Seasonal Distribution of Cotton Leafperforator: Pheromone Dispenser Persistence and Effect of Trap Height on Moth Catches in Pheromone Baited Traps

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Abstract

The cotton leafperforator (CLP) Bucculatrix thurberiella Busck. is a sporadic pest in cotton fields of southwest desert area. The cotton leafperforator sex pheromone was identified and synthesized by Hall et al. (1992), thus providing a sensitive method for detecting CLP moths. Tests were conducted in 1992 and 1993 to determine the effective life of CLP polyethylene pheromone dispensers, correlate CLP male moth catches to cotton field infestations, determine the seasonal distribution, and effect of trap height on moth catches. The polyethylene pheromone dispensers were effective for about 4 weeks. The best correlation coefficients for 1993 data, were obtained by comparing CLP moth catches per night to main stem leaf damage at 6 node position from top of plants at field edges. Horseshoe stage CLP per leaf and trap catches had the highest correlation coefficient, r= 0.78. There was more than twice as much CLP damage to leaves at field edges when compared to leaves 10 m into the field. The first CLP moth capture occurred in early to late July and increased rapidly each year in August to 100 to 200 per trap night, but was variable in September, with a high of 300 and a low of 9 per trap night. CLP-baited delta traps placed 0.3 m above ground caught more moths than traps placed at greater heights from 11 to 21 August.

Introduction

The cotton leafperforator (CLP) *Bucculatrix thurberiella* Busck. is a sporadic pest in Arizona and California cotton fields and often affects only a part of the field. The life history and behavior were reported by Watson and Johnson (1972), and Benschoter and Leal (1979). Field scouting to identify economic infestation levels was the only method to determine CLP field populations until recently. The cotton leafperforator sex pheromone was identified and synthesized by Hall et al. (1992), thus providing a sensitive method for detecting CLP moths. Field tests with polyethylene vials and rubber septa dispensers with three pheromone blends demonstrated a very efficient CLP pheromone (Hall et al. 1992).

The present tests were conducted in 1992 and 1993 to determine the effective life of the pheromone in dispensers, the seasonal CLP distribution and effect of trap height on moth catches. All tests were conducted using CLP pheromone dispensers in delta sticky traps (Scentry Inc., P.O. Box 426, Buckeye, AZ).

Seasonal distribution of CLP moths. Seasonal distribution and duration of pheromone effectiveness in Delta traps was determined by locating two trap lines oriented along roads near Higley and Goodyear in Maricopa Co. AZ, 1992. At each location, six CLP-baited delta traps were placed along the roads at 1.6 km intervals in areas with cotton, alfalfa, and vegetables. Traps were located 2 to 5 m from cultivated crops. Traps were examined weekly from 22 June to 18 September. The effective life of the pheromone in the dispensers, as determined by CLP moth catches, was determined by placing 6 additional traps at 0.8 km intervals between the 1.6 km distant

traps in each trap line. Pheromone dispensers were changed at 2 wk interval in 0.8 km traps, but were not changed in 1.6 km traps from 27 July to 18 September 1992. All traps were replaced weekly. Data from 1993 field oriented traps were also used to estimate seasonal CLP moth distribution.

Effect of trap height on CLP moth catches. Altitude of moth flight was determined with delta traps placed at 0.3 m intervals with a range of 0.3 to 1.8 m above ground. Moths caught at this location were recorded from 11 to 28 August 1992. The 0.3 m trap was removed on 21 August to determine if moth catch would increase in higher traps.

Results and Discussion

Effective duration of CLP pheromone dispensers in the field. Under field conditions, the CLP pheromone vial dispensers were effective in traps for 3 and 6 weeks at Goodyear and Higley, respectively, when compared to dispensers replaced at 2 week intervals (Fig. 1) . Replacing the pheromone dispenser in traps every 4 wks should provide an adequate survey tool for detection of CLP populations.

