NOTE

Abundance of Thrips (Thysanoptera: Thripidae) on Spring-Planted Snap Beans[1]

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The snap bean, *Phaseolus vulgaris* L., is an important vegetable crop in many parts of the United States. Major insect pests of the crop include the European corn borer, *Ostrinia nubilalis* (Hübner), (Dively and McCully, 1979, J. Econ. Entomol. 72: 152-154; Sanborn et al., 1982, J. Econ. Entomol. 75: 551-555) and the corn earworm, *Helicoverpa zea* (Boddie), (McLeod, 1984, Pp. 34-38. *In*. Proc. Arkansas State Hortic. Soc. 105th Annual Meeting; McLeod, 1988, Environ. Entomol. 17: 587-592) depending on geographical area. In Arkansas, another concern of snap bean producers and processors is thrips.

Literature regarding the impact of thrips on snap beans is scarce. On lima beans, Watts (1936, S. C. Agric. Exp. Sta. Bull. 306) suspected flower thrips, *Frankliniella tritici* (Fitch), as being a possible hindrance to normal fruit setting when an average of about 30 thrips per blossom was found. Dupree (1970, J. Ga. Entomol. Soc. 5: 48-52) reported that lima bean yields were reduced by excessive blossom shedding and mentioned thrips as a possible cause. Dupree also listed several thrips species occurring on lima bean in Georgia but reported that systemic insecticides that significantly reduced thrips did not always increase yield. The soybean thrips, *Neohydatothrips variabilis* (Beach) (formerly *Sericothrips variabilis* [Beach]), can be the most abundant insect on soybean in some areas of the U. S. (Lentz et al., 1983, J. Econ. Entomol. 76: 836-840). Thrips on young soybean, however, have been reported to have little effect on yield (Irwin and Kuhlman, 1979, J. Ga. Entomol. Soc. 14: 148-154; Lentz, 1984, Tenn. Farm and Home Sci. 129: 5).

The objective of this research was to determine the abundance and species composition of thrips on spring-planted snap beans in Arkansas.

During the spring of both 1991 and 1992, two fields of snap beans were sampled for thrips; one near Scott, Pulaski Co., AR and another near Lowell, Benton Co., AR. All fields sampled were commercial production fields grown for

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machine harvest and canning. Each was approximately 16.2 ha in size. Thrips were sampled by collecting 20 plants from each field weekly. In 1991, plants were collected randomly from throughout the fields, while in 1992, sampling was divided into areas within fields (four plants from each of five areas, i.e., NE, NW, SE, and SW corners, and center). Sampled plants were placed individually in 0.946-liter Ziploc® plastic bags (DowBrands Inc., Indianapolis, IN) while the plants were small, or 3.78-liter Ziploc® bags when the plants were larger. Bagged plants were transported to the laboratory in an ice chest and then refrigerated until examined. Each plant was removed from its bag and placed over white paper. Leaves, blooms, and stems were destructively examined. Thrips were collected with a moistened brush from the white background, plant surface, and sample bag and placed in vials of 70% ethyl alcohol. Subsequently, the thrips were mounted on glass slides for microscopic identification. A representative sample of each species was sent to Charles Cole, Texas Agricultural Extension Service, for verification and/or identification. Thrips populations from each sampling were plotted over time with SYSTAT (Wilkinson, 1986, SYSTAT: The system for statistics, Evanston, IL, SYSTAT, Inc.) Data were statistically analyzed with the General Linear Model procedure of the Statistical Analysis System (SAS Institute, 1987, PC SAS version 6.04, SAS Institute, Cary, NC).

Three species of thrips were commonly found in spring-planted snap bean fields (Fig. 1), including: the tobacco thrips, *F. fusca* (Hinds), the flower thrips, *F. tritici*, and the soybean thrips, *N. variabilis*. Other less common species were *Chirothrips crassus* Hinds, *Aeolothrips bicolor* Hinds (Aeolothripidae), *Leptothrips mcconnelli* Crawford (Phlaeothripidae), and *Nesothrips* sp. (Phlaeothripidae).

Tobacco thrips infestations were generally highest on young plants at unifoliate to early trifoliate stages (Fig. 1). They were often found in the developing leaf buds before the leaves expanded. Thrips feeding within these leaf buds probably accounts for much of the damage visible on fully-expanded leaves. In the field near Scott, tobacco thrips infestations were low throughout the season during both years. Field observations indicated that flower thrips occurred most often inside blooms. Their numbers increased considerably as the plants started blooming. Peak infestations on snap bean usually occurred 1 wk following first bloom. Soybean thrips reached their peak abundance around the first bloom (R-1) stage (Lebaron, 1974, Univ. of Idaho College of Agric., Coop. Ext. Serv., Agric. Exp. Sta., Current Inform. Series No. 228) in most cases and at a V-3 to early V-4 stage the remainder of the time.

