5% level of probability. Index: 0 = no injured leaves, 2 = 20% injured leaves, etc.

**b = band, f = in furrow.

Table 13. THRIPS/LEAFHOPPER TEST - 1976. Southern corn rootworm injury to peanut fruit treated with various insecticides at planting. TRACEC, Suffolk, Va.

Treatment - lb AI/acre*	Average Percent Injured Fruit**		
	Mature	Immature	Total
Temik 15G @ 0.5 - furrow	6.7 bc	9.0 bcd	8.1 abc
Furadan 10G @ 1.0 - furrow	8.4 abc	7.4 cd	7.8 bc
Nematak 15G @ 0.75 - band	10.9 abc	12.3 a-d	11.7 abc
Nematak 15G @ 0.5 - furrow	11.0 abc	10.1 bcd	10.4 abc
Disyston 15G @ 1.0 - furrow	12.1 abc	14.1 a-d	12.6 abc
Nemacur 15G @ 1.5 - band	12.3 abc	9.7 bcd	11.0 abc
Nemacur 15G @ 2.5 - band	12.4 abc	21.8 a-d	16.1 abc
SRA 12869 - 15G @ 2.0 furrow	13.4 abc	16.8 a-d	14.4 abc
Untreated	20.0 abc	10.7 bcd	15.8 abc
Untreated	22.1 abc	21.9 a-d	22.1 abc
Temik 15G @ 1.0 furrow	23.3 abc	27.0 ab	25.1 abc
Counter 15G @ 1.0 furrow	23.4 abc	21.4 a-d	22.6 abc
Dacamox 10G @ 0.5 furrow	26.6 abc	31.4 a	29.2 a
Temik 15G @ 0.75 - furrow	27.8 abc	18.1 a-d	22.6 abc
Dacamox 15G @ 1.0 furrow	27.9 abc	25.5 abc	27.3 ab
Untreated	29.3 ab	22.0 a-d	24.5 abc
Thimet 15G @ 1.0 furrow	31.7 a	26.5 abc	28.1 ab

*Granular in-furrow treatments were applied 5/25/76 with a Gandy Model 901-2 granular applicator.

Rootworm injury evaluations were taken September 20-24, 1976.

**Treatment means not sharing a common letter are significantly different at the 5% level of probability.

injury on each of the two sample dates (Table 12). The r^2 values between hopperburn injury on July 13 and leafhopper counts on July 14 and between hopperburn injury on August 13 and leafhopper counts on August 16 were 0.73 and 0.65, respectively. Perhaps because of differences of plant material within rows between plots, neither value demonstrated a very close fit between leafhopper populations and their injury.

Treated plots generally suffered less injury from thrips. Again Dacamox treatments had the lowest thrips injury ratings (Table 12). Plots treated with Dacamox 10G @ 0.5 lb AI/acre had the greatest percentage of southern corn rootworm injured fruit. Furadan 10G @ 1.0 lb AI/acre resulted in the least percentage of injured fruit (Table 13).

As in all tests during 1976, leafhopper population levels decreased at the beginning of September (Figure 4). Statistically, peanut yield values did not differ significantly between any treated or untreated groups.

The r^2 analyses showed little association between peanut yield values and any of the independent variables or combinations of variables. The analyses did not suggest a cause and effect relationship between pest populations or their injuries and peanut yield values.

