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EVALUATION OF DIFFERENT COLOUR STICKY TRAP ON MASS TRAPPING OF ONION THRIPS *Thrips tabaci* (Lindeman)

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ABSTRACT

Onion, *Allium cepa* L., is one of the most important vegetable crops in India. The various insect pests attack on different growth stages of onion. Among the insect pests, *Thrips tabaci* (Lind.) is one of important pest attack in all stages of crop growth. On the other hand, famers use large quantities of synthetic chemical insecticides singly or in combination to get good yield. This practice of indiscriminate use of insecticides and calendar based application leads to build up of pesticide residues in the produce, destruction of beneficial insects, pest resurgence, pesticide exposure to farm workers, environmental contamination, bioaccumulation and biomagnifications of toxic residues and disturbance in ecological balance. Therefore, to overcome insecticides mediated environmental problems and calendar-based application an effective and safer method of pest management should be identified. The aim of the present research was to determine the efficiency of effective sticky boards for a systematic thrips control in onion crops. Suitability of coloured sticky boards for monitoring thysanoptera species is a common knowledge the experiments results shows that the efficacy of mass trapping of five different colours of sticky trap *viz.*, green, yellow, orange, violet and white. Among this sticky board Green colour sticky boards were found effective in attracting thrips (16.88 thrips/board) than yellow (11.27 thrips/boards), violet, orange and white were found on par with each other (3.65, 3.02, 2.53 thrips/board) respectively.

KEYWORDS: Onion, *Thrips tabaci*, Sticky Trap, Mass Trapping

INTRODUCTION

Onion thrips, *Thrips tabaci* Lindeman (Thysanoptera: Thripidae) is a polyphagous pest that causes serious damage on vegetables and ornamentals all over the world (Murai, 2000), its population usually high on plants from the Alliaceae family, especially on onion (*Allium cepa* L.). The nymphs and adults feed mostly on green leaf tissue, causing direct damage by destroying epidermal cells. They feed by piercing the surface tissue and imbibing exuded cellular contents. The empty cells on attacked plants create silvery-white spots, referred to as silver damage, that make the plants less marketable (Koschier *et al*., 2002). Srinivas and Lawande (2004) reported that *Thrips tabaci* could cause yield loss in the range of 46-87 % in onion, while Mohite *et al*. (1992) estimated the loss to be around 50 % in that crop. Onion thrips are also an important vector of several plant viruses such as tomato spotted wilt virus (Kritzman *et al*., 2002; Jenser *et al*., 2003), tobacco streak virus (Sdoodee and Teakle, 1987) and soybean mosaic virus (Hardy and Teakle, 1992). In addition to this thrips were also recognized as a transmitter of a tospovirus, Iris yellow spot virus (IYSV) (Doi *et al*., 2003).

In most of the target crops, use of synthetic pesticides is the most commonly used option for controlling thrips. The concealed habit, smaller size, cryptic nature and rapid reproduction necessitate frequent applications of chemical treatments. These treatments cause residue and insecticide resistance problems, which are costly and undesirable with regard to risk to operators, livestock and non-target organisms (Maniania *et al*., 2003). Increasing public concern about environmental hazards, wide spread resistance in pest populations and their possible negative impact on the ecosystem threaten the continued use of conventional insecticides (Babu *et al*., 2001). Under this situation, the use of Integrated Pest Management (IPM) rather than unilateral reliance on synthetic insecticides would be a better option for managing thrips population. The use of sticky trap for early monitoring of thrips could be an important component of IPM (Maniania *et al*., 2003). Therefore, to overcome insecticides mediated environmental problems and calendar-based application an effective and safer method of pest management should be identified for following objective

- To evaluate the efficacy of various colour sticky traps against onion thrips *Thrips tabaci.*

MATERIALS AND METHODS

Raising of Onion

Onion (variety: Co-l) was raised in slab pots of size 10x10 in the pot culture yard of Department of Entomology Annamalai University. The spacing of 15cm between the rows was followed while planting. Regular watering and fertilizer applications were done.

Preparation of Sticky Colour Board

Five different colour boards *viz.* green, yellow, orange, violet and white were prepared by affixing colour paper sheets lined with thin polythene layer on both the sides of cardboards of size 15cmxl0cm. Then cardboards were fixed on wooden reaper (1' length).

Fixing of Boards

The total cropping area was divided in to five plots (2' x 2') and at the centre of each plot one board was fixed. Three replications were followed. A control was also maintained separately. The boards were fixed on 25st day of the crop when the symptoms observed uniformly in all replications.

Recording of Data

Once in 3 days, number of thirps stuck on the coloured surfaces was counted using 1 Ox hand lens. After taking counts, the boards were smeared with new sticky material (castor oil) and then fixed. Ten counts were taken during the cropping period and the cumulative data were analyzed statistically.

