The

FLORIDA ENTOMOLOGIST

Volume 41, No. 2 *June, 1958*

CONTENTS

Published by The Florida Entomological Society

THE FLORIDA ENTOMOLOGIST is issued quarterly—March, June, September, and December. Subscription price to non-members $5.00 per year in advance; $1.25 per copy. Entered as second class matter at the post office at Gainesville, Florida.

Manuscripts and other editorial matter should be sent to the Editor, Biology Department, University of Florida, Gainesville. Subscriptions and orders for back numbers are handled by the Business Manager, Box 2425, University Station, University of Florida, Gainesville. The Secretary can be reached at the same address.

Authors are urged to consult a style manual when preparing manuscripts. For form of literature citations, see recent issues of THE FLORIDA ENTOMOLOGIST.

One zinc etching, not to exceed one-half page in size, or the equivalent thereof, will be allowed free. The actual cost of all additional illustrations must be borne by contributors. In general, the cost of a full page zinc etching is $7.50. Reprints of articles may be secured by authors if they are ordered before, or at the time proofs are received for correcting; 25 copies furnished free to authors.

REPRINTS WITHOUT COVERS

No. Pages	50 copies	100 copies	Each additional 100 copies
1-4	$ 5.25	$ 6.25	$ .98
5-8	8.75	10.75	2.10
9-16	13.00	17.10	3.00
17-20	19.25	23.50	4.00
More than 20 pages, per page	.98	.88	.19

Additional for covers with title and author's name,
First 50 .... $5.25   Additional, each .... $ .02

FACTORS AFFECTING THE RESULTS OF CORN EARWORM CONTROL STUDIES [1]

EMMETT D. HARRIS, JR.
Everglades Experiment Station, Belle Glade, Florida

Many papers have been written on the control of the corn earworm, *Heliothis zea* (Boddie), but few authors have published on those factors that may affect the reliability and precision of the experiment on corn earworm control. Some of these factors that have been studied by the author are discussed in this paper.

EVALUATING INJURY: Most workers have estimated the degree of corn earworm injury by two basic methods: 1) the percentage of injured or uninjured ears, and 2) by an injury index to show the average degree of injury per ear. To determine the injury index, numbered categories are arbitrarily based on the depth of injury from the tip of the ear by earworms entering through the silk channel, and on the number of kernels damaged by insects attacking the ear by chewing through the husk. The number of ears in each category is multiplied by the category number. These products are then summed and the total divided by the number of ears examined. Walter (1948) described a method in which the categories are numbered from 0 to 5 with 0 indicating no injury and 5 indicating the greatest amount of injury. He also estimated the average number of kernels that are destroyed for each category of injury. Connell (1956) developed an instrument to facilitate measuring the depth of injury. Ditman and Ditman (1957) described another instrument for this purpose. They also gave details of a method by which the depth of earworm injury can be used to estimate the actual percentage loss of kernels by weight.

During the summer of 1956, the author compared the two basic methods of evaluating corn earworm injury in popcorn and field corn variety trials, and in chemical control experiments on sweet corn. The two methods were compared by several statistical measurements: the treatment F value; the coefficient of variation; the lowest significant difference by the Multiple Range Test; and, the percentage that the lowest significant difference was of the average amount of injury in the experiment. A higher treatment F value would imply that a method was more likely to detect significant differences among treatments. The coefficient of variation is the square root of the error means square divided by the average amount of injury for the experiment. The precision of an experiment varies inversely with the size of the coefficient of variation (Snedecor 1946). The lowest significant difference by the Multiple Range Test is that value used to compare two adjacent, ranked means (Duncan 1953). It is analagous to the L.S.D. The Multiple Range Test value cannot be used directly for comparing the two methods as they give injury evaluations that are numerically different from each other. However, by dividing the lowest significant difference by the average amount of injury and multiplying by 100, percentage values for each method are obtained which can be compared. These percentage values merely reflect the coefficient of variation but are given for amplification.

[1] Florida Agricultural Experiment Stations, Journal Series No. 643.

On June 21 and 22, 25 ears from each plot were examined in a popcorn variety trial that had been planted by Dr. V. E. Green, Jr. for agronomic studies (Green and Harris, 1956a). There were 19 varieties in four randomized complete blocks. Each plot consisted of one row that was 100 feet in length. Injury index categories were: 0—no injury; 1—injury to kernels to one-eighth the length of the ear; 2—injury to one-fourth the length of the ear; 3—injury to one-third the length of the ear; 4—injury to one-half the length of the ear; 5—injury exceeding one-half the length of the ear. For each plot the number of ears in each category was multiplied by the category number. The products were added, divided by 25, and then multiplied by 100 to make whole numbers for greater ease in making calculations. The injury index method was superior to percent worm-free ears for detecting significant differences among varieties (Table 1). This injury index method gave a highly significant treatment F value as compared to a non-significant one for percent worm-free ears. The coefficient of variation was much lower for the injury index method.

TABLE 1.—COMPARISON OF METHODS OF EVALUATING CORN EARWORM INJURY IN A POPCORN VARIETY TRIAL.

	Angles for Percent Worm-free Ears [1]	Injury Index
Treatment F value (d.f. = 18 & 54)	1.29 (NS)	33.19**
Average earworm injury	15.9	148.2
Coefficient of variation	51.4%	13.6%
Lowest significant difference by the Multiple Range Test	11.6	29
Percent of average injury	72.8%	19.6%

[1] Percent worm-free ears transformed to arc sin $\sqrt{\%}$ before analysis of variance.

Examinations were made for injury to field corn that had been planted by Dr. V. E. green, Jr. for agronomic studies (Green and Harris, 1956b). Thirteen varieties were compared in five randomized complete blocks. Each plot consisted of a single row that was 100 feet in length. The corn was harvested on July 9 but not examined for earworm injury until August 2, 1956. Twenty-five ears per plot were examined to compare the varieties by each method of injury evaluation. Categories for the corn earworm injury index were: 0—no injury; 1—tip only; 2—injury to kernels to one-half inch below the tip of the ear; 3—injury to one and one-fourth inch below the tip; 4—injury to two and one-half inches below the tip; 5—injury exceeding two and one-half inches below the tip. Because it was infrequent, injury to the ear caused by earworms chewing through the husk was not considered. Again the injury index was the superior method for detecting significant differences among varieties (Table 2).

The criteria of injury index and percent worm-free ears were compared in two chemical control studies on sweet corn. Twenty-five ears were examined per plot. The method of scoring was based on U. S. Standards for Green Corn (Lennartson, 1954) as applied to corn earworm injury.

Code	Grade	Description of Injury
0	U. S. Fancy	No evidence of insect, frass, or injury.
1	U. S. No. 1	Insect, frass, or injury in silk channel or at tip of ear.
2	U. S. No. 2	Insect, frass, or injury to a depth greater than ¼ the length of the ear from the tip.
3	Cull	Insect, frass, or injury to a depth greater than ⅓ the length of the ear from the tip.

Injury to the side of the ears was negligible and was not included in the analyses. In both experiments, analysis of percent worm-free ears gave a higher degree of precision than analysis of injury indexes (Table 3). The treatment F values were slightly higher, and the coefficients of variation and the differences needed to show adjacent, ranked treatment means significantly different were much lower with percent worm-free ears.

The injury index method seemed superior in field corn and popcorn variety trials but appeared inferior to the criterion of percent worm-free ears in chemical control studies on sweet corn. The sweet corn injury index method was less precise than for popcorn or field corn because of fewer categories but it is doubtful that this is the reason for it failing to be as effective as percent worm-free ears. It is also doubtful that there is any real difference between field corn or popcorn and sweet corn in this respect. During the silking period, insecticides were applied to the sweet corn and not to the popcorn or field corn. A chemical probably tends to either completely prevent or permit earworm injury with little effect on the degree of injury. Differences in earworm resistance among varieties appear to be manifested in the degree of injury per ear.

Originally it was thought that an injury index method might show differences among insecticide treatments that are too subtle to be detected by percent worm-free ears. The data (Table 3) contradict this supposition.

From a practical standpoint in the Everglades area, percent worm-free ears is a better criterion for evaluating corn earworm control on sweet corn. Everglades grown corn is sold for the fresh market and the grower is interested in obtaining only U. S. Fancy corn. A U. S. Fancy ear shows absolutely no evidence of attack by the corn earworm. Field corn or popcorn is another matter. Here, we are not interested in grade requirements but the actual amount of corn destroyed. Percent worm-free ears reveals little about this, whereas, the injury index is a reliable estimate.

NUMBER OF EARS EXAMINED PER PLOT: By determining only the percent worm-free ears and omitting the injury index, at least four times as many ears can be examined in a given time. The precision of the experiment can be increased by examining a larger number of ears per plot. Two of the chemical control experiments conducted in 1957 were harvested in such a manner that the effect of sample size on the precision of the experiment could be determined. In each experiment the percentage of worm-free ears per plot was determined and the data were transformed to angles (arc sin $\sqrt{\%}$) before analysis of variance.

The first experiment was conducted to screen some of the newer insecticides for corn earworm control. The corn was sprayed only once during the silking period in January. The corn earworm population was low and

TABLE 2.—COMPARISON OF METHODS OF EVALUATING CORN EARWORM INJURY IN A FIELD CORN VARIETY TRIAL.

	Angles for Percent Worm-free Ears [1]	Injury Index
Treatment F value (d.f. = 12 & 48)	1.25 (NS)	2.08*
Average earworm injury	25.3	196.4
Coefficient of variation	30.9%	15.2%
Lowest significant difference by the Multiple Range Test	10.0	38.1
Percent of average injury	39.4%	19.4%

[1] Percent worm-free ears transformed to arc sin $\sqrt{\%}$ before analysis of variance.

TABLE 3.—COMPARISON OF METHODS OF EVALUATING CORN EARWORM INJURY IN INSECTICIDE TRIALS ON SWEET CORN.

	Angles for Percent Worm-free Ears [1]	Injury Index
Experiment 1		
Treatment F Value (d.f. = 19 & 38)	3.49**	3.03**
Average earworm injury	83.2	4.9
Coefficient of variation	8.6%	196.5%
Lowest significant difference by the Multiple Range Test	12.0	16.0
Percent of average injury	15.4%	328.1%
Experiment 2		
Treatment F Value (d.f. = 13 & 39)	9.31**	8.55**
Average earworm injury	51.9	58.0
Coefficient of variation	10.1%	41.7%
Lowest significant difference by the Multiple Range Test	14.1	35.0
Percent of average injury	27.2%	60.3%

[1] Percent worm-free ears transformed to arc sin $\sqrt{\%}$ before analysis of variance.

TABLE 4.—INCREASED INFORMATION OBTAINED BY DOUBLING THE NUMBER OF EARS EXAMINED IN A CORN EARWORM CONTROL EXPERIMENT ON SWEET CORN.

	Number of ears per plot	
	25 [1]	50
Treatment F Value (d.f. = 15 & 45)	1.72 (NS)	2.66**
Coefficient of variation	10.8	7.1
Lowest significant difference by the Multiple Range Test	10.7	7.0

[1] Average of two analyses.

84 percent of the ears in the untreated check plots were worm-free. Sixteen treatments (including the untreated check) were compared in four randomized complete blocks. A 25-ear sub-sample was examined for corn earworm injury in each row of each two-row plot. The two sub-samples were used separately and combined in analyses of variance. The analysis of the 50-ear sample gave about 52 percent more relative information than the average of the analyses for the 25-ear sub-samples (Table 4). The treatment F value for the 25-ear sub-sample was not significant, whereas, that for the 50-ear sample was highly significant. The coefficient of variation and the lowest significant difference between two adjacent ranked means as determined by the Multiple Range Test (Duncan, 1953) was greatly reduced by the larger sample size.