Results of sampling snap bean fields varied somewhat for the 2 years (Fig. 1). In 1991, thrips populations were higher in the Lowell field. In 1992, the Scott field, on most occasions, had the highest number of thrips of either field sampled. Thrips numbers in the field near Lowell were comparable during both years. The field near Scott had considerably higher thrips numbers during 1992 than did the field near Lowell. This was unexpected because in this area, the spring was wetter in 1992 than in 1991. Wetter conditions may often be assumed to result in fewer thrips because rains can beat thrips off a plant, drown pupae in soil, and pack the soil to prevent emergence of adults (Watts 1936).

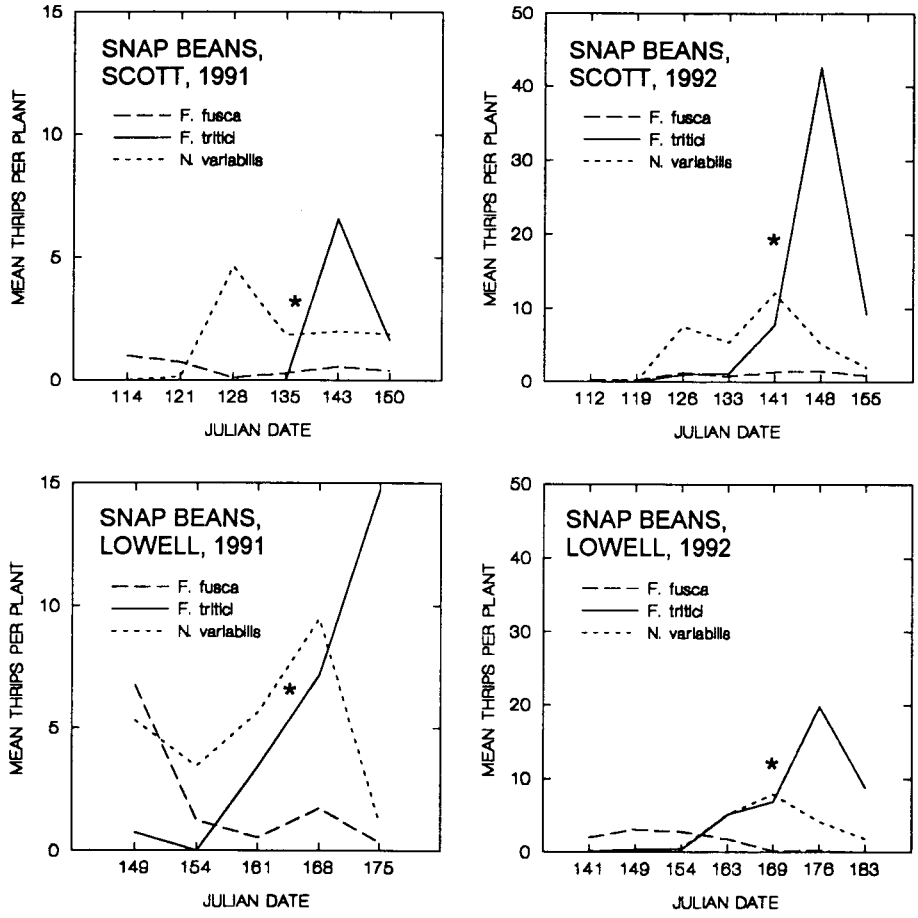

Fig. 1. Thrips abundance on Arkansas snap beans during 1991 and 1992. Asterisks indicate first bloom stage of crop. Note differing scales for 1991 and 1992 graphs.

In both fields sampled during 1992, sample date had a significant effect on numbers of each of the three common species as well as numbers of immatures, total adult thrips, and total thrips ($F \geq 5.01$; df = 6, 105; $P \leq 0.0002$ in all cases). Within field sample area had a significant effect on number of immatures and total thrips in both fields ($F \geq 6.00$; df = 4, 105; $P \leq 0.0002$ in all cases); however, the reasons for these differences are unclear. The interaction of date and area was significant in some cases, but again, there was no obvious explanation. On cowpeas, areas of fields adjacent to earlier-planted fields tended to have highest thrips numbers (Sweeden and McLeod, 1993, J. Entomol. Sci. 28: 427-432). In this study, there were no earlier-planted snap

beans in close proximity to the fields sampled. Therefore, no assumptions about movement of thrips between fields could be made.

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