PURDUE WEED SCIENCE

Spatial and Temporal Distribution of Stalk Boring Insects in Indiana and Michigan Giant Ragweed

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Introduction

Giant ragweed (GRW) is one of Indiana's most problematic agronomic weeds. Glyphosate occasionally fails to control giant ragweed at commercially acceptable levels. Reasons for poor control include poor coverage due to dense populations, inadequate rates for plant size and suspected glyphosate resistance. Based on late season field observations, escaped GRW plants were found in 26% and 50% of the soybean fields surveyed in 2003 and 2004, respectively (Barnes et al. 2004, Johnson et al. 2004). Reports indicate that GRW can serve as a host to stalk boring insects (SBIs) such as European corn borer [*Ostrinia nubilalis* (Hüber)] (Dicke 1932) and the stalk borer [*Papaipema nebris* (Guenée)] (Decker 1931). Purdue University entomologists have also found the celery leaftier [*Udea rubigalis* (Guenée)], the cocklebur weevil [*Rhodobaenus quinquedecimpunctatus* (Say)], and the ragweed borer [*Epiblema strenuana* (Walker)] infesting GRW plants (Gerber and Obermeyer unpublished data). Ott et al. (2006) showed that glyphosate efficacy can be reduced on large GRW plants infested with SBIs.

Figure 1. Escaped giant ragweed plants in a soybean field

Figure 2. Giant ragweed plant with SBI tunneling

To help us understand this phenomenon better, more information is needed to determine what SBIs infest GRW, when SBIs infest GRW, and the geographical distribution of GRW SBIs.

Objectives

The primary objectives are: 1) to identify SBIs infesting GRW, 2) to determine when SBIs infest GRW plants, and 3) to determine the geographical distribution of GRW SBIs.

Materials and Methods

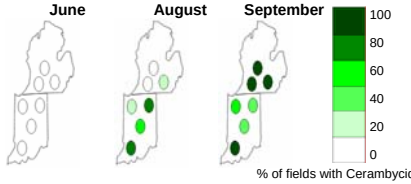
In June, August, and September 2005, GRW plants were sampled from soybean fields located in four regions of Indiana [central (C IN), northeastern (NE IN), northwestern (NW IN), and southwestern (SW IN)] and three regions of Michigan [central (C MI), southeastern (SE MI), and southwestern (SW MI)]. Five soybean fields with GRW plants present were chosen within each region. Ten GRW plants were collected from each site at each timing. Plants were examined for the presence or absence of SBIs. If an insect was present, it was placed in a vial with isopropyl alcohol. Insects were identified to the family level. Percentages of plants infested with the four most found SBI families were subjected to ANOVA and separated with an LSD (0.05).

Distribution of SBI Families

Percent of Plants Infested with SBIs

Cerambycidae

Figure 3. Cerambycidae SBI distribution.



% of fields with Cerambycidae SBI family present

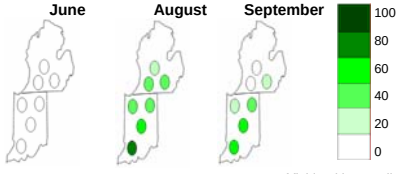
Table 1. Percent of plants with Cerambycidae SBIs present by sample timing and region.

Region	C IN	NE IN	NW IN	SW IN	C MI	SE MI	SW MI	LSD (0.05)
	% of plants infested							
June	0	0	0	0	0	0	0	NA
August	6	8	2	10	0	2	0	5
September	4	10	18	22	28	30	16	14

Cerambycidae SBIs were frequently found in September in both states (Figure 3 and Table 1).

Curculionidae

Figure 4. Curculionidae SBI distribution.



% of fields with Curculionidae SBI family present

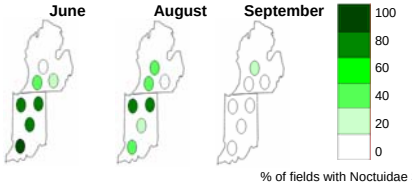
Table 2. Percent of plants with Curculionidae SBIs present by sample timing and region.

Region	C IN	NE IN	NW IN	SW IN	C MI	SE MI	SW MI	LSD (0.05)
	% of plants infested							
June	0	0	0	0	0	0	0	NA
August	10	6	10	24	2	4	4	19
September	14	4	2	6	0	2	0	11

Curculionidae SBIs were found primarily in August throughout both states (Figure 4 and Table 2).

Noctuidae

Figure 5. Noctuidae SBI distribution.



% of fields with Noctuidae SBI family present

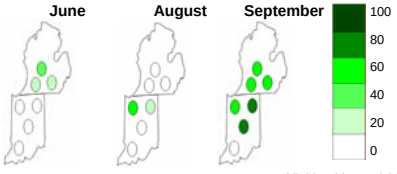
Table 3. Percent of plants with Noctuidae SBIs present by sample timing and region.

Region	C IN	NE IN	NW IN	SW IN	C MI	SE MI	SW MI	LSD (0.05)
	% of plants infested							
June	12	10	16	18	0	2	12	12
August	2	10	20	6	6	0	16	19
September	0	0	0	0	0	2	0	2

Noctuidae SBIs were found mostly in the early to mid part of the growing season in both states (Figure 5 and Table 3).

Tortricidae

Figure 6. Tortricidae SBI distribution.



% of fields with Tortricidae SBI family present

Table 4. Percent of plants with Tortricidae SBIs present by sample timing and region.

Region	C IN	NE IN	NW IN	SW IN	C MI	SE MI	SW MI	LSD (0.05)
	% of plants infested							
June	0	0	0	0	4	4	6	8
August	0	2	10	0	0	0	0	7
September	18	10	12	0	8	4	10	11

Tortricidae SBIs were found primarily in September throughout both states (Figure 6 and Table 4).

Conclusions

In this study, six different families were identified as SBIs of GRW. These families included Cerambycidae, Curculionidae, Languriidae, Noctuidae, Pyralidae, and Tortricidae. Different SBIs are present throughout the growing season, and are present in different geographical regions. The Cerambycidae, Curculionidae, Noctuidae, and Tortricidae families are present when glyphosate applications are being made. Since these families were found in GRW and are present during glyphosate applications, it can be assumed that they are partially responsible for reduced glyphosate efficacy on GRW plants.

References

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