

Impact of Coloured (Z)-9-Tricosene Treated Traps on *Musca Domestica* and Non-Target Flies

S.T. Bino Sundar¹, A. Sheeba, Bhaskaran Ravi Latha, T.J. Harikrishnan and A. Serma Saravana Pandian

Department of Veterinary Parasitology, Madras Veterinary College, Chennai-600 007.

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Abstract

A study was undertaken to find out the impact of background colours on trap catches of house flies and non-target flies with (Z)-9-tricosene treated glue traps. Three species of flies viz., *Musca* sp., *Chrysomyia* sp. and *Sarcophaga* sp. were trapped. Green coloured traps were found to attract the maximum percentage of flies followed by white, yellow and blue. Out of the 8580 flies trapped, 3494, 2235, 2064 and 787 flies were trapped in green, white, yellow and blue coloured traps, respectively. Statistically significant difference in catch rates were noticed in (Z)-9-tricosene treated traps compared to controls irrespective of colour.

Key words: (Z)-9-tricosene, colours, house flies

The house fly, *Musca domestica* is a common nuisance fly in animal houses, poultry sheds, dog kennels and households. Apart from the irritation and nuisance, they transmit bacterial, viral, protozoan and helminthic diseases in animals and man. They act as intermediate hosts and mechanical vectors for various helminthic diseases. Traps play a vital role in control of house flies. Pheromones like (Z)-9-tricosene in traps greatly increase the trap catches (Hanley *et al.*, 2004). The present study evaluated the impact of different colours in sticky traps with (Z)-9-tricosene lures on *Musca domestica* and other non-target flies.

Materials and Methods

Traps were fabricated by smearing rat glue evenly over transparent polythene sheet for a thickness of 1 mm pasted on different colour shades on plywood boards. The synthetic female *M. domestica* sex pheromone (Z)-9-tricosene

(50 µl, Sigma Aldrich) was dissolved in 1000 µl of acetone and applied on a filter paper strip (2 X 2 cm) fixed at the middle of the trap. Eight such traps were prepared for each trial and six replicates were made. In control traps, acetone was added. The traps were prepared, labeled and randomly kept in a garbage dump where house flies and blow flies were abundantly found. The traps were kept for 12 hours from 6 AM to 6 PM and trap catches were counted. Polythene sheet was replaced for each replicate. Traps were randomly placed and position was changed each trial to avoid position bias. Identification of trapped flies was done based on Soulsby (1982). Statistical analysis was done by using Chisquare test.

Results and Discussion

Three species of flies viz., *Musca*, non-target flies *Chrysomyia* and *Sarcophaga* were trapped. Out of the 8580 flies trapped, 8468 were *Musca* sp. (98.69%), 95 were *Chrysomyia* sp. (1.10%) and 17 were *Sarcophaga* sp. (0.19%). Among the total flies, 3494 (40.72%) were trapped in green, 2235 (26.04%) in white, 2064 (24.05%) in yellow and 787 (9.17%) in blue coloured traps irrespective of the addition of (Z)-9-tricosene and this was found to be highly significant ($\chi^2=2286.64^{**}$). (Table I, Fig 1). In traps treated with (Z)-9-tricosene, the highest preference was towards green followed by white, yellow and blue and this preference was similar in control traps as well. This order of colour preference was found to be highly significant in (Z)-9-tricosene treated traps followed by control traps. Significant difference was observed in the total number of house flies caught in traps treated with (Z)-9-tricosene and controls irrespective of colours (5186 vs. 3282 flies). Similar findings were also made with

¹Corresponding author : Email : binosundar.s.t@tanuvas.ac.in

Table I. Effect of (Z)-9-tricosene (Z9T) treated and control traps in different colours on flies

Colour of trap	Musca sp.		Sarcophaga sp.		Chrysomyia sp.		Total
	No.	%	No.	%	No.	%	
Control							
Yellow	758	23.09	0	0	9	37.50	767
Green	1400	42.65	1	33.33	1	4.16	1402
Blue	290	8.83	0	0	10	41.66	300
White	834	25.41	2	66.66	4	16.66	840
Total	3282	99.29	3	0.07	24	0.62	3309
Treatment (Z9T)							
Yellow	1270	24.48	7	50.00	20	28.16	1297
Green	2075	40.01	4	28.57	13	18.30	2092
Blue	470	9.06	0	0	17	23.94	487
White	1371	26.43	3	21.42	21	29.57	1395
Total	5186	98.38	14	0.26	71	1.34	5271
Overall total flies	8468	98.69	17	0.19	95	1.10	8580

