# Role of different nutrients on attack of thrips (*Thrips tabaci* Lindeman) in onion

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Onion (*Allium cepa* L.) is an important vegetable crop commercially grown in India. The productivity of onion is affected by many biotic and abiotic stresses. Among the biotic stresses, the pests and diseases cause considerable yield losses. Onion thrips (*Thrips tabaci* Lindeman) is a major and serious pest that causes direct or indirect damage to onion crop. Yield losses were reported to the tune of >50% and it can be more problematic when thrips transmit Iris yellow spot virus (family Bunyaviridae, genus Tospovirus, IYSV).Yield losses due to IYSV were estimated to the extent of 100%(Diaz-Montano *et al.,* 2011). Bulb forming stage is the most crucial point where insecticidal sprays need to be initiated.

In recent years, thrips have developed resistance to most of the insecticides due to their continuous usage. To avoid resistance development by *T. tabaci* it is necessary to rotate the insecticides groups and need to look for new formulations against onion thrips. Various entomo-pathogenic fungi have been evaluated against thrips. Spray formulations of *B. bassiana* were found promising under laboratory and green house conditions only. *Metarrhizium ansopliae, Paecilomyces fumosoroseus* and *Verticillium lecani* also killed *T. tabaci* and *Frankliniella* sp. Mortality of thrips was highest with *B. bassiana* at $26^0$ c and 75% RH (Murphy *et al.,* 1998).At present insecticides is the major strategy for controlling thrips. To dig out the alternate strategies for the management of thrips, a study has been conducted using different plant nutrients for their management. The main aim of the study is to evaluate the varied nutrient levels of calcium silicate, sodium silicate, nitrogen, potassium in regulating thrips population.

The field experiment was carried out to assess the impact of nutrients on the thrips infestation on onion at experimental fields of Directorate of Onion and Garlic Research, Rajgurunagar, Pune during *Rabi* season. The experiment was laid out with eleven treatments in 2x2 $cm^2$ plots in Randomised Block Design (RBD) with three replications.

The treatment details were as follows:
T1: RDF (150:50:80), T2: High N (200:50:80), T3: Low N (100:50:80), T4: Low K (150:50:50), T5: High K (150:50:100), T6: RDF+ Ca Spray 0.5% T7: RDF+ Ca Spray 1%, T8:RDF+ Si spray 0.2gm Si/kg soil + 0.2% foliar spray, T9: RDF+ Si spray0.2gm si/kg soil + 0.5% foliar spray, T10: RDF+ Ca (0.5%) & Si spray (0.25%), T11: RDF+ Ca (1%) & Si spray (0.5%).

The soils of the experimental plot were clay loam soils having low nitrogen, with medium phosphorous and high potassium content. Nitrogen was applied in three split doses *viz.,* basal, 30 and 45 days after planting, whereas phosphorous, potassium, calcium silicate and sodium silicate were applied as basal doses. Foliar sprays of calcium silicate and sodium silicate were initiated from 30 days after planting at 10 days interval.

Thrips population was recorded randomly in five plants per plot in three replications at ten days interval. Maximum mean thrips per plant (44.77 per plant) was observed in recommended dose of fertilizers (RDF 150:50:80 kg/ha) application. Low and high levels of nitrogen and potassium had no effect on thrips infestation. Minimum thrips infestation was observed in 0.5% and 1% doses of Calcium silicate sprays (T6 & T7) (38.87 and 39.12 per

plant) respectively along with RDF. But there is no significant difference among these two treatments of calcium silicate sprays on thrips infestation. Similarly crop yield was also higher at 1% (T7) of calcium silicate spray (45.33t/ha) as compared to RDF (37.33 t/ha). Again there is significant reduction in the thrips infestation in combined foliar sprays of calcium silicate and sodium silicate along with RDF(T10 &T11) (40.92 and 42.25 thrips/plant) and significant increase in the yield (45.50 and 43.33t/ha) was observed, respectively. Finally the results of the experiment concludes that foliar and soil application of calcium and sodium silicate play an important role in reduction of thrips and increase in the yield of onion.

