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# Field Efficacy of Some Novel Insecticides on Sucking Pests of Brinjal

**Bhupendra Kumar[1], B.L. Uikey[1], S.K. Gharde[2] and P.K. Pal[1]**

[1]Bidhan Chandra Krishi Viswavidyalaya, Mohanpur, Nadia - 741252, India.
[2]Uttar Banga Krishi Viswavidyalaya Pundibari, Coochbehar - 736165, India.

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**An experiment was carried out to evaluate the efficacy of some novel insecticides either alone or in combination at different doses against the sucking pests, White fly and Jassids infesting brinjal during 2012 at BCKV, Kalyani, Nadia, West Bengal, India. Field efficacy tests of different insecticidal treatments as evident from percent reduction in population over control indicated that the pesticide Thiamethoxam 25 WG @ 25g a.i./ha was found most effective both in cases of White fly and Jassids for registering population reduction. Followed by Sumiprempt 20 EC @ 150 g a.i./ha (Pyriproxyfen5% + Fenpropathrin 15%) and Pyriproxyfen 10 EC @ 200g a.i./ha The treatment Diafenthiuron 50WP 300g a.i./ha was worst performer for recording population reduction of White fly and Jassids to the extent of 43.53-51.88% and 47.83-67.53 respectively.**

**Key words**: Jassids, Whitefly, Thiamethoxam, Sumiprempt, Pyriproxyfen, Diafenthiuron.

The role of vegetables in the balanced diet of mankind cannot be avoided. A large number of studies have shown that the consumption of vegetables specially solanaceous ones, reduces the risk particularly of alimentary canal and respiratory passage. Brinjal is an economically important vegetable crop grown in allover India. In India it is the third most important vegetable crop. Brinjal is attacked by a number of insect pests and nematodes during various stages of crop growth among them sap sucking pest like whitefly (*Bemicia tabaci Genn.), leafhopper* (*Amrasca biguttula biguttula Ishida*,) are important one. The extent of losses caused by these pests depends on season, variety, soil and other factors (Dhamdhare *et al*., 1995; Roy and Pande, 1995).

So for the insect pest management of agricultural crops particularly of vegetable is concerned, the selection of proper pesticides has become an important factor at present. This is a great demand for use of safe or more selective pesticides affecting only the harmful insects while spacing beneficial species or other organism. Keeping in view the above, effort have been made to develop novel insecticides with selective properties to acts biochemical sites present in a specific insect group as against the hazardous conventional pesticides possessing different properties. The present programme of work has, therefore, been taken to evaluate the field efficacy of some modern or novel pesticides either alone or combination with other against the sucking pest, Jassid and White fly infesting brinjal.

## MATERIALS AND METHODS

The field experiments was carried out during January – April, 2012 at District seed farm (A, B-Block) under Bidhan Chandra Krishi Viswavidyalaya, in Kalyani, Nadia (W.B.) to evaluate the efficacy of different insecticides

* To whom all correspondence should be addressed.
E-mail: bhupenchandrakar@gmail.com

against Jassid and White fly infesting brinjal. Brinjal cultivar "Jhuri Begun" (Local cultivar of West Bengal) was used with eight treatments replicated thrice in Randomized Block Design in a plot 3 m × 4 m with a spacing of 60 cm × 60 cm. Irrigation and fertilizers are given as per requirement and subjected to be treatments as given in Table 1.

The population of sucking pest viz., Jassid and White fly were recorded from top, middle and bottom leaves form five randomly tagged plants per plot. The crop was sprayed with insecticides three times at an interval of 10 days starting observations on pest population were recorded one day before spray and 1, 7 and 10 days of each spray.

For analysis of data, percent reduction in population (no.) of insect as a result of insecticidal spray over unsprayed control was worked out for each treatment using the formula (Henderson and Tilton, 1955) given below-

% Reduction in insect population (no.) = $\left[1 - \frac{Ta - Cb}{Tb - Ca}\right]$x100

Where,

Tb = No. of insects/sample unit recorded before treatment.

Ta = No. of insects/sample unit recorded in control plot before treatment.

Cb = No. of insects/sample unit recorded after treatment.

Ca = No. of insects/sample unit recorded in control plot after treatment.

