

Populations of Beneficial Insects in Organically Grown Sweet Corn Using Methyl Salicylate Based PredaLure[®] Insect Attractant

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Kentucky Sweet Corn Facts



- Sweet corn is among the major vegetables grown in Kentucky during the summer months
- Produced on small farms throughout the state
- Helping to replace lost tobacco income through sales at farmers' markets, roadside stands, KY Marketing Coops, KY Produce Auction and KY Produce Shippers
- In 2002 the total acreage in Kentucky was estimated to be 810 ha (2,000 acres)
- Since then production in Kentucky increased 39% to 1,134 ha (2,800 acres)
- Value of the crop is > \$5 million

Methods of Insect Control

- **Primarily insecticide use (Warrior[®], Mustang[®], Pounce[®])**
- **Transgenic insecticidal cultivars (Bt corn)**
- **Traditional resistant varieties**
- **Organic insecticide use (some Bts, Entrust[®])**
- **Biological Control (predators, parasites, pathogens: naturally occurring vs. augmented)**
- **Mechanical removal of insects**

Conservation Biological Control

- **Incorporates practices (e.g., chemical ecology) that attract predators and parasitoids into crop systems**
- **Strengthening the natural enemy community by increasing density and species diversity to suppress pests is the goal**
- **Exploiting beneficial insect attractants (semiochemicals) is a growing field of CBC**

Examples of Semiochemicals

- **2-phenylethanol** attractive to pink lady beetle (Coccinellidae) and green lacewing (Chrysopidae), developed into a lure for predaceous insects (**Benallure[®]**)
- **Methyl salicylate** attractive to *Geocoris pallens* (Lygaeidae); syrphid flies (Syrphidae); *Stethorus punctum* (Coccinellidae); green lacewing (Chrysopidae) in hops (**PredaLure[®]**)
- **Methyl salicylate** attractive to green lacewing (Chrysopidae); *Hemerobius* sp. (Hemerobiidae); *Deraecoris brevis* (Miridae); *Stethorus punctum* (Coccinellidae); and *Orius tristicolor* (Anthocoridae) in grapes and hops (**PredaLure[®]**)
- **Methyl salicylate** attractive to *Coccinella septempunctata* (Coccinellidae) in laboratory studies

Objective

**To determine the effects of PredaLure[®]
beneficial insect attractant on populations of
beneficial insects in organically grown sweet
corn**

Materials and Methods

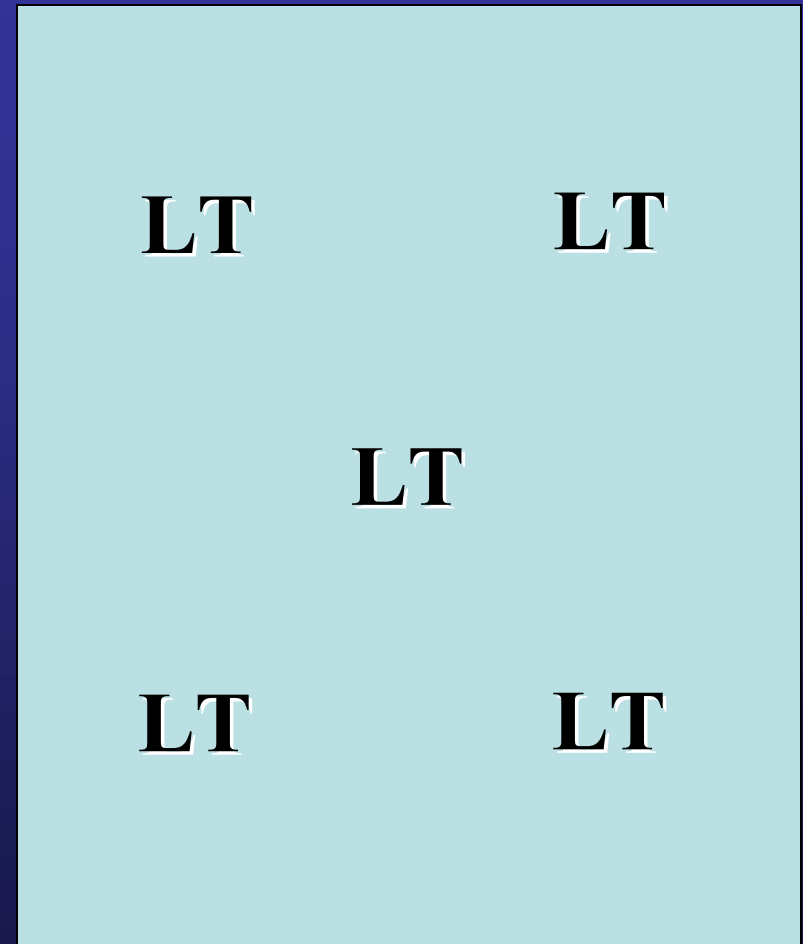
- **Experimental plots located in the certified organic section of KSU's Agricultural Research and Demonstration Farm**
- **Sweet corn plots planted using Syngenta's untreated 'Garrison' hybrid**
- **Plots were 21 m long X 12 m wide (0.03 ha)**
- **Row spacing was 0.9 m and plant spacing was 20 cm**
- **Standard organic agricultural practices were used**

