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Pattern Based Control of *Musca domestica* using Pheromones

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ABSTRACT

Field trials investigating the effect of visual cues on catches of Musca domestica (Diptera: Muscidae) at toxic targets impregnated with the female sex pheromone (Z)-9-tricosene, were conducted in a dairy and Livestock farm of Tiruvarur district . trap contain four different pattern viz longitudinal, Vertical, Spaced spots, Clustered spots were used . Maximum number of flies caught in horizontal pattern followed by clustered spot, vertical, regular spot . Flies got stuck in the glue immediately and were unable to fly again because the wings and legs were firmly trapped in the glue. The flies ultimately died after a short struggle Significant difference in the number of flies was observed in Z-9-Tricosene treated traps when compared to control traps without (Z)-9-Tricosene thus indicating the effectiveness of (Z)-9-Tricosene as an efficient lure in attracting house flies so that eco friendly pheromone based traps can be used in house fly control strategies as part of integrated pest management strategies.

Key words: *Musca domestica, Z- 9 tricosene, Horizontal pattern, Vertical pattern, Regular spaced pattern, Clustered pattern*

INTRODUCTION

Musca domestica (House fly) is widely regarded as important pest species because of its close association with human settlement and habit of breeding in waste. These flies cause economic loss in dairy and poultry industry by causing fly worry and they reduce egg quality by causing fly specks. Huge fly populations also interfere with the routine farm work like feeding, milking etc. House flies are strongly suspected for transmitting at least 65 diseases to humans, including cholera, typhoid fever, dysentery, poliomyelitis, anthrax, tularemia, leprosy and tuberculosis. In addition, they also act as intermediate host for various helminth parasites affecting animals apart from acting as mechanical vectors[1]. For many years effective control was achieved using contact insecticides applied by spraying. However, this approach has resulted in the widespread development of insecticide resistance[3,7,8]. One of the alternative environmental friendly methods of controlling house flies is by using pattern based pheromones. In the present study we investigate the efficacy of Z-9 tricosene for the management of House flies in Livestock and Poultry farms.

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MATERIAL AND METHODS

The field study was conducted on Dairy and Poutry farms of Tiruvarur District. The traps were set up in the farm where there was high fly activity. The plywood sticky trap was designed by following[6], with slight modifications. Plywood board of 15 cm length, 5 cm width and 2 cm thickness was used to prepare traps. Four different patterns (longitudinal, Vertical, Spaced spots, Clustered spots) were first fixed on the surface of the board. Over the pattern transparent polythene sheet was fixed using pins. Rat glue was then smeared over the transparent polythene sheet to a thickness of 0.5 mm. The synthetic female house fly sex pheromone (Z)-9-Tricosene (Sigma Aldrich) was used in the study. 50 µl of (Z)-9-Tricosene was mixed with 1,000 µl of acetone before application. A filter paper strip (3x3 cm) was fixed at the centre of the trap and the (Z)-9-Tricosene and solvent mixture was pipette on to the filter paper before keeping in livestock and poultry farms. Trap were kept during the day time and removed during night time. Flies caught in the trap were counted and recorded. New sheets were fixed for new experiments.

RESULTS

Trap contain Glue + Z-9 tricosene with Horizontal pattern caught maximum number of house flies followed by Glue + Z-9 tricosene with clustered spotted pattern, Glue+ Z-9 tricosene with vertical line, Regular spaced spot. Number of flies caught in each trap give in table (1) . Total number of flies caught in trap given in table (2). more number of flies caught in poultry shed followed by dairy farm. A total of 2696 flies caught in trap depicted in fig (1) . The increase in total catches of Musca domestica elicited by Z-9 tricosene was typically 2-3 times greater than control groups.

Number of *Musca domestica* flies caught in each trap with percentage in parenthesis

Location	Clustered Spot	Regular spot	Horizontal Line	Vertical Line
Poultry Shed	440(27%)	242(15%)	555(34%)	382(24%)
Dairy farm	287(27%)	178(17%)	381(35%)	231(21%)

Total number of flies caught in each trap

Target	Total number of flies caught
Clustered Spot	727
Regular spot	420
Horizontal Line	936
Vertical Line	613
	2696

Fig. 1: House flies trapped in sticky trap

Row1: Clustered Spot, Regular Spaced Spot, Horizontal line,Vertical line as control group
Row 2: Clustered Spot, Regular Spaced Spot, Horizontal line,Vertical line with Z-9 tricosene

DISCUSSION

A newer environmental friendly low cost technique to control the house flies in the farm will reduce the loss and increase the profit. This study is conducted to evaluate the efficacy of Z- 9 Tricosene . Efficacy of Z-9-Tricosene based targets have been studied by several researchers. Z-9-Tricosene baited targets made of plywood for control of house fly in outdoor situations was evaluated Hanley *et al*[6] and observed that more number of flies were attracted towards Z-9-Tricosene based targets compared to controls. Visual responses of *Musca domestica* to Z-9-Tricosene impregnated traps in poultry units was also studied by Chapman *et al*[4].

It was concluded that addition of Z-9-Tricosene beads to plywood consistently produced significantly greater catch rates of *Musca domestica* than control traps. Evaluation of rats glue to trap *M. domestica* was studied by[5] and found that rat glue was effecting in trapping house flies.

In the present study also rat glue proved to be an excellent trapping agent. Evaluation of rat glue to trap *Musca domestica* was studied by Butler *et al*[2] and results revealed that rat glue was effecting in trapping house flies. The results obtained in the present study is also in accordance with the findings of the above authors and suggest that Z-9-Tricosene based traps can be effectively used to control house flies. This will significantly help to reduce the usage of insecticides and thereby can be one of the environmental friendly methods in controlling house flies.

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