## RESULTS AND DISCUSSION

It may be seen from Table 2 that the treatments varied significantly on all dates *i.e.* 1, 7 and 10 days after each spray. The percent population reduction was recorded to be minimum of 43.13% on the 10th day after spray in Diafenthiuron ($T_7$) and maximum of 83.59% on 7th day after 1st spray in Thiamethoxam ($T_6$).

In case of first spray, the percent population reductions of White fly was at lower side in Diafenthiuron ($T_7$) as ranging from 43.13-49.80%. The treatment, Thiamethoxam ($T_6$), on the contrary recorded percent population reduction at higher side being 68.30-83.59%. It is also observed that Thiamethoxam ($T_6$) differed statistically with all other treatments except on 1st and 7th days when it was at par in its performances with Sumiprempt ($T_4$ and $T_5$ on 1st day and $T_5$ only on 7th day). The rest of the treatment performed variously with and without statistical significance among themselves after 1st spray.

The 2nd spray caused population reduction at lower side as ranging from 43.53 - 51.88% also in Diafenthiuron ($T_7$) as against the higher side of 69.36-78.95% in Thiamethoxam ($T_6$). On all the dates after 2nd spray, however, Thiamethoxam ($T_6$) was at par in its effect with Pyriproxyfen ($T_3$) and Sumiprempt ($T_4$ and $T_5$). The rest other treatment varied differently among themselves. More or less similar trend of result were observed after 3rd round of spray. The treatment wise data on percent population reduction after each spray indicate that Thiamethoxam 25 WG @ 25g a.i./ha($T_6$) was best in its performance followed by the treatments Su mipremt 20 EC @ 150g a,i,/ha ($T_5$), Pyriproxyfen10 EC @ 200g a.i./ha ($T_3$), Sumipremt 20 EC @ 100g a.i./ha ($T_4$), Pyriproxyfen 10 EC @ 100g a.i./ha ($T_2$), Pyriproxyfen @ 50g a.i./ha($T_1$) and Diafenthiuron 50 WP @ 300g a.i./ha ($T_7$).

**Table 1.** Treatments details

| Treatment | Insecticides | Dose(g a.i./ha) |
|---|---|---|
| T1 | Pyriproxyfen 10 EC | 50 g |
| T2 | Pyriproxyfen 10 EC | 100 g |
| T3 | Pyriproxyfen 10 EC | 200 g |
| T4 | Sumiprempt 20EC(Pyriproxyfen 5%+ fenpropathrin15% EC) | 100 g |
| T5 | Sumiprempt 20 EC(Pyriproxyfen5% + fenpropathrin 15% EC) | 150 g |
| T6 | Thiamethoxam 25% WG | 25 g |
| T7 | Difenthiuron50% WP | 300 g |