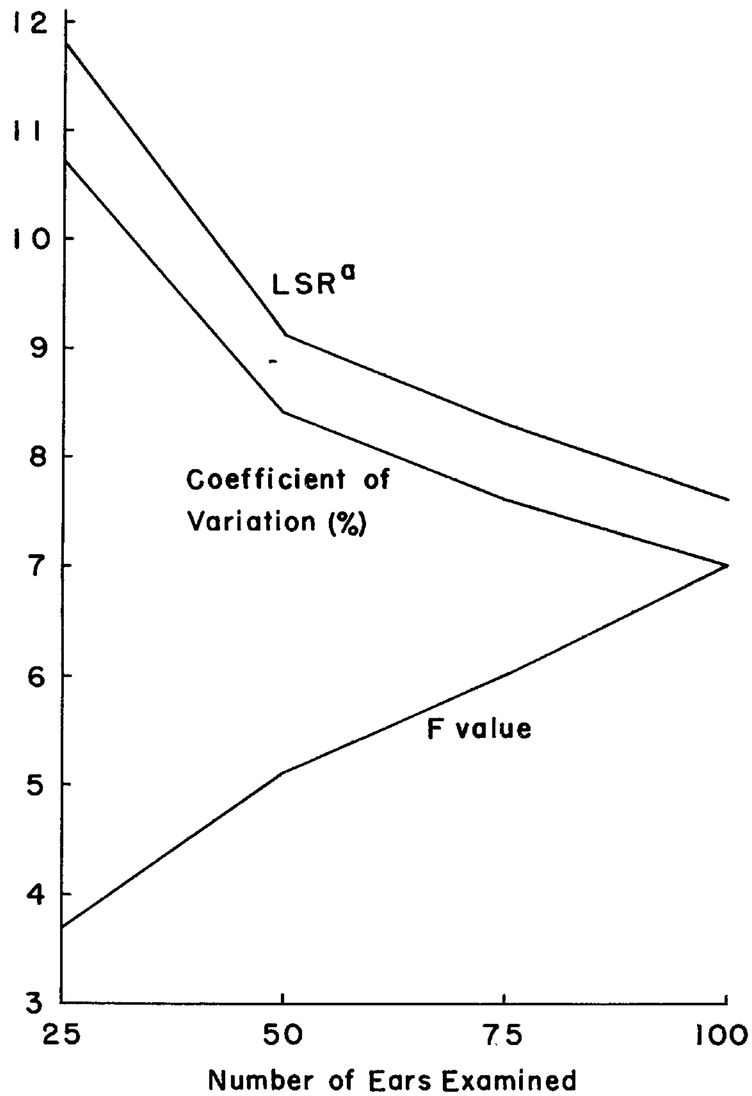


Fig. 1.—Number of ears examined per plot and the precision of a chemical control experiment. [a] Multiple Range Test value for comparing two adjacent, ranked means.

The second experiment was conducted to compare 15 insecticide treatments. Most of these gave about the same degree of corn earworm control. Treatments were applied at 24- or 48-hour intervals during the silking period in April. Each was replicated four times in a randomized complete block design. The untreated check plots, which contained an average of 49 percent worm-free ears, were not included in the analyses of variance. A sub-sample of 25 ears was taken from each half of the two center rows of each six-row plot. Four analyses each were made for samples containing 25, 50, and 75 ears per plot and then averaged for each sample size. In each analysis, data from the same plot quadrant or combination of quadrants were used throughout the analysis. The quadrants were chosen randomly for the 50-ear samples as there was a possibility of two more quadrant combinations than were analyzed. Analysis for the 100-ear sample also was conducted.

The precision of the experiment increased sharply as the sample size increased from 25 to 100 ears per plot (figure 1). The relative information for the 100-ear sample was about 53 percent greater than that for a 25-ear sample. Theoretically, the optimum sample size would be indicated by the point at which the lines would become nearly horizontal. It is apparent that this point was not reached with a sample of 100 ears per plot. Further work is needed to disclose the optimum number of ears per plot to be examined in corn earworm control experiments.

In determining a suitable sample size the experimenter should be guided by the magnitude of the difference that he wishes to detect among treatments within an experiment. In preliminary experiments to screen insecticides or methods of application, a small sample size would probably be in order. For experiments in which it is desired to detect small treatment differences, 100 or more ears per plot should be examined.

EFFECT OF STAND: Douglas and Eckhardt (1953) reported that there was greater earworm injury to field corn with fewer plants per acre, and when the number and size of ears were reduced by nitrogen deficiency. Eden (1956) reported that there were no significant effects in the percentages of worm-free sweet corn ears resulting from differences in irrigation, rate of nitrogen fertilizer, or spacing. Corn in their tests was sprayed routinely for corn earworm control. Klostermeyer (1950) reported that an increase in nitrogen fertilizer resulted in less corn earworm injury to sweet corn and field corn. He thought that the effect of nitrogen was through one or more of the following factors: earlier silking and maturity, increased number and size of ears, decreased number of barren stalks, increased length of husk extension, and tightness of husk.

In the field corn and popcorn variety trials planted by Dr. Green in 1956 there was an erratic reduction in stand caused by subterranean insects and poor growing conditions. In both experiments each plot consisted of a single 100-foot row in which the plants were intended to be spaced 12 inches apart. These rows were three feet apart and the planting rate should have resulted in 14,520 plants per acre.

The regression ($r = -0.2784^*$; $Y = 1.791 - 0.2773X$) of the injury index on the number of popcorn ears per 100-foot of row is shown in figure 2 along with the percent change occurring to variety means when adjusted for regression. Covariance analysis showed a significant reduction ($F =$

4.71*) of the error mean square by regression. Figure 3 shows the highly significant regression (r = —0.4008**; Y = 288.2 — 1.0978X) of the corn earworm injury index for field corn on the number of ears harvested per 100 feet of row and the percentage that variety means were adjusted for number of ears per row. The reduction (F = 8.98**) of the error mean square due to regression was highly significant. Figure 4 shows the same information for the regression of percent worm-free ears on the number of field corn ears harvested per row (r = 0.4337**; Y = 0.3866X — 12.1). The reduction (F = 10.89**) of the error mean square due to regression was again highly significant.

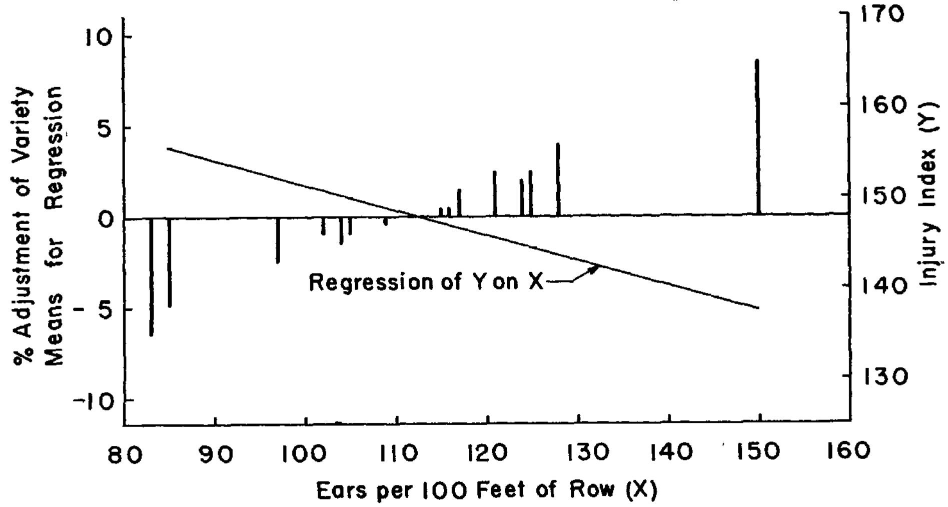


Fig. 2.—The effect of ear population density on the degree of corn earworm injury in a popcorn variety trial.

In a sweet corn planting in which the author conducted a chemical control study on budworms, a complex of *Heliothis zea* (Boddie) and *Laphygma frugiperda* (J. E. Smith), and a later chemical control study on the corn earworm, *Heliothis zea* (Boddie), the stand was erratic as a result of frost and wireworm injury. Before the first budworm insecticide application there was a highly significant negative correlation (R = —0.8911**) between the percentage of plants injured by budworms and the number of plants per row. After two insecticide applications for budworm control, the negative correlation had fallen to a non-significant value (R = —0.2727). There was a still lower negative correlation (R = —0.1912) between the percentage of ears free from earworm injury and the number of plants per row.

These experiments indicate a relationship between the number of plants per row and the degree of earworm injury. This effect seems greater for unsprayed corn in variety trials than it is for corn in chemical control studies. The experimenter should take this relationship into consideration when he has an uneven stand within a corn field.

GALLONAGE: Few will deny that with a given concentration of insecticide the amount of spray applied per acre (at least to the point of run-off) has an effect upon the degree of insect control. But how many experiment-

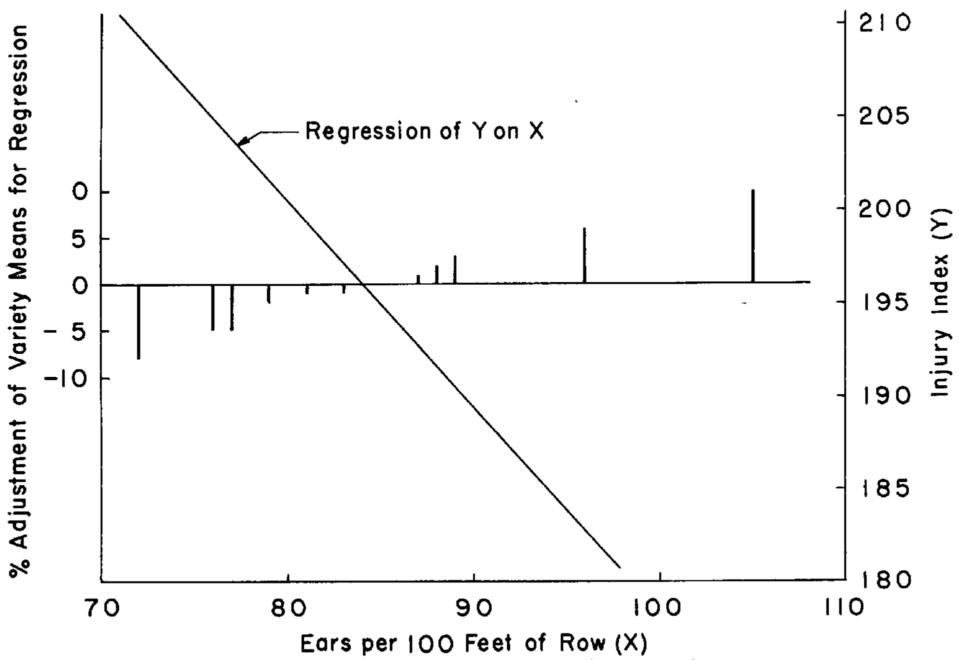


Fig. 3.—The effect of ear population density on the degree of corn earworm injury in a field corn variety trial.

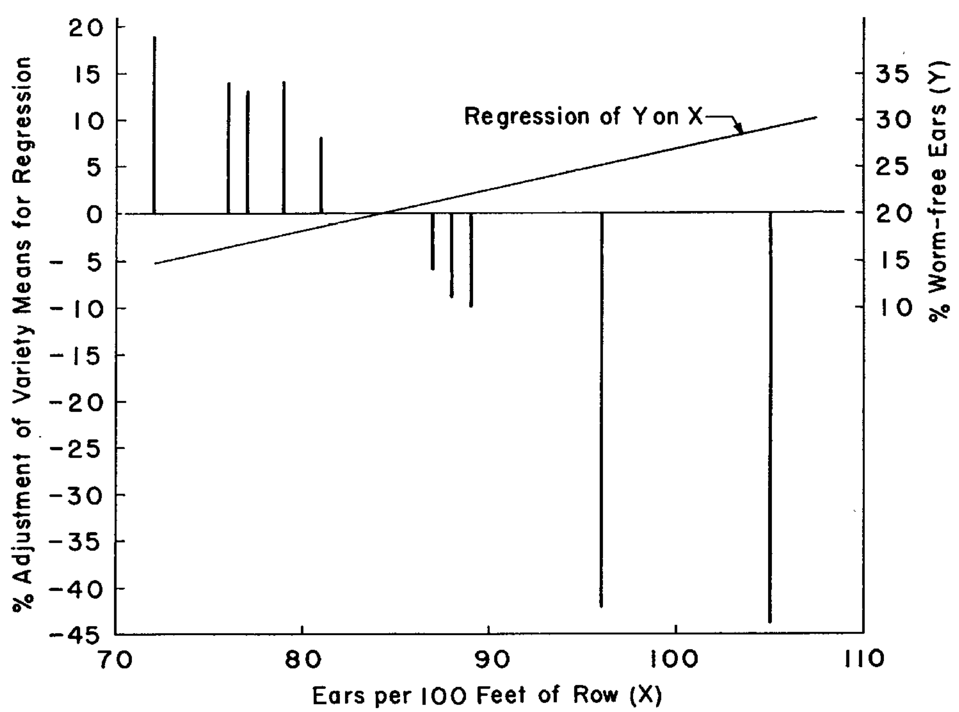


Fig. 4.—The effect of ear population density on percent worm-free ears in a field corn variety trial.

ers assume that when the spray pressure, nozzles, and sprayer speed are constant, different insecticide sprays are applied at the same gallonage per acre? Under such conditions it has been found that a spray containing two pounds of actual DDT in 50 gallons prepared from four pounds of 50 percent DDT wettable powder is applied at a much lower gallonage than one prepared from one gallon of 25 percent DDT emulsifiable concentrate.

In one instance, it was found that two Myers jumbo nozzles per row containing number 3 disks, at a spraying pressure of 200 pounds per square inch, and a speed of about 3.4 miles per hour, delivered 36 gallons of DDT wettable powder spray as compared to 48 gallons of DDT emulsion per acre. When the self-propelled sprayer was shifted to the next lower gear to give a speed of approximately 2.0 miles per hour the wettable powder spray was applied at the rate of 54 gallons per acre.

Analysis of gallons per acre applied on three dates at 3.4 miles per hour and 200 pounds per square inch pressure indicated that DDT emulsions were applied at 67.8 gallons per acre as compared to DDT wettable powder sprays at 56 gallons per acre. This difference was highly significant.