CLP seasonal distribution of moth trap catches. In 1992, the first CLP moths were captured 29 June at Goodyear and Higley and generally increased to mid September (Fig. 1). In 1993, the first CLP moths were caught at the Higley location on 30 July. Moth catches increased each week for 4 weeks from 1.8 to 220 moths per trap night (Fig. 2). One hundred cotton plants per field were examined weekly at Higley but no damage was found until 10 Sept 1993. CLP-baited traps at Casa Grande and Marana had high moth catches of 301 per trap night on 2 Sept and low catches of 61 moths per trap night on 17 Sept (Fig. 2). The first CLP moth capture occurred in early to late July and increased rapidly each year in August to 100 to 200 per trap night, but was variable in September with a high of 300 and a low of 9 per trap night.

Effects of trap height on CLP moth catches. CLP-baited delta traps placed 0.3 m above ground caught more moths than traps placed at other heights above the ground from 11 to 21 August. The delta trap placed 0.6 m above ground caught more CLP moths than traps placed 0.9 to 1.8 m above ground. CLP moth catches in baited traps 1.2, 1.5, and 1.8 m above ground were low and relatively constant during the test period (Fig 3).

Discussion

CLP moth catches preceded detectable cotton leaf damage by 4 weeks in 1992, and 6 weeks in 1993. Examination of our data showed the leaves from 6th mainstem node from plants at field edges gave the best correlation with CLP moth trap catches, However interior of fields would have to be examined before control action would be justified for the entire cotton fields. Treating only field edges may provide enough control to avoid economic loss. Additional information on timing of seasonal flights is needed. A north-south trap line through the cotton growing areas could give advance warning of moth flights.

References

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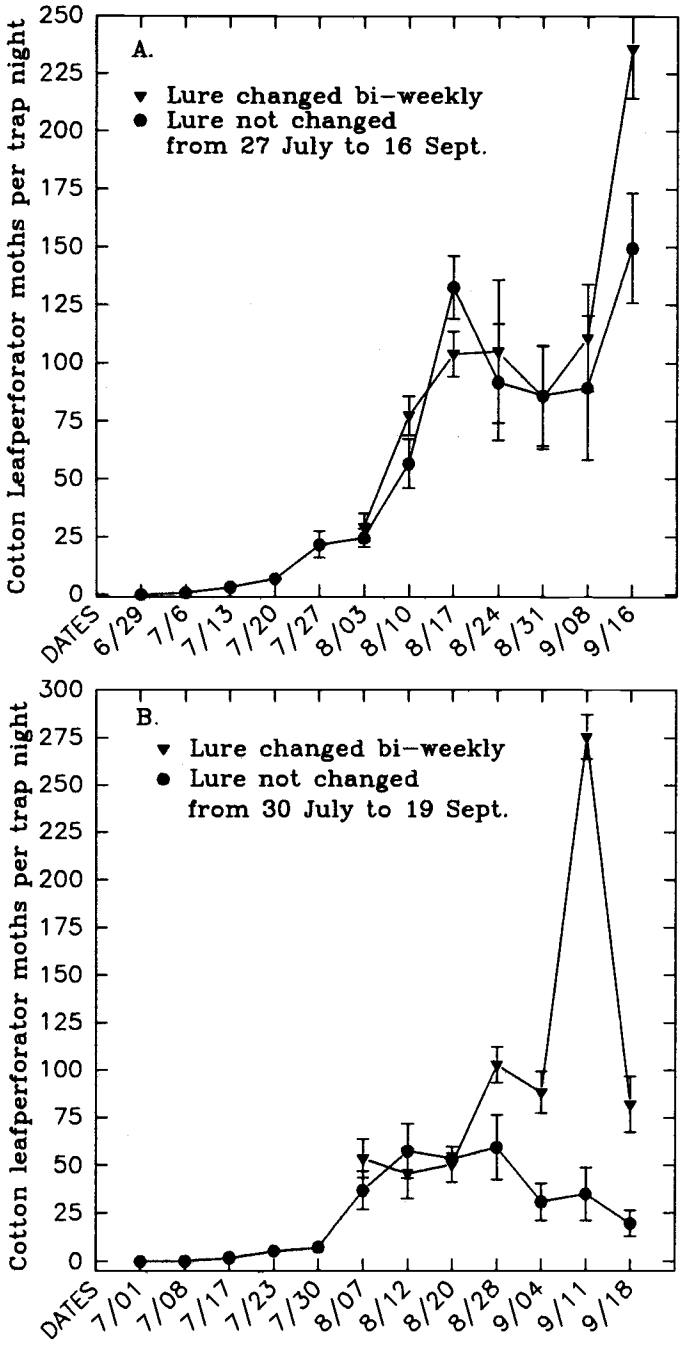

Fig. 1. CLP moth catches in delta traps with dispensers changed biweekly or not changed near Goodyear and Higley, AZ, 27 July to 16 September.