**Table 2.** Effect of different pesticidal treatment schedules on population reduction of White fly infesting brinjal

| Treatment | Dose g a.i./ha | Pre-T, Count (no./5 leaves/plant | (%)Population reduction (mean 3 of replication) after | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1st Spray | | | 2nd Spray | | | 3rd Spray | | |
| | | | 1st DAT | 7th DAT | 10th DAT | 1st DAT | 7th DAT | 10th DAT | 1st DAT | 7tH DAT | 10tH DAT |
| Pyriproxyfen 10EC ($T_1$) | 50 g | 11.33 | 52.38 (46.37) | 48.11 (43.92) | 44.24 (41.69) | 45.74 (42.56) | 52.49 (46.43) | 52.65 (46.52) | 55.66 (48.25) | 62.18 (52.05) | 58.28 (49.77) |
| Pyriproxyfen 10EC ($T_2$) | 100 g | 9.03 | 57.19 (49.13) | 57.21 (49.14) | 52.58 46.48) | 57.08 (49.07) | 63.52 (52.84) | 61.01 (51.36) | 61.18 (51.46) | 68.93 (56.12) | 63.39 (52.77) |
| Pyriproxyfen 10 EC ($T_3$) | 200 g | 8.17 | 59.53 (55.50) | 71.91 (58.00) | 61.13 (51.43) | 63.62 (52.90) | 73.33 (58.91) | 65.45 (54.00) | 66.54 (54.66) | 73.07 (58.74) | 66.64 (54.72) |
| Sumiprempt 20 EC ($T_4$) (Pyriproxyfen5%+Fenpropathrin 15 % EC) | 100 g | 12.90 | 63.16 (52.63) | 73.06 (58.73) | 59.78 (50.64) | 64.12 (53.20) | 70.78 (57.28) | 63.62 (52.91) | 64.40 (53.37) | 72.66 (58.47) | 65.10 (53.73) |
| Sumiprempt 20 EC ($T_5$) (Pyriproxyfen5%+Fenpropathrin 15% EC) | 150 g | 13.60 | 69.81 (56.67) | 79.34 (62.97) | 66.01 (54.34) | 68.24 (55.70) | 73.20 (58.82) | 66.60 (54.69) | 68.17 (55.66) | 78.02 (42.04) | 67.46 (55.22) |
| Thiamethoxam 25WG ($T_6$) | 25 g | 8.20 | 68.30 (55.74) | 83.59 (66.10) | 72.25 (58.21) | 70.32 (56.99) | 78.95 (62.69) | 69.36 (56.39) | 70.86 (57.33) | 81.67 (64.65) | 71.15 (57.51) |
| Diafenthiuron 50WP ($T_7$) | 300 g | 10.50 | 45.33 (42.32) | 49.80 (44.89) | 43.13 (41.05) | 43.53 (41.28) | 50.15 (45.08) | 51.81 (46.03) | 55.68 (48.26) | 61.26 (51.51) | 62.07 (51.99) |
| Control ($T_8$) | | 11.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| S.Em (±) | | NS | 2.08 | 1.65 | 0.65 | 2.96 | 2.81 | 2.08 | 1.50 | 2.61 | 2.43 |
| **CD at 5%** | | NS | 6.32 | 5.00 | 1.99 | 9.00 | 8.54 | 6.33 | 4.54 | 7.93 | 7.39 |

*figures in parentheses are angular transformed values.

DAT = Days after treatment

**Table 3.** Effect of different pesticidal treatment schedules on population reduction of Jassid infesting brinjal

| Treatment | Dose g a.i./ha | Pre-T, Count (no./5 leaves/plant | (%)Population reduction (mean 3 of replication) after | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1st Spray | | | 2nd Spray | | | 3rd Spray | | |
| | | | 1st DAT | 7th DAT | 10th DAT | 1st DAT | 7th DAT | 10th DAT | 1st DAT | 7tH DAT | 10tH DAT |
| pyriproxyfen 10EC ($T_1$) | 50 g | 6.33 | 60.72 (51.19) | 63.36 (52.75) | 51.31 (45.75) | 60.83 (51.25) | 66.37 (54.55) | 52.75 (46.57) | 62.73 (52.38) | 59.86 (50.69) | 52.95 (46.69) |
| pyriproxyfen 10EC ($T_2$) | 100 g | 7.00 | 64.18 (53.24) | 66.23 (54.47) | 60.04 (50.79) | 64.57 (53.47) | 68.21 (55.68) | 58.41 (49.84) | 64.73 (53.57) | 64.94 (53.69) | 63.13 (52.61) |
| pyriproxyfen 10 EC ($T_3$) | 200 g | 6.67 | 70.54 (57.13) | 71.80 (57.92) | 63.95 (53.10) | 66.03 (54.35) | 72.17 (58.16) | 64.63 (53.50) | 66.84 (54.84) | 71.43 (57.69) | 64.97 (53.71) |
| Sumiprempt 20EC ($T_4$) (Pyriproxyfen5%+Fenpropathrin 15 % EC) | 100 g | 8.00 | 66.31 (54.52) | 72.12 (58.13) | 65.29 (53.90) | 64.17 (53.23) | 70.04 (56.82) | 60.54 (51.08) | 67.60 (55.30) | 69.69 (56.60) | 62.83 (52.43) |
| Sumiprempt 20EC ($T_5$) (Pyriproxyfen5%+Fenpropathrin 15 % EC) | 150 g | 7.67 | 71.04 (57.44) | 75.92 (60.61) | 69.47 (56.46) | 67.15 (55.03) | 73.57 (59.06) | 63.97 (53.11) | 70.06 (56.82) | 74.67 (59.78) | 68.09 (55.60) |
| Thiamethoxam 25 WG ($T_6$) | 25 g | 8.67 | 69.41 (56.42) | 81.80 (64.74) | 71.61 (57.80) | 71.46 (57.71) | 78.80 (62.58) | 66.89 (54.87) | 72.94 (58.66) | 83.67 (66.16) | 69.13 (56.25) |
| Diafenthiuron 50WP ($T_7$) | 300 g | 7.00 | 54.71 (47.70) | 58.02 (49.62) | 47.83 (43.76) | 64.51 (53.43) | 67.53 (55.26) | 56.28 (48.61) | 60.78 (51.23) | 50.17 (45.10) | 64.52 (53.44) |
| Control ($T_8$) | | 8.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| S.Em (±) | | | 2.07 | 0.83 | 1.10 | 0.71 | 1.86 | 1.14 | 1.18 | 1.94 | 1.14 |
| CD at 5 % | | | 6.28 | 2.51 | 3.36 | 2.16 | 2.66 | 3.47 | 3.58 | 5.91 | 3.45 |

