SUMMARY

Development of a rearing technique for ADB

I developed a new rearing method to study the basic biology of ADB. Three methods were tested. The most effective rearing method was the culturing of ADB on cotton leaves and *Helicoverpa* spp. eggs in a small petridish. In this method over 60% of ADB's survived from nymphal stage to adult compared to the other methods where less than 40 per cent survived.

Species of apple dimpling bug found in cotton

Two species of apple dimpling bug, *Campylomma liebknechti* (Girault) and *C. seminigricaput* (Girault) were found in cotton growing areas of NSW during the study. Out of these two, only *Campylomma liebknechti* (Girault) was found to occur and cause damage in cotton.

Life cycle of ADB and description of different stages

ADB passes through an egg and five nymphal stages before becoming an adult. The females laid their eggs inside the plant tissues. The egg cap is left exposed for respiration purposes. Eggs took 5-11 days to hatch. The first instar nymphs were initially pale white in colour but gradually became pale to bright yellow as they mature. Wing pads developed at the third instar stage. The two distinguishing characters of ADB are dark spicules on the hind legs and dark brownish rings at the far end of second antennal segment. These characters were visible at the 5th instar stage. ADB males and females took 18.5 and 18.1 days respectively to develop from egg to adult stage. Females lived 4 days longer than males. ADB female can lay an average of 41.3±4.3 eggs in its life time. The peak oviposition period occurred between 6-10 days after emergence.

Temperature and ADB development

Temperature has profound effect on ADB fecundity and development. Laboratory experiments showed that fecundity and development increased with temperature until an optimum was reached, thereafter, fecundity and development slowed down and in some case caused mortality. The optimum temperature for ADB fecundity and development was 32°C. The threshold temperatures for egg and nymphal development was 9.2° and 12.1°C respectively.

Pest and predator status of ADB

Both adult and nymphs of ADB caused similar types of damage. However, the degree of damage caused by different ADB stages differ. The late stage nymphs, 4th and 5th instar stages caused more damage than the early stage/younger nymphs (1-3rd instar stage). ADB prefer to feed on growing parts of plants, particularly terminals and squares. Feeding on terminals and leaves caused characteristic blackening and curling of leaf margin at the feeding point. Field and glasshouse experiments showed that seedling damage by ADB did not cause yield loss but caused 4 to 5 days delay in boll maturity. ADB prefer to feed on very small squares. Their feeding can cause necrosis of the anthers and cause squares to shed particularly pin-head squares. The shedding of squares as a result of ADB feeding was dependent on square size, feeding frequency, duration and point of feeding.

Experiments showed that ADB need *Helicoverpa* spp. eggs for their development. The presence of *Helicoverpa* spp. eggs did not significantly reduce ADB feeding on cotton plants.

The economic threshold for ADB based on visual counting was determined in this study as 10 per metre row of cotton. ADB was found mostly in the upper halves (1 to 8 nodes from first unfolded leaf) of the cotton plant than the lower halves.

Population dynamics of ADB

A wide range of crops and weeds were identified as overwintering hosts for ADB. Field study showed a linear relationship between densities of ADB adults on overwintering hosts during spring and infestations on cotton during summer. There was no difference in the densities of ADB population on both Ingard® and conventional cotton. On both Ingard® and conventional cotton crops, ADB occurred mainly from seedling through to squaring stage. High temperature (>38°C) for few consecutive days and the use of synthetic insecticides to control *Helicoverpa* were the two most limiting factors for ADB population. Lucerne was found to harbour more ADB than any other available hosts.

Recommendations for Best Management Practices

1. Growers should not use synthetic insecticides against ADB at seedling stage
2. An economic threshold of 10 ADB per metre row and 50% fruit retention should consider deciding on ADB control.
3. Lucerne can be used as a trap crop for ADB.