IOSR Journal of Agriculture and Veterinary Science (IOSR-JAVS)
e-ISSN: 2319-2380, p-ISSN: 2319-2372. Volume 17, Issue 3 Ser. 1 (March. 2024), PP 59-62
www.iosrjournals.org

Bio Efficacy Of Attraps Against Tomato Sucking Insects And Fruit Fly In Kenyan Agroclimatic Zone.

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Abstract:
The evaluation of Bio efficacy of chromatic, pheromone and composite insect attractants is conducted in Kenyan agroclimatic zone. The methyl eugenol pheromone trap, yellow sticky trap and aTTraps (sticky glue, methyl eugenol and yellow colored aerosol composite) are comparatively studied for their insect attractant ability in watermelon crop under identical conditions. We have observed that the pheromone trap captured total 15 insects, sticky trap attracted 23 and aTTraps trapped 103 insects after 15 days on installation. It is also observed that aTTraps demonstrates to be the quickest and most versatile insect attractant when compared to pheromone and chromatic traps. This also proves that aTTraps is a very effective and efficient tool for mass trapping of fruit fly as well as sucking insects like thrips, aphids, whitefly and jassids.

Date of Submission: 21-03-2024 Date of Acceptance: 31-03-2024

I. Introduction:

Insect pests pose a significant threat to agriculture output worldwide, causing substantial losses in crop production each year. These pests cause damage to the 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 decrease in crop yield. This also highlights the need to explore suitable pest control measures (Atwal AS,1986).

Farmers often have to invest in pesticides, insecticides, and other 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 treatments and reduce the environmental impact of pest control (Atwal AS,1986).

Agricultural losses due to fruit flies is found be 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 fruit to rot prematurely and become unsellable. These losses can have a significant impact on farmers' income and the overall decline in the supply of fresh produce in the market (Steiner LF, 1952).

In addition to fruit fly, infestation of sucking insects like thrips, aphid, jassid, whitefly also cause heavy damage to crops. Various pesticides are being used to control sucking insects. But still they get their share and cause economical loss to farmer. Chemical insecticides can also help building insect resistance in long run (Arora R, Dhaliwal GS (1996).

To combat fruit fly and sucking insect infestations, farmers often use integrated pest management techniques such as trapping, baiting, and the application of insecticides (Tan KH and Nishida R. 2012) and (Agrawal N, Deepa M.2013)(Nagaraj K et al 2014). Ethyl eugenol is successfully used as a bait across the globe for control of fruit fly (Steiner LF, esides 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). The chromatic traps are can trap multiple types of sucking insects (Vaishampayan *et al.*, 1975).

There are limited options available for trapping sucking insects like thrips (Dara SK (2017), aphids (Kafle K, 2015), jassids and whiteflies by using pheromone as attractant.

In this study we have evaluated three insect traps for a comparative evaluation of efficacy viz. (1) methyl eugenol based traditional pheromone trap for fruit fly, (2) yellow chromatic sticky trap and (3) aTTraps, a unique combination of chromatic, pheromone and sticky trap.

II. Material And Method:

Materials:

1. Fruit fly pheromone trap: Dome shaped trap installed with methyl eugenol-based pheromone lure.

2. Yellow sticky trap: Yellow A4 sized sheet with sticky glue.
3. aTTraps: aerosol based sticky trap with a unique combination three ingredients namely pheromone, sticky glue and yellow color.
4. Empty HDPE drum.

Method:

The dome shaped fruit fly pheromone trap equipped with pheromone lures installed in quarter acre tomato farm. In another part of farm A4 sized yellow sticky trap is installed on identical size farm area. Finally, an empty HDPE drum is cleaned and sprayed with aTTraps and installed in another quarter acre area of tomato plot.

Trial farm Location details:
Name of Farm: Malan Green Ltd.
Farm Address: Kisaju, off Namanga road Iseniya Kisaju, near Athi River, Nairobi, Kenya
Trial Crop: Tomato, Variety: Shanti. Anna F1

All the traps were installed at the height of 2-3 feet height. All experiments are carried out in triplicate in the month of Feb 2024.

