CLARIFICATION OF PEST STATUS OF THE RUTHERGLEN BUG AND THE GREY CLUSTER BUG ON COTTON

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Introduction

The rutherglen bug (RB, *Nysius vinitor* Bergroth) was considered a possible cause of damage to cotton (von Mengersen 1982; Adams and Pyke 1982). In particular, it was implicated as one of the insect pests causing damage in the cotton planting season of 1983-84 in N.S.W. (Anonymous 1983). Both the rutherglen bug and the grey cluster bug (GCB, *Nysius clevelandensis* Evans) were included in the sap-sucking bug complex that reputedly damages cotton in N.S.W. and Queensland. The damage caused by thirty-five rutherglen bugs/grey cluster bugs was considered to equal that caused by one green mirid (*Creontiades dilutus* Stål) adults (Adams *et al.* 1984).

Experiments were conducted to determine whether on cotton, RB and GCB were able to survive, develop and reproduce. Their ability to damage cotton was also assessed.

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Materials and methods

1. Laboratory trials

The experiments were performed in a controlled environment cabinet with a constant temperature of 28 ± 1°C and a 14L:10D photoperiod. The eight treatments were freshly-cut cotton tip plus water (T + W), freshly-cut square plus water (Sq + W), sunflower kernels plus water (S + W) water-moistened wettex (W), tip only (T), square only (Sq), sunflower kernels only (S) and blank (B).

In all treatments with plant parts were replaced every 3 d, except those with sunflower kernels which were replaced twice a week.

The containers used, as cages, were clear plastic cups, 5 cm high and 7.5 cm in diameter, with pin-prick perforations in the lids. In treatments that included moisture, a piece of wettex, 1 X 1.5 cm, was placed in the bottom of the cage. To keep plant parts fresh, the cut end of each stalk bearing a square or tip was push through a small hole at the bottom of the experimental container, then through a hole in the lid of a similar container that contained water.

The experiments were arranged in a completely randomized design.

Cotton tips were observed for insect damage, indicated by wilting. Squares were dissected under a microscope to observe internal damage symptoms.

Nymphs - survival and development

The experimental unit was six newly hatched nymphs per container, replicated 15 times. Daily observations on number of dead nymphs and those developed to adults were recorded.

Adults - longevity and fecundity

The experimental unit was one male and female which did not differ in emergence datc by more than a day. Sixteen replications were allocated. A small piece of cotton roll was provided as an oviposition site.

Mortality and number of eggs laid were recorded daily. All dead females were dissected under a microscope to observe the number of eggs that had developed in the ovaries.

2. Shaded-house and field trials

Experiments were extended to assess the ability of the bugs to damage growing cotton tips and squares.

The treatments comprised 30 adults or late instar nymphs, 50 adults or late instar nymphs and control, with five replications each. The artificial infestations were maintained for one week.

Seedling experiment in shaded-house

Ten first-two true leaf cotton seedlings were introduced into cages, 50 X 50 X 40 cm, with the appropriate number of insects. The number of wilted-tips was recorded daily after the artificial infestation.

Square experiment in field

Cotton terminals (c.a. each with 15-20 squares) were confined with fine mesh cloth cages, 40 cm in diameter. After the experiment squares were removed to detect the damage symptoms - necrosis and/or rotting of anthers, ovaries or staminal column, under a microscope.

Results

1. Laboratory trials

Nymphs - survival and development

All nymphs of RB and GCB that fed on Sq + W, T + W, Sq, T and W alone died within approximately 3.5 - 4 d and 1.7 d when provided with S or nothing (B) after hatching. Survival of nymphs was not significantly different among the treatments Sq + W, T + W, Sq, T and W ($P > 0.05$), and survival in these treatments was significantly longer than those groups provided with W or B ($P < 0.01$). In contrast, 57.7% of RB and 62.22% of GCB nymphs developed to adults when provided with S + W.

Adults - longevity and reproduction

Male longevity was similar to female longevity in any given treatments. Longevity was not significantly different among treatments T + W, Sq + W, S + W and W (21 - 24d); Sq and T (14d); S and B (6d) ($P > 0.05$). But longevity of the first group was significantly greater than the second group and the third group respectively ($P < 0.01$). Every female in S + W produced eggs, (average 198 eggs / ♀♀ RB and 144 eggs / ♀♀ GCB) while none did in the T + W, Sq + W, W, Sq, T, S and B treatments.

2. Shaded-house and field trials

Wilted-tips were not found in the seedling experiment, and necrotic- and/or rotting symptoms in anthers, ovaries and staminal columns in square experiment were not observed.

Discussion

Nymphs of RB and GCB require a seed source (e.g. sunflower kernels) and moisture for suvival and development. Moisture was essential for adult longevity, while a seed source was vital for reproduction. The results from RB confirmed the work done by Kehat and Wyndham (1972).

The inability of nymphs to survive and develop and adults to reproduce when fed on cotton only, as well as the absence of damage on tips and squares, RB and GCB can be excluded from the sap-sucking complex considered to be damaging to early-season cotton.

Acknowledgements

We gratefully acknowledge the support of the Cotton Growers Research Committee and thank Dr G.H. Walter for reviewing the manuscript.

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