

# A biochemical method for the management of vegetable and mango fruit pests, *Bactrocera cucurbitae* and *B. dorsalis* (Diptera: Tephritidae)

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## ABSTRACT

A safe and ecofriendly approach to manage the vegetable and mango fruit pests, *Bactrocera cucurbitae* and *B. dorsalis* (Diptera: Tephritidae) is developed using crushed tulsi leaves. In the current scenario of increasing pest and disease problems affecting the agricultural crops, ensuring crop productivity and food safety through pesticide free cultivation practices is a real challenge. *B. cucurbitae* is a well known pest affecting a variety of vegetables such as cucumber species, bitter gourd, snake gourd, ash gourd, pumpkin, etc. and *B. dorsalis* affects mango. A simple mechanism using crushed tulsi leaves, *Ocimum sanctum* L. is found to attract the flies of *B. dorsalis*, if they are present in and around the vegetable and mango growing fields. The crushed tulsi leaves baited with a few drops of bygon bait solution, acts as a trap to attract and kill these flies. The great advantage of this trap system is that no pesticide is applied on to the vegetables and mango directly. This method ensures improved crop productivity and pesticide free vegetables and mangoes.

**Keywords:** *Bactrocera cucurbitae*, *B. dorsalis*, *Ocimum sanctum*, bygon bait

Farmers suffer huge economic loss each year in the cultivation of vegetable crops and mango due to the damage caused by the insect *Dacus cucurbitae* (Diptera: Tephritidae) [1-3]. The most affected plants are those belonging to the cucurbitaceae family, viz. *Mermodica charantia* (Bitter gourd), *Trichosanthes cucurmerina* (Snake gourd), *Cucurbita moschata* (Pumpkin), *Benincasa hispida* (Ash gourd) and *Cucumis melo* var. *conomon* (Cucumber). But it is observed that both these pest species show a very strong attraction towards crushed thulasi (*Ocimum sanctum*). This short communication examines the feasibility of using this technique to control these insects [3-5] with the objectives to manage *B. cucurbitae* and *B. dorsalis* populations well before the vegetable crop flowers and fruits initiation occurs, production of pesticide free, safe vegetables and mango fruits, and to study how long each trap remain effective to attract the flies.

To prepare a tulsi leaf trap, collect a bunch of tulsi leaves (*O. sanctum*), and crush them into a paste form. Prepare the bait solution by adding half table spoon (5 g) of bygon bait in to 100 ml of water and stir well till it is fully dissolved. This is the stock pesticide solution. Keep it in a bottle. Add a few drops of this solution to the crushed tulsi leaves and mix it thoroughly. This baited crushed tulsi leaves become a trap to attract and knock down *Dacus* flies [4-7]. Prepare sufficient number of such traps. Two to four traps will be sufficient for one hectare area. Keep these traps at different location within the vegetable growing area or mango plantation. In the case of vegetables, this should be done well before the flowering and early fruit setting begins. In case of mango, the traps may be kept ready around the mango tree at the ground level, by the time the mango starts

maturing. To find out the duration of effective functioning of each trap, three sets of traps were prepared and observations taken. Each set consists of sixteen numbers of traps. The first set kept for two days, second set for four days and third set for 8 days. The number of *Dacus* flies attracted and killed in each trap were recorded every day. These data were used for the evaluation of the effective functional period of each trap [8,9].

The data generated were tabulated and analyzed (Figure 1, 2 and 3). The data from all three sets showed good fly catch in the early days and the number of flies attracted and knocked down reduced day by day. All the traps worked effectively in the early days. The more the numbers of traps kept, the more will be flies attracted and removed (killed) from the ecosystem. Thus farmers can ensure the protection of their crops from these *Dacus* flies and can expect an enhanced yield. The very specific nature of this pest eradication mechanism is notable since no other insect species or animals and human beings were found to be affected by these traps, and no pesticide pollution of the ecosystem. The tulsi leaf traps could be used for the safe management of the vegetable and mango pests, *B. cucurbitae* and *B. dorsalis*. No direct application of the pesticides to the crops is needed in this method and thus it is an eco-friendly method for the management of the pests. Productivity could be increased by managing these pests well before the each vegetable crop start flowering and young fruits are formed.

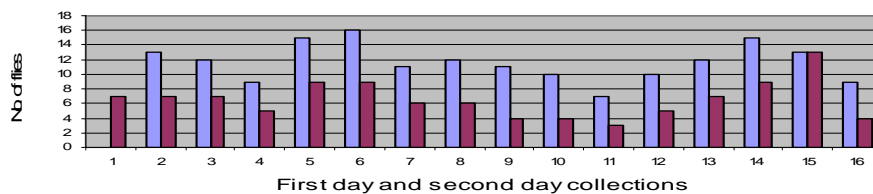


Figure 1. *B. cucurbitae* flies trapped from Bitter gourd cultivated plots at Amballur using baited tulsi traps which were replaced on every 3<sup>rd</sup> day.

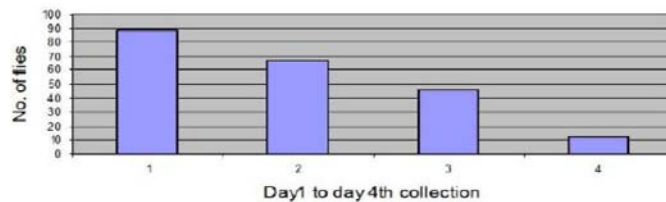


Figure 2. *B. cucurbitae* flies trapped from Bitter gourd cultivated plots at Amballur using baited tulsi traps which were replaced on every 5<sup>th</sup> day.

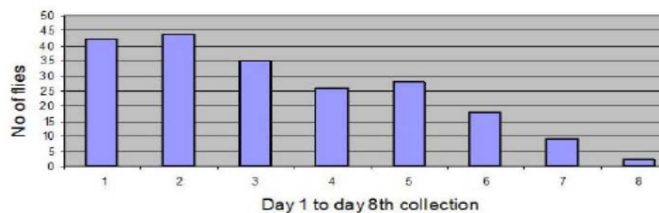


Figure 3. *B. cucurbitae* flies trapped from Bitter gourd cultivated plots at Amballur using baited tulsi traps which were replaced on every 9<sup>th</sup> day.

Thus, farmers can apply this bio-chemical eco-friendly method and enhance the productivity of both vegetables and mango fruits. Ensuring the availability of tulsii plants can ensure better productivity of these crops. The greatest strength of this technique is its simplicity and cost effectiveness. Further work is needed to extract the chemical compound responsible for this attraction and utilizing it for effective pest management. The essential oil found in the tulsii leaves (methyl ethanol) is the main ingredient that attracted the *Dacus* flies. Isolation of methyl ethanol from tulsii leaves or the use of synthetic methyl ethanol as a pheromone trap may attract more *Dacus* flies. This need further detailed investigations.

## REFERENCES

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