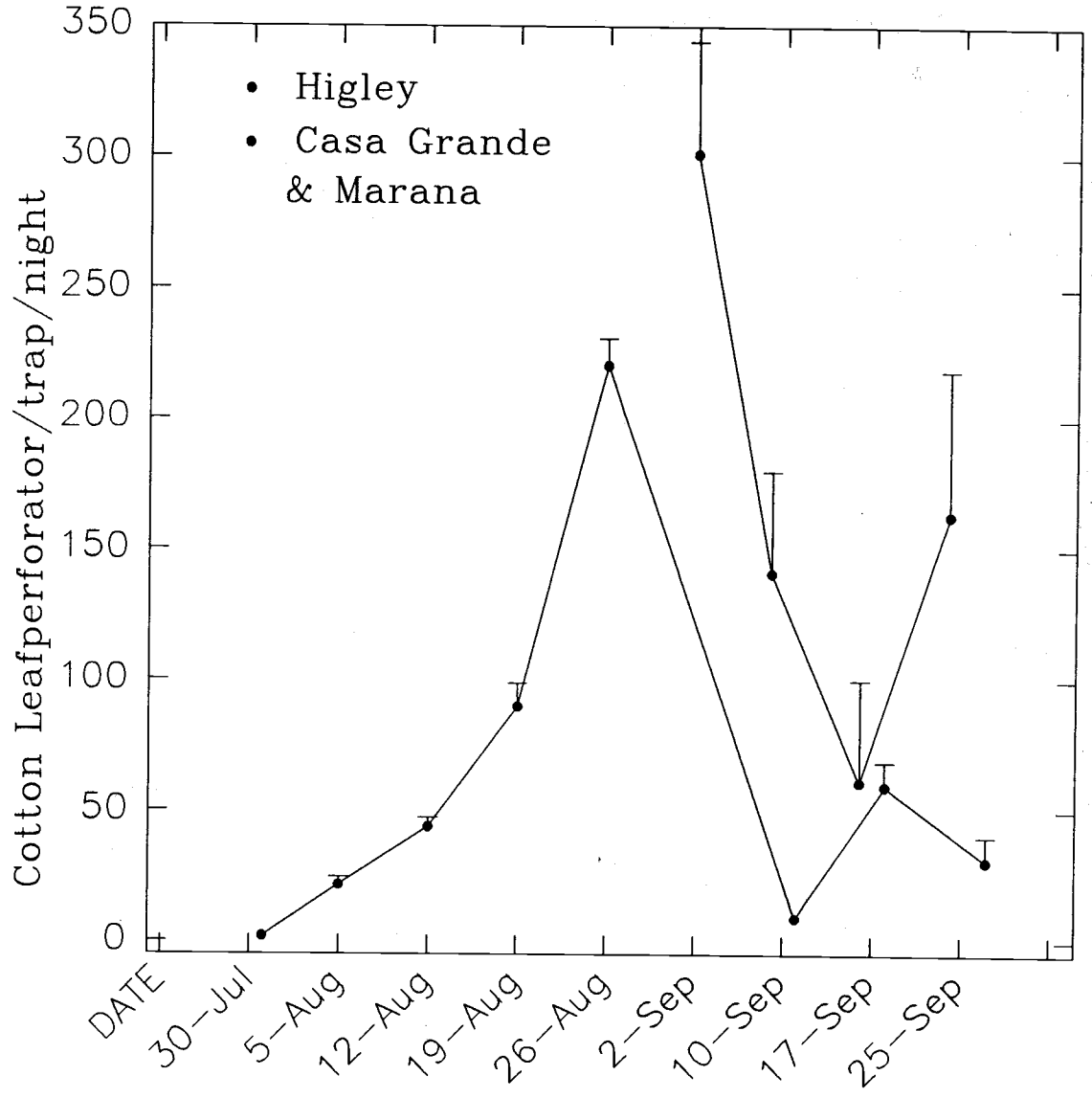

Fig. 2. Seasonal trap catches of CLP moths at 1993 test sites.