A wettable powder spray flows through the nozzles at a reduced rate probably because of increased viscosity and friction. It is suspected that the author detected such great differences because a heavy concentration of insecticide was used. But in corn earworm control it is common to use high concentrations. There is a problem of how to apply equal gallonages of two insecticidal sprays, without adding a variable that is just as important, or more important, than gallonage. Nozzle sizes of the same type are different enough to over-compensate for this difference in gallonage. Spraying pressure has to be changed too much to correct the gallonage. It seems that the best selection would be to use a filter of finer mesh with the more free-flowing material or to vary the speed of application.

DISCUSSION: Only a few of the factors that affect the results of corn earworm control experiments have been discussed and the studies on these factors are far from complete and conclusive. Many workers probably have data on these and other factors that they consider of importance only to themselves. Unless such data are published each worker must either study these factors or ignore them.

The author has shown by two experiments that increasing the sample size greatly increased the precision of the experiment. But it is not known how many ears per plot should be examined to give optimum results. There is apparently nothing in the literature concerning a closely related factor, i. e. the number of replicates that should be included in the experiment. Further, the author knows of no work that has been conducted to determine the best type of experimental design. Perhaps a Latin square would give a more precise experiment than the randomized complete block that is commonly used in corn earworm control studies.

Most workers analyze injury indexes without transformation, and analyze percent worm-free ears as such or after transformation to angles (arc sin $\sqrt{\%}$). Statisticians have shown that percentages usually should be transformed to angles before analysis of variance but that data (including percentages) with certain types of distribution should be transformed to other values, e. g. logarithms (Snedecor, 1946). It seems that transformation to angles gives better results than anlyzing raw percentages but perhaps there is some other transformation that will give even more reliable results.

Studies and subsequent publications concerning the factors that influence the results of corn earworm control studies would greatly benefit all entomologists studying the control of the corn earworm. Much of this information would be of direct importance to the corn grower.

SUMMARY: Comparisons of two methods of evaluating corn earworm injury indicated that an injury index is superior for variety trials, whereas, percent worm-free ears is superior for chemical control studies. Increasing the number of ears examined per plot from 25 to 50 and 100 greatly increased the relative information obtained from corn earworm control experiments. Unequal stands were found to affect the results of corn earworm control experiments, especially variety trials. The gallonage per acre applied with wettable powder sprays was much less than that applied with emulsions containing the same concentration of actual DDT when other factors were constant.

ACKNOWLEDGMENTS: The author is indebted to Mr. Edward King, Jr., Draftsman, and Mr. H. M. Spelman III, Staff Assistant, for preparation of the graphs and to Mr. C. E. Seiler and Mr. F. D. Stevens, Field Assistants, for help in conducting field experiments.

LITERATURE CITED

Connell, W. A. 1956. Control of larvae infesting sweet corn ears. Jour. Econ. Ent. 49 : 539-542.

Ditman, L. P., and *J. L. Ditman.* 1957. On apparatus for measuring corn earworm injury to sweet corn. Jour. Econ. Ent. 50 : 371-372.

Douglas, W. A., and *Robert C. Eckhardt.* 1953. The effect of nitrogen in fertilizers on earworm damage to corn. Jour. Econ. Ent. 46 : 853-854.

Duncan, D. B. 1953. Multiple range and multiple F tests. Dept. of Statistics and Statistical Lab. Va. Agr. Exp. Sta. Tech. Rpt. 6a : 1-54.

Eden, W. G. 1956. Influence of nitrogen fertilizer, spacing, and irrigation on control of the corn earworm in sweet corn. Jour. Econ. Ent. 49 : 278-279.

Green, Victor E., Jr., and *Emmett D. Harris, Jr.* 1956. Studies with popcorn varieties in the Everglades area 1952-1956. Everglades Station Mimeo Report 57-4.

Green, Victor E., Jr., and *Emmett D. Harris, Jr.* 1956. Results of research with field corn in the Everglades Area 1956. Everglades Station Mimeo Report 57-5.

Klostermeyer, E. C. 1950. Effect of soil fertility on corn earworm damage. Jour. Econ. Ent. 43 : 427-429.

Lennartson, Roy W. 1954. United States standards for green corn. U. S. Dept. Agr. Agricultural Marketing Service F. R. Doc. 54-2915 : 1-4.

Snedecor, G. W. 1946. Statistical Methods, 4th ed. 485 pp. Ames, Iowa. The Iowa State College Press.

Walter, E. V. 1948. Corn earworm resistance in sweet corn inbreds and hybrids. U. S. Dept. Agr. B.E.P.Q. E-745 : 1-22.

quires about two weeks during the summer months; there are three generations from mid-July to September 1.

No control measure has been worked out. Under existing conditions, eradication of the host plant, *A. glabra*, would possibly be the most effective and economical method. According to Quayle (1938) poison baits have been used in other countries to suppress adult population of related species.

SUMMARY: Samples of pierced oranges were received from a grove near Fort Pierce, Florida in 1956. The insect involved was found to be an adult moth, *Gonodonta nutrix* (Cramer). Considerable damage was done to mature oranges as a result of the adult moths drilling holes in them.

From field observations made during two seasons, it was found that the moth pierced the oranges during the night hours, and that other non-piercing moth species used the holes to obtain food. The host plant for the egg, larva, and pupa is the pond apple, *Annona glabra* (L.), which grows along canals adjacent to citrus groves.

No control measure has been worked out, but with the limited population of the host plant, *A. glabra*, it is possible that its eradication would provide effective control of this pest.

ACKNOWLEDGMENT: Acknowledgment is made to Messers C. C. Woolard, Jr. and R. L. Reese, of Fort Pierce, Florida for their help in life history studies.

LITERATURE CITED

Crumb, S. E. 1956. The larvae of the Phalaenidae. U.S.D.A. Tech. Bul. No. 1135.

King, John R. 1957. Summary of observations of citrus pests in Cuba and the Isle of Pines. Citrus Magazine. 19(11) : 21-22.

Quayle, H. J. 1938. Insects of citrus and other subtropical fruits. Comstock Pub. Co. Inc. Ithaca, N. Y.

Swanson, R. W. 1957. Cooperative insect pest survey. Florida State Plant Board. 4(21) : 103.

ANNOUNCEMENT OF THE 41st ANNUAL MEETING

The Florida Entomological Society will hold its annual meeting September 11-12, 1958, at the Tampa Terrace Hotel in Tampa. In addition to the usual reading of papers (deadline for titles is August 1st), there will be invitational speakers and two symposia. One panel will discuss nemas, the other will talk about virus-vector relationships of plant diseases in Florida. Dr. John S. Allen, President, University of South Florida, will be the guest speaker at the banquet.

Members who have failed to receive the April communication calling for titles can contact the Program Chairman, Frank W. Mead, State Plant Board of Florida, Gainesville, if they so desire.

THE REDISCOVERY OF *DINUROTHRIPS VANZENYII* BAGNALL (THYSANOPTERA: THRIPIDAE)

J. DOUGLAS HOOD
Cornell University

The finding of an old, "lost" species is certainly among the most gratifying experiences of the systematist. It fills a gap in his knowledge, of which he has been acutely conscious, while a new species merely extends his knowledge in a more or less expected manner. Since the description of *Dinurothrips vanzenyii* in 1919, by R. S. Bagnall, on the basis of a defective unique female from Argentina, collected in 1905, others than I have no doubt read and re-read his description, wondering whether the specimen was really a *Dinurothrips* and, if so, whether it might not be simply the short-winged form of *D. hookeri,* the only other member of the genus. Mr. Fritz Plaumann has now taken it in southern Brazil, and his material permits for the first time a direct comparison between identical forms of the two species and also between the males.

The other species treated below, *D. hookeri,* is of interest, too, because it is new to the known fauna of Florida and the United States.

Genus *DINUROTHRIPS* Hood

1913. *Dinurothrips* Hood, Ins. Insc. Menstr., 1 (12) : 150.

In connection with the genus itself, it is worth noting that the tarsi are either one- or two-segmented, as shown in Figs. 5 and 6. This is a striking fact, in view of the importance of the number of tarsal segments even in the definition of much higher taxa in certain other orders of insects, such as the Coleoptera. *Dinurothrips,* too, has a finger-like process near the tip of the hind tarsi, on the dorsal surface, terminating in a stout seta (fig. 9). The structure is not peculiar to this genus, however.

The following characters differentiate the two known species effectively:

a. (FEMALES, long-winged): Yellowish brown to naked eye or under hand lens, distinctly yellowish toward tip of abdomen; tibiae and tarsi yellow, femora often yellow but frequently shaded with brown or even wholly brown; legs longer, the hind tibiae (fig. 6) about five times as long as wide; all tarsi one-segmented (figs. 6 and 9); pterothorax (fig. 7) about as long as wide, the mesonotum (figs. 3 and 7) divided medially only in posterior third, its sculpture finer, its reticles more sharply polygonal and largely fanning out from the anterior end of median suture; segment X of abdomen (see figure in original description) slenderer and more tube-like.—(MALES, long-winged): Glandular areas on sterna III-VII (fig. 10) subequal, that on III with lateral margins touching or surpassing ante-coastal line; tergum IX (fig. 12) with two pairs of stout median setae (one directly behind the other), and three pairs of long, strong, dorso-lateral setae ....*hookeri* Hood

aa. (FEMALES, long- and short-winged): Blackish brown or nearly black to naked eye or under hand lens, somewhat yellowish toward tip of abdomen; legs blackish brown, with only the tarsi and the basal two-fifths of hind tibiae yellowish; legs shorter, the hind tibiae (fig. 5) about four times as long as wide; all tarsi two-segmented (fig. 5); pterothorax (fig. 4) wider than long, with relatively shorter dorsal sclerites, the mesonotum (figs. 2 and 4) completely divided along median line, its sculpture coarser, its reticles rounded and less polygonal and not fanning out from posterior third; segment X of abdomen stouter (about 1.6 times as long as greatest width), less concave at basal fourth, more nearly conical than tube-like.—(MALES, short-winged): Glandular areas on sterna III-VII (fig. 8) unequal, becoming smaller on the anterior sterna, that on III with lateral margins far behind antecostal line; tergum IX (fig. 11) with only one pair of stout median setae and only two pairs of long, strong, dorso-lateral setae ....*vanzenyii* Bagnall

It may be well to note that Moulton, in his key to these species (Rev. Ent., 3 [1] : 97, 1933), bases his separation on two characters: wing length and leg color. The former character is seldom, if ever, of taxonomic value. It usually indicates merely that our knowledge of the species is incomplete; and sooner or later the missing form—usually the macropterous one—is discovered. This is the case here. The latter of his two characters is based upon error, he having given the color of the legs of *hookeri* under *vanzenyii*, and vice versa. His records under *hookeri* (he did not know *vanzenyii*) are doutless correct, nevertheless, as I have material of that species from the same localities, and *venzenyii* appears to be more southern in distribution.

Dinurothrips hookeri Hood
(Figs. 3, 6, 7, 9, 10, and 12)

1913. *Dinurothrips hookeri* Hood, Ins. Insc. Menstr., 1 (12) : 151, Pl. V, Figs. 1-4.

Little need be added to the original description and figures, or to the six additional figures now given and the characters enumerated above. Short-winged forms are unknown and perhaps do not occur. The male, however, has not been described. Its color is like that of the female, but more yellowish. The principal structural characters are shown in figs. 10 and 12. Males are not frequent, though I have specimens from Jacarepaguá, Campinas, Santos, and Nova Teutonia, all in Brazil.

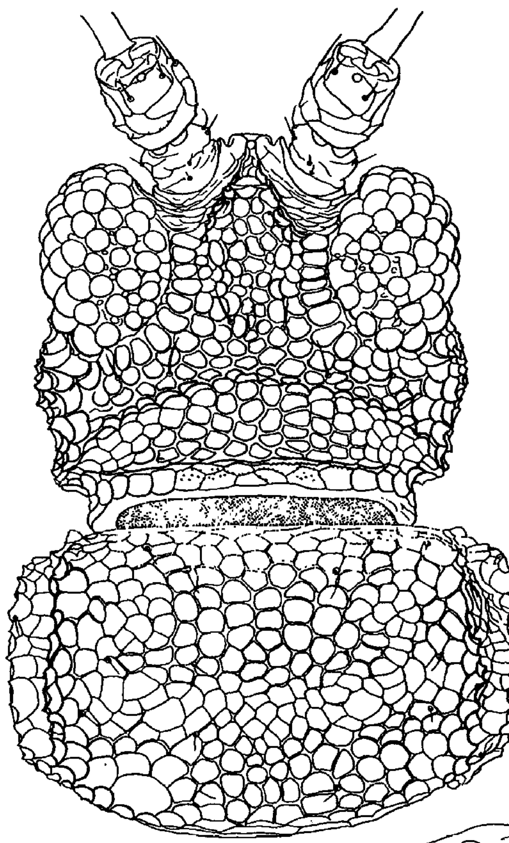
DISTRIBUTION: Puerto Rico, Cuba, Jamaica, St. Lucia, Grenada, Trinidad, Panamá, Surinam, Brazil, and Florida (Gainesville, taken in September, 1938 or 1939, by J. R. Preer, and in December, 1953, by Dr. Minter J. Westfall, Jr., and me). It occurs on a variety of unrelated plants. As was noted in the introduction above, it has not heretofore been recorded from the United States or from Florida.