Overall preference of flies to different colour traps: $\chi^2=2286.64^{**HS}$

Colour preference in (Z)-9-tricosene treated traps compared to control: $\chi^2=1311.33^{**HS}$

Overall preference of flies to different coloured Z9T and control traps: $\chi^2=7.22^{*S}$, 15.51^{**HS} , 4.65 and 5.03, respectively for green, blue, yellow and white colours

respect to non-target flies viz., *Sarcophaga* sp. (14 vs. 3 flies) and *Chrysomyia* sp. (71 vs. 24 flies). Overall, (Z)-9-tricosene treated traps and control traps lured 61.43 and 38.56% flies, respectively (Table I).

In (Z)-9-tricosene treated as well as control traps, statistically significant differences was observed only in green and blue colours ($\chi^2=7.22^*$ and 15.51^{**} , respectively) and not with yellow and white. Influence of trap colour on (Z)-9-tricosene treatment with respect to fly species trapped indicated that there is no statistically significant difference between the treatment and control revealing the fact that colour has more influence over pheromone treatment in attracting flies towards traps. χ^2 values of *Musca* sp., *Sarcophaga* sp., *Chrysomyia* sp. and overall flies were 5.98, 3.24, 6.06 and 6.28, respectively.

Colour preference in house flies vary based on locality, environmental temperature and various time periods of the day. Results of

the present study revealed green and blue to be the most and least preferred colours, respectively. Similar observations were made by Fatah (2012) where green was preferred to yellow and white. Geden (2005) found blue colour attracted significantly more number of flies compared to white colour which is in contrast to the present findings where white was preferred over blue. Hanley *et al.* 2009 opined that trap colour has no significant effect on house fly catches. In the present study a clear preference for colour was observed. Although pheromone traps caught more flies than controls, the pattern of colour preference was similar indicating that flies tend to prefer colours irrespective of pheromone, but addition of pheromone has a positive impact in attracting more flies and significantly increase the trap catches.

Efficacy of (Z)-9-tricosene based traps have been studied by several researchers. (Z)-9-tricosene baited targets made of plywood for control of house fly in outdoor situations was

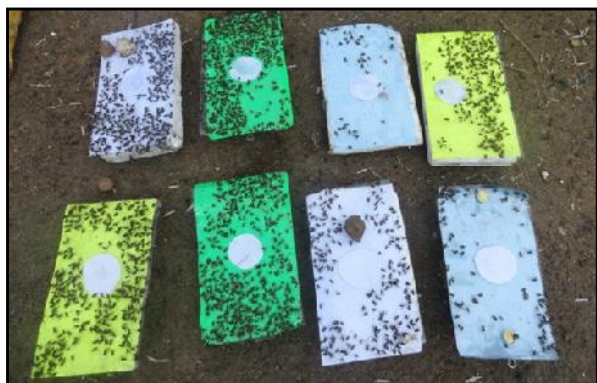


Fig 1. Flies trapped in various coloured traps

evaluated by Hanley *et al*, *loc cit*, who observed that more number of flies were attracted towards (Z)-9-tricosene based targets compared to controls. Effect of (Z)-9-tricosene in attracting house flies has been proven by studies conducted by Butler *et al*, 2007, Chapman *et al*, 1998, Chapman *et al*, 1999 and Butler and Mullens (2010). The results obtained in the present study is also in accordance with the findings of the above authors and suggest that (Z)-9-tricosene can be effectively used to attract house flies and non-target flies towards traps. Addition of green colour to traps along with pheromone can help to lure more number of flies towards traps and can be used effectively to control flies.

Summary

Glue traps with green colour were found to attract maximum number of flies followed by white, yellow and blue. Three species of flies viz., *Musca* sp., *Chrysomya* sp. and *Sarcophaga* sp. were trapped. Order of preference was similar in (Z)-9-tricosene baited traps as well

as control traps. However, statistically significant differences in catch rates were observed in (Z)-9-tricosene treated traps compared to controls.

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