Development of Pink Bollworm Populations in Field Cages Containing Deltapine Nectaried and Nectariless Cottons

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ABSTRACT

The development of populations of pink bollworm, Pectinophora gossypiella (Saunders) in 0.003 ha field cages containing 'Deltapine 61' (DPL-61) or a closely related nectariless cultivar 'Deltapine NSL' (DPL-NSL) was studied at the University of Arizona Maricopa Agricultural Center, Maricopa, AZ. Boll infestations were significantly lower in cages of DPL-NSL and total catches of moths in gossyplure-baited Delta traps at the end of the season were lower in these cages. The overall seasonal increases were 15.3-fold for DPL-NSL and 21.4-fold for DPL-61, a highly significant 29% reduction for DPL-NSL.

INTRODUCTION

The extrafloral nectaries of cotton contain nectar high in sucrose that are highly attractive to adult Lepidoptera (Rogers 1985). Cotton varieties without nectaries have significant reductions in boll damage (Wilson and Wilson 1976). Historically, tests of nectariless cottons have been conducted in fields or field plots in which the movements of pink bollworms were not controlled. We conducted the test reported here to assess the impact of the nectariless character on the biotic potential of the moth populations confined to either a commercial nectaried cultivar, 'Deltapine 61' (DPL-61) or a closely related nectariless cultivar 'Deltapine NSL' (DPL-NSL).

MATERIALS AND METHODS

Sixteen 0.003 ha, screen-covered, field cages were erected on 19 May over 4-row plots of DPL-61 or DPL-NSL on ground that had not been planted in cotton the preceding season. The cotton, planted 14 April, did not yet have susceptible squares. On 10, 20, and 26 June, we released 5, 10, and 10 pairs, respectively, of unfed, laboratory-reared, USDA-WCRL-strain moths in each cage.

The plants were observed for rosetted blooms between 27 June and 10 July, and samples of 25 bolls/cage were collected weekly from 16 June to 3 September (bolls incubated for 2 weeks and numbers of pin bollworms counted). On 9 September, a single Delta trap baited with gossyplure was placed in each cage and catches monitored 3 times per week until 15 October.

RESULTS

Averages of 6.9, plus or minus 3.7 (mean plus or minus S.D.), and 12.4, plus or minus 4.6, rosetted blooms were found in cages of DPL-NSL and DPL-61, respectively. The linear rate of increase per day of rosetted blooms was higher at the 10% level of probability for DPL-61. The seasonal average number of pink bollworms per 25-boll sample was 16.1, plus or minus 10.2, and 22.7, plus or minus 15.5, for DPL-NSL and DPL-61, respectively.

These infestations were not significantly different in a paired t-test, but DPL-NSL had significantly lower numbers of pink bollworms on 12, 18, and 21 August in comparisons by individual date. The linear rate of increase per day of pink bollworms in bolls was higher at the 10% level of probability for DPL-61 than for DPL- NSL. Averages of 390 and 525 males/cage for DPL-NSL and DPL-61, respectively, were collected in traps.

The average seasonal increase in moths in cages of DPL-NSL and DPL-61 was 15.3 and 21.4-fold, respectively, determined by dividing the total trap catch/cage by the 25 males released at the beginning of the season. This is a highly significant 29% reduction for DPL-NSL.

DISCUSSION

These data indicate that previously observed reductions in infestations in uncaged plots or fields of nectariless cotton could be due to reduction of the biotic potential of moths (antibiosis) rather than avoidance of these cottons by the moths [antixenosis).

LITERATURE CITED

Rogers, C. E. 1985. Extrafloral nectaries: Entomological implications. Bull Entomol. Soc. of Amer. 31:16-20.

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