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Soybean Aphid Aphis glycines Matsumura (Homoptera: Aphididae) Insecticide Performance in Floyd County, Iowa

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Abstract
In 2005, the soybean aphid reached economic populations in many Iowa counties. A frequent question from growers has been, "What product offers the highest level of soybean aphid control under Iowa conditions?" To help answer this question we established a replicated field experiment at the Northeast Research Farm located in Floyd County, Iowa.

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Introduction

In 2005, the soybean aphid reached economic populations in many Iowa counties. A frequent question from growers has been, "What product offers the highest level of soybean aphid control under Iowa conditions?" To help answer this question we established a replicated field experiment at the Northeast Research Farm located in Floyd County, Iowa.

Materials and Methods

Twelve products or combinations of products were evaluated (untreated check, Fufill, Trimax, Cruiser 50g/100Kg, Cruiser100g/100Kg, Gaucho, Lorsban 4E, ProAxis, Decis, Lorsban + Baythroid, Warrior, and Baythroid). Treatments were replicated four times in a randomized complete block design. Effectiveness of the treatments on aphid populations was determined by sampling consecutive plants at a randomly selected location. Aphid counts were taken at one-week intervals starting after insecticides were applied on August 2 and ending on September 2. The mean number of aphids/plant was used to calculate the aphid days for each treatment.

Aphid days = mean aphids/plant at previous date + current mean aphids/plant/2 × number of days between sampling.

Summing the aphid days accumulated during the growing season (cumulative aphid days) provides an estimate of the total aphid exposure that soybean plants experienced. All treatments were harvested on September 30.

Results and Discussion

Insecticides had a significant impact on soybean aphid populations (Figure 1a: $F = 14.07$, $df = 11, 43$; $P = 0.0001$). When left untreated, these aphid populations significantly impacted yields in Iowa (Figure 1b: $F = 13.9$, $df = 11, 43$; $P = 0.0001$). Organophosphate and pyrethroid insecticides provided a similar level of soybean aphid control (Figure 1b) and yield protection (Figure 1a). The seed treatments we tested provided the lowest level of soybean aphid control (Figure 1b) and the lowest yields (Figure 1a) as well. Interestingly, the unlabelled, experimental insecticides provided an intermediate level of protection, both in terms of aphid suppression and yield when compared with the broad-spectrum insecticides (organophosphates, pyrethroids) and seed treatments.

Our data suggest that there is little difference in soybean aphid efficacy amongst the organophosphate and pyrethroid insecticides we tested. Growers have expressed an interest in combining the perceived longer residual time of a pyrethroid (Baythroid) with the faster knockdown of an organophosphate (Lorsban). We did not see an improvement in control or yield protection when these two classes of insecticides were combined. Therefore, growers may not need to combine these insecticides to optimize protection against soybean aphids.

Compared with the foliar-based insecticides, the seed treatments did not provide as great a level of protection. Although we did observe some evidence of control between the untreated soybeans and the seed treatments, the variability among these treatments was great. Although Gaucho appeared to provide the lowest amount of protection, when the active ingredient

(imidacloprid) is applied as a foliar insecticide (Trimax) later in the season, its ability to manage aphids is improved. It is unlikely that soybean aphid protection from seed treatments is sufficient for aphid outbreaks that occur in August, especially for soybeans planted in May.

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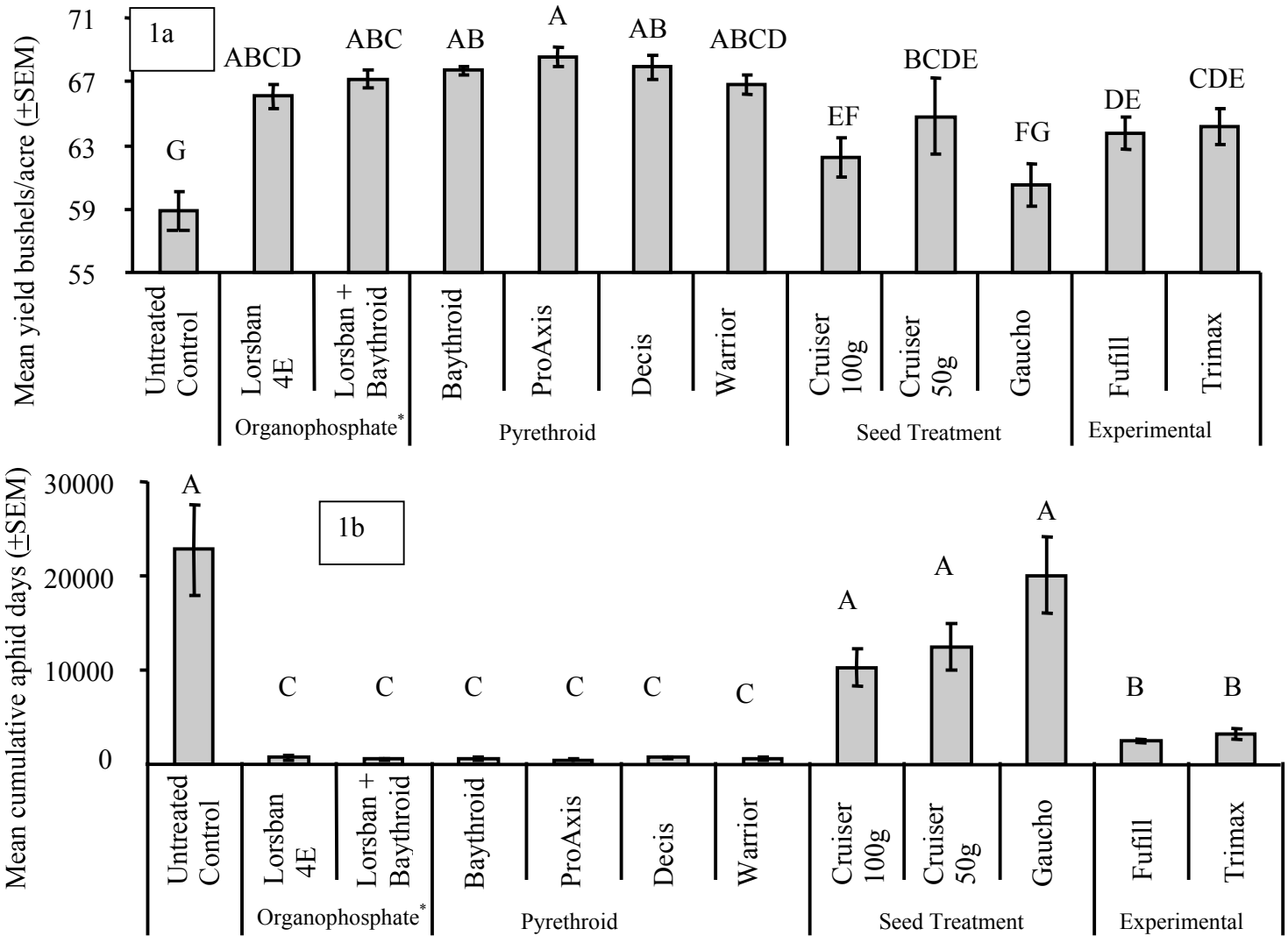

Figure 1. Impact of different insecticides grouped by mode of action on (a) yields reported in bushels/acre at 13% moisture and (b) plant exposure to soybean aphids. Foliar insecticides were applied on August 2, 2005. Means labeled with a unique letter were significantly different (P=0.05).

* Lorsban + Baythroid is a tank mix consisting of an organophosphate (Lorsban) and a pyrethroid (Baythroid).