Research Article

Evaluation of Colored Sticky Traps for Monitoring the Population of White Fly *Bemisia Tabaci* (Gennadius) on Brinjal Crop

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Abstract | The present study for use of different coloured sticky traps to assess in color magnetism of white fly on brinjal crop was evaluated at field condition at Shaheed Zulfiqar Ali Bhutto Agricultural College Dokri, Sindh-Pakistan. Different coloured sticky traps contains yellow, light green colour, green colour and pink colours were used to monitor the movement of whitefly and the number of whitefly catches at traps on different observations on brinjal. Results of field trials confirmed that yellow sticky trap attracted more number of whiteflies as compared to the green, pink and light green, so yellow color traps may be used in methods of insect population monitoring. The other colors were less attractant so this study found that using yellow-colored sticky-traps as an alternative for Brinjal crop for the monitoring and management of whitefly. On the basis of results it is suggested that sticky traps are the most excellent integrated pest management approach to prevent problems from increase of whitefly population in the brinjal crop. Further is suggested that these traps are extremely not expensive and simple they can be posted by any unqualified labor.

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Introduction

Brinjal, eggplant or aubergine (*Solanum melongena* L.) occupies a pride of place among the vegetable crops. It is one of the most popular vegetable grown all over the world. Globally, the egg plant is cultivated in an area of 1.72 million hectares with a production of 43.17 million metric tonnes with an average productivity of 25 metric tonnes per hectare (FAOSTAT, 2011). In Pakistan, vegetables cover an area of about 385578 ha with production of 3116808 tons. Pakistan total cultivated area of brinjal is 8325 ha with 82999 tons annual production. Production losses due to insect pests are very high in South Asia [6]. As brinjal is attacked by numerous insect pests and pesticides are used widely to decrease economic losses caused by these pests. The use of pesticides results in many hazards like environmental pollution, bioaccumulation and biomagnification (Dadmal et al., 2004). The indiscriminate and constant use of insecticides causes insecticide resistance in pest insects (Harish et al., 2018). Among the pest insects, different sucking pests like whitefly, jassid, aphid and thrips are big threats to brinjal cultivation and they attack from nursery period till harvesting and their attack can result in loss to the profitable yield

(Regupathy et al.,1997). Insect pests like whitefly and jassid are important sucking pests of brinjal. It has been reported that in the South East Asia the sucking pest caused 67% yield losses (Nagia et al., 1993). To avoid further resistance in this pest, different non chemical methods need to be evaluated. Thus sticky traps, a cultural control method can be used as a component of integrated pest management. Determination of colour preference of crop pests may help develop pest traps using such attractive colors, thus providing opportunities for pest control by integrating specific colors into crop management methods. This helps either to reduce or avoid the use of synthetic pesticides and hence helping to avoid the buildup of pesticide residues in the environment and food. Coloured sticky traps could be a simple and low cost method for determining the relative abundance of insects. It is needed for the determination of colour preference of thrips to get maximum catches of the insect (Devi and Roy, 2017). The yellow sticky traps are a usually used technique for population monitoring of several pests. Sticky traps are reasonably priced due to their less charge and less necessity of scientific labor and as well safer for natural habitats. Keeping in view the consequence of sticky traps a study was conceded out on whitefly preference to colors were evaluated with special color traps in field environment.

Materials and Methods

The study was carried out at Shaheed Zulfiqar Ali Bhutto Agricultural College Dokri, Sindh- Pakistan in the experimental field for trials during the 2017. Eggplant, *Solanum melongena* L. was used as the host plant of *B. tabaci*, because eggplant is one of the most favorable host plants for *B. tabaci* and is also an important economic crop in Pakistan. During the experiments four colors, green. light green, yellow, and pink sticky traps were used which were made up of ¼ inch ply wood painted bright with mentioned colors with mounted on pointed wooden stacks that can be driven in to the soil. The petroleum jelly was used as sticky agent during the experiment the traps were fixed randomly about 120 cm above the ground level in soil the size including width 10" and length was 15" respectively. The petroleum jelly on the card was replaced at weekly interval after recording whitefly population. All the sticky traps were used in 4 replications. The traps were repainted from time to time to ensure that their colours would not fade away. Whiteflies which were stuck on coloured sticky traps were counted from ten square grids using hand magnifying lens. The data was collected on every 72 hours and total six observations were carried out during the experiment period.

Results and Discussion

During experimental work total six observations were taken from different sticky traps, all collected data was analyzed through means shown in the Figures 1 and 2. The Results shows in Figure 1a shows that during the 1st observation the maximum whiteflies caught on the board of yellow sticky traps was 99.5/ white flies/trap were recorded and counted. Similarly, in 2nd observation the number of whiteflies caught 94.5/trap, in 3rd observation 93.6 whiteflies/trap, in 4th observation 94.5 whiteflies/trap, in 5th observation 87.1 whiteflies/trap and in 6th observation 81.3 whiteflies/trap were counted. The results shown in Figure 1b that whiteflies caught 23.3/trap in light green color sticky traps in 1st observation, followed by 34.9, 31.8, 30.1, 34.5, 26.7 whiteflies per trap in 2nd, 3rd, 4th, 5th, and 6th observations respectively.

