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**SS Palaskar**
Post Graduate Student, Entomology Section, College of Agriculture, Dhule, Maharashtra, India

**MP Badgujar**
Research Guide and Assistant Professor of Entomology, Onion and Grape Research Station Pimpalgaon Baswant, Nasik, Maharashtra, India

**AS Mahale**
Assistant Professor of Entomology, Department of Entomology, College of Agriculture, Dhule, Maharashtra, India

**Corresponding Author:**
**SS Palaskar**
Post Graduate Student, Entomology Section, College of Agriculture, Dhule, Maharashtra, India

# Evaluation of different genotypes against thrips and mites of garlic (*Allium sativum* L.)

**SS Palaskar, MP Badgujar and AS Mahale**

**Abstract**
The experiment was conducted at "Onion and Grape Research Station, Pimpalgaon Baswant, Nashik" under Mahatma Phule Krishi Vidyapeeth, Rahuri during *rabi* 2019-20. The objective was to screen the different genotypes of garlic against thrips and mites of garlic. For this trial, twenty seven genotypes with two standard checks were evaluated against garlic thrips (*Thrips tabaci* L.) and mites (*Tetranichus urticae* Koch). These genotypes were Agra Local, Bhima Omkar, Dindori Local-White, Dindori Local-Voilet, G-1, Godavari, Gondal, IC-49350, Jalagaon Sel, Jamnagar, Jawahar MP2, Kalyanpur Sel, Kalwan Local, Kochi Sel, Mansoor Local-1, NHRDF Sel, PB-11, PB-16, PB Sel-15-1, Pimpri-2, Solan Local, Shweta, Punjab Local, Rahuri Sel-2, Rajkot Local, RHRG-7 along with two standard checks i.e. Phule Baswant and Phule Nilima. The genotypes, *viz*., Agra Local (14.76 thrips / plant), Bhima Omkar (18.83 thrips / plant) and Dindori Local-White (19.70 thrips / plant) recorded lower average thrips population, whereas PB-11(48.22 thrips / plant), Shweta (47.27 thrips / plant) and Solan Local (46.79 thrips / plant) observed more thrips as against standard check, Phule Baswant (20.05 thrips / plant) and Phule Nilima (43.34 thrips/ plant). In case of mite screening, the genotypes *viz*., G-1, IC 49350 and Jamnagar observed lower incidence of mites and it was 0.85, 1.09 and 2.35 average mites per 2.5 cm length of leaf, respectively. Whereas, higher incidence of mites was observed in Delhi Local, Shweta and Pimpri-2, which recorded 23.98, 23.69 and 21.65 average mites per 2.5 cm length of leaf, respectively as against standard check Phule Baswant (10.57 mites / 2.5 cm length of leaf) and Phule Nilima (10.82 mites / 2.5 cm length of leaf). Thus, the genotypes *viz*., Agra Local, Bhima Omkar and Dindori Local-White can be used as resistance source against garlic thrips as well as the genotypes *viz*., G-1, IC 49350 and Jamnagar can be used as resistance source against garlic mites. The genotypes *viz*.,PB-11, Shweta and Solan Local which are susceptible lines against garlic thrips as well as genotypes *viz*., Delhi Local, Shweta and Pimpri-2 which are susceptible lines against garlic mites can be used in further screening trials of garlic for assure source of incidence of particular pests. The genotype Kalwan Local registered maximum yield of 149.33 quintal per hectare.

**Keywords:** garlic thrips and mites, screening, genotype

## Introduction
Garlic (*Allium sativum* L.) is a species in the onion genus Allium and is perennial plant of amaryllis family *(Amaryllidaceae)*. Allium is a genus of monocotyledonous flowering plants that include hundreds of species, including the cultivated onion, garlic, scallion, shallot, leek and chives.

Garlic (*Allium sativum* L.) is the second most widely used cultivated allium after onion. It is second most important bulb crop grown throughout the plains of India for spices and condiments. The total area under cultivation of garlic in India during 2017-18 was 317 thousand hectare, whereas total production was 1622 thousand metric tons. Total export from India to other countries in 2017-18 was 31.22 MT and these total value with foreign currency was 13,266.07 lakh rupees. Major state in India under cultivation of garlic is Madhya Pradesh, Rajasthan, Uttar Pradesh, Assam and Maharashtra. Most Commonly cultivated varieties in India is Yamuna Safed, Yamuna Safed 2, Yamuna Safed 3, Yamuna Safed 4, Yamuna Safed 5, Yamuna Safed 6, Yamuna Safed 7, Yamuna Safed 8, Yamuna Safed 9, Godavari, Sweta, Phule Baswant, Bhima Purple, Bhima Omkar, Agriford Parvati, Agriford 2 etc. (Anonymous, 2018) [1].