Materials and Methods con't.

- **All plots were plowed and disced and a preplant application of Nature Safe fertilizer (10-2-8) was made**
- **Plots were roto tilled between rows when plants were 6 leaf stage, hand weeded within rows thereafter**
- **A RCBD was used with three replicates of baited and non baited plots**

Lure and Trap Placement

- Five lures were placed in each plot and hung at ear height
- One 15 cm X 15 cm sticky trap was deployed at each trap location



Materials and Methods

- **Traps were changed weekly through anthesis**
- **Sticky traps were wrapped individually in clear plastic wrap, labeled, and transported to the laboratory for insect identification and enumeration**



- **SAS ANOVA used to analyze all data**

Beneficial Insects Caught

- **Pink lady beetle, *Coleomegilla maculata***
- Multi colored Asian lady beetle, *Harmonia axyridis*
- Spotless lady beetle, *Cycloneda munda*
- 7-Spotted lady beetle, *Coccinella septempunctata*
- Parenthesis lady beetle, *Hippodamia parenthesis*
- **Big eyed bug, *Geocoris punctipes***
- Green lacewing, *Chrysoperla carnea*

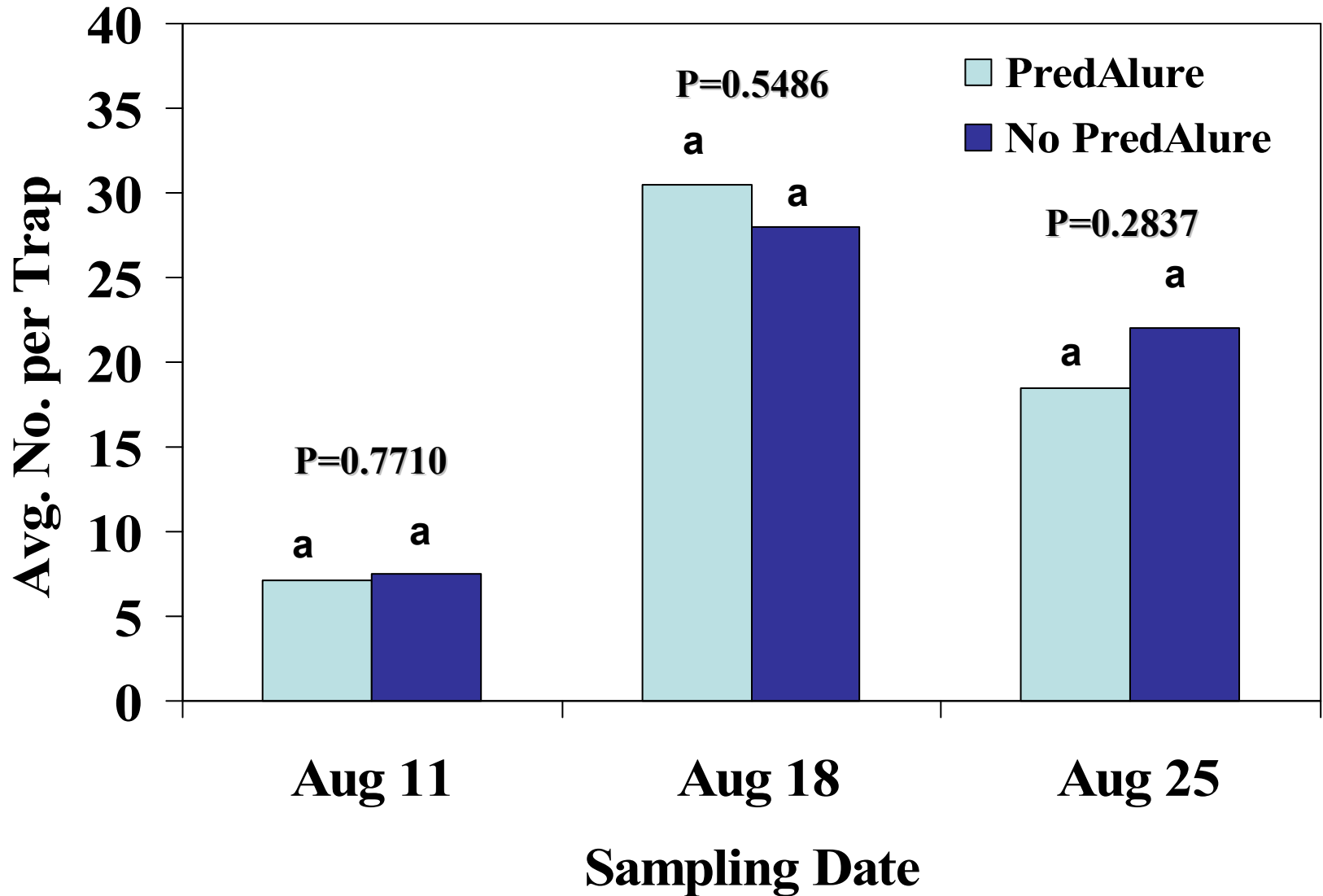
Pink Lady Beetle



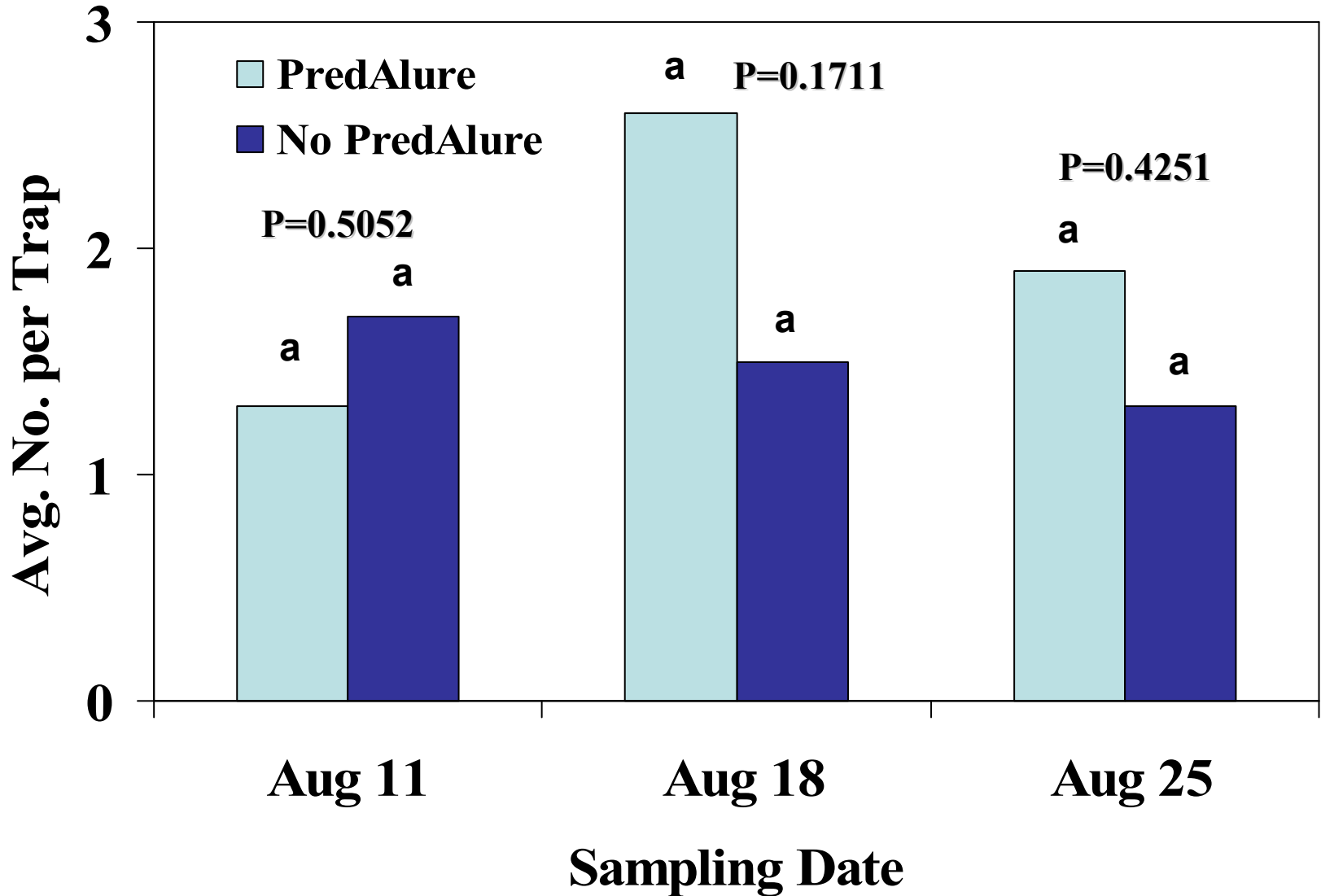
Big Eyed Bug



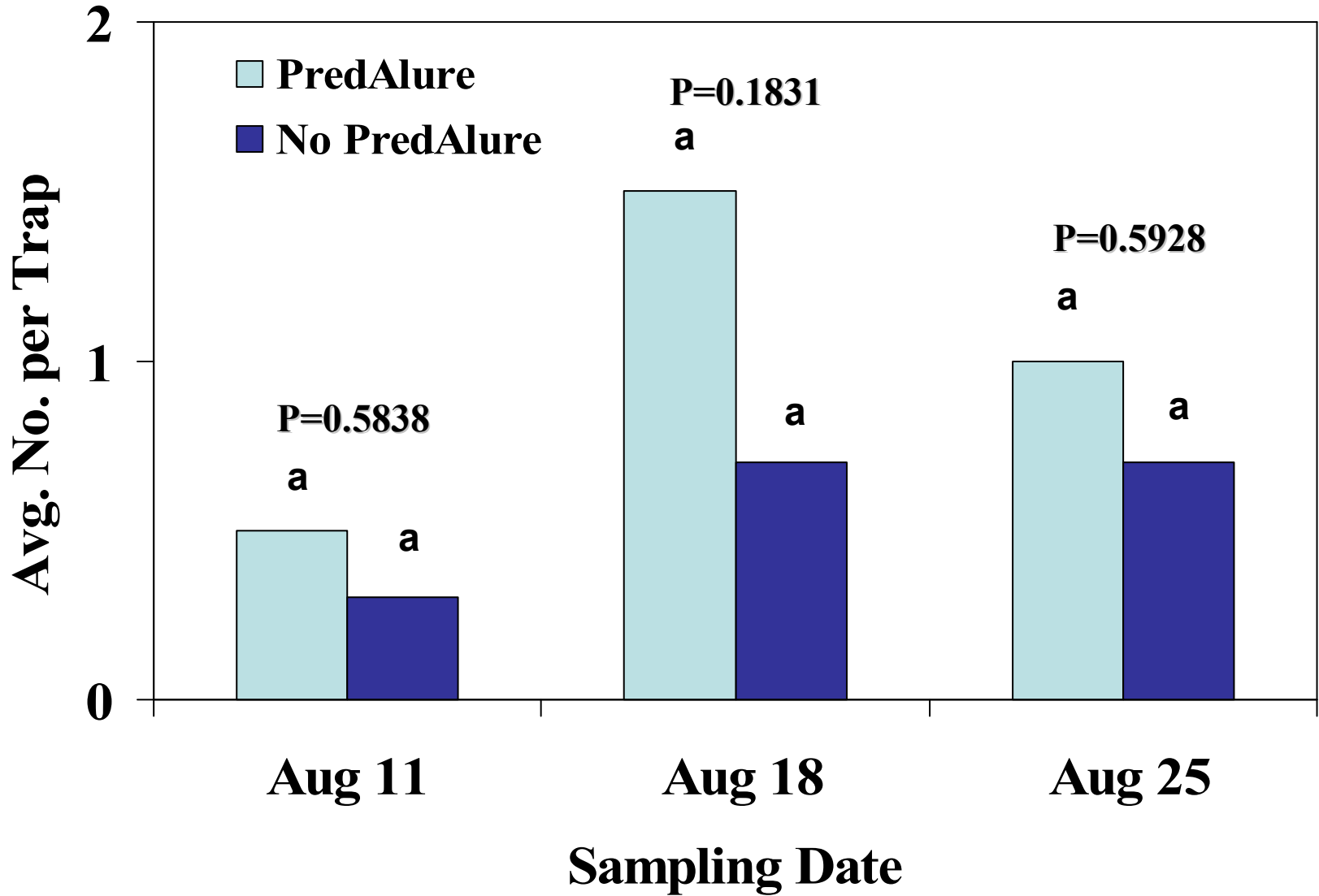
Pink Lady Beetle



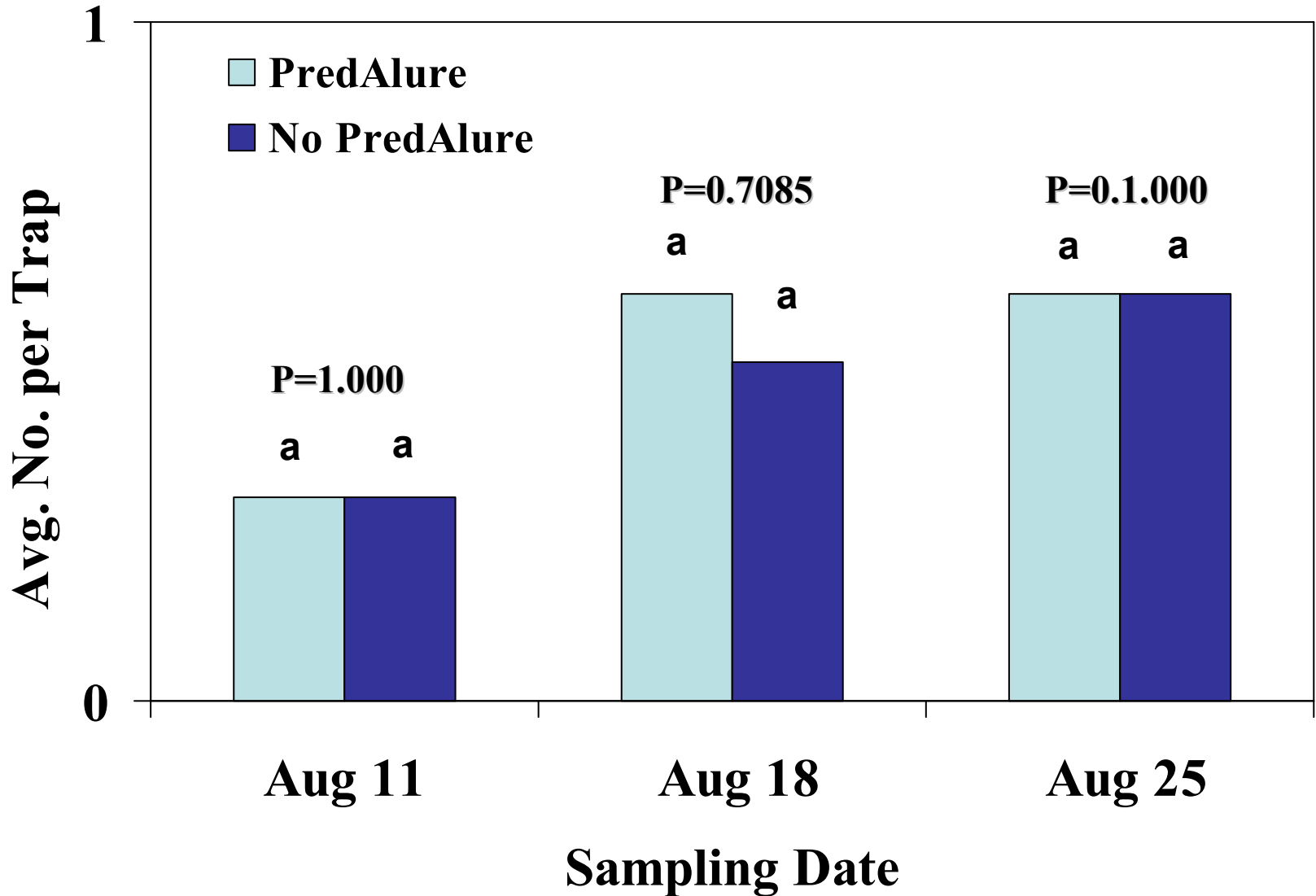