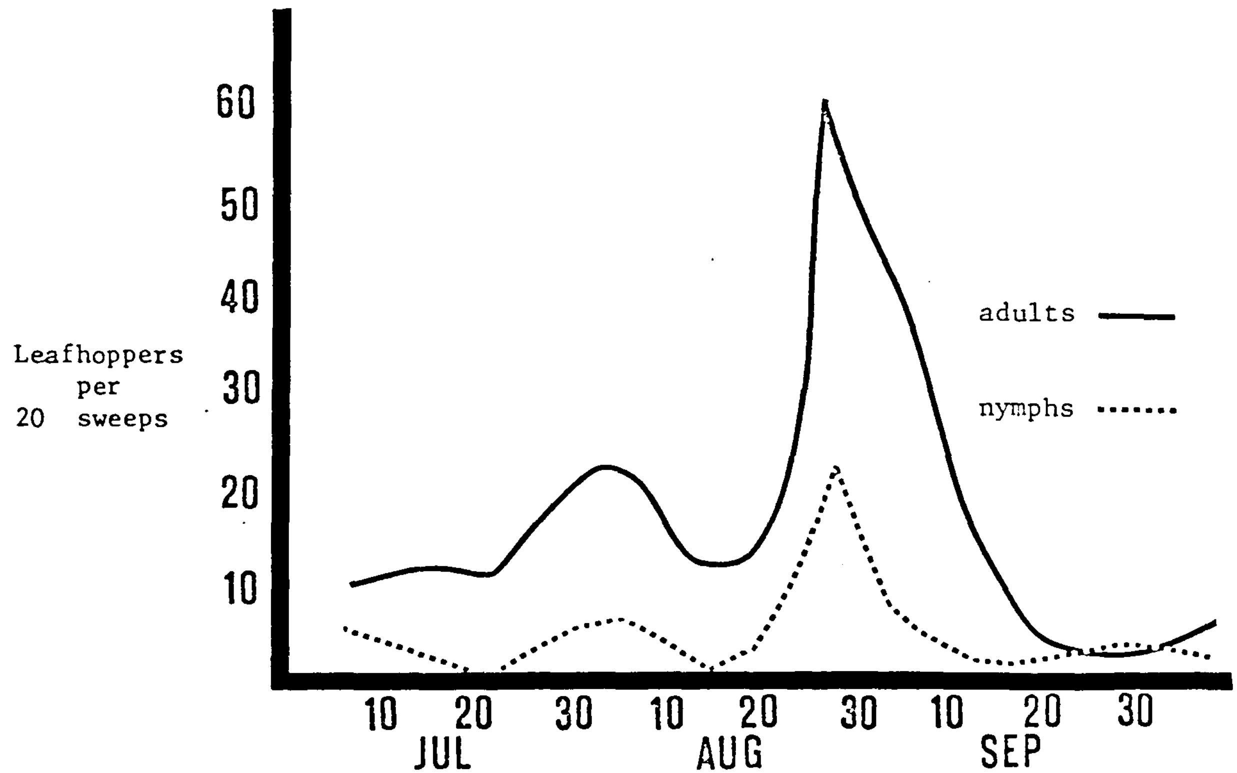

Fig. 4. THRIPS / LEAFHOPPER TEST. Leafhopper populations on untreated plots - ave. 4 reps.

VIII. INDIVIDUAL PLANT TEST

Methods and Materials

During 1976, a field test was performed to evaluate the effect of known numbers of the potato leafhopper on peanut growth and the variation of peanut yields obtained with different pesticide application timing. Va.61R peanuts were planted on May 25 in fine sandy loam, and except where noted, received only standard herbicides for weed control and Benlate and Manzate for *Cercospora* leafspot control.

Four groups, each consisting of six individual plants, were treated differently. The groups were separated by 25 ft (8m) and within each group the plants were no closer than six ft (1.8m). Samples were collected on: August 17, September 9, and September 13. Two plants from each group were used on each of these dates.

Absolute leafhopper population numbers were taken from Group A by fumigating the plants for 24 hours beneath washtubs with Vapona strips taped to the inside. Black plastic sheets placed below the plants acted as catch-cloths for collecting the dead leafhoppers. No other insecticides were applied to the plants in this group. On each of the three sample dates the total population of leafhoppers, adults and nymphs, was recorded.

Group B plants also received no insecticides. Green nut weights and pod numbers were recorded for each plant. Data was taken to evaluate absolute population levels and yields from similarly infested plants.

Plants in Group C were treated with 5% Sevin dust approximately every seven days and were relatively free from leafhopper injury. Data collected from the three groups, A, B, and C, were used to compare yields of uninfested plants with those hosting a known number of leafhoppers.

Group D consisted of six plants similar to all other groups. These plants were divided into three subgroups. The first subgroup received no insecticidal treatment until August 17. Sevin dust was applied on a weekly basis thereafter. The second subgroup remained untreated until September 9, and control in the third subgroup began on September 13. Yield variations in response to different pesticide application times were examined.