Garlic has been considered as a rich source of carbohydrates, proteins, vitamin B1, B2, B3, B6, vitamin A and C and minerals like iron, calcium, sodium, phosphorus and magnesium. Every 100 g of garlic will serve us with close to 150 calories, 33g of carbohydrates, 6.36g of protein. The major factors affecting the production and productivity of garlic are abiotic factors like temperature, wind, precipitation and biotic factors *viz.* pest and diseases.

Satyagopal, K. *et al.* (2014) [9] reported the garlic pests *viz.*, onion thrips, *Thrips tabaci* Lindeman (Thysanoptera: Thripidae), onion maggot, *Delia antiqua* (Anthomyiidae: Dipterae), bulb mite, *Rhizoglyphus robini* Claparede (Sarcoptiformes: Acaridae), eriophyid mite, *Aceria tulipae* (Keifer) (Prostigmata: Eriophyidae) and red spider mite, *Tetranychus cinnabarinus* (Boisduval) (Trombidiformes: Tetranychidae) has a national significance and contributed considerable yield losses. Among these pests, garlic thrips, *Thrips tabaci* and mites, *Tetranychus urticae* Koch causes considerable losses in yield. The infestation of these pests leads to curling of leaves and poor quality with low yield of garlic bulbs in Maharashtra. Thrips is responsible for curling of leaves, low yield, and poor quality of bulb. Leaf curling reduces the activity of photosynthesis and thus reduces the crop yield. This pest is polyphagous in habbit occurring throughout the year on different cultivated and wild plant species. It was regularly occurred on garlic and onion crops during winter season in Maharashtra. Also, when temperature rises during February end and in March, the incidence of garlic mite, (*Tetranychus urticae* Koch.) occurs regularly and causes yield losses to garlic crop.

Changela in 1993 [2] reported 15.35 to 46.82 per cent yield losses occurred in garlic bulb yield due to garlic thrips at Junagadh. However, the information on resistant or susceptible genotypes for garlic pest is scanty. Therefore, the present investigations were undertaken with an objectives as to evaluate the different genotypes against thrips and mites of garlic.

## Materials and Methods

The field experiment was conducted during *rabi* season of 2019, at Onion and Grape Research Station, Pimpalgaon Baswant Dist. Nasik (MS). In this study twenty seven garlic genotypes with two standard checks were selected. Seeds of these genotypes were obtained from the Officer Incharge, Onion and Grape Research Station, Pimpalgaon Baswant (Nashik). These twenty seven genotypes were Agra Local, Bhima Omkar, Delhi Local, Dindori Local (W), Dindori Local (Violet), G-1, Godavari, Gondal, IC-49350, Jalagaon Sel, Jamnagar, Jawahar MP2, Kalyanpur Sel, Kalwan Local, Koachi Sel, Mansoor Local-1, NHRDF Sel, PB-11, PB-16, PB Sel-15-1, Pimpri-2, Solan Local, Shweta, Punjab Local, Rahuri Sel-2, Rajkot Local, RHRG-7 with two checks *viz.* Phule Baswant and Phule Nilima. All genotypes were sown in flat beds prepared on the well cultivated soil with 3 x 2 mt size. The manure and fertilizer were applied as per the recommended package of practices.

The observations were recorded on the number of thrips and mites from five randomly selected plants of each genotypes. For counting thrips**,** observations were recorded on five randomly selected plants per plot by examining carefully the inner leaf sheaths and growing parts of the plants. For mite observations, five plants were randomly selected from each genotype and from each plant, 2.5 cm length of leaf was considered. These leaves were observed under microscope for mite count. (Naidu and Channabasavanna (1989) [6]. Such observation were recorded starting from appearance of the symptoms (curling, twisting and yellowing of leaves). i.e. 68 days after sowing and at 20 days interval. In this way four counts were taken at 68, 88, 108, 128 days after sowing. The yields of garlic bulb obtained from different genotypes were recorded in kg per plot and then data was expressed as quintal per hectare.

In order to find out the significance of differences in different garlic genotypes, all experimental data was transformed in to square root values (x+0.5) and statistical analysis was done as per Panse and Sukhatme (1985) [7]. The significance of different genotypes was assessed at 5 percent level.

## Results and Discussion

The incidence of garlic thrips, *Thrips tabaci* L. was recorded since 1 MW to 11MW of 2020 at fortnightly interval. This incidence of garlic thrips in all meteorological weeks was quite similar to average and hence here only average values are discussed.

The average incidence of thrips during crop growth period ranged from 14.76 to 48.22 thrips per plant. The genotype Agra Local found most promising over all other genotypes and recorded least average incidence i.e. 14.76 thrips per plant. It was followed by Bheema Omkar (18.83 thrips / plant) and Dindori Local-White (19.70 thrips / plant). The maximum mean incidence of 48.22 thrips per plant was observed on the genotype PB-11 and it was followed by Shweta (47.27 thrips / plant) and Solan Local (46.79 thrips / plant).