**Jassids**

The percent population reductions of Jassids due to pesticidal treatment have been shown in Table 3 that Jassids registered a population reduction of 47.83% (Diafenthiuron -$T_7$) to 83.67% (Thiamethoxam -$T_6$) during the period under present investigation. The treatment variations were observed to be statistically significant for all the dates of observations after each spray (Table 3).

It may also be seen from the above table that Thiamethoxam ($T_6$) was significantly superior in its effect on other treatments in most of the dates of observations. Thiamethoxam ($T_6$) registered maximum population reduction of 66.89-83.67% during the entire period of investigation as against the minimum of 47.83-67.53% in Diafenthiuron ($T_7$). The overall performance of test insecticides after each spray, however, reveal that Thiamethoxam 25 WG @ 25g a.i./ha($T_6$) was best in reducing the population of Jassids followed by Sumiprempt 20 EC @ 150g a.i./ha($T_5$), Pyriproxyfen10 EC @ 200g a.i./ha($T_3$), Sumiprempt 20 EC @ 100g a.i./ha($T_4$), Pyriproxyfen 10 EC @ 100g a.i./ha($T_2$), Pyriproxyfen10 EC @ 50g a.i./ha($T_1$) and Diafenthiuron 50 WP @ 300g a.i./ha($T_7$).

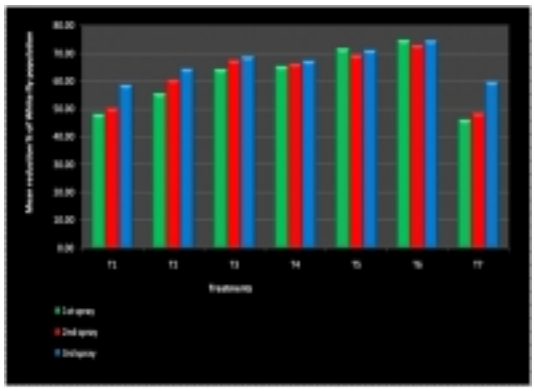

**Fig. 1.** Treatment effect of different pesticides ($T_1$-$T_7$) and population reduction of White fly

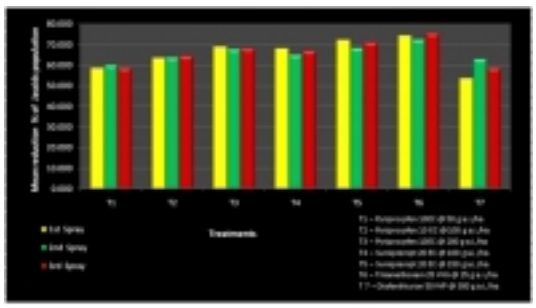

**Fig. 2.** Treatment effect of different pesticides ($T_1$-$T_7$) and population reduction of Jassids

Biswas and Chatterjee (2008) reported that Thiamethoxam @ 35 g a.i./ha was highly effective against both the Jassids and White fly on brinjal while Naik *et al* (2009) observed Thiamethoxam alone 0.005% and in combination with Novaluron 0.05% and Azadiractin 0.15% as also very effective to reduce population of both the above pests.

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