Dinurothrips vanzenyii Bagnall
(Figs. 1, 2, 4, 5, 8, and 11)

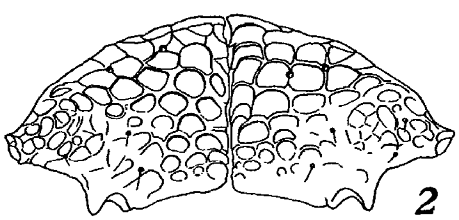
1919. *Dinurothrips vanzenyii* Bagnall, Ann. Mag. Nat. Hist., Ser. 9, 4:256.

Bagnall's brief but discriminating description, based upon a unique short-winged female from Tucuman, Argentina, taken more than fifty years ago, is the only record of the species in the literature. The antennae of his type had been broken off beyond segment II. Mr. Plaumann's recent sending from southern Brazil comprises a good series of specimens, including one long-winged female and two males, both of the latter short-winged. It thus becomes possible for the first time to make a comparison between females of the same form of the two species and to describe the male.

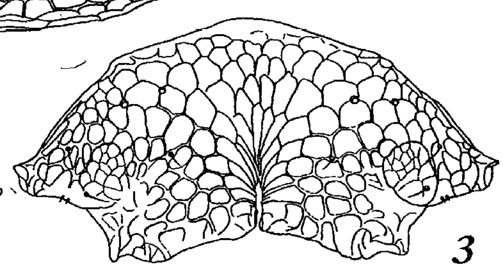
FEMALE, forma macroptera (newly discovered).—Somewhat shorter than *hookeri*, the total length about 1.6 mm. Color blackish brown to nearly black; head somewhat yellowish in front; pronotum indistinctly yellowish



1



2



3

(EXPLANATION OF FIGURES)

Fig. 1.—*Dinurothrips vanzenyii* Bagnall, head and pronotum; ♀, brachypterous form.

Fig. 2.—*D. vanzenyii*, mesonotum; ♀, brachypterous form.

Fig. 3.—*D. hookeri* Hood, mesonotum; ♀, macropterous.

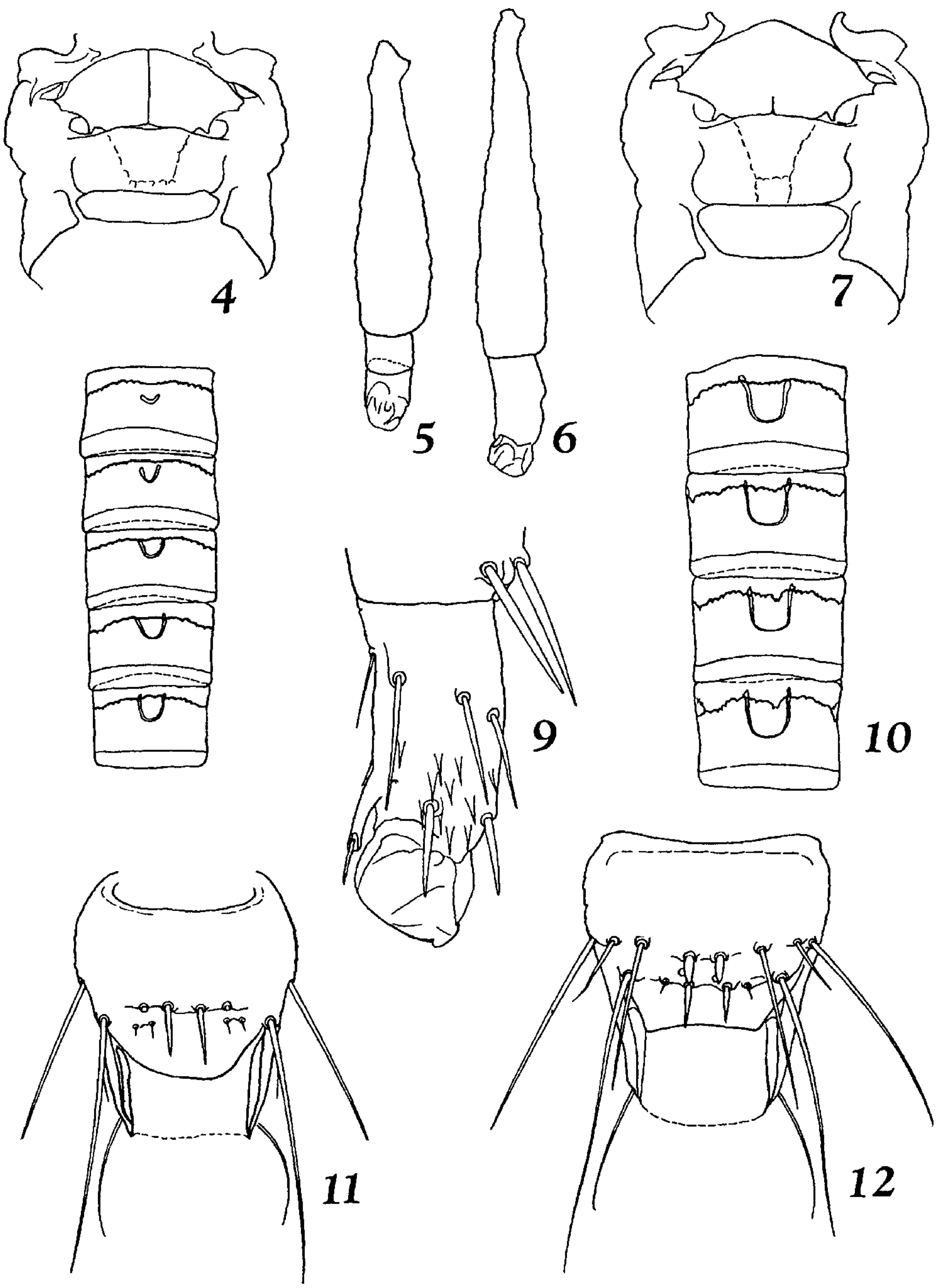


Fig. 4.—*Dinurothrips vanzenyii* Bagnall, outline sketch of pterothorax; ♀, macropterous form.
Fig. 5.—*D. vanzenyii*, left hind tibia and tarsus; ♀, macropterous form.
Fig. 6.—*D. hookeri*, left hind tibia and tarsus; ♀, macropterous.
Fig. 7.—*D. hookeri*, outline sketch of pterothorax; ♀, macropterous.
Fig. 8.—*D. vanzenyii*, sterna III-VII of abdomen; ♂, brachypterous.
Fig. 9.—*D. hookeri*, left hind tarsus in lateral aspect; ♀, macropterous.
Fig. 10.—*D. hookeri*, sterna III-VI of abdomen; ♂, macropterous.
Fig. 11.—*D. vanzenyii*, tergum IX of abdomen; ♂, brachypterous.
Fig. 12.—*D. hookeri*, tergum IX of abdomen; ♂, macropterous.

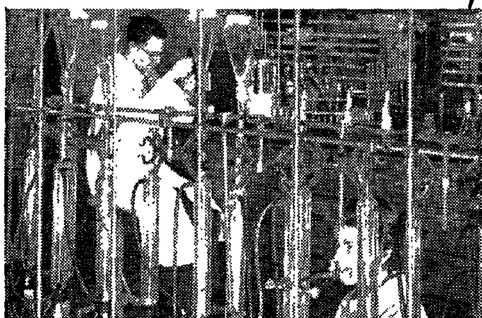
anteriorly and posteriorly; legs concolorous with body, except for the somewhat yellowish tarsi and the yellowish basal two-fifths of the hind tibiae; antennae with segments I and III-V yellow, only the last of these shaded apically, II dark brown, VI-VIII nearly black. Head 171μ long medially, 182 laterally, 190 across eyes, 172 just behind eyes, 195 across cheeks, 183 near base of cheeks, 154 across neck-line base, its scructure and sculpture scarcely different from those of short-winged form shown in fig. 1; eyes 88μ long dorsally, 55 wide, 80 apart. Pronotum 157μ long, 238 wide, sculptured as in short-winged form (see fig. 1). Pterothorax (fig. 4) shorter than greatest width; mesothorax 273μ across anterior angles, its greatest width 298; Mesonotum with complete median suture, its sculpture as in short-winged form (see fig. 2). Fore wings 815μ, formed as in type species. Abdomen 392μ across segments III-IV; X 162μ long, 101 wide near base, conical rather than sub-tubular in form; seta I on segment IX about 121μ, II about 142; seta I on X about 123μ, II about 104. Antennal segments: I 27 (34), II 47 (40), III 94 (20), IV 60 (21), V 53 (23), VI 50 (23), VII 19 (12), VIII 48 (6-7); sense-cones on III and IV simple.

FEMALE, forma brachyptera (Bagnall's type is of this form, and the following notes and measurements are supplementary to his description).—Length about 1.6 mm., or somewhat less. Color of head, body, legs, and antennae as in macropterous form; fore wings brown, with a pale area just before middle. Head (fig. 1) 165μ long medially, 178 laterally, 186 across eyes, 176 just behind eyes, 192 across cheeks, 175 near base of cheeks, 143 across neck-like base; eyes 86μ long dorsally, 56 wide, 74 apart. Pronotum (fig. 1) 137μ long (ranging from 137 to 152, with an average of 148), its width in this specimen about 225. Pterothorax shorter than greatest width; mesothorax 238 across anterior angles, its greatest width 251; mesonotum with complete median suture, its sculpture shown in fig. 2. Fore wings 294μ long, tapering to a narrow point. Abdomen 371 at segments III and IV. Antennal segments: I 28 (34), II 44 (39), III 86 (20), IV 56 (21), V 53 (23), VI 47 (23), VII 19 (12), VIII 50 (6-7); sense-cones on II and IV simple.

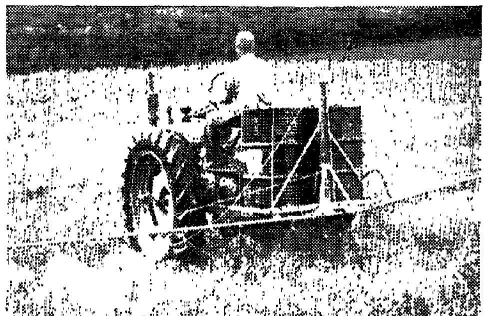
MALE (brachypterous; newly discovered).—Smaller and more slender than female, otherwise very similar in color and structure; glandular areas on sterna III-VII (fig. 8) and tergum IX of abdomen (fig. 11) very different from those of *hookeri* (compare with figs. 9 and 11, respectively).

DISTRIBUTION: Tucuman, Argentina (Bagnall's type); Nova Teutonia, S. C., Brazil, June, 1957, Fritz Plaumann, 1 macropterous ♀, 7 brachypterous ♀ ♀, and two males (brachypterous), from grasses.

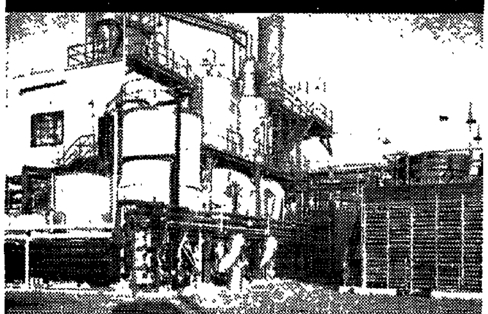
What does it really take to kill insects?



RESEARCH . . . laboratory work that takes many years and millions of dollars



TESTING . . . years of field work, to determine effectiveness, dosages, side effects



PRODUCTION . . . to make commercial quantities available at an economically sound cost

EDUCATION . . . teaching methods of use, gaining confidence and trust

A great deal of work and knowledge goes into the development of insecticides. Once developed, however, they're a priceless defense against the loss of food and fiber, the disease, and the annoyance caused by man's insect enemies. Velsicol Chemical Corporation manufactures five basic insecticides that are thoroughly proven, widely recommended, and extensively used: Heptachlor, Chlordane, Endrin, Parathion and Methyl Parathion. Each of them is rated most efficient for specific types of insect control, and all are available everywhere, in ready-to-use, reasonably priced formulations. If you deal with any phase of insect control, we think you will find technical information about these insecticides highly useful.

NEW! VELSICOL GIBBERELLINS!
Amazing plant growth stimulant. Velsicol's newest contribution to increased agricultural productivity. Extensive research program in progress

WRITE FOR A BROCHURE OF TECHNICAL INFORMATION, PREPARED BY VELSICOL'S ENTOMOLOGISTS!
HEPTACHLOR • CHLORDANE • ENDRIN • PARATHION • METHYL PARATHION

VELSICOL

VELSICOL CHEMICAL CORPORATION
330 East Grand Ave., Chicago 11, Illinois
International Representative: Velsicol International Corporation, C.A.
P.O. Box 1687 • Nassau, Bahamas, B.W.I.