III. Observations:

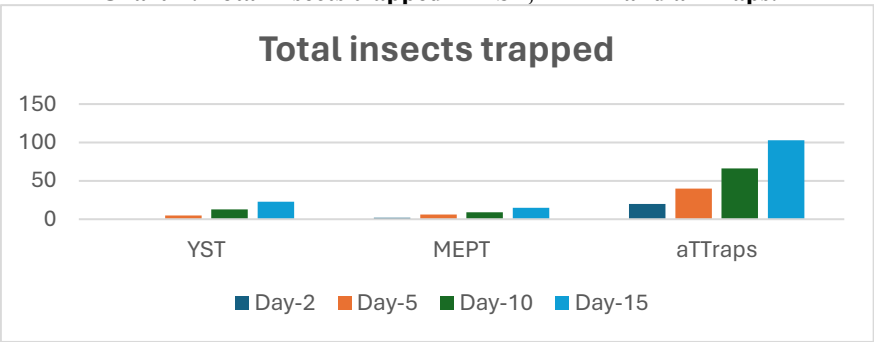
All traps are inspected at the interval of 2, 5, 10 and 15 days after application and the trapped insects are counted ND COM. The observations are summarized in Table-1.

Table-1

Trap type -->	YST				MEPT				aTTraps			
Insects trapped -->	FF	THR	WF	JS	FF	THR	WF	JS	FF	THR	WF	JS
Day-2	0	0	0	0	2	0	0	0	11	7	5	1
Day-5	0	1	3	1	6	0	0	0	17	13	9	6
Day-10	0	3	8	2	9	0	0	0	25	19	16	8
Day-15	0	7	12	4	15	0	0	0	38	27	23	15

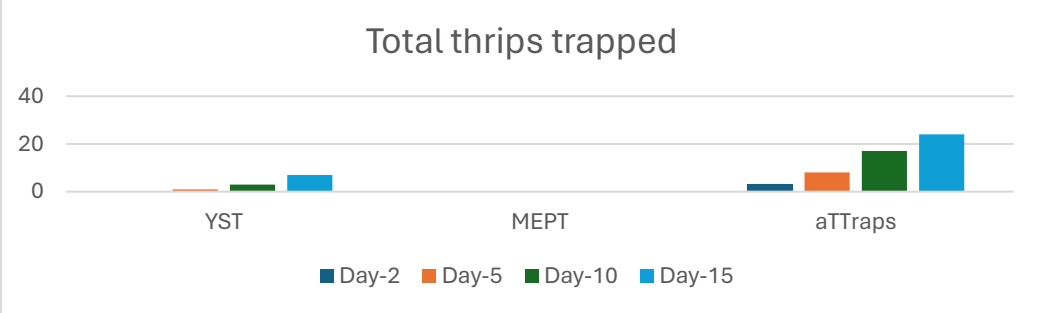
***YST:** Yellow sticky trap, **MEPT:** Methyl eugenol pheromone trap, **aTTraps:** yellow, pheromone sticky aerosol.*

Chart-1: Total insects trapped in YST, MEPT and aTTraps.



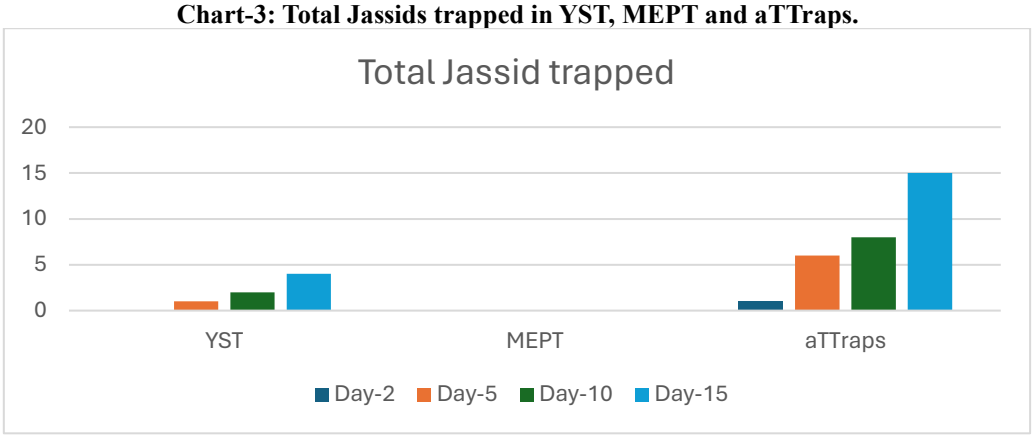
***YST:** Yellow sticky trap, **MEPT:** Methyl eugenol pheromone trap, **aTTraps:** yellow, pheromone sticky aerosol.*

Chart-2: Total thrips trapped in YST, MEPT and aTTraps.