Results and Discussion

The method of surveying absolute leafhopper populations on individual plants appeared to be effective. Black plastic placed beneath Group A plants proved to be an efficient way of catching dead insects during fumigation. The plastic sheets also provided an excellent background for locating and counting the leafhoppers.

The experiment was tailored to provide information on varying levels of leafhopper infestations among Group A plants throughout the season; however, due to insufficient numbers of samples, there was a lack of data available on varying population levels. Plants surveyed on August 17 showed the largest leafhopper populations. From surveys taken in neighboring experiments, it was apparent that populations continued to increase until the beginning of September when cold temperatures coincided with population decreases. Due to this decrease before September 9, infestation levels recorded during the second survey (Table 14) were not truly representative of peanut yields (pod weight and numbers) taken concurrently.

On each of the three sample dates, pod weights and numbers were greater on treated peanuts (Group C) than on untreated peanuts (Group B). The differences were greatest on August 17 and least on September 13; however, values between treated and untreated plants did not differ significantly on any of the three dates (Table 15).

Pods weights and numbers taken from Group D plants are recorded in Table 16. Peanut plants receiving the least amount of leafhopper control and therefore hosting the longest leafhopper infestations had greater yields than the other subgroups.

It should be noted that the experimental design of this test contributed to a high sample variance and that this was partially at blame for the lack of significant differences in the results. Increasing the number of sample dates and the number of repetitions on each of these dates would improve the test design. Additionally, the experiment was placed in a poorly drained portion of the field and inconsistencies in the data may have resulted from non-uniform soil conditions.

Table 14. Individual Plant Test. Leafhopper Numbers.

Sample Date	Group-plant	Number of Leafhoppers		
		Nymph	Adult	Total
August 17	A-1	48	2.0	50.0
	A-4	76	5.0	81.0
	average	62	3.5	65.5
September 9	A-2	9	9.0	18.0
	A-5	7	5.0	12.0
	average	8	7.0	15.0
September 13	A-3	1	2.0	3.0
	A-6	7	1.0	9.0
	average	4	1.5	6.0

Table 15. Individual Plant Test. Yields from Untreated Peanuts

Sample Date	Group-plant (ave. 2 reps)		Large pods	Small pods	Total
August 17	B-1/B-4	number of pods	7.00	27.50	34.50
		pod weight (gms)	31.75	13.25	45.00
September 9	B-2/B-5	number of pods	68.50	36.50	105.00
		pod weight (gms)	271.00	39.50	311.00
September 13	B-3/B-6	number of pods	58.00	40.50	98.50
		pod weight (gms)	250.25	58.00	308.25
August 17	C-1/C-4	number of pods	26.50	45.50	72.00
		pod weight (gms)	104.25	27.25	131.50
September 9	C-2/C-5	number of pods	92.00	60.00	152.00
		pod weight (gms)	363.25	88.25	451.50
September 13	C-3/C-6	number of pods	61.00	65.00	126.00
		pod weight (gms)	255.25	109.00	364.25

Table 16. Individual Plant Test. Yields from Peanuts Treated at Various Dates.

Beginning date of leafhopper control	Group-plant (ave. 2 reps)		Large pods	Small pods	Total
August 17	D-1/D-4	number of pods	88.50	58.50	147.00
		pod weight (gms)	326.50	96.00	422.50
September 9	D-3/D-5	number of pods	75.50	64.00	139.50
		pod weight (gms)	282.00	111.00	393.00
September 13	D-2/D-6	number of pods	119.50	55.00	174.50
		pod weight (gms)	542.75	100.50	644.75

IX. GENERAL SUMMARY AND CONCLUSION

During 1975 and 1976, potato leafhopper populations and their injury to peanuts were the heaviest recorded within a twelve-year period at the Tidewater Research and Continuing Education Center (Allen 1976). The leafhopper has been shown to vary in abundance and time of occurrence from year to year (Miller 1942). The first immigrants arrived in southeastern Virginia at least 30 days earlier in 1975 than in 1976.

