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Bio-Efficacy Of Attraps-All Rounder Against Watermelon Sucking Insects And Fruit Fly.

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Abstract:
The evaluation of Bio-efficacy of chromatic, pheromone and composite insect attractants is conducted, on watermelon crop under cultivation, in a greenhouse, located at Al-Dhaid, Sharjah, UAE.
a) A Yellow Sticky Trap b) The conventional dome shaped Methyl eugenol pheromone trap and c) a Novel Trap (Sticky glue, Methyl eugenol and Yellow colored Aerosol Composite) namely "aTTraps-All Rounder" Trap are studied for comparison of their insect trapping ability in watermelon crop.
We have noted that the Yellow sticky trap attracted 23 insects, conventional dome shaped pheromone trap captured total 15 insects, and the novel "aTTraps-All Rounder" trapped 106 insects after 15 days on installation It is observed that aTTraps-All Rounder acts fastest and is the most versatile insect attractant as compared to the chromatic and the conventional dome shape pheromone traps. Thus it proves to be useful tool for mass trapping of fruit fly as well as sucking insects like thrips, aphids, whitefly and jassids.
Keyword *– Novel insect trapping, Innovative pheromone trap, Versatile Insect trap, Pheromone trap, mass insect trapping, IPM, insecticide free pest management, sticky trap, pesticide free crop management.*

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I. Introduction:

Insect pests pose a significant threat to agriculture output worldwide, causing substantial losses in crop production each year. These pests can damage crops by feeding on plants, spreading diseases, and reducing the overall quality of the harvest (Arora R, Dhaliwal GS (1996).

The economic impact of insect pests on agriculture is staggering, with billions of dollars lost annually due to diminished crop yields and the need for expensive pest control measures (Atwal AS, 1986).

Farmers often have to invest in pesticides, insecticides, and other insecticide free pest management strategies to protect their crops from these destructive insects. Integrated pest management techniques, which combine biological, cultural, and chemical control methods, are increasingly being used to minimize the reliance on chemical usages and reduce the environmental impact of pest control (Atwal AS, 1986).

Agricultural losses due to fruit flies is a significant concern for farmers around the world. Fruit flies are pests that lay their eggs in ripening fruit, leading to infestations that can cause fruits to rot prematurely and become unsellable. These losses have a significant negative impact by shrinking farmers' incomes and also reducing the overall supply of fresh produce in the market (Steiner LF, 1952).

In addition to fruit fly, infection of sucking insects like thrips, aphid, jassid, whitefly can cause heavy damage to crops. Various pesticides are being used to control sucking insects. But still these insects manage to devour and damage substantial quantity of crops and cause economical loss to farmer. Chemical insecticides also trigger insect resistance resulting in negating the effect of the pest control (Arora R, Dhaliwal GS (1996).

To combat fruit fly and sucking insect infestations, farmers often use integrated pest management techniques such as trapping, baiting together with the application of insecticides (Tan KH and Nishida R. 2012) and (Agrawal N, Deepa M.2013)(Nagaraj K et al 2014). Methyl eugenol has proved to be very successful active ingredient (pheromone) across the globe for control of fruit fly (Steiner LF, 1952).

Yellow sticky traps are used for sucking insect trapping and monitoring (Lu Y, Bei Y, Zhang J. 2012 and Thein Mu, Jamjanya T, Handboonsong Y.2011). These chromatic traps can attract and trap multiple types of sucking insects (Vaishampayan *et al.*, 1975).

However there are very few options available for effective mass insect trapping of sucking insects like thrips (Dara SK (2017), aphids (Kafle K, 2015), jassids and whiteflies by using pheromone as an attractant.

In this field study we have comparatively evaluated three Methyl eugenol based traps. a)Traditional dome shape Pheromone Trap for fruit fly, b)Yellow Chromatic Sticky Trap and c) an innovative combination of chromatic, pheromone and sticky trap namely aTTraps-All Rounder.

II. Material And Method:

Materials:

a) Yellow Sticky Trap: Yellow A4 sizes sheet with Sticky Glue
b) Fruit fly Pheromone Trap: Dome shaped trap mounted with Methyl eugenol-based Pheromone Lure.
c) aTTraps-All Rounder: Aerosol based novel sticky trap loaded with Pheromone, Sticky Glue and Yellow color sprayed and coated on an empty HDPE drum.

Method:

1. The dome shaped fruit fly pheromone trap equipped with pheromone lures was installed in a greenhouse at (area 25 by 70 feet) Watermelon farm.
2. Similarly at another part of the green house, A4 sized Yellow Sticky Trap was installed by covering an identical and separate area of the green house.
3. Finally, plastic sheet surface was sprayed on both the sides with aTTraps-All Rounder and installed in an identical and separate area of the same greenhouse.

The Watermelon crop variety selected for this study is known as Sugar Queen Variety.
The Green house is located at Al Dhaid, Sharjah, UAE.