Similar studies were conducted by Almeida *et al.,* in 2008 to evaluate the effect of calciumsilicate and an organic mineral fertilizer, together or separately, on the resistance increase of the eggplant to *T. palmi*. The calcium silicate and the organic mineral fertilizer reduced both the population of *T. palmi* and the damage caused by its nymphs, suggesting a possible increase in eggplant resistance to this pest as a result of the treatments.In onion crop, the bulb forming stage i.e., 30-45 DAP are most preferred stage by thrips. During this stage the thrips incidence will be higher. The thrips incidence gradually increased and reached more than 150 /plant during this period (Figs. 1 & 2). After 60-90 DAP, thrips infestation slowly declined towards the time of harvesting. The results in current study reveal that there is no significant differences were observed among the treatments in different days after planting (Figs.1, 2 &3).

**Table1: Effect of different nutrients on thrips infestation and yield in onion**

| Sr. No. | Treatments | Mean thrips/plant | Total Yield (t/ha) |
|---|---|---|---|
| 1 | RDF (150:50:80) | 44.77 (6.72) [a] | 37.33 |
| 2 | High N (200:50:80) | 40.11 (6.36) [ab] | 33.83 |
| 3 | Low N (100:50:80) | 41.21 (6.45)[ab] | 35.60 |
| 4 | Low K (150:50:50) | 42.63 (6.56) [ab] | 36.00 |
| 5 | High K (150:50:100) | 42.31 (6.53) [ab] | 38.17 |
| 6 | RDF (150:50:80) + Ca spray (Low) 0.5% | 39.12 (6.29) [b] | 45.33 |
| 7 | RDF (150:50:80) + Ca spray (High) (1%)1.0 % | 38.87 (6.27) [b] | 42.40 |
| 8 | RDF (150:50:80) + Si spray (low) 0.2 gm Si/kg soil +0.2 % foliar spray | 42.10 (6.52) [ab] | 44.00 |
| 9 | RDF (150:50:80) + Si spray (high) 0.2 gm Si/kg soil +0.5 % foliar spray | 43.25 (6.61) [ab] | 41.83 |
| 10 | RDF (150:50:80)+ Ca ( 0.5 %) & Si spray (low) (0.25 %) | 40.92 (6.43) [ab] | 45.50 |
| 11 | RDF (150:50:80) + Ca (1 %) & Si spray (high) (0.5%) | 42.25 (6.53) [ab] | 43.33 |
| | CV % | 3.10 | 7.54 |
| | SD ± Mean | 0.22± 6.48 | 0.80± 6.72 |
| | CD @ 5 % | 0.34 | 0.86 |

*Figures in parentheses are square root (X+0.5) transformed; the means followed by the same letter in the column are not significantly different at (P<0.05)