RESULTS AND DISCUSSIONS

Present investigation was undertaken to study the mass trapping of five different colours of sticky trap *viz.*, green, yellow, orange, violet and white. Among this sticky board green colour sticky boards were found effective in attracting thrips (16.88 thrips/board) than yellow (11.27 thrips/boards), violet, orange and white were found on par with each other (3.65, 3.02, 2.53 thrips/board) respectively. Our results are in corroboration with the findings of Alex harman *et al.* (2007), who identified that green traps are useful in Adult bean thrips, *Caliothrips fasciatus* (Pergande) management on citrus in Australia.

Past studies on the attractiveness of different coloured trap cards to other species of thrips have yielded varying results. Hoddle *et al*. compared blue, yellow and white cards for their efficacy in trapping avocado thrips (*Scirtothrips perseae* Nakahara), western flower thrips [*Frankliniella occidentalis* (Pergande)] and a principle predator of avocado thrips, *Franklinothrips orizabensis* Johansen. They found yellow cards to be most attractive to *S. perseae*, and white cards to be most attractive to *F. occidentalis* and *F. orizabensis*. White traps also proved more effective than yellow, red or orange traps at attracting *Frankliniella bispinosa* (Morgan) in Florida citrus groves. However, Chen *et al*.17 caught significantly more *F. occidentalis* on blue traps than on yellow or white traps in greenhouse experiments, and Chu *et al*.18 found 'true blue' and white to be the most effective of nine colours (white, rum, red, yellow, lime green, spring green, woodland green, true blue and black) at trapping the same species in fields of several different crops in the southwestern USA, India, and China. Complicating matters, *F. occidentalis* has shown differential attraction to colour, depending on sex, whether or not thrips are engaged in swarming behaviour associated with mating19 or time of year.

Green colour sticky boards were found effective in attracting thrips than yellow boards. Violet, orange and white were found on par with each other. Our results are in corroboration with the findings of Alex harman *et al.* (2007), which identified that green traps are useful in Adult bean thrips, *Caliothrips fasciatus* (Pergande) management on citrus in Australia. Ananthakrishnan and Sen (1980) who reported that yellow and white boards were effective in attracting thrips.

CONCLUSIONS

The Green colour sticky boards were found effective in attracting thrips than yellow boards. Violet, orange and white were found on par with each other. The utilization of Sticky trap with integrated pest management (IPM) techniques Could provide satisfactory environmentally safe, effective control and early monitoring of thrips for maximize the yield in onion.

Table 1: Number of Thrips Attracted Towards Different Coloured Sticky Boards

Treatment	*Mean Number of Thrips / board										Cumulative Mean
	1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	
Green	6.2	8.1	10.2	15.3	14.5	18.1	23.2	24.2	20.1	28.9	16.88 (4.43)[a]
Violet	2.1	3.2	3.1	4.2	2.1	2.8	3.4	6.3	4.6	4.8	3.65 (1.93)[c]
Yellow	7.2	8.6	6.2	10.3	12.2	10.2	12.6	16.1	13.2	16.1	11.27(3.26)[b]
Orange	3.4	4.4	2.1	1.6	3.5	2.7	2.3	2.3	3.4	4.5	3.02(1.73)[c]
White	11.1	0.0	2.4	0.0	1.6	2.4	1.3	0.0	3.2	3.3	2.53(1.54)[c]
									CD	(0.05)	0.962

***mean of three replications**
***values in parenthesis are square root transformed.**
***values with different alphabets differ significantly**

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APPENDICES

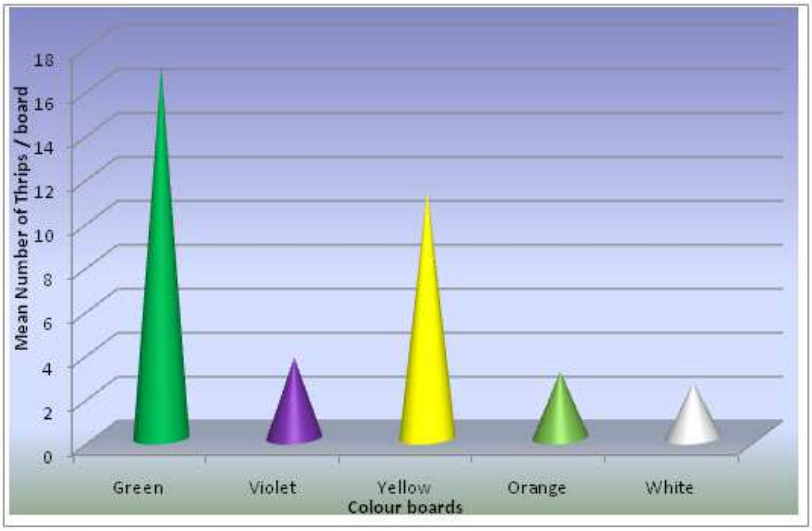

Figure 1: Mean Number of Thrips Attracted towards Different Coloured Sticky Boards