All the traps were installed at the height of 2-3 feet height from the ground. All experiments were conducted in February 2024 in a set of triplicate.

Observations:

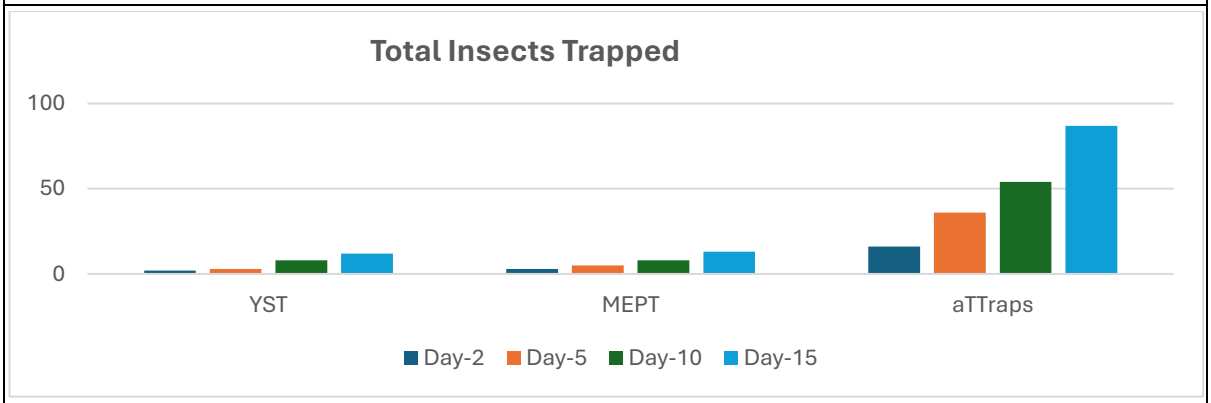
All traps were inspected at the interval of 2, 5, 10 and 15 days from the installation and trapped insects were counted in each individual trap. The observations are summarized in Table-1 and represented in Chart 1 to 4.

Table 1

Trap type	YST			MEPT			aTTraps-All Rounder		
Insects trapped	FF	THR	WF	FF	THR	WF	FF	THR	WF
Day-2	0	2	1	3	0	0	9	4	3
Day-5	0	3	1	7	0	0	18	7	11
Day-10	0	7	4	10	0	0	26	15	13
Day-15	0	12	11	20	0	0	53	26	27

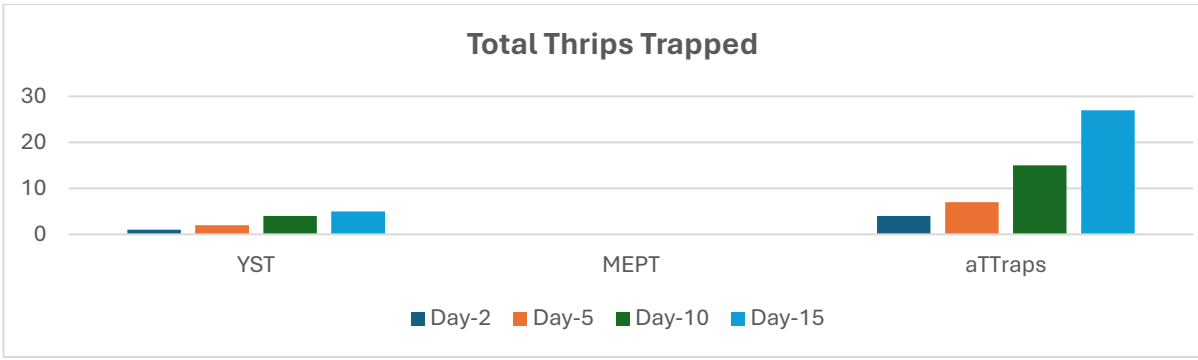
***YST -** Yellow Sticky Ttrap, **MEPT -** Methyl eugenol Pheromone Trap,
aTTraps-All Rounder - Yellow, Pheromone based Aerosol Sticky Trap (Aerosol).

