RESEARCH NOTE

EFFECT OF APPLIED SOIL NUTRIENTS ON THE ABUNDANCE OF TOBACCO THRIPS ON TOBACCO[1,2]

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Flue-cured (Type 11) and dark-fired (Type 21) tobaccos were fertilized at low, medium and high levels of nitrogen, phosphorus, potassium, and complete fertilizer (N-P-K) to determine the effects of fertilization on the occurrence of *Frankliniella fusca* (Hinds). *F. fusca* populations were significantly larger at the high rates of phosphorus and complete fertilizer and were smaller at the highest rate of nitrogen.

INTRODUCTION

The tobacco thirps, *Frankliniella fusca* (Hinds), is an occasional pest of tobacco in the United States. It has caused the greatest problems on cigar-wrapper tobacco in the Connecticut Valley (1). Another species of thrips is an important vector of tomato spotted wilt virus in tobacco in Greece (3). In Virginia, thrips caused noticeable damage to tobacco in 1977 and 1980. Both adults and nymphs occur on tobacco, especially during dry seasons. Females oviposit in the leaf epidermis. Oviposition and feeding injury give the lower leaves of damaged tobacco a silvery appearance, especially along the leaf veins.

Adjustments in soil nutrients have important effects on insect populations on tobacco. On Maryland tobacco, Wooldrige and Harrison (5) have shown that the fecundity of the green peach aphid, *Myzus persicae* (Sulzer), increased as the amount of potassium and nitrogen was increased in the soil. Semtner et al, (2) demonstrated that tobacco fertilization had significant effects on the abundance of the tobacco hornworm, *Manduca sexta* (L.), and the tobacco flea beetle, *Epitrix hirtipennis* (Melsheimer).

The objective of this study was to determine the effects of various rates and combinations of nitrogen, phosphorus and potassium on thrips populations on flue-cured (Type 11) and dark-fired tobaccos (Type 21).

EXPERIMENTAL METHODS

Field experiments were conducted at the VPI & SU Southern Piedmont Center, Blackstone, VA during 1977. Experimental plots, 12.2 m (24 plants) long x 3.7 m (4 rows) wide, were established in a split-plot design with four replications. The whole plots consisted of the levels of N-P-K and the subplots contained the two types of tobacco. Soils in the experimental area had low to medium levels of phosphorus and potassium at the beginning of the study. Lime was applied and incorporated in the fall of 1976 to adjust the pH to 5.5 to 6.0. Isopropalin (Paarlan® 6EC, 1.7 kg ai/ha) and enthoprop (Mocap® 6EC, 6.7 kg ai/ha) were applied and incorporated pretransplant for weed and nematode control. Treatments included low, medium, and high levels of nitrogen, phosphorus, potassium and total nutrients (N-P-K) (**Table 1**). Ammonium nitrate (34-0-0), triple super phosphate (0-46-0) and potassium sulfate (0-0-50) were applied, broadcast, to obtain the desired level of nitrogen, phosphorus, and potassium, respectively. The ferilizers were incorporated by double disking immediately after application. Each plot contained two rows of 'Va 309' dark-fired tobacco and two rows of 'Coker 347' flue-cured tobacco. The tobacco was transplanted on May 18, 1977. On June 3, 1977, tobacco thrips were counted on 10 plants/tobacco type on the two inside rows of each main plot (one-row of each tobacco type). The data were analyzed using the analysis of variance tests for a split-plot experimental design and for randomized complete block for each tobacco type. Significant means were separated by Duncan's multiple range test.

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[1] *Thysanoptera: Thripidae*

[2] *Mention of a proprietary product does not constitute a recommendation or endorsement by Virginia Polytechnic Institute and State University.*

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Contribution received May 23, 1983. Tob. Sci. 28:23-24. 1984.

RESULTS AND DISCUSSION

Increased total fertilization had significant ($P < 0.05$) effects on tobacco thrips populations on flue-cured and dark-fired tobaccos (**Table 1**). The excessive rate (2X) of total fertilizer for flue-cured tobacco (Treatment 3) resulted in 96 and 58% more thrips for flue-cured and dark-fired tobaccos, respectively, than the unfertilized tobacco (Treatment 1). The 2X rate of nitrogen for dark-fired tobacco was not tested.

Nitrogen had no significant effects on thrips populations. However, tobacco receiving the high rate of nitrogen (Treatment 5) tended to have lower thrips populations (**Table 1**). These findings are supported by Wittwer and Haseman (4) who reported decreases in damage by the greenhouse thrips, *Heliothrips haemorrhoidalis* (Bouché), on New Zealand spinach at high rates of nitrogen.

Thrips were more abundant at the high rates of phosphorus (Treatment 7) than at the medium and low rates (Treatments 2 and 6) for dark-fired tobacco (**Table 1**). On flue-cured tobacco, populations were only different for the low and high rates.

Potassium did not significantly affect thrips populations on either type of tobacco.

Ajustments in the amount of major nutrients, particularly phosphorus, applied for the production of tobacco significantly affected thrips populations. High levels of nitrogen tended to decrease populations, while high levels of phosphorus resulted in increased populations. In this test there were no significant differences in populations between the two tobacco types. However, dark-fired tobacco normally receives about twice as much nitrogen as flue-cured, probably making it a less favorable host for thrips. Although tobacco can take up only a relatively small amount of phosphorus, the practice of applying recommended instead of excessive rates seems to make the crop less attractive to thrips.

Phosphorus and potassium rates seemed to have a greater overriding effect on thrips populations on tobacco than nitrogen. Thrips response to phosphorus, and potassium fertilization were similar, and opposite to responses to nitrogen.

Table 1. Effects of N-P-K fertilization levels on the abundance of tobacco thrips on flue-cured and dark-fired tobacco, Southern Piedmont Center, Blackstone, VA. 1977.

Fertilization rate (kg/ha)			Treatment	Thrips/10 plants[1/]	
N	P	K	#	Flue-cured	Dark-fired
0	0	0	1	91 cd	104 cd
67	112	168[2/]	2	134 abc	124 bc
134	224	336	3	178 ab	164 ab
0	112	168	4	185 ab	119 bc
134	112	168[3/]	5	121 bcd	89 cd
67	0	168	6	66 d	52 d
67	224	168	7	204 a	204 a
67	112	0	8	93 cd	106 cd
67	112	336	9	154 abc	123 bc

[1/] Means within a column not followed by the same letter are significantly different ($P < 0.05$) as indicated by Duncan's multiple range test.

[2/] Recommended rate of fertilization for flue-cured tobacco.

[3/] Recommended rate of fertilization for dark fire-cured tobacco.

LITERATURE CITED

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Tobacco Science, 1984, 28-8, p. 23-24, ISSN. 0082-4523.pdf