In order to return the maximum profit from a control program, it is necessary to forecast the possibility of destructive levels of the insect pest. With a pest capable of rapid fluctuations in population size, the sweep net proved to be a practical method of surveying relative numbers of leafhoppers among test plots. Additionally, this method gave the approximate arrival time of the first immigrants into the area, showed the change of population levels through time, and enabled the comparison of leafhopper numbers with leafhopper injury. Careful sweeping allowed quick and uniform information to be collected in a program delimited by time and labor.

The readily apparent injury produced by the leafhopper makes it suspect for blame in decreases of peanut fruit yield. Because chemical control methods are an integral portion of a pest management system, experiments conducted during 1975 and 1976 chemically manipulated leafhopper population levels and the effect on peanut yield values was observed.

Large population build-ups resulted from a combination of leafhopper immigration and a high reproductive rate. A second application of foliar sprays was required in 1975 because of late season population increases. Naturally declining populations within untreated control plots coincided with a relatively cold temperature period; therefore, peanuts required no additional protection from leafhopper injury.

Tests have demonstrated the ability of many pesticides to reduce leafhopper populations when applied as granulars at planting-time, pegging-time, or as foliar spray treatments. Reductions of pesticidal rates during 1976 did not significantly affect potato leafhopper control.

Except for Disyston 15G @ 0.25 lb AI/acre, all granular pesticides applied at Emporia, Virginia, in 1976 at planting-time gave season-long leafhopper control and resulted in significantly lower leafhopper infestations. These granular pesticides provided the added benefit of reducing the risk of pesticide drift and protecting both roots and above ground plant parts. With such a wide array of effective materials available, the development of a control program aimed at a broader spectrum of the pest complex is facilitated.

Although many pesticide treatments resulted in significantly lower potato leafhopper populations in comparison to the untreated controls, yield values for peanuts remaining untreated were seldom significantly lower than yield values for treated peanuts. No significant regressions of peanut values upon leafhopper population levels or leafhopper burn injury were obtained in any of the experiments. The results suggest that deviations of leafhopper infestations do not affect peanut yields. While hopperburn injury and leaf curling associated with leafhopper feeding may be easily seen, the actual damage to the peanut plant appears to be quantitatively less significant than the complementary complex of factors affecting yields and peanut values. Correlations between peanut values and other pest populations and their injuries also proved insignificant.

Prior to the development of resistant plant types, the only successful control of the potato leafhopper has been through the use of chemicals. No information is available upon the tolerance of the VA.61R peanut to the potato leafhopper. Increased knowledge of host-plant resistance may reduce the reliance upon potentially harmful materials.

Successful pest management requires a knowledge of economic thresholds; however, the factors contributing to yield reductions are often quite variable and impede the establishment of economic injury levels. More information is required on the variable and constant factors affecting peanut growth and yields.

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X. APPENDIX

Appendix Table 1. Foliar Spray Test - 1976. Southern corn rootworm injury to peanut fruit receiving various spray treatments for potato leafhopper control. TRACEC. Suffolk, Va.

Treatment - lb AI/acre**	Average Percent Injured Fruit*		
	Mature	Immature	Total
1. Monitor 4 WM @ 0.5	1.3 b	9.1 ab	4.1 ab
2. Furadan 4F @ 1.0	1.3 b	4.8 ab	2.6 b
3. Diazinon 4E @ 0.5	1.8 ab	2.9 b	2.1 b
4. SD 41706 - 2.4E @ 0.5	2.2 ab	7.2 ab	4.5 ab
5. Azodrin 5E @ 0.5	2.5 ab	5.9 ab	3.3 b
6. Nudrin 1.8E @ 0.45	3.1 ab	6.4 ab	4.7 ab
7. Furadan 4F @ 0.5	4.6 ab	3.3 b	4.2 ab
8. Sevin 80S @ 1.0	4.6 ab	3.4 b	2.5 b
9. Diazinon 4E @ 1.0	4.9 ab	3.8 b	4.9 ab
10. Untreated	5.1 ab	9.4 ab	6.6 ab
11. Orthene 75S @ 0.25	5.9 ab	12.0 ab	8.9 ab
12. Lannate 1.8E @ 0.45	7.7 ab	3.8 b	5.7 ab
13. Orthene 75S @ 0.5	8.7 ab	12.4 ab	9.5 ab
14. Azodrin 5E @ 0.25	8.8 ab	6.5 ab	8.1 ab
15. SD 43775 - 2.4E @ 0.05	11.0 ab	8.2 ab	9.9 ab
16. Nudrin 1.8E @ 0.9	14.6 a	17.4 a	15.9 a

*Treatment means not sharing a common letter are significantly different at the 5% level of probability.

