Vegie bug biocontrol poised to strike

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A South American parasitic fly released into the northern cropping region in 1996 looks set to impact on green vegetable bug (GVB) populations in some cropping districts. Trichopoda giacomelli, a species from South America (Argentina), was released in 1996 by CSIRO and QDPI in north-west NSW (Moree) and in the Lockyer Valley and South Burnett (Kingaroy and Byee) in Queensland.

Stinkbugs, including GVB, are emerging pests of several crops. In cotton they cause damage to growing cotton bolls. The damage includes dull to shiny black spots on the outside of bolls, warty growths inside the carpels (boll walls) and discoloured lint (see The Australian Cottongrower July–August 2001, page 16).

GVB have been a problem in all summer cropping regions of the north. They have been particularly noticed in Ingard cotton, where the use of broad-spectrum insecticides to control Helicoverpa has been reduced.

The absence of effective natural enemies of large nymphs and adults further aggravates this situation. Although two species of Trichopoda (fly parasitoids of GVB) were introduced into Australia in the 1940s and 50s, neither species became established.

The establishment of this parasitoid in north-western New South Wales and coastal south-eastern Queensland has been reported, but establishment and subsequent parasitism levels in the South Burnett have yet to be reported. We conducted a survey from November 2000 to November 2001 in the South Burnett area on different plant hosts of GVB — including available wild hosts — to determine the extent of parasitism by this fly.

TABLE 1: Monthly parasitism of GVB by Trichopoda in the South Burnett

	% parasitism (no. collected)			
	Adult		Nymph	
October 2000	14.3	(7)	31.3	(16)
November 2000	25.9	(27)	5.6	(18)
December 2000	1.8	(55)	0	(18)
January 2001	0	(12)	0	(0)
February 2001	16.0	(12)	33.3	(90)
March 2001	38.8	(121)	0	(0)
April 2001	0	(5)	59.3	(7)
May–August 2001	0	(13)	0	(74)
September 2001	0	(10)	0	(15)
October 2001	0	(0)	0	(0)
November 2001	2.4	(42)	24.3	(107)

The Fly

T. giacomellii is a small fly about eight mm long. Males are yellowish brown with an orange abdomen and females are dark brown to black coloured. The fly attacks late instar (four and five instar) nymphs and adults of GVB, attaching small white eggs predominantly on the thorax and pronotum (just behind the head).

The eggs hatch out to larvae within two or three days. Larvae burrow into the bug and feed on its internal organs and body fluids. Within two weeks, final-instar larvae emerge from the host and pupate in nearby soil. The adult flies emerge from pupae after 15 days and live for a maximum of 10 days.

Parasitised fourth instar nymphs sometimes die before reaching the adult stage while parasitised fifth instar nymphs continue to develop to adults. But as parasite eggs are shed with the bug's skin during moulting, it is difficult to ascertain whether or not a bug has been parasitised. Egg maturation is suppressed in parasitised adults.

The reproductive ability of mature female bugs is reduced by 70 per cent during the period of larval parasitoid development. The adults, especially females, can survive for several weeks after the emergence of the parasitoid.

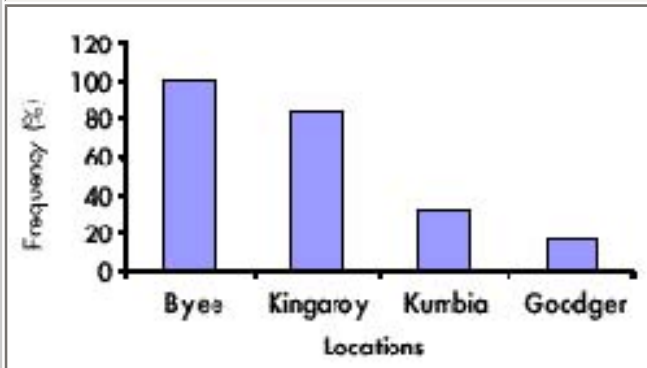
Extent of parasitism in the South Burnett

During 2001, both the parasitic fly and parasitised GVB were detected from Goodger and Kumbia, about 30 km from Kingaroy where the parasitoid was initially released. But the frequency of parasitoid detection was lower at Goodger and Kumbia than at Byee and Kingaroy (Figure 1).

The study has also shown that with rising temperatures in October, both GVB and Trichopoda start to breed. Breeding of the parasite continues through November and December (Table 1) before declining from January. GVB continue to breed, particularly in soybean.

This may be due to interference of pesticides sprayed in cotton and other summer crops, which may suppress parasitoid numbers. Further

FIGURE 1: Distribution of Trichopoda in different locations in the South Burnett region of south-east Queensland, October–November, 2001



A green vegetable bug adult with Trichopoda eggs on pronotum (behind head).

studies are needed to assess the impact of pesticides used in cotton systems on the parasitoid. The level of parasitism was greater where bugs were clumped on wild hosts, rather than spread throughout a crop.

Conclusion

The study shows that Trichopoda is well established and continues to spread in the South Burnett area. Since the parasitoid is very slow acting and GVB can live quite some time and continue to breed, even after parasitisation, any impact on overall GVB populations will only be noticed after a number of years.

But in the meantime research is needed to look at the effect of parasitism on GVB feeding on cotton bolls. Trichopoda should be considered for release in other cotton growing areas including the Namoi, Macintyre and Macquarie.

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