FOUR NEW *TYPHLODROMUS* FROM SOUTHERN FLORIDA (ACARINA: PHYTOSEIIDAE)

DONALD DE LEON
Pensacola, North Carolina

The typhlodromids described below are of particular interest because the first one has three pairs of median setae instead of the usual two pairs and the remaining three species have all or most all the setae of the dorsal shield pectinate.

In these descriptions all measurements are in microns and are averages unless variation from the average is more than ten percent, in such cases the range is given.

Typhlodromus ecclesiasticus, n. sp.

(Figures 1-4)

FEMALE.—Dorsal shield reticulate, 295 long, 155 wide at about L5 and 170 wide at about L7, with 19 pairs of setae as follows: 10 lateral, three median, and six dorsal. Except for M2 and L10 all setae of the dorsal shield short (13-21 long), smooth, and tapering to a point. M2 and L10 obovate, flattened and with the edges distally serrate; M2 22 long, L10 23-28 long. The extra pair of median setae situated between L6 and D4. Peritremata extending forward to D1. Ventrianal plate constricted at sides with four pairs of preanal setae and a pair of pores, surrounded by four pairs of setae including VL1 which is about 21 long, smooth, and tapering to a point. Sternal plate indistinct, the number of pairs of setae on it not determinable. Fixed digit with three subterminal teeth and one opposite *pilus dentilis*, movable digit with one tooth. Legs relatively short (leg IV from base of coxa to end of claw 226 long) and heavy, without macrosetae.

MALE.—Not known.

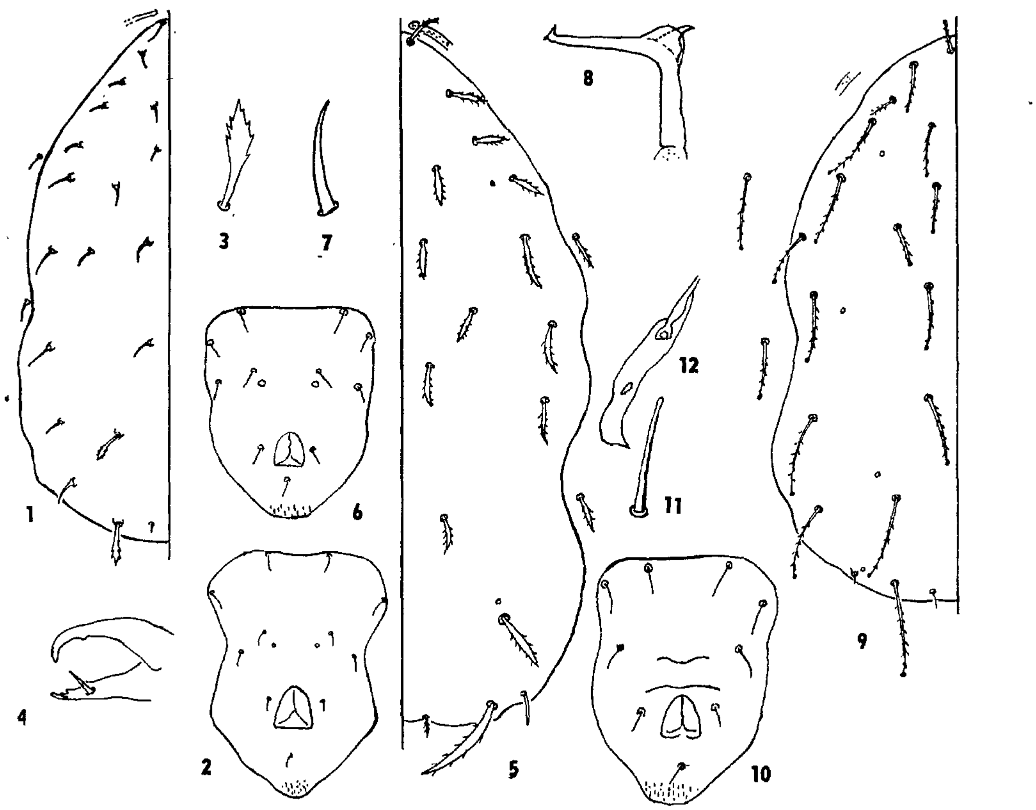
Holotype: Female, Coral Gables, Florida, April 18, 1955 (D. De Leon) from *Laguncularia racemosa; paratype*: female, west of Perrine, Florida, October 24, 1954, (D. De Leon) from *Tecoma stans*.

Typhlodromus ellipticus, n. sp.

(Figures 5-8)

FEMALE.—Body tan, broadly oval; dorsal shield with moderate imbrications, 296 long, 164 wide at L5 with 16 pairs of pectinate, narrow-elliptic setae. In a few specimens D1 and D6 appear to be tapering and smooth, and some of the other setae in some specimens (without consistency between specimens) scarcely elliptic and indistinctly pectinate, this condition apparently caused by a turning up of edges of setae in mounting medium. In the following measurements setal length is given above the line, distance between setal bases below the line; for lateral setae this is the distance to the setal base behind, for the others it is the transverse distance between bases: L1 $\frac{16}{13}$, L2 $\frac{15}{14}$, L3 $\frac{17}{22}$, L4 $\frac{19}{25}$, L5 $\frac{20}{35}$, L6 $\frac{20}{136}$, L7 $\frac{17}{14}$, L8 41; M1 $\frac{16}{58}$, M2 $\frac{29}{84}$;

D1 $\frac{19}{2}$, D2 $\frac{15}{24}$, D3 $\frac{14}{14}$, D4 $\frac{17}{23}$, D5 $\frac{18}{20}$, D6 $\frac{9}{10}$; S1 14, S2 21; VL1 27 (the last three setae also pectinate); in some specimens S2 on shield on one or both sides; two pairs of pores. Anterior end of peritreme extending to D1, peritremal plate curving behind coxae IV and there somewhat expanded, the inner angle sharply pointed, the outer rounded. Sternal plate indistinct, apparently with two pairs of setae and with caudal margin slightly concave; genital plate 66 wide at posterior end; ventrianal plate 94 long, 70 wide at anterior end with four pairs of preanal setae and a pair of large pores 15 apart. Fixed digit with two teeth distal of *pilus dentilis* and a lateral one about opposite proximal tooth, movable digit with one tooth. Legs relatively short and heavy; basitarsus IV with a coarse seta (appreciably coarser than the other coarse setae of this or the other legs) 17 long, length of tarsus not including pretarsus, 78.



FOUR NEW *TYPHLODROMUS* FROM SOUTHERN FLORIDA

Explanation of Figures

Typhlodromus ecclesiasticus, n. sp.: Fig. 1, dorsal shield; Fig. 2, ventrianal plate; Fig. 3, seta L10 enlarged; Fig. 4, chelicera.

Typhlodromus ellipticus, n. sp.: Fig. 5, dorsal shield; Fig. 6, ventrianal plate; Fig. 7, macroseta of tarsus IV; Fig. 8, spermatophore.

Typhlodromus jackmickleyi, n. sp.: Fig. 9, dorsal shield; Fig. 10, ventrianal plate; Fig. 11, macroseta of tarsus IV.

Typhlodromus annectens, n. sp.: Fig. 12, caudal end of peritremal plate.

MALE.—Resembles female in chaetotaxy, but S2 always on shield and general curve of margin of shield unbroken at S2; shield 237 long, 144 wide. Spermatophore of shape shown in figure, foot 20 long, shaft 13 long.

Holotype: Female, Coral Gables, Florida, October 23, 1956, (D. De Leon) on *Conocarpus erecta. Allotype*: same data as for holotype and on same slide; *paratypes*: two females, one male, Coral Gables, June 3, 1956, from *Achras zapota*; five females, two males, Coral Gables, October 16 and 23, 1956, from *Conocarpus*. Specimens were also collected at Delray Beach, Florida, September 15, 1956, from *Bursera simaruba*; Coral Gables, October 23, 1956, from *Laguncularia racemosa;* a single specimen from mango, Miami, Florida, March 2, 1955, and from coconut Coral Gables, November 2, 1955.

This is a fairly common mite on *Conocarpus* where it was found in association with an undescribed species of *Brevipalpus*.

Typhlodromus jackmickleyi, n. sp.

(Figures 9-11)

FEMALE.—Body light tan, broadly oval; dorsal shield practically smooth, very faintly imbricate, 341 long, 208 wide at about L5, with 18 pairs of setae all but L9 and D6 pectinate and all but L2, L9, and D6 with a small knob at tip. S1 and S2 pectinate and with a small knob at tip. The same system is used to record setal lengths and distances between bases as that used for *T. ellipticus*: L1 $\frac{36}{22}$, L2 $\frac{24}{13}$, L3 $\frac{37}{34}$, L4 $\frac{43}{36}$, L5 $\frac{45}{36}$, L6 $\frac{45}{63}$, L7 $\frac{71}{54}$, L8 $\frac{58}{45}$, L9 $\frac{5}{14}$, L10 63; M1 $\frac{27}{72}$, M2 $\frac{56}{70}$; D1 $\frac{23}{3}$, D2 $\frac{27}{18}$, D3 $\frac{28}{13}$, D4 $\frac{36}{27}$, D5 $\frac{45}{29}$, D6 $\frac{10}{25}$; S1 34, S2 45; VLI 60 (faintly pectinate); four pairs of pores. Anterior end of peritreme extending about to posterior margin of coxa I, peritremal plate ending in a blunt angle behind coxa IV. Sternal plate with two pairs of setae, posterior margin broadly irregularly V-shaped; ventrianal plate 111 long, 79 wide with three pairs of preanal setae, pores absent; genital plate posteriorly 82 wide. Fixed digit with two teeth near terminal hook, inner margin of movable digit not observable. Legs long and slender; patella, tibia, and tarsus of leg IV each with a large seta slightly expanded at tip, 20, 27 and 45 long respectively; tarsus IV not including pretarsus 143 long.

MALE.—Not known.

Holotype: Female, Coral Gables, Florida, October 16, 1956, (D. De Leon) on *Conocarpus erecta* in association with *T. ellipticus*, n. sp. The mite is named for Dr. Jack Mickley of Hollywood, Florida.

Typhlodromus annectens, n. sp.

(Figure 12)

FEMALE.—Body off white, elongate; dorsal shield mildly imbricate, 260 long, 127 wide with 17 pairs of setae, only D6 smooth, the anterior laterals generally more strongly pectinate than posterior ones. The same system is used to record setal lengths and distances between bases as that used for

T. ellipticus: L1 $\frac{34}{18}$, L2 $\frac{33}{12}$, L3 $\frac{39}{21}$, L4 $\frac{34}{26}$, L5 $\frac{39}{30}$, L6 $\frac{47}{39}$, L7 $\frac{49}{49}$, L8 $\frac{42}{28}$, L9 41; M1 $\frac{33}{52}$, M2 $\frac{42}{44}$; D1 $\frac{15}{2}$, D2 $\frac{23}{15}$, D3 $\frac{33}{8}$, D4 $\frac{43}{22}$, D5 $\frac{43}{16}$, D6 $\frac{8}{13}$; S1 30 (pectinate); VL1 34 (pectinate); three pairs of pores. Anterior end of peritreme extending about to middle of coxa I, peritremal plate curving behind coxae IV, of shape shown in figure. Sternal plate indistinct, apparently with two pairs of setae; caudal end of genital plate 58 wide; ventrianal plate moderately emarginate laterally, 85 long, 54 wide at anterior end with four pairs of preanals and a pair of small pores 12 apart and about in line with posteriormost preanals. Fixed digit with two teeth just behind terminal hook and one lateral of them, movable digit with a small tooth at base of curve. Legs short, rather slender, without distinctive setae; tarsus IV 70 long, excluding pretarsus.

MALE.—Resembles female; dorsal shield 204 long, 118 wide. Spermatophore L-shaped with a lateral projection just proximal of mid-part of foot, tip of foot slightly expanded, and at about an angle of forty-five degrees to it, shaft 14 long, foot about 8.5 long.

NYMPH.—Resembles adult in number of setae, but pectinations less distinct and setae somewhat longer than in adult.

Holotype: Female, Coral Gables, Florida, June 4, 1956, (D. De Leon) from *Trema floridana; allotype*: same collection data as for holotype; *paratypes*: three females, one male August 30, 1955, from *Morus rubra;* three females, one male, October 8, 1956, from *Callicarpa americana,* all from Coral Gables, and three females, one male from *Verbesina virginica,* Delray Beach, Florida, September 15, 1956. The specimens from *Verbesina* are somewhat larger than those from the other plants. Other specimens have been taken from *Hamelia patens, Eriobotrya japonica, Tetrazygia bicolor* at Coral Gables, *Callicarpa americana* at Key Largo, June 7, 1956, and a single specimen from *Cercis canadensis,* Columbus, Georgia, August 29, 1956.

The only other species in this genus known in Florida with many distinctly pectinate setae on the dorsal shield is *T. transvaalensis* (Nesbitt)[1]. A differential diagnosis of the Florida species with pectinate setae follows:

16 pairs of dorsal shield setae .... *ellipticus*, n. sp.
17 pairs of dorsal shield setae .... *annectens*, n. sp.
18 pairs of dorsal shield setae;
  2 pairs of sternals .... *jackmickleyi*, n. sp.
18 pairs of dorsal shield setae;
  3 prs of sternals .... *transvaalensis* (Nesb.)