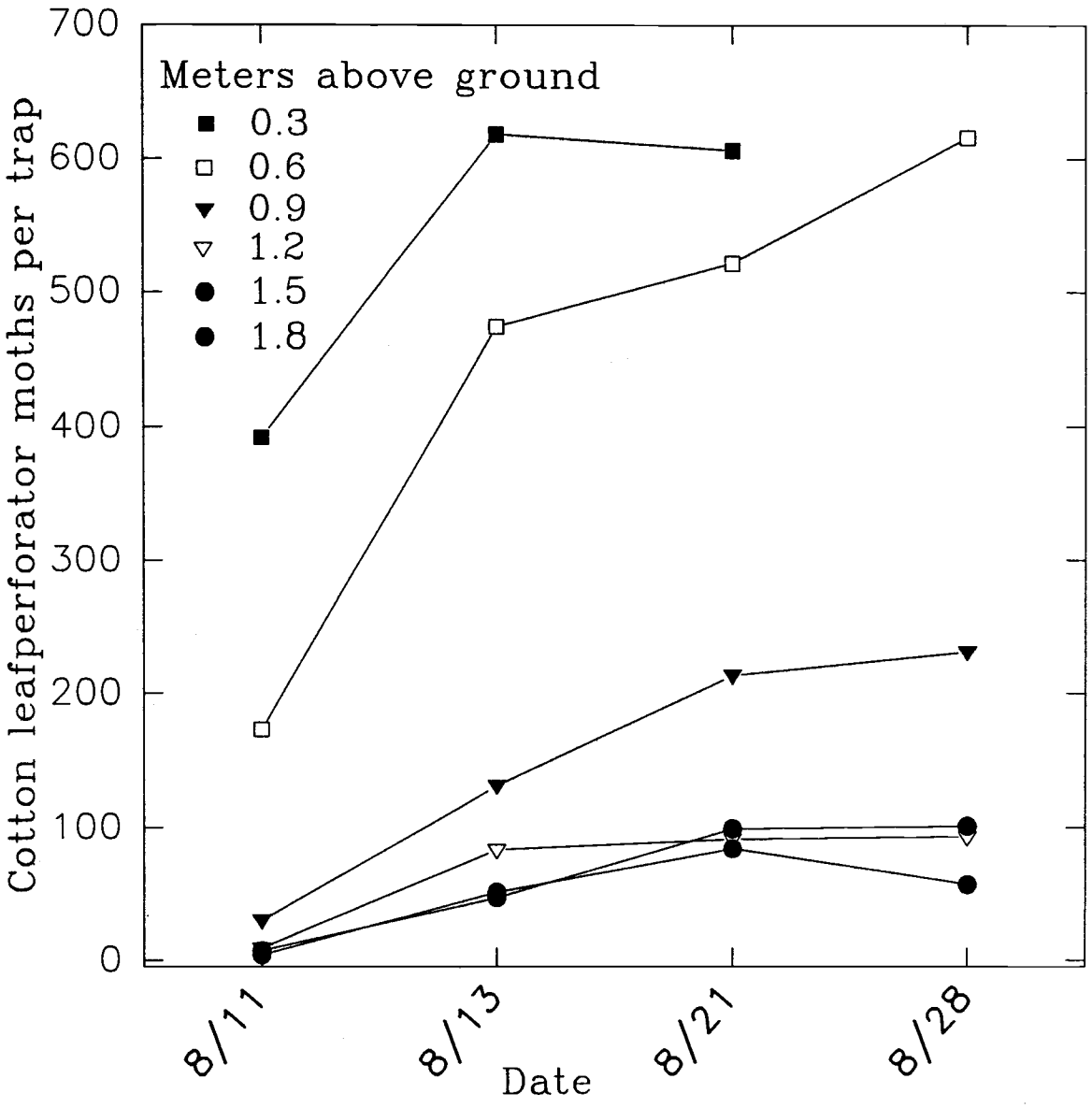

Fig. 3. Cotton leafperforator moths caught per trap at 6 heights above ground in delta traps 11 to 28 August 1992. Trap at 0.3-m levels was removed on 21 August.