



A low cost bisexual food baited trap for *Bactrocera cucurbitae* (Coquillet) (Tephritidae: Diptera) in gourds

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ABSTRACT: A low cost fruit fly trap was designed to attract the fruit flies with food baits. The preliminary field experiments were conducted for selecting the food bait and its concentration. A combination of 30 g of banana pulp + 3 ml of food grade alcohol selected and tested in gourds namely snake gourd (*Trichosanthes anguina* L.), ridge gourd (*Luffa acutangula* L.) and bitter gourd (*Momordica charantia* L.) in Coimbatore and Dharmapuri. The food bait attracted both sexes of *B. cucurbitae* with female: male ratio 0.78:1 and the cost of trap and food bait costs only 43 rupees per acre. © 2018 Association for Advancement of Entomology

KEY WORDS: Low cost trap, food bait, para- pheromones, *Bactrocera cucurbitae*

Fruit flies (Diptera: Tephritidae) are important pests that may cause even up to 100 per cent yield loss in cucurbits. Among the fruit fly species, the melon fly, *Bactrocera cucurbitae* (Coquillet) infests over 70 hosts and it is the key insect species infesting snake gourd (*Trichosanthes anguina* L.), ridge gourd (*Luffa acutangula* L.) and bitter gourd (*Momordica charantia* L.), muskmelon (*Cucumis melo* L.) and snap melon (*C. melo* var. *momordica* L.). The control of fruit flies is difficult in small orchard and vegetable plots because of the constant immigration of flies from nearby areas (Mumford and Kalloo, 2005). The parapheromones viz., methyl eugenol and cue lure are the effective tool for the management of *B. dorsalis* and *B. cucurbitae* respectively. Since the parapheromones are sex biased, synthetic, posing problem in biodegradation (Sankaram, 1999) and not accessible to farmers due to high cost and/or lack of availability (Sookar

et al., 2002), there is a need for low cost fruit fly trap. The present paper deals with evaluation of the low cost fruit fly trap and food bait used in gourds in the field.

A low cost trap was designed to keep food attractants for attracting fruit flies in gourds. Two used plastic water bottle of 1 litre capacity were used. The bottle 'A' was cut at 23cm from top. The top portion served as fly collecting chamber. The bottom portion was given 6-8 entry holes for attracted flies. A square cut of 3 cm² foldable bait window was provided just above the entry holes to facilitate manual bait placement. The bottle 'B' was cut 10 cm from top. The top portion was inserted into the top portion of bottle 'A' and fastened using Fevicol SR® after placing the bottom portion of bottle A. The trap was closed with the lid after fastening with nylon wire to suspend the unit in the field. The

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whole set up measured 33 cm (Plate 1 and Fig. 1).

Food bait is kept inside the trap at the base plate using a spoon through the foldable window, which can be closed after keeping bait. The fly entry holes above the base plate allow volatile dispersion which results in attraction of fruit flies. The trap was tied in between the crops from the roof of the pandal with the help of wire at canopy level. Attracted fruit flies enter into trap via fly's entry holes and move into the transparent collecting chamber (which mimics the sky) through fly gate and get trapped (Plate 2). The traps were placed in field at the rate of 10 traps/ acre and fruit flies collected in the trap were killed within the trap by using chloroform/ ethyl acetate dipped cotton. Once all the flies died, flies were collected with the help of camel hair brush by removing lid and transferred to plastic tray with size 25 X 20 cm. The adults collected, were identified using taxonomical keys (David and Ramani, 2011) and counted and sexed on a daily basis and preserved. After a preliminary screening with other food baits including pumpkin, sapota, snake gourd for their attractiveness, a combination of 30 g banana pulp with 3 ml food grade alcohol was finalized. Traps were replaced with same composition of food bait for every 4 days (10-11 replacements for 45 days).

In large scale experiments at two locations @ 10 traps/acre, revealed that the combination of 30 g banana pulp with 3 ml food grade alcohol, attracted significantly more number (139.23 flies/trap/day) of *B. cucurbitae* in snake gourd and was followed by bitter gourd (135.42 flies/trap/day) (51.31 females

and 84.11 males) and in ridge gourd 133.44 flies/trap/day with 61.02 females and 78.21 males in Coimbatore. The highest female to male ratio was recorded in ridge gourd with 0.78:1. The combination significantly attracted more number of fruit flies in snake gourd ecosystem with 141.6 fruit flies/trap/day (56.16 females and 85.44 males) followed by bitter gourd, 139.33 flies/trap/day (55 females and 84.33 males) and in ridge gourd the catches were 137.66 flies/trap/day (55.56 females and 82.1 males) at Dharmapuri district. Maximum female to male ratio 0.67:1 was recorded in ridge gourd (Table 1).

The combination attracted 40% of female and 60% of male *B. cucurbitae* in gourds and has an added advantage that it lessens oviposition of female fruit flies on the fruits resulting in reduced egg load and lesser infestation. Fruit flies were attracted to banana because of its high sugar content (Bose and Mitra, 1990). Several workers reported the added effect of sugar/fermented sugar in food baits (Thomas and Mangan, 2005; Stone house *et al.*, 2007; McPhail, 1937; Jiji *et al.*, 2005).