**Sprays applied 8/10/76.

Rootworm injury evaluations were taken September 20-24, 1976.

Appendix Table 2. Daily Maximum and Minimum Temperatures, April-October, 1975, Holland Station, Suffolk, Va.

Day of Month	Temperature °F													
	April		May		June		July		August		September		October	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1.	57	38	58	51	87	74	83	59	87	64	92	62	80	60
2.	68	40	67	54	84	62	81	51	90	65	77	66	79	62
3.	77	52	69	49	83	61	87	61	92	68	80	66	71	40
4.	67	34	73	52	85	59	92	64	94	74	85	62	62	36
5.	55	31	75	49	86	66	89	66	95	73	88	62	67	43
6.	46	30	70	47	92	68	82	62	93	72	89	63	74	53
7.	57	32	78	49	87	65	88	68	89	65	89	66	80	54
8.	58	29	68	49	85	53	81	67	77	69	77	67	76	48
9.	65	33	75	47	79	52	88	70	81	57	85	65	75	52
10.	64	42	74	46	80	57	89	70	86	63	84	58	67	59
11.	58	39	73	47	80	51	89	68	88	70	80	59	72	55
12.	51	41	79	53	80	64	78	68	88	66	84	65	74	55
13.	56	30	82	61	76	68	81	70	89	66	88	54	69	44
14.	61	34	84	50	88	57	80	71	92	71	71	49	73	49
15.	61	42	80	54	90	64	81	71	92	72	67	43	86	58
16.	52	42	83	64	93	67	88	69	92	72	67	55	86	62
17.	61	40	82	61	89	66	85	70	93	72	67	62	85	61
18.	69	49	71	56	93	67	86	66	94	70	77	60	74	62

Table 2. Continued.

Day of Month	Temperature °F													
	April		May		June		July		August		September		October	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
19.	79	63	75	62	94	67	88	69	90	69	79	65	74	54
20.	84	50	73	55	93	71	87	70	87	61	80	68	66	46
21.	71	38	85	59	90	65	89	72	90	66	87	71	65	39
22.	67	39	90	66	84	57	90	73	90	71	85	63	73	43
23.	70	48	89	68	84	57	92	70	95	72	76	65	80	46
24.	80	54	90	55	87	58	90	74	88	69	83	72	82	48
25.	81	64	82	57	91	68	90	74	91	70	86	71	75	63
26.	84	49	83	62	94	69	88	71	96	71	85	71	77	58
27.	72	40	80	62	94	66	82	56	97	74	82	65	71	53
28.	71	50	90	65	88	71	83	65	95	60	77	54	63	54
29.	55	49	82	59	82	66	90	70	85	59	73	48	74	55
30.	65	51	81	65	85	67	90	69	86	59	77	53	67	50
31.			86	70			86	61	93	64			57	32
Ave.	65	42	78	56	87	64	86	67	90	67	81	62	73	51
Normal	70	46	78	55	86	63	88	67	87	66	82	60	72	48

Appendix Table 2a. Daily Precipitation, April-October, 1975, Holland Station, Suffolk, Va.