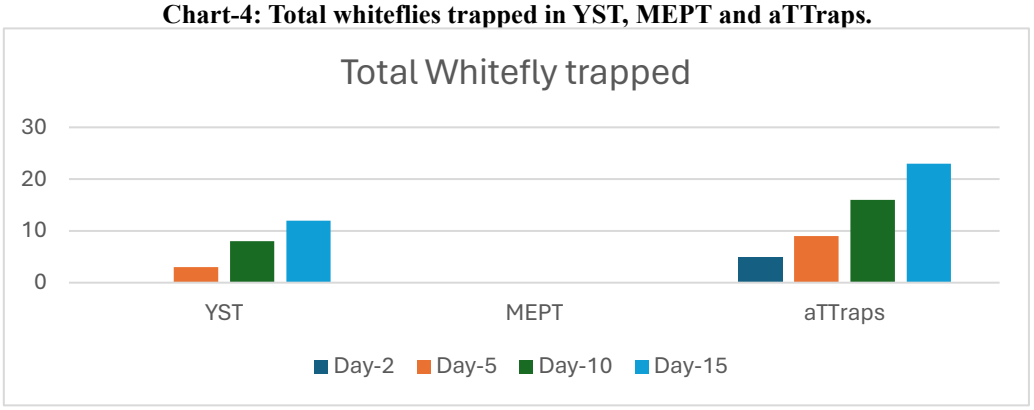
***YST:** Yellow sticky trap, **MEPT:** Methyl eugenol pheromone trap, **aTTraps:** yellow, pheromone sticky aerosol.*

Chart-3: Total Jassids trapped in YST, MEPT and aTTraps.



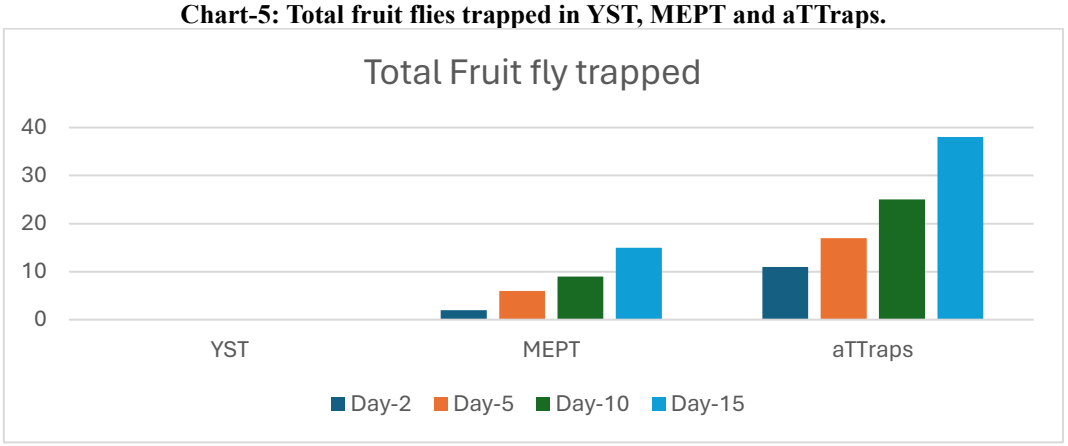
***YST:** Yellow sticky trap, **MEPT:** Methyl eugenol pheromone trap, **aTTraps:** yellow, pheromone sticky aerosol.*

Chart-4: Total whiteflies trapped in YST, MEPT and aTTraps.



***YST:** Yellow sticky trap, **MEPT:** Methyl eugenol pheromone trap, **aTTraps:** yellow, pheromone sticky aerosol.*

Chart-5: Total fruit flies trapped in YST, MEPT and aTTraps.



***YST:** Yellow sticky trap, **MEPT:** Methyl eugenol pheromone trap, **aTTraps:** yellow, pheromone sticky aerosol.*

During this bio efficacy study, following observations are recorded,

a. Yellow sticky trap:

I. Attracted sucking insects including thrips, aphids, jassid and whitefly.

II. No fruit fly is captured by yellow sticky trap.

b. Dome shaped methyl eugenol pheromone trap:

I. Attracted fruit flies only.

c. aTTraps:

I. Found to capture fruit fly, thrips, aphid, jassid and whitefly.

II. aTTraps is found to be quickest for entire range of insect attraction when compared to chromatic and dome shaped methyl eugenol pheromone trap.

III. Beneficial insect like ladybird beetle of honeybee are not found in traps.

IV. Results And Discussion:

The Yellow sticky traps and pheromone traps are good for scouting purpose. The yellow sticky traps is useful for scouting of sucking insects only. The Methyl eugenol-based pheromone trap is useful for scouting of fruit fly.

The aTTraps is useful for trapping of multiple insects including fruit fly, thrips, aphid, whitefly and jassid. aTTraps is found to be quickest in attracting entire range of insects as compared to chromatic and dome shaped methyl eugenol pheromone trap. Hence aTTraps proves to be useful tool for mass trapping of multiple insects.

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