Paratypes of the above new species will be deposited in the University of Florida Collections, Gainesville.

[1] Nesbitt, H. H. J. 1951. A taxonomic study of the Phytoseiinae (family Laelaptidae) predaceous upon Tetranychidae of economic importance. Zool. Verhand. No. 12; 1-64, 32 pl.

A CATALOG OF THE LARVAEVORIDAE OF FLORIDA

CONSTANCE NICHOLAS PATTON
Department of Entomology
University of Florida

(*Continued from p.* 39, *Vol.* 41, *No.* 1)

Leskiopsis Townsend

L. thecata (Coquillett)
Jacksonville, Nov. 3; Clearwater, Apr. 30. (Johnson, 1913 : 71). [as *Leskia*].

Lixophaga Townsend

L. diatraeae Townsend
"This species has not been recorded north of the Gulf States." (Curran, 1930 : 100).

L. mediocris Aldrich
Monticello, Fla., Nov., 1954, A. M. Phillips, AES 10698. Parasites of *Laspeyresia caryana* (Fitch) on pecan shucks.

L. variabilis (Coquillett)
Gainesville, Fla., 3/25/55, C. N. Patton.
Gainesville, Fla., 7/30-8/3/55, L. A. Hetrick, P-277L. U.V. light trap. 1 spm.

Lydella Robineau-Desvoidy

L. sodalis (Van der Wulp)
Ormond, Fla., Mrs. Slosson. (Johnson, 1913 : 73).

Lydellohoughia Townsend

L. dimmocki (Aldrich)
Florida. *Metriona bivittata* (Col.). (Stearns, 1933 : 153).
Cedar Keys, Fla., 5/6/1875, Hubbard and Schwartz. Reared from *Chelymorpha cassidea* F. (Aldrich, 1932 : 5).

Megapariopsis Townsend

M. opaca (Coquillett)
Jacksonville, Fla., Mrs. Slosson. (Johnson, 1913 : 74).

M. sp. (? n. sp.)
Gainesville, Fla., 7/30-8/3/55, L. A. Hetrick, P-277D. U.V. light trap. 1 spm.

Metadexia Coquillett

M. sp. n.
Gainesville, Fla., 7/20-23/55, L. A. Hetrick, P-276D. U.V. light trap. 1 spm.

Microchaetina Van der Wulp

M. cinerea Van der Wulp
Ormond, Fla., Mrs. Slosson. (Johnson, 1913 : 75).

Microphthalma Macquart

M. disjuncta (Wiedemann)
White Springs, Fla., Townsend. (Aldrich, 1926b : 3).

Muscopteryx Townsend

M. hinei Reinhard
So. Fla., March, 1923, J. S. Hine. (Reinhard, 1944 : 354. orig. desc.).

Myiopharus Brauer and Bergenstamm

M. dorsalis (Coquillett)
Biscayne Bay, Fla., Mrs. Slosson. (Johnson, 1913 : 72). [as *Carcelia*]

Myiophasia Brauer and Bergenstamm

M. atra (Robineau-Desvoidy)
Crescent City, Fla., April 21; Charlotte Harbor, Mrs. Slosson. (Johnson, 1913 : 70).

M. globosa (Townsend)
Inverness, Mar. 3-20, Robertson; Jacksonville, May 9. (Johnson: 1913 : 70).

M. metallica Townsend
Orlando, Mar. 15-22, Inverness, Mar. 15, Robertson; Ft. Myers, Nov. 19. (Johnson, 1913 : 70).

M. sp.
Gainesville, Fla., 9/12-18/55, L. A. Hetrick, P-279E. U.V. light trap. 2 spm.

Nemorilla Rondani

N. floralis (Fallén)
Gainesville, Fla., 7/30-8/3/55, L. A. Hetrick, P-277J. U.V. light trap. 1 spm.

gen. sp.? near *Nemorilla floralis* (Fallén)
Orlando, Fla., 7/27/51, AES 9922. Parasite of the Bougainvillea caterpillae, *Asciodes gordialis* (Guen) det. H. W. Capps. There was a fly puparium in the material when received 7/9/51.

Nicephorus Reinhard

N. floridensis Reinhard
Gainesville, Fla., 5/3/14, prob. J. R. Watson, AES, 185. Visitor to *Ceanothus* (New Jersey tea).
Hilliard, Florida, July 24, 1939, R. H. Beamer. (Reinhard, 1944 : 64. orig. desc.).

Ocypterosoma Townsend

O. politum (Coquillett)
Jacksonville, Fla., Mrs. Slosson. (Coquillett, 1898 : 234. orig. desc.).

Oestrophasia Brauer and Bergenstamm

O. calva Coquillett
Gainesville, Fla., 5/15-20/55, L. A. Hetrick, P-274B. U.V. light trap.
Gainesville, Fla., 6/19-23/55, L. A. Hetrick, P-275A. U.V. light trap.

O. clausa Brauer and Bergenstamm
St. Augustine, C. W. Johnson; Ormond, Mrs. Slosson; Lake Mary, March, Griffith. (Johnson, 1916 : 71).

Ormia Robineau-Desvoidy

O. lineifrons Sabrosky
Daytona, Fla., April 8, 1919, C. W. Johnson. (Sabrosky, 1953 : 175. orig. desc.).
Gainesville, Fla., 10/6-14/55, L. A. Hetrick, P-282E. U.V. light trap.

O. punctata Robineau-Desvoidy (s. str.)
St. Petersburg, Fla., 11/6/53, C. N. Patton, P-206. Three specimens collected at neon lights a few blocks from the beach.

Oxynops Townsend

O. anthracina (Bigot) (= *O. serratus* Townsend teste Aldrich)
Biscayne Bayfront, Fla., 11/30/08, Mrs. Townsend. (Townsend: 1912 : 110. orig. desc.). [as *serratus*].

O. nitens (Coquillett)
Biscayne Bay, Fla., Mrs. Slosson. (Johnson, 1913 : 71). [as *Hypostena*] Florida. (Aldrich, 1924 : 147).

Pacidianus Reinhard

P. sp.
Gainesville, Fla., 11/19/55, C. N. Patton, P-284. One spm. emerged from jar of *Anisota virginiensis* (Drury) which had been collected as larvae on 9/22/55. det. H. J. Reinhard.

Paradidyma Brauer and Bergenstamm

P. affinis Reinhard
Florida. (Reinhard, 1934c : 35).

P. apicalis Reinhard
Gainesville, Fla., 5/15-20/55, L. A. Hetrick, P-274C. U.V. light trap.
Gainesville, Fla., 9/12-18/55, L. A. Hetrick, P-279H. U.V. light trap.

P. singularis (Townsend)
Gainesville, Fla., 10/19/55, C. N. Patton. Loose in laboratory.
Gainesville, Fla., 7/30-8/3/55, L. A. Hetrick, P-277C. U.V. light trap.

Paralispe Brauer and Bergenstamm

Paralispe sp., possibly new, possibly *P. infernalis* Townsend
Gainesville, Fla., 9/19-23/55, L. A. Hetrick, P-280I. U.V. light trap. 1 spm. det. H. J. Reinhard.

Patelloa Townsend

P. leucaniae (Coquillett)
Oleno State Park, Fla., 9/8/55, C. N. Patton, P-275B. Reared from *Datana ministra* (Drury) collected as mature larvae on *Hicoria tomentosa* on 8/14/55. det. H. J. Reinhard.

Phasiops Coquillett

P. flava Colquillett[7]
Gainesville, Fla., 1952, Jones and Anthony. Reared from larva? of *Tabanus petiolatus* Hine. A second specimen, probably this species, reared from *T. fumipennis* Wied. in 1954. U.S.D.A. collection at Gainesville.

Phasiopsis Townsend

P. floridana Townsend
Otter Creek, Fla., 10/1/55, C. N. Patton, P-261L. On *Polygonum hydropiperoides.*
Miami, Fla., Nov. 4-29, 1908, Townsend. (Townsend, 1912 : 108. orig. desc.).

Phasmophaga Townsend

P. sp. (?*antennalis* Townsend)[8]

Alachua Co., Fla., March, 1953, L. A. Hetrick, P-222. Ex *Anisomorpha buprestoides* (Stoll).

P. meridionalis Townsend
Cutler, Fla., May 29, 1908, Townsend. Reared from *Anisomorpha buprestoides* (Stoll). (Johnson, 1913 : 71).

---

[7] "This species was reared once before, from *Tabanus* sp., prob. *trimaculatus*, at Magnolia, La."—C.W.S.

[8] "Townsend recorded *P. meridionalis* from Florida, from the same host, but from limited available material, I am inclined to think that *meridionalis* is a synonym of *antennalis*."—C.W.S.

Phorocera Robineau-Desvoidy

P. claripennis Macquart

Jay, Fla., 7/21/45, AES 9062. Three flies reared from about 5 dozen bagworms, *Thyridopteryx ephemeraeformis* Haw. which were sent in on above date. Flies emerged 8/4 and 8/21/45.

Poe Springs, Fla., 9/23/54, C. N. Patton, P-225A. One specimen reared from over 50 larvae of *Megalopyge pyxidifera* A. &. S.

Vero Beach, Fla., 7/31/18, Berger, SPB 8522. from *Prodenia eridania.* Cram. det. R. T. Webber. [as *Euphorocera*].

Gainesville, Fla., 8/20/28, AES 7027. Taken from breeding cage of armyworms.

Gainesville, Fla., 3/24/48, A. N. Tissot and G. E. Ritchey, AES 9463. Reared from larvae or pupae of *Heliothis virescens* (F.) collected boring in green pods of sweet yellow lupine.

Gainesville, Fla., 4/12/55, C. N. Patton, P-247. Reared from [prob.] *Plathypena scabra* (F.).

P. edwardsi Williston

Inverness, Fla., 3/18, Robertson. (Johnson, 1895 : 332).

P. sp., probably *einaris* Smith

Alachua Co., Fla., 10/6/53, H. V. Weems, SPB.

P. (sens. lat.) *floridensis* Townsend

Gainesville, Fla., 1/15/29, AES 7062. Parasites of the rubber worm, *Lymire edwardsi* Grote.

Gainesville, Fla., 10/15/53, C. N. Patton, P-203. One specimen reared from *Datana major* G. & R.

Blue Springs, Fla., 10/21/54, C. N. Patton, P-226. Four flies reared from a single larva of *Anisota* sp. nr. *rubicunda* (F.). Host larva had three macrotype eggs glued to its integument.

Davenport, Fla., 10/3/52, Poucher and Frierson, SPB 114788. Reared from the grape leaf skeletonizer. [*Harrisina americana* Guer.].

Lake City, Fla., 7/28/1897. *Laphygma frugiperda* (A. & S.)

Gainesville, Fla., J. R. Watson. Ex *Anticarsia gemmatilis* Hub. (Townsend, 1916 : 217. orig. desc.). [as *Euphorocera*].

Miami, Fla., 2/14/49, O. D. Link, Reared from pupa of *Melanchroia cephise* Cramer, emerged 2/23/49. Reared by G. W. Dekle.

St. Petersburg, Fla., 11/26/55, C. N. Patton, P-287. Nine flies reared from about 200 larvae of *Syntomeida epilais* Jaiker. Parasites emerge from host pupae, pupate in the soil. Many probably succumbed to fungus which attacked pupae of host.

P. hamata Aldrich and Webber

Gainesville, Fla., January, 1955, L. A. Hetrick. Ex *Neodiprion* sp.

Gainesville, Fla., 10/19/55, C. N. Patton, P-265. Parasite of a sawfly on pine, ?*Neodiprion* sp.

Gainesville, Fla., 10/18/55, R. A. Dennison, P-266. Parasites of *Neodiprion fabricii* (Leach).

P. (*Palpexorista*) *imitator* Aldrich and Webber

Gainesville, Fla., 9/19-23/55, L. A. Hetrick, P-280C. U.V. light trap.

P. sp., apparently *subnitens* Aldrich and Webber [9]

Gainesville, Fla., summer, 1944. A. N. Tissot, AES 10651B. Parasites of a moth larva on cherry laurel. [The moth compares with one det. by J. F. G. Clarke as "near *Triprocris*".]

P. tachinomoides Townsend

Miami, Fla., Townsend: Lake Mary, March, Griffith. (Johnson, 1913 :72).

---

[9] "*Subnitens* was described from Virginia, and only the holotype seems to be known. The Florida specimens differ only slightly and seem to me now to be only variants, or a Floridian subspecies, which often show reddish color."—C.W.S.

Plagiomima Brauer and Bergenstamm

P. alternata Aldrich
White Springs, Oct. 16-18, Townsend. (Aldrich, 1926c : 27).

Plagiprospherysa Townsend

P. parvipalpis (Van der Wulp)
Gainesville, Fla., May 20, H. L. Dozier. At chinquepin blooms. (Dozier, 1920 : 372).

Plectops Coquillett

P. melissopodis Coquillett
Gainesville, Fla., 3/27/55, C. N. Patton.
Gainesville, Fla., 10/6-14/55, L. A. Hetrick, P-282N. U.V. light trap. 1 spm.