Day of Month	Precipitation (Inches)						
	April	May	June	July	August	September	October
1.	0.10	0.22	-	-	-	1.40	-
2.	-	0.17	-	-	-	0.26	-
3.	0.25	-	-	-	-	-	-
4.	0.13	0.57	-	-	-	-	-
5.	-	0.18	-	1.02	-	-	-
6.	-	-	-	-	0.25	-	0.15
7.	-	0.04	-	T	0.39	0.41	-
8.	-	0.02	-	0.68	0.01	0.06	-
9.	-	-	-	0.37	-	-	0.67
10.	0.03	-	-	0.88	-	-	0.03
11.	0.02	-	-	0.53	-	-	-
12.	0.16	-	0.02	1.64	0.04	0.04	-
13.	0.04	-	0.11	0.85	-	0.79	-
14.	-	-	-	0.08	-	-	-
15.	1.44	-	-	0.28	-	-	-
16.	0.21	0.08	-	0.84	-	0.05	-
17.	-	0.06	-	0.31	-	1.35	-
18.	-	0.51	0.55	0.02	-	T	1.18
19.	-	0.39	0.11	0.10	-	0.05	0.09
20.	0.10	0.01	-	-	-	-	-
21.	-	-	-	-	-	-	-
22.	-	-	-	-	-	0.22	-
23.	-	-	-	-	-	0.02	-
24.	-	1.57	-	-	-	0.54	-
25.	0.04	-	-	0.10	0.04	0.27	0.02
26.	0.12	0.24	-	0.88	-	1.08	-
27.	-	0.01	-	-	-	0.52	0.58
28.	0.02	1.06	0.03	-	-	-	0.01
29.	0.35	-	-	-	-	-	-
30.	0.02	-	0.02	0.43	-	-	0.03
31.	-	-	-	-	-	-	-
Total	3.03	5.13	0.84	9.01	0.73	7.06	2.76
Normal	3.17	3.57	4.62	6.14	6.32	4.13	3.28

Appendix Table 3. Daily Maximum and Minimum Temperatures, April-October, 1976, Holland Station, Suffolk, Va.

Day of Month	Temperature °F													
	April		May		June		July		August		September		October	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
1.	69	49	76	54	88	61	88	69	87	71	81	51	78	58
2.	64	40	70	57	90	63	83	65	85	66	85	51	78	59
3.	60	34	77	58	81	57	88	63	78	61	83	63	70	56
4.	69	45	74	50	60	57	86	63	75	60	77	60	65	54
5.	82	33	66	43	68	39	79	60	81	54	84	62	66	57
6.	63	39	76	54	71	43	82	63	86	63	88	66	76	51
7.	71	40	81	64	77	50	82	66	91	66	78	47	77	53
8.	67	41	78	50	79	56	79	65	91	71	81	53	80	60
9.	60	41	63	35	83	58	85	67	75	58	89	57	86	66
10.	52	31	72	43	89	58	87	60	75	64	92	60	74	42
11.	63	43	77	56	84	67	87	65	86	66	76	45	64	39
12.	78	32	76	61	87	66	87	74	86	61	75	48	65	40
13.	53	29	76	51	92	65	91	57	90	67	84	52	64	37
14.	69	39	73	59	72	63	83	56	93	71	85	52	72	41
15.	76	40	88	65	83	62	86	66	90	71	82	60	69	37
16.	84	59	85	69	88	70	97	68	90	68	73	68	78	37
17	90	59	84	68	89	73	92	69	83	60	85	66	73	53
18	93	54	83	63	82	67	86	69	81	58	84	65	55	36

Appendix Table 3. Continued.

Day of Month	Temperature °F													
	April		May		June		July		August		September		October	
	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min
19.	91	57	81	44	88	66	83	58	82	58	83	60	55	32
20.	87	57	72	41	87	69	85	56	78	57	82	58	63	39
21.	89	59	80	58	85	69	88	66	77	66	84	58	68	43
22.	87	63	86	59	79	67	93	70	83	69	77	49	60	33
23.	84	51	82	60	82	67	93	70	90	69	75	44	60	33
24.	86	54	68	54	86	67	86	71	92	67	80	52	62	34
25.	91	67	68	45	85	68	95	67	91	68	83	54	62	46
26.	79	59	70	50	88	72	85	58	89	63	83	56	68	53
27.	72	35	69	48	88	72	83	64	91	65	80	61	55	33
28.	62	34	75	47	89	65	88	74	90	68	85	67	48	30
29.	65	37	79	61	90	66	92	69	90	72	75	55	47	25
30.	70	42	73	62	89	70	93	70	93	62	75	60	63	29
31.			81	63			95	71	88	47			64	34
Ave.	74	45	76	55	83	63	87	66	86	64	82	57	67	43
Normal	70	46	78	55	86	63	88	67	87	66	82	60	72	48

Appendix Table 3a. Daily Maximum and Minimum Precipitation, April-October, 1976, Holland Station, Suffolk, Va.

