Rationale for Sampling Pink Bollworm Eggs in Cotton Management Programs

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Summary

Management decisions for pink bollworm (PBW) control, based on larval infestation levels, are hindered by an inherent time lag between the period of increasing adult populations (primary target stage) and when treatments are actually applied (typically 6 to 10 days). It is suggested that this time lag is too long in many cases for optimal control; i.e., larval infestations may become well established between applications. An alternative approach based on monitoring PBW eggs laid on bolls is presented.

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The pink bollworm (PBW) adult is generally considered to be the stage most vulnerable to insecticides (e.g., Reynolds 1980). In mid- to late-season, eggs and larvae are usually protected from bracts of bolls (Henneberry and Clayton 1982a), and upon hatching, larvae can enter bolls within 20 minutes (McLaughlin 1972). Although the adult is considered the target stage, treatment decisions for PBW in mid- to late-season are typically based on larval infestation levels (Toscano and Sevacherian 1980).

Because larval infestations dictate when to treat (for adults), this management approach is hindered by an inherent time lag between the period of increasing adult populations and when treatments are actually applied. The time lag, of 6 to 10 days, results from at least four factors: (1) an adult preoviposition period of 1-2 days; (2) an average egg developmental time of 4 to 5 days; (3) the logistics of detecting larval infestations (small first-instar larvae) and applying a treatment; or (4) simply reflects the implementation of a 7 to 10 day spray schedule. Given the fact that females can lay approximately 85% of their total egg complement in 7 to 10 days (McLaughlin 1972), it is reasonable to assume larval infestations may become well established between applications.

An alternative method developed to decrease this time lag should: (1) provide a more recent index of moth activity; (2) allow for more timely treatment applications; and (3) thereby decrease the magnitude of subsequent larval infestations. Pheromone

(gossyplure) trap catches only reflect male moth dynamics and often provide inconsistent estimates of adult activity after insecticides are applied (Rice and Reynolds 1971, Flint et al. 1976, Henneberry and Clayton 1982b, Huber and Chesser 1984).

I have therefore investigated the possibility of monitoring PBW eggs as an alternative criterion for making treatment decisions. A PBW egg sampling plan, which has potential for field implementation, has been developed (Hutchison et al. 1986) and is summarized in the following article.

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A Presence/Absence Sampling Plan For Pink Bollworm Eggs in Cotton

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Summary

A new monitoring approach for the pink bollworm (PBW) was developed where only the presence or absence of one or more viable eggs/boll must be determined. Since individual eggs do not have to be counted, an experienced checker can examine a 25-boll sample in approximately 12 minutes. To use egg sampling for making treatment decisions, it is recommended that 3 to 4 25-boll samples be taken per field.

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Although the adult PBW moth is generally considered the target stage (see preceding article; Hutchison et. al. 1986), consultants must primarily rely on larval boll infestations to determine when to spray in mid- to late-season. This approach is hindered by a 6 to 10 day lag time between increasing adult populations and the detection of subsequent larval infestations. In this report we present a sampling plan for PBW eggs that provides a more recent index of moth activity and should allow for more timely treatment applications.

Methods

Data used to develop the egg sampling plan were obtained during 1984 from two untreated 0.87-ha fields of Deltapine-61 cotton located at Tempe and the Maricopa Agricultural Center. The Tempe