Polistomyia Townsend

P. plumipes (Fabricius)
Otter Creek, Fla., 10/1/55, C. N. Patton, P-261-0. On *Polygonum hydropiperoides.*
Gainesville, Fla., 9/12-18/55, L. A. Hetrick, P-279B. U.V. light trap. 1 spm.
Highlands Hammock State Park, Fla., 3/18/52, H. V. Weems.

Promasiphya Townsend

P. confusa (Aldrich)
Miami, Fla., Townsend; Biscayne Bay, Fla., Mrs. Slosson. (Aldrich, 1925 : 109. orig. desc.). [as *Masiphya*]

Prosenoides Townsend

P. flavipes (Coquillett)
Alachua Co., Fla., 11/16/53, H. V. Weems, SPB.
Fla. City, Fla., 7/24/53, H. V. Weems, SPB.
Lake Worth, Charlotte Harbor, Fla., Mrs. Slosson. (Coquillett, in Johnson, 1895 : 314. orig. desc.).

Pseudeuantha Townsend

P. rubripes Aldrich
Miami, Fla., Oct. 29, Mrs. Townsend. (Aldrich, 1921 : 91. orig. desc.).

Pseudochaeta Coquillett

P. argentifrons Coquillett
Sebring, Fla., 6/26/53, H. V. Weems, SPB.
Gainesville, Fla., 9/12-18/55, L. A. Hetrick, P-279K. U.V. light trap. 1 spm.
Charlotte Harbor, Fla., Mrs. Slosson. (Coquillett, in Johnson, 1895 :310. orig. desc.).

P. perdecora Reinhard
Oldtown, Fla., 7/11/39, D. E. Hardy. (Reinhard, 1946b : 115. orig. desc.).

Pseudomyothyria Townsend

P. ancilla (Walker)
Alachua Co., Fla., 9/21/53, H. V. Weems, SPB.

Ptilodexia Brauer and Bergenstamm

P. tibialis Robineau-Desvoidy
Crescent City, Fla., 4/21. (Johnson, 1913 : 74).

Rhamphinina Bigot

Rhamphinina-Ptilodexia complex, prob. n. sp. [10]
Alachua Co., Fla., 10/26/38. [♀]
Gainesville, Fla., 9/2/17, J. R. Watson, AES 1825. At *Eupatorium* in flatwoods. [♂]

Roeseliopsis Townsend

R. floridensis Greene
Palm Beach, Fla., 6/25, Dyar. (Greene, 1934 : 30. orig. desc.).

Salmacia Meigen

S. crassicornis Fabricius
Gainesville, Fla., 11/9/53, C. N. Patton, P-204. One specimen reared from a larva of *Prodenia eridania* Cram.
Sebring, Fla., 12/24/49, H. V. Weems, SPB.
Key West, Fla., 12/30/52, H. V. Weems, SPB.
Sanford, Fla., 11/11/42, AES 10484. Reared from a pupa of *Feltia subterranea* (F.) which had pupated 11/17. On 11/29, a thick, tan-colored liquid exuded from the posterior end of the pupa. On 12/27, the fly emerged. det. M. T. James, 1945.

S. pallens Wiedemann
So. Fla., Townsend. (Johnson, 1913 : 74).

S. senilis (Williston)
"Oak grove, Virginia, Fla., Daucus 2, viii, ? CHTT." cited as label of specimen. (Morrison, 1940 : 352).

S. sp. (*?texensis* Reinhard)
Key West, Fla., 12/28/53, H. V. Weems, SPB. On *Flaveria linearis.*

S. sp. ♀
Tallahassee, Fla., 9/23/54, AES 10572D. Reared from *Laphygma frugiperda* (A. & S.).

Schizotachina Walker

S. ruficornis Greene
Titusville, Fla., G. G. Ainslee. (Greene, 1934 : 33. orig. desc.).

S. vitinervis (Thompson)
Biscayne Bay, Fla., Mrs. Slosson. (Thompson, 1911 : 268. orig. desc.).

S. sp., possibly n. sp.
Deerfield Beach, Fla., 6/29/53, Mrs. W. B. Larzelere, AES 10255B. Reared from *Chionodes* sp. on seagrape.

Siphoclytia Townsend

S. robertsoni Townsend
So. Florida, Robertson. (Townsend, 1892b : 117. orig. desc.).
Inverness, Fla., 3/13/17, Robertson. (Johnson, 1913 : 71). [as *Epigrimyia*].

Siphophyto Townsend

S. floridensis Townsend
Florida. (Reinhard, 1946a : 82).
Inverness, Fla., March 1-29, Robertson. (Johnson, 1895 : 333).

S. neomexicanus Townsend
So. Florida, Robertson. (Townsend, 1892b : 128. orig. desc.).

Siphosturmia Coquillett

S. rostrata (Coquillett)
Gainesville, Fla., 8/19/17, J. R. Watson, AES 1738. At yellow composite (bitterweed or mayweed).

[10] "White grub parasites. (I have been accumulating material for a revision for a long time)."—C.W.S.

Slossonaemyia Townsend

S. rostrata (Coquillett)
Biscayne Bay, Fla., Mrs. Slosson. (Coquillett, 1898 : 235. orig. desc.). [as *Chaetophleps*].

Spallanzania Robineau-Desvoidy

S. bucephala (Meigen)
Gainesville, Fla., 3/4/44, A. N. Tissot, AES 10481. Four specimens reared from larvae or pupae of *Feltia subterranea* (F.). det. James, 1945.

S. hebes (Fallen)
Gainesville, Fla., May 25, H. L. Dozier. A number of specimens taken at chinquepin blooms.

S. pansa Snow
St. Augustine, Fla., C. W. Johnson. (Johnson, 1895 : 334).

Spathidexia Townsend

S. creolensis Reinhard
Miami, Fla., Oct. 28, Townsend. (Reinhard, 1955 : 131. orig. desc.).

S. sp. nr. *rasilis* Reinhard
Gainesville, Fla., 5/15-20/55, L. A. Hetrick, P-274G. U.V. light trap. 1 spm.

Spathimeigenia Townsend

S. hylotomae (Coquillett)
Gainesville, Fla., 10/14/55, C. N. Patton, P-264. Parasite of a sawfly, *Arge rubiginosa* (Beauv.), on *Rhus* sp.

S. spinigera Townsend
Lake Butler, Fla., 11/28/49, W. J. Cowen, AES 9901. Two flies reared from over a dozen larvae of *Neodiprion lecontei* (Fitch.)
Gainesville, Fla., 10/18/55, R. A. Dennison, P-266. Parasites of *Neodiprion fabricii* (Leach).

Stomatolydella Townsend

S. infernalis Townsend
Lake Worth, Fla. (Coquillett, 1897 : 63). [Misidentified in this paper as *Didyma inconspicua*].

Sturmia Robineau-Desvoidy

S. australis Coquillett
Jacksonville, Fla., Mrs. Slosson. (Johnson, 1913 : 73).

S. fraudulenta Van der Wulp
Florida. (Coquillett, 1897 : 112).

S. harrisinae Coquillett
Gainesville, Fla., 5/30/52, L. W. Sistrunk, AES 10083. Two flies reared from "several" larvae of *Harrisina americana* Guer.

n. sp. near *"Sturmia" harrisinae* Coquillett
Gainesville, Fla., 10/6/54, C. N. Patton, P-229. A single fly reared from over 200 larvae of *Harrisina americana* Guer.

S. incompta (Van der Wulp)
Gainesville, Fla., 3/16/55, C. N. Patton, P-235. Twenty flies reared from a pupa of *Pholus fasciatus* Sulzer that had been collected as a mature larva in October, 1954.

S. strigata (Van der Wulp)
Jacksonville, Fla., Coquillett. (Johnson, 1913 : 73).

Tachinomyia Townsend

T. floridensis Townsend
Florida. (Webber, 1941 : 293).
Alachua Co., Fla., 8/25/48, Solomon, CED.

Tachinophyto Townsend

T. floridensis Townsend
St. Augustine, Mar. 21; Tick Island, May 12, C. W. Johnson; Jacksonville, bred from *Schizocercus*, Mrs. Slosson; Inverness, Mar. 27, Robertson; LaBelle, Nov. 14. (Johnson, 1913 : 70). [as *Hypostena*].

T. maculosa (Coquillett)
St. Augustine, Fla., C. W. Johnson. (Coquillett, in Johnson, 1895 : 313. orig. desc.). [as *Hypostena*].

T. setinervis (Coquillett)
Biscayne Bay, Fla., Mrs. Slosson. (Coquillett, 1898 : 236. orig. desc.). [as *Hypostena*].

T. vanderwulpi (Townsend)
Inverness, Fla., Feb. 12, Robertson. (Johnson, 1913 : 71). [as *Hypostena*].

Thelairodoria Townsend

T. (n. sp.?)
Gainesville, Fla., 7/30-8/3/55, L. A. Hetrick, P-277K. U.V. light trap. 2 spm.
Gainesville, Fla., 9/19-23/55, L. A. Hetrick, P-280J. U.V. light trap. 1 spm.
Gainesville, Fla., 10/6-14/55, L. A Hetrick, P-282M. U.V. light trap. 2 spm.

Theresia Robineau-Desvoidy

T. tandrec Robineau-Desvoidy
Jacksonville, May 22, C. W. Johnson. (Johnson, 1913 : 74).

Trichopoda Latreille

T. lanipes (Fabricius)
Gainesville, Fla., 9/2/55, C. N. Patton, P-254. Reared from adult ♀ *Acanthocephala femorata*. det. C. N. Patton.
Otter Creek, Fla., 10/1/55, C. N. Patton, P-261P. On *Polygonum hydropiperoides*.

T. pennipes (Fabricius) complex
Gainesville, Fla., 4/26/55, C. N. Patton, P-240. Reared from adult *Leptoglossus phyllopus* (L.). det. C. N. Patton.
Gainesville, Fla., 5/4/55, C. N. Patton, P-241. Reared from adult *Archimerus alternatus* (Say) det. R. F. Hussey. det. C. N. Patton.

Winthemia Robineau-Desvoidy

W. citheroniae Sabrosky
Gainesville, Fla., 11/17/46, A. N. Tissot, AES 9189. Reared from *Citheronia regalis* (F.) pupa. Mature host larva collected on 10/13/46. Forty flies emerged on above date. (Sabrosky, 1948 : 65. orig. desc.).
Gainesville, Fla., 9/27/55, C. N. Patton, P-260. Three flies reared from *Citheronia regalis* (F.) pupa. Fourth puparium was attacked by a fungus.
Palatka, Fla., 11/7/55, L. T. Nieland and J. S. Jensen, P-285. Thirteen flies reared from a pupa of *Eacles imperialis* (Drury).

W. datanae (Townsend)
Gainesville, Fla., 9/28/55, C. N. Patton, P-262B. Five specimens reared from *Datana ministra* (Drury) larvae that had entered soil by above date. Flies emerging on 10/11/55.

W. deilephilae (Osten-Sacken)
Gainesville, Fla., 9/1/55, C. N. Patton.

W. intermedia Reinhard
Gainesville, Fla., 10/6-14/55, L. A. Hetrick, P-282G. U.V. light trap. 1 spm.

W. okefenokeensis Smith [11]
Alachua Co., Fla., 1941.
Gainesville, Fla., 3/27/55, C. N. Patton.

W. quadripustulata Fabricius
Ft. Meade, 7/26/18, J. C. Holton, SPB 8320. Reared from *Prodenia eridania* Cram. det. R. T. Webber.
Vero, Fla., 7/31/18, E. W. Berger, SPB 8323. Ex. *P. eridania.* det. Webber.

W. rufopicta (Bigot)
Gainesville, Fla., 7/22/54, AES 10540B. Reared from larvae or pupae of *Laphygma frugiperda* (A. & S.). Fly emerged 8/2/54.
Gainesville, Fla., 9/19/51, L. C. Kuitert, AES 9947A. Four specimens reared from a mixed infestation of *Prodenia eridania, P. ornithogalli* (Guenée), *P. dolichos, Heliothis armigera* (Hubner), and *Laphygma frugiperda* (A. & S.).
Gainesville, Fla., 8/16/51, A. N. Tissot, AES 9980. Reared from several *Prodenia eridania* collected on sweet potatoes.

Xanthoernestia Townsend

X. sp.
Gainesville, Fla., 10/6-14/55, L. A. Hetrick, P-282K. U.V. light trap. 1 spm.

Xanthomelanodes Townsend

X. atripennis (Say)
Gainesville, Fla., 10/16/53, H. V. Weems, SPB.
Florida. (Sabrosky, 1950 : 365.).

Zelia Robineau-Desvoidy

Z. vertebrata (Say)
Gainesville, Fla., 7/8/17, AES 1506. Two flies—resting head down on trunk of tree and occasionally flying out a few feet, only to return to same spot. Made a buzzing noise like a locust.
Gainesville, Fla., 11/13/55, M. M. Murphey, P-283. Reared from larva of *Passalus cornutus* F. det. C. N. Patton.

