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Site-specific soybean insect management: benefits and barriers

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Site-specific soybean insect management: benefits and barriers

Abstract

Insect pest management involves monitoring pests and treating with an insecticide when economic thresholds are exceeded. Site-specific insect management offers the opportunity to treat only those areas where pest populations are highest. For 3 years, entomologists at Iowa State University have been involved in a site-specific farming project, funded by the Iowa Soybean Promotion Board, to study the potential of this technology for soybean insect management. Some potential benefits and current barriers to implementing site-specific soybean insect management have been identified.

Keywords

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Insect pest management involves monitoring pests and treating with an insecticide when economic thresholds are exceeded. Site-specific insect management offers the opportunity to treat only those areas where pest populations are highest. For 3 years, entomologists at Iowa State University have been involved in a site-specific farming project, funded by the Iowa Soybean Promotion Board, to study the potential of this technology for soybean insect management. Some potential benefits and current barriers to implementing site-specific soybean insect management have been identified.

One benefit of site-specific insect management is the ability to visualize pest problems and relate them to other field characteristics. In Iowa, the bean leaf beetle is one of the main soybean insect pests. Bean leaf beetle populations can reach economic levels on late-season soybean. In this study, persistent bean leaf beetle aggregations were identified within seasons and across years in some fields (Figure 1). If information on pests is collected for several consecutive years, it may be possible to understand causes of persistent patterns.

Despite the potential of site-specific technologies for understanding insect populations, there are barriers to implementation. The primary barrier is that current methods for sampling insect populations are too costly. Site-specific management requires intensive field sampling and soybean insects must be sampled manually. In this study, it appeared that there could be some benefit to site-specific management, but when sampling costs were added, these benefits were lost (Table 1).

Another barrier to implementing site-specific management is that accurate aerial insecticide applications cannot be performed. Insecticide applications on late-season soybean are usually applied aerially and, at present, technologies for targeting insecticide to small field areas from an airplane do not exist.

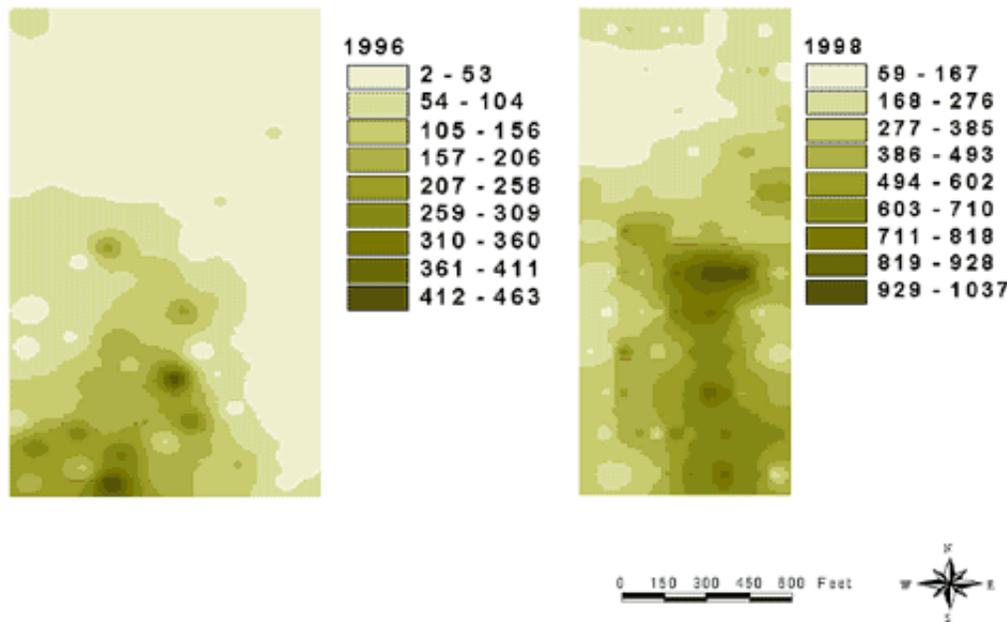
The potential of site-specific management is great enough that it is possible these barriers will eventually be overcome. At present, the best way to proceed with site-specific insect management is to begin to track pest populations by mapping generalized areas with large insect populations. These data collected over multiple years will help farmers identify localized problems. As technologies improve, farmers will be able to use this information for making pest management decisions.

Table 1. Comparison between uniform and site-specific management for second-generation bean leaf beetles on soybeans. All values are expressed in average return per 0.5 acre. Equipment costs were not included in analysis.

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Western Iowa field	Difference in return between whole-field spraying with insecticide and no insecticide treatment	Difference in return between site-specific and whole-field insecticide treatment	Difference in return between site-specific and whole-field insecticide treatment (cost of sampling added)
1997	+\$17.22	+\$0.24	-\$26.28
1998	-\$0.22	+\$1.21	-\$11.40

Figure 1. September bean leaf beetle population dispersion in a central Iowa field in two different years (1996-50 acres, 1998-32 acres). Populations were aggregated in the southern portion of the field in both years.



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