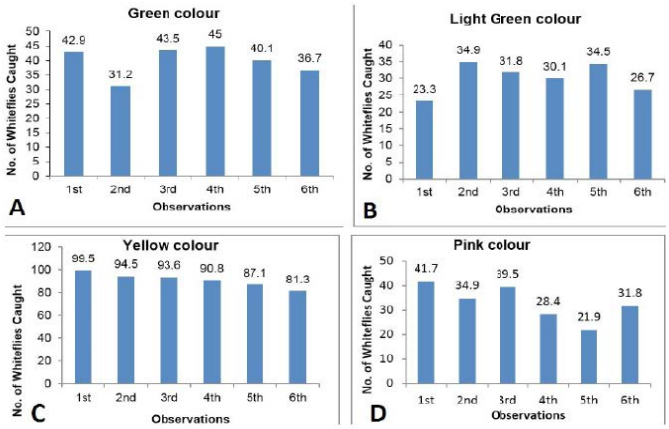

Figure 1: *Number of whiteflies caught on different colour sticky traps on brinjal.*

Similarly, results as shown in Figure 1c that Whiteflies caught 42.9/trap in green colour sticky traps 1st observation, further Whiteflies caught 31.2.3, 43.5, 45.00, 40.15 and 36.7/traps in green colour sticky in 2nd, 3rd, 4th, 5th and 6th observations respectively. The results shown in Figure 1d that Whiteflies caught as 41.7, 34.9, 39.5, 28.4, 21.9 and 31.8 in traps during the data recorded in 2nd, 3rd, 4th, 5th and 6th observations, respectively. In this study the yellow color was found to be most dominant attractive sticky trap to monitor or catch the white fly populations followed by the green, pink and light

green so yellow color traps may be used in methods of insect population monitoring. The overall results show in Figure 2 that maximum 91.1 mean population of whiteflies caught in yellow sticky colour followed by 39.9 in green sticky traps, 33.0 in pink colour sticky traps and 30.2 whiteflies in light green color sticky traps.

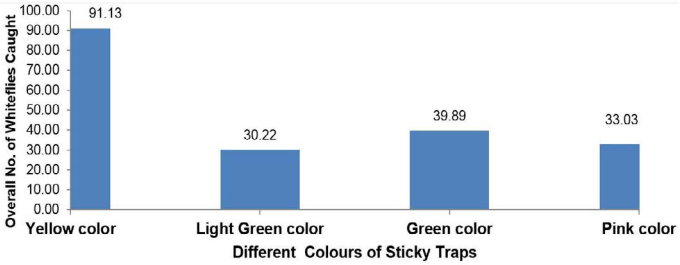

Figure 2: *Overall Number of whiteflies caught on different colour sticky traps on brinjal.*

These results agree with Premalatha and Rajangam (2011) who reported that maximum number of whitefly *Trialeurodes vaporariorum* (Westwood) (adults) attracted towards yellow sticky trap in gerbera. Likewise, Lu et al. (2012) reported that yellow sticky traps can be used as an effective method for the control of whiteflies, *Bemisia tabaci* in the greenhouse. These reports support the present finding. Elango et al., 2017 mentioned in their study that the Yellow Colour sticky trap significantly attracted more number of whiteflies with a mean population of 22.1 whiteflies per trap per week. Yellow sticky traps are a commonly used method for population monitoring of many pests. In recent decades, studies of these traps mainly focused on how to use them to monitor populations of pest species such as whiteflies, leafminers, and aphids (Shen and Ren, 2003; Zhou et al., 2003; Qiu et al., 2006; Gu et al., 2008). In recent years, yellow sticky traps have also been used as a method for the control of some pests, especially for the control of whitefly. Further results also agree with the Idris et al., 2012 reported in their results that the White Fly catches in the yellow trap was the highest, and this was followed by red, green, blue, white, and black traps. Results showed that yellow sticky traps were the most effective for monitoring and managing whiteflies in brinjal crops at subtropical climate conditions. The other colors were less attractant. This study found that using yellow-colored sticky-traps as an alternative for brinjal crop protection is less expensive and less hazardous than using chemical pesticides.

Conclusions and Recommendations

From the above mentioned results it is concluded that yellow colour sticky traps are an alternative IPM tool for the monitoring of the whitefly on brinjal crop, which are one of the cheaper and almost equal effective for whitefly pest on brinjal. It is recommended that green color sticky traps can be posted in the brinjal crop to trap adults of white fly. In current study, yellow color was found most effective colour sticky trap which can help to regulate eco, friendly environment in the crops.

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Author's Contribution

Shah Nawaz Khuhro: Overall Management of the article.
Irshad Ali Junejo: Contribution in Result and discussion.
Muhammad Haroon Hullio: Technical contribution at every step.
Sultan Ahmed Maitlo: Wrote abstract and methodology.
Javeed Shabir Daar: Help in Data collection.
Shahjahan Rajput: Did necessary analysis.

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