The cost of methyl eugenol and cue lure per acre was Rs 450/- and Rs 600/- respectively, while the low cost trap and food bait cost was only Rs 43/- acre (Table 2). Further, the food bait based traps have competitive advantage of attracting both males and females as against only male counterparts in case of commonly available lures. Besides cost, the food bait based trap attracts the target species *B. cucurbitae* while paraperomones attract only *B. dorsalis* and *B. correcta* which are not the pest species of cucurbits. Thus the food based trap

Table 1. Field evaluation of banana pulp (30g) + food grade alcohol (3ml) attractant against fruit flies in gourds

Locations	Snake gourd				Ridge gourd				Bitter gourd			
	Mean no. of flies/trap/day				Mean no. of flies/trap/day				Mean no. of flies/trap/day			
	M	F	Total*	F:M	M	F	Total*	F:M	M	F	Total*	F: M
Coimbatore	85.43	53.80	139.23	0.62:1	78.21	61.02	133.44	0.78:1	84.11	51.31	135.42	0.61:1
Dharmapuri	85.44	56.16	141.6	0.65:1	82.1	55.56	137.66	0.67:1	84.33	55	139.33	0.65:1

M= Male, F= Female, *Mean catches from 10 traps

Table 2. Economics of commonly available parapheromonal traps versus food baited traps

Sl. No.	Particulars	Total cost (in Rs)		
		Methyl eugenol trap	Cue lure trap	Food baited trap
A	Cost of trap @ 6 nos./ acre	300	300	20*
B	Lure cost/ trap for 3 replacements from 45 DAS to 90 days.	150	300	33**
	Total cost/ac (A+B)	450	600	43

*Traps recommended at 10/acre;

** Food baits replaced once in 4 days necessitating 10-11 replacements

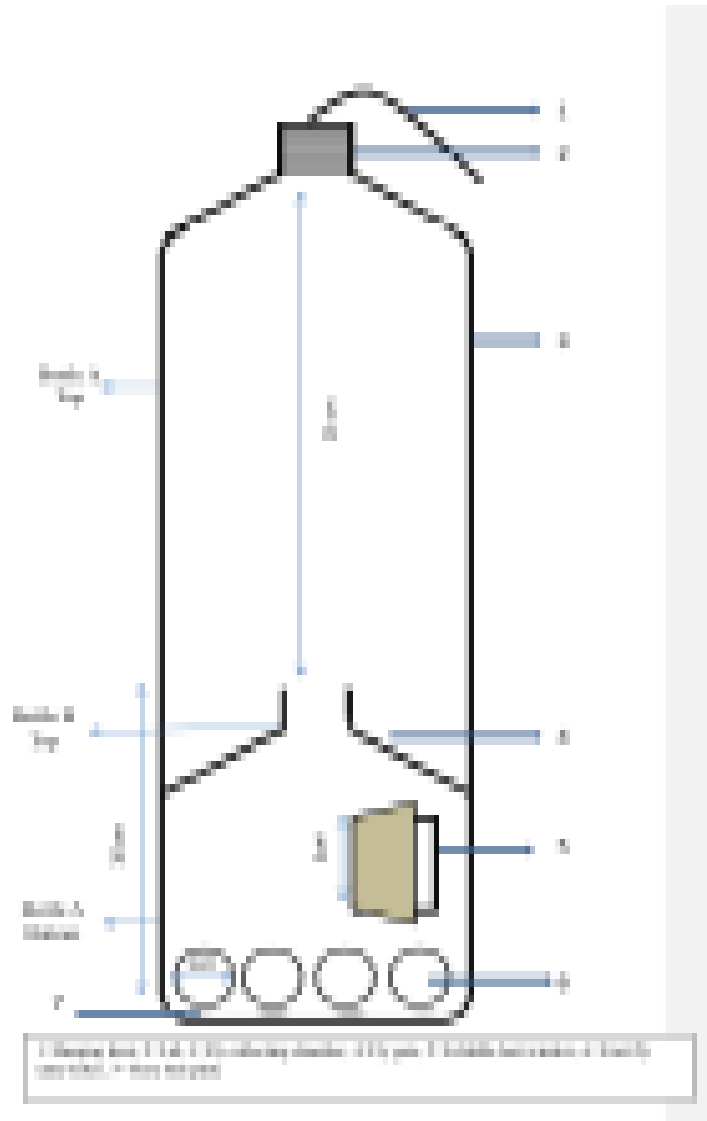


Fig 1. Design - low cost food attractant based fruit fly trap



Plate 1. Low cost fruit fly trap

banana pulp (30g) + food grade alcohol (3ml) suspended in used plastic bottles @10/acre is cost effective, attractive to both sexes and serve the real purpose of attracting the intended target pests.

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Plate 2. Fruit flies collection in the trap in the field

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