Chart 1 - Total Insects Trapped in YST, MEPT and aTTraps-All Rounder



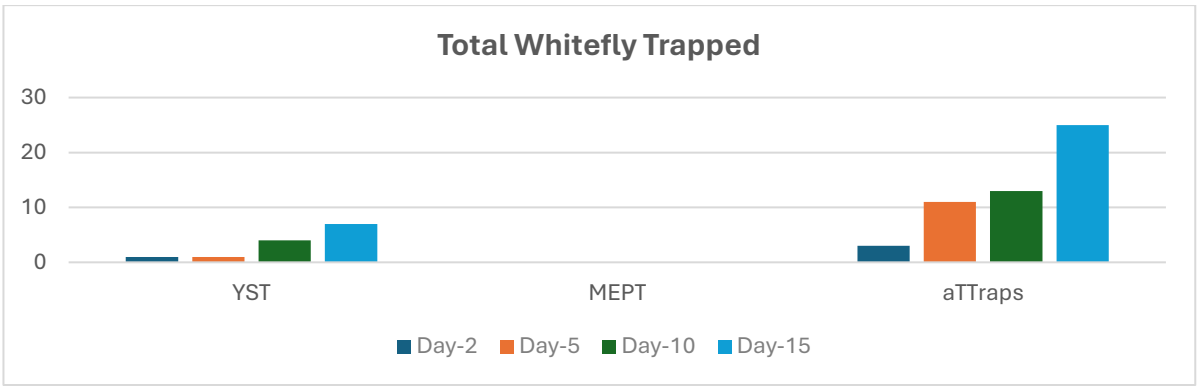
***YST -** Yellow Sticky Ttrap, **MEPT -** Methyl eugenol Pheromone Trap,
aTTraps-All Rounder - Yellow, Pheromone based Aerosol Sticky Trap (Aerosol)

Chart 2 -Total Thrips Trapped in YST, MEPT and aTTraps-All Rounder.



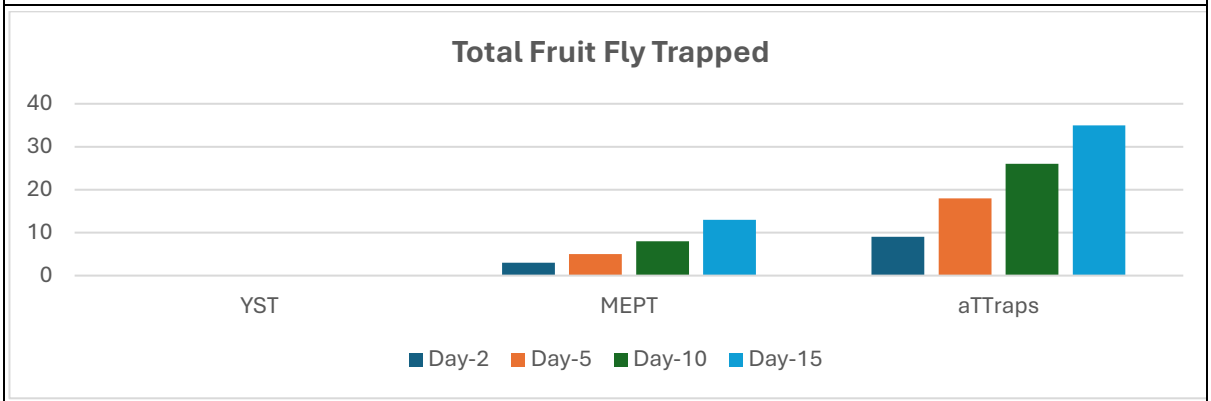
***YST -** Yellow Sticky Ttrap, **MEPT -** Methyl eugenol Pheromone Trap,
aTTraps-All Rounder - Yellow, Pheromone based Aerosol Sticky Trap (Aerosol

Chart 3 - Total whiteflies trapped in YST, MEPT and aTTraps-All Rounder



***YST -** Yellow Sticky Ttrap, **MEPT -** Methyl eugenol Pheromone Trap,
aTTraps-All Rounder - Yellow, Pheromone based Aerosol Sticky Trap (Aerosol)

Chart-4: Total fruit flies trapped in YST, MEPT and aTTraps-All Rounder



***YST -** Yellow Sticky Ttrap, **MEPT -** Methyl eugenol Pheromone Trap,
aTTraps-All Rounder - Yellow, Pheromone based Aerosol Sticky Trap (Aerosol)

During this Bio-efficacy study, following observations are recorded	
1	Yellow Sticky Trap:
	a) Attracted sucking insects including thrips and whitefly.
	b) No fruit fly was captured by yellow sticky trap.
2	Dome shaped methyl eugenol Pheromone Trap:

	a) Attracted fruit flies only.
3	aTTraps-All Rounder:
	a) Found to capture fruit fly, thrips and whitefly.
	b) aTTraps-All Rounder found to be quickest in all insect trapping as compared to chromatic and dome shaped methyl eugenol pheromone trap.
	c) No beneficial insect like ladybird beetle of honeybee fount in traps.

III. Results And Discussion:

Yellow Sticky Traps and Pheromone Traps are good for scouting purpose.
The Yellow Sticky Trap is useful for scouting of sucking insects only.
The Methyl eugenol-based Pheromone Trap is useful for fruit fly scouting.

The novel aTTraps-All Rounder Pheromone containing aerosol based Yellow Sticky Trap is effective on trapping of multiple insects including fruit fly, thrips, whitefly and jassid. The novel aTTraps-All Rounder has demonstrated to be the quickest and is also capable of attracting a large variety of insects as compared to the Chromatic and the conventional Dome shaped Methyl eugenol based Pheromone Trap.

To conclude, the novel aTTraps-All Rounder Pheromone containing Aerosol based Yellow Sticky Trap proves to be a useful tool for mass trapping and control of multiple insects.

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