Day of Month	Precipitation (Inches)						
	April	May	June	July	August	September	October
1.	0.68	0.25	-	0.14	-	-	0.86
2.	0.06	0.69	1.74	-	-	-	0.25
3.	-	-	0.88	-	0.30	1.18	0.43
4.	-	0.01	1.47	1.28	-	-	-
5.	0.07	-	-	-	-	-	0.65
6.	-	-	-	-	-	-	-
7.	-	-	-	0.49	-	-	-
8.	-	0.17	-	0.01	-	-	-
9.	0.12	-	-	-	0.55	-	0.22
10.	-	-	-	0.57	0.11	-	0.18
11.	-	-	-	-	-	1.09	-
12.	-	0.01	-	0.04	-	-	-
13.	-	-	-	-	-	-	-
14.	-	-	-	-	-	-	-
15.	-	0.24	-	-	0.18	0.06	-
16.	-	0.05	-	0.83	0.45	3.99	-
17.	-	0.20	-	-	-	0.03	-
18.	-	0.06	0.39	-	-	-	0.37
19.	-	0.34	-	-	-	-	-
20.	-	-	0.36	-	-	-	-
21.	-	-	0.44	-	-	-	1.26
22.	-	-	0.34	-	-	-	-
23.	-	-	0.14	0.06	-	-	-
24.	-	-	-	-	-	-	-
25.	-	-	-	0.83	-	-	0.15
26.	0.06	-	-	-	-	-	0.59
27.	-	-	-	-	-	-	-
28.	-	-	-	-	-	0.05	-
29.	-	0.19	-	0.01	-	-	-
30.	-	1.03	-	0.09	0.44	0.18	-
31.	-	0.05	-	0.16	-	-	0.49
Total	0.95	3.29	5.76	4.51	2.03	3.99	5.45
Normal	3.17	3.57	3.61	4.53	6.20	6.19	4.20

Appendix Table 4. Description of Pesticide Materials.

Official Common Name	Trade Name	Active Ingredient	Source
Aldicarb	Temik	2-Methyl-2-(methylthio propionaldehyde) O-(methylcarbomoyl) oxime	Union Carbide Corp. Ag. Products 270 Park Avenue New York, N. Y. 10017
Acephate	Orthene	O, S-dimethyl acetyphoramidothioate	Chevron Chem. Corp. Ortho Div. 200 Bush St. San Francisco, Ca. 94120
Bay Ntn 9306	Bolstar	O-Ethyl O-[4-(methylthio)phenyl] S-propyl phosphoro-dithioate	Chemagro Ag. Div. Mobay Chem. Corp. P. O. Box 4913 Hawthorne Rd. Kansas City, Mo. 64120
Bay 92114	None	1-Methylethyl-2-ethoxy-(1-methylethyl) aminophosphinothioyloxy benzoate	Chemagro Ag. Div. Mobay Chem. Corp.
Carbaryl	Sevin	1-naphthyl N-methylcarbamate	Union Carbide Corp. Ag. Products
Carbofuradan	Furadan	2,3-dihydro-2,2-dimethyl-7-benzofuranyl methylcarbamate	Bayer AG 509 Leverkusen Bayerwerk, West Germany

Appendix Table 4. Continued

Official Common Name	Trade Name	Active Ingredient	Source
Chlorpyrifos	Lorsban	0,0-Diethyl 0-(3,5,6-trichloro-2-pyridyl)-phosphorothioate	Dow Chemical Company Ag. Dept. P. O. 1706 Midland, Mich. 48640
Diazinon	Diazinon	0,0-Diethyl 0-(2-isopropyl-4-methyl pyrimidyl 6) thiophosphate	Ciba-Ceigy Corp. Ag. Div.
Disulfoton	Disyston	0,0-Diethyl S-2[(ethylthio)]ethyl phosphorodithioate	Bayer AG
Dowco 275	None	0,0-Diethyl 0-(6-fluoro-2-pyridyl) phosphorothioate	Dow Chemical Company
CGA 12223	None	0-[0-chloro-1-(methylenthyl)-1H-1,2,-triazol-3-y 1]0,0-diethyl phosphorothioate	Ciba-Geigy Ag. Div.
Ethoprop	Mocap	0-ethyl S,S-dipropyl phosphorodithioate	Mobile Chemical Corp. Industrial Chem. Div. 401 East Main Street Richmond, Va. 23208
Fenamiphos	Nemacur	Ethyl 3-methyl-4(methylthio) phenyl (1-methylethyl) phosphoramidate	Bay AG

Appendix Table 4. Continued.

