# POPULATION MONITORING OF LYGUS HESPERUS WITH FEMALE-BAITED TRAPS John R. McLaughlin Western Integrated Cropping Systems Research USDA, Agricultural Research Service Shafter Research Station Shafter CA

#### Abstract

Wing-type sticky traps baited with virgin female *Lygus hesperus* were placed about a 2.4-ha field of cotton at the Shafter Research Station. Virgin females from 7 to 14-days-old reliably attracted males; attraction occurred in the morning hours; mating of females dramatically reduced attractiveness; trap captures of males mirrored the numbers of males captured by conventional sweep net method; trap captures also indicated the population magnitude in the immediately adjacent area of the field.

### **Introduction**

Scales (1968), Strong et al. (1970) and Graham (1987) have demonstrated that the plant bug species *Lygus lineolaris* (tarnished plant bug), *L. hesperus*, and *L. elisus* each have female-produced sex pheromones that attract conspecific males. Aldrich (1988) summarized the status of pheromone identification for *Lygus* species. He found some sexual dimorphism in the airborne chemicals recovered from male and female *L. lineolaris*, but was unable to attract males to traps baited with candidate chemicals. He reported no sexual dimorphism in airborne chemicals recovered from *L. hesperus*.

Dr. Jocelyn Millar, University of California, Riverside, and I have begun a project to isolate and identify the sex pheromone of *L. hesperus*. As part of this effort I conducted some trapping studies in alfalfa and cotton at the Shafter Research Station in the southern San Joaquin Valley, 15 miles north of Bakersfield, CA. The objectives of this study were to develop a reliable trapping system using virgin females in order to facilitate eventual field bioassay of candidate pheromonal compounds and to determine if data obtained by pheromone trapping would have any potential use in a cotton management system.

## Methods

The bugs were reared on green beans purchased from local supermarkets. Their diet was supplemented with coddled beet armyworm or cabbage looper larvae. Soon after eclosion to the adult instar, the bugs were narcotized with CO, and separated by sex. The trap baits were prepared by

> Reprinted from the Proceedings of the Beltwide Cotton Conference Volume 2:733-734 (1996) National Cotton Council, Memphis TN

placing 5 virgin females in a  $44 \times 100$  mm plastic cylinder closed at each end with a double layer of plastic window screening. One end of each cage could be removed. These cylindrical cages were suspended within wing-type sticky raps. The females were sustained by placing two green beans, resting on a pad of cotton batting within each cage. The cotton batting was wetted with water each time the traps were serviced.

Initial testing established that females did not attract males reliably to traps until they were five to seven days old and that females that were kept well supplied with food and water would attract males for at least seven days. The double layer of screening prevented mating with the feral males. Mating severely reduced the attractiveness of females. Each trap was baited once each week with sevenday-old females. The traps were inspected daily, except on weekends, and all plant bugs captured were removed, sexed, and counted.

Six female-baited traps were placed about the perimeter of a 300 m long by 85 m wide field of cotton (Maxxa). The field was divided lengthwise into 4 plots (A thru D) and transversely (north-south) into 5 subplots (1-5), each comprising 28 rows (12 cm row spacing). The field was bounded on the north by fallow ground and an almond orchard, on the west (the "5" plots of the diagram below) by almonds, on the south by cotton, and on the east by a reservoir and grapes.

A1	A2	A3	A4	A5
B1	B2	B3	B4	B5
C1	C2	C3	C4	C5
D1	D2	D3	D4	D5

The traps were placed at plant canopy height at the center of the 2nd row in from the edge and centered on plots A1, D1, A3, D3, A5, and D5. Each of the subplots in the entire field were swept once each week using the recommended method to determine the population level of lygus adults and nymphs in the field.

## **Results**

The mean captures of males in the female-baited traps for the morning of most days recorded during the test are presented in Table 1, along with the concurrent mean of the sweep net data from all subplots for that date. The trapping data tracks the sweep net data very closely in terms of gross changes in population levels. There were two invasions of lygus bugs as reflected in both sweep net counts and trapping data. The field was treated for lygus on June 12 and June 27. Almost no nymphs were recorded in the sweep net samples, which certainly caused the traps to track the field population more closely. The pheromone traps will not capture nymphs, therefore they will not alert managers of this potential for damage.

Tables 2 shows the trapping data for June 6 and 12 along with sweep net data from the adjacent subplot for each trap. These values also track one another, indicating that the traps reflect conditions pertaining to the local area of the field. Both sampling methods reflect the relatively even distribution of adults across the field on June 6 and the greater concentration of the population on the west end of the field on the 12th.

Occasionally, *L. elisus* males were captured in the traps. In every case, at least one *L. elisus* female was found trapped on the sticky surface. In no case was a *L. elisus* female found entrapped without conspecific males being trapped. There was no indication that the presence of the *L. elisus* female either enhanced or reduced the capture (attraction) of *L. hesperus* males by their conspecific females.

#### References

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Table 1. Mean number of *Lygus hesperus* adults captured in six femalebaited sticky traps and in sweep nets (mean of 50 sweeps over 20 plots) <u>on</u> each date.

D /		с н.
Date	Female-baited Traps	Sweep Net
5\31	3.4	
6\6	8.3	5.8
6\12	9.7	12.4
	Spray	
6\15	0.1	
6\20	1.3	1.7
6\24	7.0	
6\26	7.7	7.8
	Spray	
6\30	0.0	
7\3	0.0	1.1
7\5	0.1	
7\10	0.4	0.8

Table 2. Number of adult *Lygus hesperus* captured in each female-baited trap and the number captured in 50 sweeps of the adjacent cotton plot on <u>June</u> 6 and June 12, 1996.

Plot	Female-baited Trap	Sweep Net
	June 6	
A-1	9	6
A-3	8	4
A-5	8	4
D-1	10	5
D-3	7	4
D-5	8	6
	June 12	
A-1	6	6
A-3	8	7
A-5	15	14
D-1	7	7
D-3	9	5
D-5	13	15