Multi Colored Asian Lady Beetle



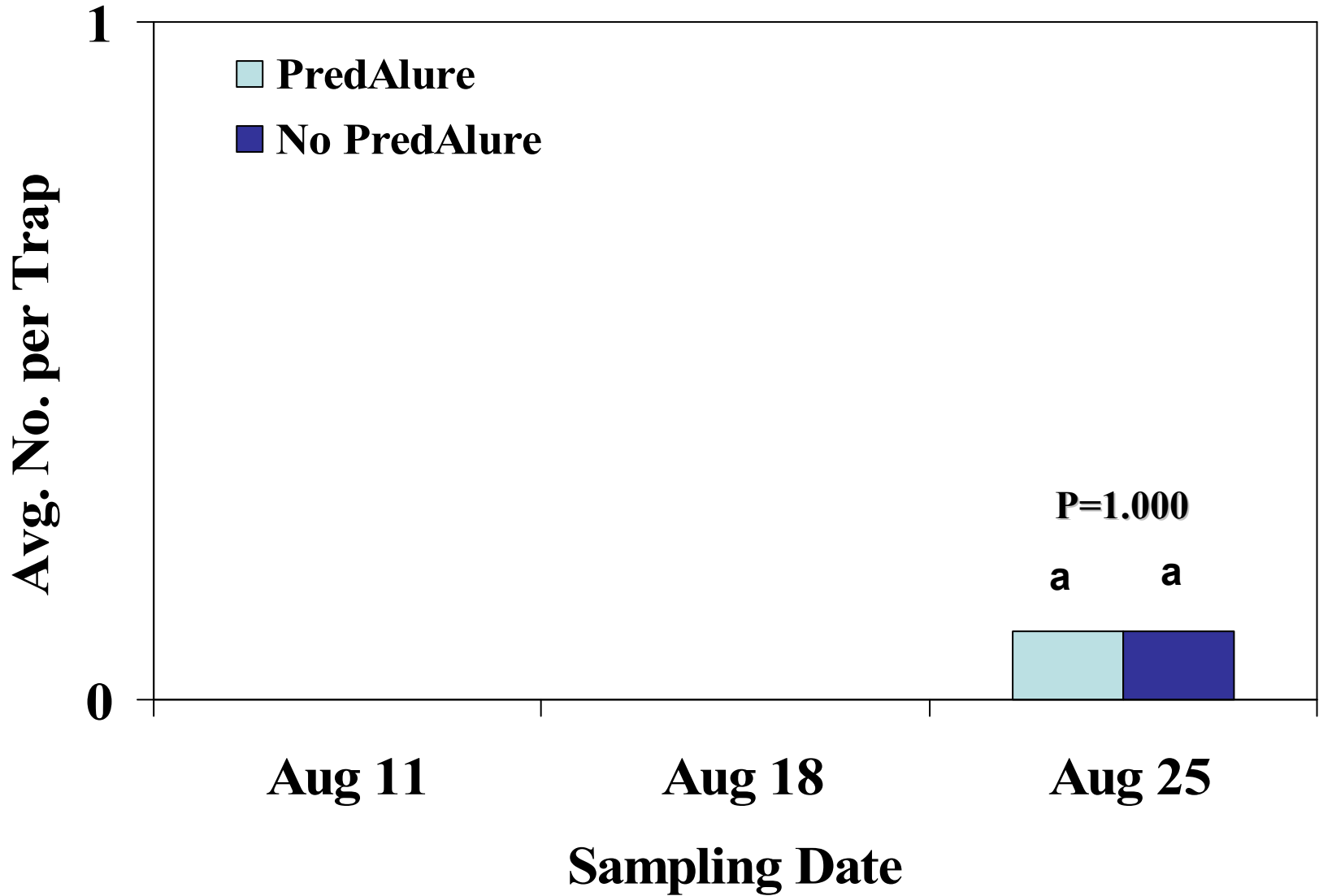
Spotless Lady Beetle



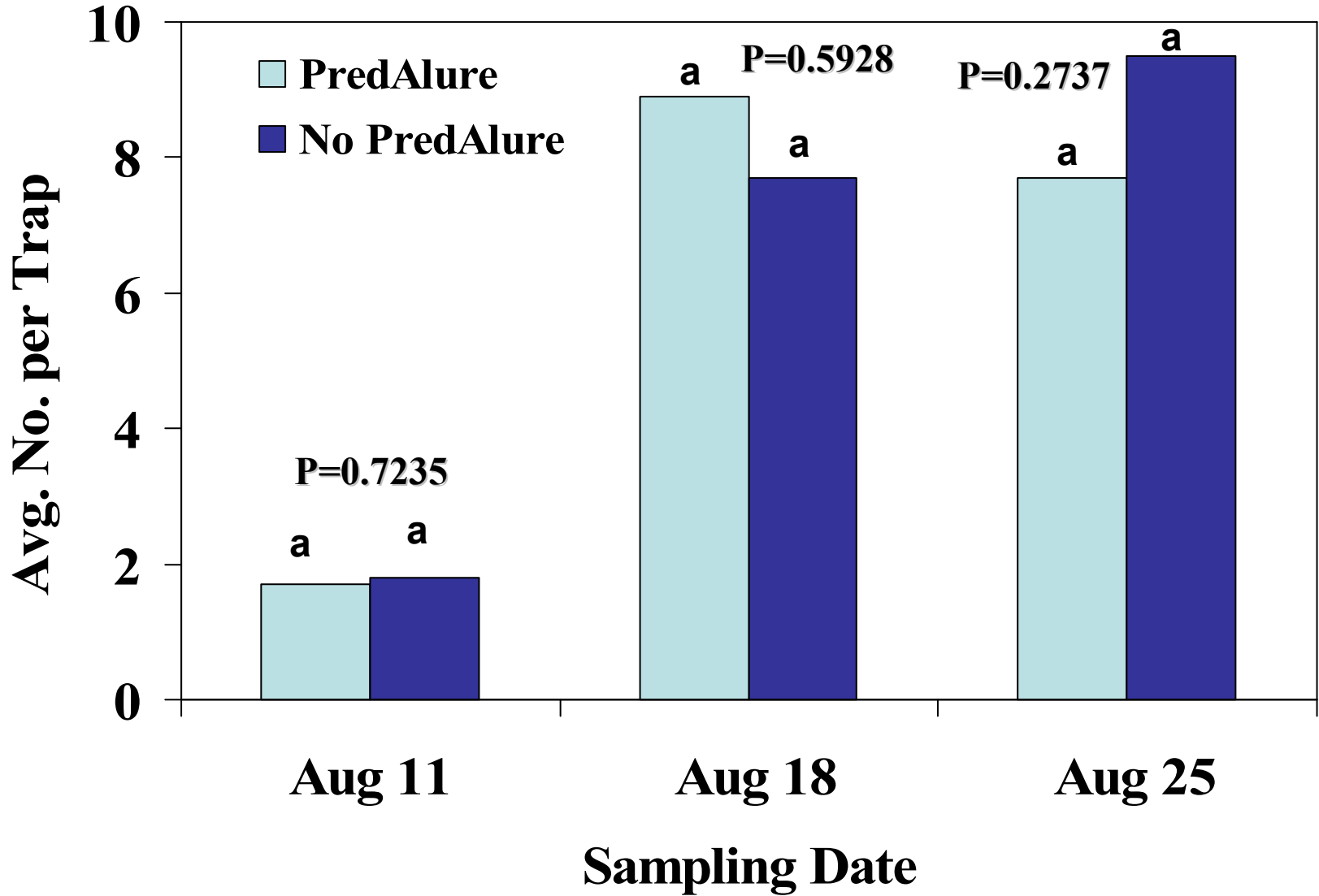
Seven Spotted Lady Beetle



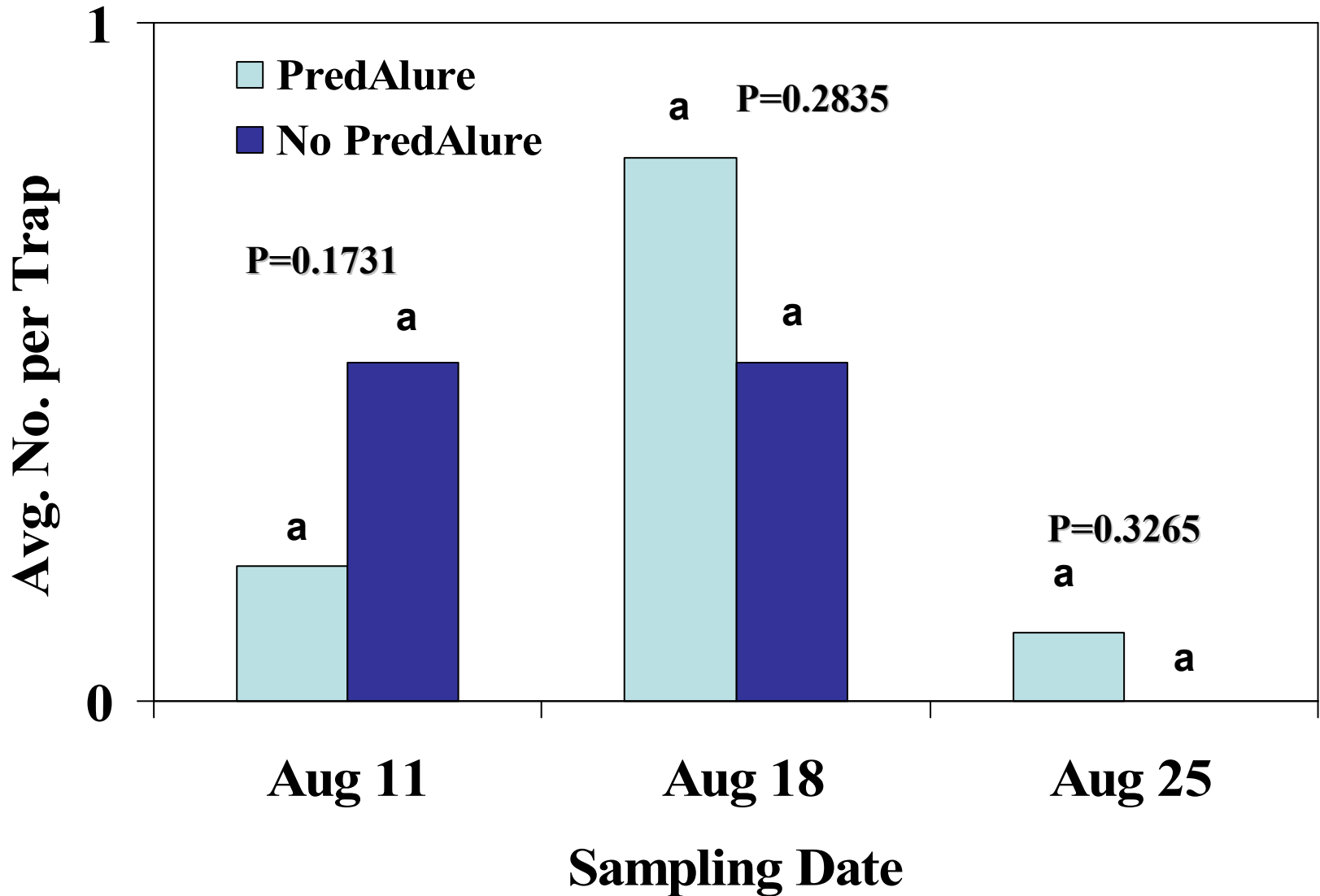
Parenthesis Lady Beetle



Big Eyed Bug



Green Lacewing



Summary and Conclusions

- **Five species of lady beetles, one species of big eyed bug and the green lacewing were caught**
- **Pink lady beetle and big eyed bug were the two most abundant predators caught**
- **There were no significant differences in abundance of any species found between PredaLure baited and non baited plots**

Summary and Conclusions cont.

- **There was a tendency toward higher numbers of Asian lady beetles, spotless lady beetles and green lacewings after deployment of PredaLure in the baited plots**
- **Active ingredient of PredaLure (MeSA) has been shown to be attractive to pink lady beetle, seven spotted lady beetle, green lacewing, and other predators in hops and grapes in Washington**

Summary and Conclusions cont.

- Could be due to plots being too close to one another (i.e., semiochemical [MeSA]) saturation of the baited and non baited plots
- Another explanation may involve the rate of emission of the MeSA from the dispenser and the duration of its effectiveness
- As temperature increases, rate of release increases
- These lures may be susceptible to this phenomenon because they were deployed in August

Summary and Conclusions cont.

- **Experiments need to be repeated with greater separation and during cooler periods**
- **Location of lure when deployed (silk vs. tassel height)**
- **Need to deploy these lures in other vegetable and fruit crops**

Acknowledgments

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