Z. zonata (Coquillett)
Jacksonville, Fla., May 22, 1894, C. W. Johnson. (Coquillett, in Johnson, 1895 : orig. desc.). [as *Gymnodexia*].

Zenillia Robineau-Desvoidy

Z. boarmiae (Coquillett)
Seabreeze, Fla., Host, *Urodus parvulus* (Hy. Edw.)
Ormond Beach, Fla., 6/5/55, D. W. Anthony, P-248. Reared from pupa of *Urodus parvulus* (Hy. Edw.). Pupated within lace cocoon of host.
Gainesville, Fla., 3/29/55, C. N. Patton.
Gainesville, Fla., 10/6-14/55, L. A. Hetrick, P-282L. U.V. light trap. 4 spm.

Z. hyphantriae (Townsend)
Florida. (Sellers, 1943 : 15).

"Z." lobeliae (Coquillett)
Blue Springs, Fla., 10/11/54, C. N. Patton, P-228. Five adults reared from one larva, and three from a second larva of *Acronicta* sp. nr.

[11] "Rarely collected species."—C.W.S.

afflicta Grt. (det. H. W. Capps). The fly larvae cut holes in the host's integument and applied their spiracles to the openings.

Z. mathesoni Reinhard

Gainesville, Fla., 4/22/36, A. N. Tissot, AES 7549. Reared from a caterpillar, apparently a tussock moth, found on poison ivy.

Gainesville, Fla., 4/24/36, A. N. Tissot, AES 7552. From a caterpillar, apparently the same as no. 7549 (tussock moth) found feeding on *Viburnum semitomentosus*.
[Dr. Tissot says he remembers a gray larva with dark pencils; this description is reminiscent of *Olene leucophaea* A. & S.] det. H. J. Reinhard.

Zygosturmia Townsend

Z. inca Townsend

Gainesville, Fla., 9/12/46, AES 9057. Sixteen flies recovered from cage in which 7 larvae of *Herse cingulata* (F.) had been reared. Puparia were found in a honey-comb-like mass.

Gainesville, Fla., 9/5/45, A. N. Tissot, AES 9058. Seventeen flies recovered from cage in which 2 larvae of *Herse cingulata* (F.) were reared. A mass of 28 puparia were found 5 inches below surface of soil, arranged in a single layer resembling a wasp comb. Because of a loose cover, apparently many of the flies escaped. det. A. N. Tissot.

DeFuniak Springs, Fla., 11/4/54, AES 10598. A dozen flies reared from a single partially pupated larva of *Herse cingulata* (F.).

Z. protoparcis (Townsend)

Gainesville, Fla., 6/14/54, C. N. Patton, P-230. Eleven flies reared from pupa of *Protoparce sexta* (Johan.).

Gainesville, Fla., 6/1/36, R. D. Becker, AES 7556. Reared from a single *Protoparce sexta* (Johan.) larva. Thirteen puparia found in a box, all but 8 flies escaped.

Gainesville, Fla., 8/23/55, C. N. Patton, P-249. Parasites of larva of *Protoparce sexta* (Johan.). On 8/8/55, the mature larva was darkened, especially about the prolegs. On 8/11/55, large fly larvae emerged from host. Adults emerged on above date.

New or Unrecognized Species

Grouped below are specimens which, because of incomplete determination, were not included in the preceding catalog. They are listed by catalog number, followed by Professor Reinhard's determination and collection data.

P-274F: near *Xanthoernestia* sp.

Gainesville, Fla., 5/15-20/55, L. A. Hetrick, U.V. light trap. 1 spm., ♀.

P-279I: near *Euceromasia* sp.

Gainesville, Fla., 9/12-18/55, L. A. Hetrick, U.V. light trap. 1 spm.

P-282I: genus and species unknown

Gainesville, Fla., 10/6-14/55, L. A. Hetrick, U.V. light trap. 4 spm. [Mr. Sabrosky placed these spm. in the Urodexiini.]

P-219: near *Phyllophorocera*

Gainesville, Fla., 12/21/54, C. N. Patton. On *Viburnum.*

P-248B and Seabreeze, Fla.: n. sp. (?"Possibly n. gen. Reinhard said he had a lone female in poor condition standing in his collection for 40 years, waiting for better material to describe it."—C.W.S.)

Ormond Beach (Eleanor Village) Fla., 6/5/55, D. W. Anthony, P-248B. One specimen reared from *Trichostiba parvula*. It pupated within the host pupa, and its puparium possesses two anterior processes resembling horns. Reared by C.N.P.

Seabreeze, Fla. Ex *Trichostiba parvula*, AES. 5 spm.

ACKNOWLEDGMENTS

I wish to thank Mr. Curtis W. Sabrosky of the Insect Identification and Parasite Introduction Section, Entomology Research Branch, USDA, for the verification or determination of virtually every larvaevorid in the several collections in the area. I also wish to thank Prof. H. J. Reinhard of the Entomology Department, Agricultural and Mechanical College of Texas, for additional determination of specimens forwarded to him by Mr. Sabrosky. Mr. George B. Merrill and Dr. Howard V. Weems, Jr., made available to me the records and collection of the State Plant Board of Florida. Dr. A. N. Tissot and Dr. John T. Creighton permitted the use of the records and collections of the Entomology Departments of the Florida Agricultural Experiment Station and the College of Agriculture, respectively.

LITERATURE CITED

Aldrich, J. M. 1921. The muscoid genera *Pseudeuantha* and *Uremyia*. Ins. Insc. Mens. 9(1-3) : 83-92.

1924. Notes on North American Tachinidae. Ins. Insc. Mens. 12(10-12) : 145-149.

1925. Notes on some types of American muscoid Diptera in the collection of the Vienna Natural History Museum. Ann. Ent. Soc. Amer. 18(1) : 107-130.

1926a. North American two-winged flies of the genus *Cylindromyia* Meigen (*Ocyptera* of authors). Proc. U. S. Nat. Mus. 68(art. 23) : 1-27.

1926b. American two-winged flies of the genus *Microphthalma* Macquart, with notes on related forms. Proc. U. S. Nat. Mus. 69(art. 13) : 1-8.

1926c. Notes on muscoid flies with retracted hind cross-vein, with key and several new genera and species. Trans. Amer. Ent. Soc. 52 : 7-28.

1928. A revision of the American parasitic flies belonging to the genus *Belvosia*. Proc. U. S. Nat. Mus. 73(art. 8) : 1-45.

1931a. Notes on Francis Walker's types of North American flies. Proc. U. S. Nat. Mus. 80(2910) : 1-16.

1931b. North American two-winged flies of the genus *Spathimeigenia*, with descriptions of five new species. Proc. U. S. Nat. Mus. 80(art. 11) : 1-10.

1932. Records of dipterous insects of the family Tachinidae reared by the late George Dimmock, with description of one new species and notes on the genus *Anetia* Robineau-Desvoidy. Proc. U. S. Nat. Mus. 80(art. 20) : 1-8.

Aldrich, J. M., and *R. T. Webber*. 1924. The North American species of parasitic two-winged flies of the genus *Phorocera* and allied genera. Proc. U. S. Nat. Mus. 63(art. 9) : 1-90.

Brooks, A. R. 1945. A revision of the North American species of the *Rhodogyne* complex. Canad. Ent. 67 : 218-230.

1949. New North American larvaevorine flies. Canad. Ent. 81(1) : 21-24.

Coquillett, D. W. 1897a. Revision of the Tachinidae of America. Ent. Tech. Ser. Bull. 7. 140 pp.

1898b. Additions to my synopsis of the Tachinidae. Canad. Ent. 30 : 233-237.

Curran, C. Howard. 1927. Some new American Tachinidae. Bull. Brook. Ent. Soc. 22 : 144-154.

1928. Revision of the American species of *Archytas*. Canad. Ent. 60 : 201-282.

1930. Report on the Diptera collected at the Station for the Study of Insects, Harriman Interstate Park, New York. Bull. Amer. Mus. Nat. Hist. N. Y. 61 : 21-115.

Dozier, Herbert L. 1920. An ecological study of hammock and piney woods insects in Florida. Ann. Ent. Soc. Amer. 13(4) : 325-380.

Fattig, Perry W. 1949. The Larvaevoridae (Tachinidae) or parasitic flies of Georgia. Emory Univ. Mus. Bull. No. 8. 40 pp.

Greene, Charles T. 1934. Tachinid flies with an evanescent fourth vein, including a new genus and five new species. Proc. Ent. Soc. Wash. 36(2) : 27-40.

Ingram, J W., Jaynes and *Lobdell.* 1939. Sugarcane pests in Florida. Rev. Appl. Ent. Ser. A. 27 : 657.

James, M. T. 1943. A review of the larvaevorid flies of the tribe Leskiini with the setulose first vein (R_1). Proc. U. S. Nat. Mus. 93(3212) : 112.

Johnson, C. W. 1895. Diptera of Florida. With additional descriptions of new genera and species by D. W. Coquillett. Proc. Acad. Nat. Sci. Phila. 1895. 303-340.

1913. Insects of Florida. I: Diptera. Bull. Amer. Mus. Nat. Hist. N. Y. 32(art. e) : 37-90.

Morrison, F. O. 1940. A revision of the American species of *Gonia* Meigen. Canad. Jour. Res. 18(D) : 336-362.

Reinhard, H. J. 1931a. The two-winged flies belonging to *Siphosturmia* and allied genera, with descriptions of two new species. Proc. U. S. Nat. Mus. 79(art. 11) : 1-11.

1931b. Revision of the American parasitic flies belonging to the genus *Winthemia*. Proc. U. S. Nat. Mus. 79(art. 20) : 1-54.

1934a. Revision of the American two-winged flies belonging to the genus *Cuphocera*. Proc. U. S. Nat. Mus. 83(2974) : 45-70.

1934b. New North American Tachinidae. Bull. Brook. Ent. Soc. 29 (5) : 186-195.

1934c. American muscoid flies of the genera *Ceratomyiella* and *Paradidyma*. Proc. U. S. Nat. Mus. 83(2973) : 9-43.

1942. A new species of *Oedematocera* with notes and key. Ent. News. 53(4) : 106-108.

1944. New North American Tachinidae belonging to the genus *Muscopteryx*. Ann. Ent. Soc. Amer. 37(3) : 352-358.

1946a. A review of the tachinid genera *Siphophyto* and *Coronimyia*. Proc. Ent. Soc. Wash. 48(4) : 79-92.

1946b. The tachinid genera *Pseudochaeta* and *Phaenopsis* in North America. Canad. Ent. 78 : 111-121.

1952. Muscoid flies of the genus *Chaetophlepsis*. Jour. Kans. Ent. Soc. 25(1) : 13-21.

1954. Parasitic flies of the genus *Prosenoides*. Canad. Ent. 86(?) : 408-413.

1955. New nearctic Sarcophagidae and Tachinidae. Bull. Brook. Ent. Soc. 59(5) : 128-133.

Sabrosky, C. W. 1948. *Winthemia citheroniae*, n. sp., with notes on the correct name of *W. cecropia*. Proc. Ent. Soc. Wash. 50(3) : 63-67.

1950. Notes on Trichopodini, with description of a new parasite of cotton stainers in Puerto Rico. Jour. Wash. Acad. Sci. 40(11) : 361-371.

1953. Taxonomy and host relationships of the tribe Ormiini in the western hemisphere. Proc. Ent. Soc. Wash. 55(4 and 6) : 167-183, and 289-305.

1955. The taxonomic status of the armyworm parasite known as *Archytas piliventris* (Van der Wulp). Fla. Ent. 38(2) : 77-83.

Sellers, Wendell F. 1943. The nearctic species of parasitic flies belonging to *Zenillia* and allied genera. Proc. U. S. Nat. Mus. 93(3157) : 1-108.

Stearns, L. A. 1933. Observations on the biology and control of *Metriona bivittata* Say. Jour. Econ. Ent. 26(1) : 153.

Thompson, W. R. 1911. Tachinidae, new and old. Canad. Ent. 43 : 265-272.

Townsend, C. H. T. 1892a. New North American Tachinidae. Ent. News. 3(6) : 129-131.

1892b. Notes on North American Tachinidae, with descriptions of new species. Trans. Amer. Ent. Soc. 19 : 88-132.

1908. The taxonomy of the muscoidean flies, including descriptions of new genera and species. Smith. Misc. Coll. 51(1803) : 138 pp.

1912. Foundation of some new genera and species of muscoid flies mainly on reproductive and early stage characters. Jour. N. Y. Ent. Soc. 29(2) : 107-118.

1916a. New genera and species of muscoid flies. Proc. U. S. Nat. Mus. 51(2152) : 308-313.

1916b. Miscellaneous muscoid notes and descriptions. Ins. Insc. Mens. 4(10-12) : 121-128.

1916c. Descriptions of two new Tachinidae (Diptera). Ent. News. 3(6) : 129-131.

Webber, R. T. 1930. Revision of the North American tachinid flies of the genus *Achaetoneura*. Proc. U. S. Nat. Mus. 79(2853) : 1-37.

1941. Synopsis of the tachinid flies of the genus *Tachinomyia*, with descriptions of new species. Proc. U. S. Nat. Mus. 90(3108) : 278-304.