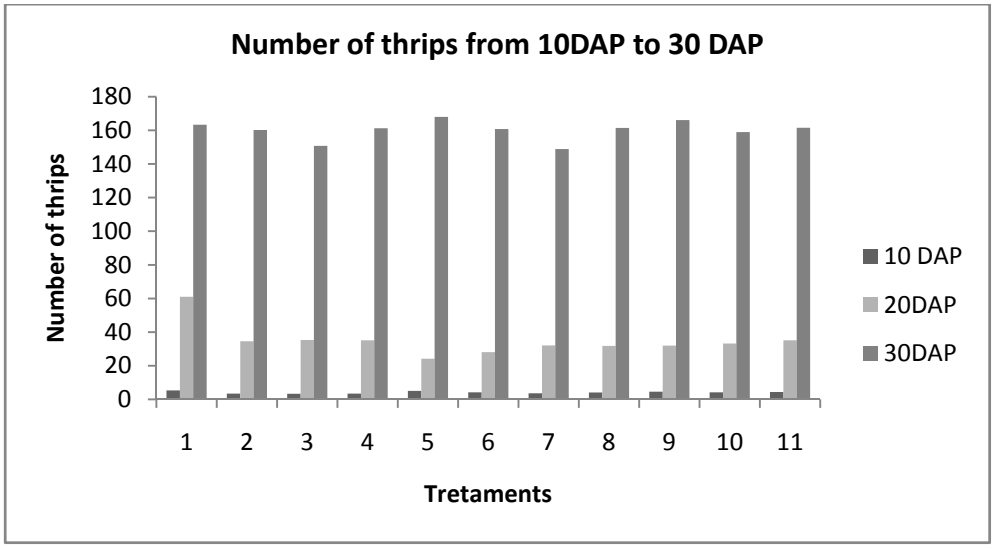


**Fig.1: Effect of different nutrient treatments on thrips infestation from 10 to 30DAP**

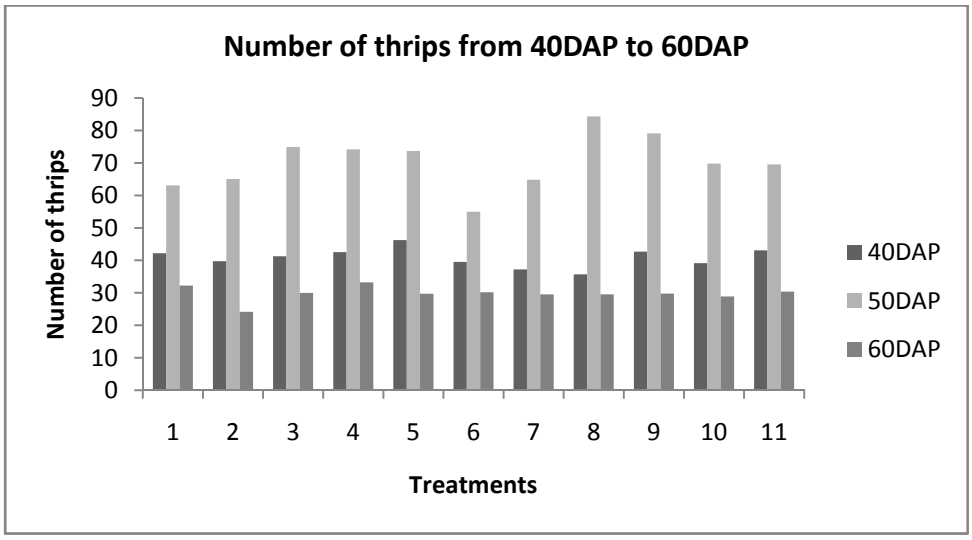


**Fig.2: Effect of different nutrient treatments on thrips infestation from 40 to 60DAP**

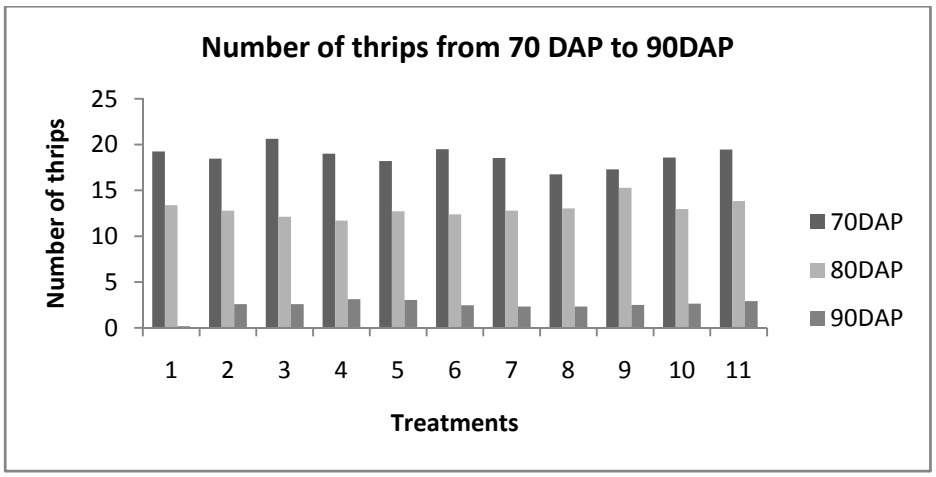


**Fig. 3: Effect of different nutrient treatments on thrips infestation from 70 to 90DAP**

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## REFERENCES

Almeida G. D., Pratissoli D., Zanuncio J. C., Vicentini V. B., Holtz A. M. and Serrao J. E., 2008. Calcium silicate and organic mineral fertilizer application reduce phytophagy by *Thrips palmi* Karny (Thysanoptera: Thripidae) on egg plants (*Solanum melongena* L.). *Itnercientia*, Vol.33, No. 11; pp: 835-838

Diaz-Montano, John; Fuchs, Marc; Nault, Brian A.; Fail, József; Shelton, Anthony M. 2011.Onion Thrips (Thysanoptera: Thripidae): A global pest of increasing concern in onion. *Journal of Economic Entomology*, 104 (1):1-13.

Murphy, B. C., Morisawa, T.A., Newman, J. P., Tjosvold, S. A. and Parrella, M. P. 1998. Fungal pathogen control thrips in green house flowers. *California Agriculture*, 52: 32-36.

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