Official Common Name	Trade Name	Active Ingredient	Source
Fonofos	Dyfonate	0 ethyl-S-phenyl ethylphosphono-dithioate	Stauffer Chemical Co. Ag. Research Center P. O. 760 Mountain View, Ca. 94040
Methamidophos	Monitor	0,S-dimethyl phosphoramidorthioate	Bayer AG
Monocrotophos	Azodrin	3-hydroxy-N-methyl-cis-crotonamide dimethyl phosphate	Ciba-Geigy Corp. Ag. Div.
Methomyl	Lannate	Methyl N-[(methylcarbamoyethyl)oxy] thioacetimidate	Dupont Demours Co. 1007 Market St. Wilmington, Del. 19898
Methomyl	Nudrin	Methyl N-[(methylcarbamoyethyl)oxy] thioacetimidate	Shell Chemical Co. Ag. Div. P. O. 4248 Modesto, Ca. 95352
Malathion	Malathion	0,0-dimethyl S-(1,2-dicarbethoxy-ethyl) phosphorodithionate	American Cyanamid Co. Ag. Div. P. O. 400 Princeton, N.J. 08540
N2596	None	0-ethyl S-(p-chloropenyl) ethyl phosphonodithioate	Stauffer Chemical Co. Ag. Research Center

Appendix Table 4. Continued.

Official Common Name	Trade Name	Active Ingredient	Source
Oftanol	SRA 12869	1-methylethyl 2-[[ethoxy[(1-methylethyl) amino]phosphinothioyl]-oxy] benzoate	Chemagro Ag. Div. Mobay Chem. Corp.
Methyl parathion (microencapsulated)	Penncap M	0,0-Dimethyl 0-p-nitrophenyl phosphorothionate	Pennwalt Corp. Ag. Chem. Div. 2901 Taylor Way Tacoma, Wash. 98401
Propargite	Omite	2-(p-tert-butylphenoxy) cyclohexyl-2-propynyl sulfite	Uniroyal Chemical Ag. Chemicals Elm St. Naugatuck, Conn. 07205
Cyclopropane carboxylic acid	SD 41706	2,2,3,3-tetramethyl-cyano-3-phenoxyphenyl methyl ester	Shell Chem. Co. Ag. Div.
Benzeneacetic acid	SD 43775	4-chloro-alpha-(1-methyl) cyano-(3-phenoxyphenyl) methyl ester	Shell Chem. Co. Ag. Div.
Terbufos	Counter	S-[[(1,1-Dimethylethyl) thio]methyl] 0,0-diethyl phosphorodithioate	American Cyanamid Co. Ag. Div.
Thiofanox	Dacamox	3,3-Dimethyl-1-(methylthio)-2-butanone 0-((methylamino)carbamoyl) oxime)	Diamond Shamrock Corp. Ag. Chem. Div. 1100 Superior Ave. Cleveland, Ohio 44114

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CONTROL OF THE POTATO LEAFHOPPER, EMPOASCA FABAE (HARRIS), AND THE INFLUENCE OF LEAFHOPPER POPULATIONS ON PEANUT YIELDS IN VIRGINIA

by

Jack Walter Jenkins

(ABSTRACT)

New and standard pesticides applied to peanuts (*Arachis hypogaea* L.) in Virginia were evaluated for control of the potato leafhopper. Leafhopper populations on test plots were monitored throughout 1975 and 1976 using a 12-inch sweep net. Grade, yield, and value data were collected from all experiments. Significant reductions of leafhopper populations were achieved with a broad range of chemicals. In many instances, the pesticidal activity of the test materials was not significantly affected by reducing their rate of application. Despite heavy leafhopper populations and injury levels during the two deasons, regression analyses demonstrated a lack of association between peanut values (dollars per acre) and potato leafhopper infestations or injury. Controlling the leafhopper did not significantly affect peanut values.