Perusal of the literature revealed no published information on screening of same garlic genotypes against thrips, *Thrips tabaci* L. However, Kowser *et al.* (2019) [5], Hossain *et al.* (2014) [3] and Patel P. B. and Patel J. J., (2012) [8] were conducted an experiment to check the susceptibility of different garlic genotypes/cultivars to thrips, *Thrips tabaci* L. However, their genotypes/cultivars were different than that of our study. These workers also observed various degree of incidence of garlic thrips in their studies and hence the present investigation was closely related with these workers.

The incidence pattern of garlic mites at 68, 88, 108, and 128 days after sowing was similar to average value and hence the average mite's population per plant are discussed herewith.

During crop growth period, average incidence of mites ranged from 0.85 to 23.98 mites per 2.5 cm length of leaf. The genotype G-1 was recorded least incidence i.e. 0.85 mites / 2.5 cm length of leaf. It was followed by genotype IC 49350 (1.09 mites / 2.5 cm length of leaf) and Jamnagar (2.35 mites / 2.5 cm length of leaf). The maximum mean incidence of 23.98 mites per 2.5 cm length of leaf was observed on the genotype Delhi Local. It was followed by the genotype Shweta, Pimpri-2, PB-11 and PB-16, which recorded 23.69, 21.65, 21.01 and 20.80 mites per 2.5 cm length of leaf of plant, respectively.

The genotype Kalwan Local recorded maximum yield of 149.33 quintal per hectare. It was followed by standard check i.e. Phule Nilima (146.67 q/ha). Punjab Local and check Phule Baswant recorded the yield 136.67 quintal each per hectare. Among the remaining genotypes, Jalgaon Selection and Gondal observed 133.33 quintal per hectare each. It was followed by G-1, Delhi Local and Rahuri Sel-2, which recorded 128.33 quintal yield per hectare each. Lowest yield found in genotype Rajkot Local (73.33 q / ha). It was followed by Bhima Omkar (89.83 q / ha), Dindori Local Voilet (90.33 q / ha), PB-11 (93.33 q / ha) and Godavari (96.37 q / ha).

Thus, this screening studies revealed that Agra Local, Bhima Omkar, Dindori Local-White found least population of thrips i.e. 14.76, 18.83 and 19.70 thrips per plant, respectively. However, regarding to mites the genotypes G-1, IC-49350 and Jamnagar found least population i.e. 0.85, 1.09 and 2.35 mites per 2.5 cm length of leaf. This indicates the possibility of tolerance to the pest in these genotypes, which however need confirmation with further detail studies.

In present studies, the genotypes G-41, IC 49383 and G-1 recorded less incidence of mites per plant. These results of present studies are in concurrence with those recorded by Katkar and pawar (1996) [4]. They also reported that genotype G-41(0.69 mites/cm length of leaf) had lowest number of mites. And, it was followed by IC 49383(1.02 mites/cm length of leaf), G-1(0.98 mites/cm length of leaf) and these were at par with G-41(0.69mites/cm length of leaf). The maximum infestation of mites observed in genotype Shweta and PB-5 were 25.91 and 23.44 mites per cm length of leaf.

**Table 1:** Evaluation of garlic genotypes against garlic thrips, *Thrips tabaci* L.

| Sr. No | Genotype name | 1 MW | 3 MW | 5 MW | 7 MW | 9 MW | 11 MW | Average |
|---|---|---|---|---|---|---|---|---|
| 01 | Agra Local | 5.37 (2.39) | 10.67 (3.31) | 14.27 (3.84) | 19.54 (4.47) | 25.04 (5.05) | 13.67 (3.75) | 14.76 (3.90) |
| 02 | Bhima Omkar | 7.57 (2.81) | 14.57 (3.85) | 21.87 (4.73) | 24.77 (5.02) | 29.14 (5.44) | 15.04 (3.92) | 18.83 (4.39) |
| 03 | Delhi Local | 17.80 (4.27) | 32.80 (5.77) | 44.40 (6.69) | 48.60 (6.99) | 54.67 (7.43) | 25.60 (5.10) | 37.32 (6.15) |
| 04 | Dindori Local (W) | 7.87 (2.87) | 20.27 (4.56) | 22.84 (4.82) | 26.44 (5.18) | 29.70 (5.49) | 11.10 (3.38) | 19.70 (4.49) |
| 05 | Dindori Local (V) | 12.40 (3.58) | 20.67 (4.60) | 32.14 (5.71) | 36.17 (6.05) | 40.27 (6.38) | 22.60 (4.81) | 27.37 (5.28) |
| 06 | G-1 | 8.77 (3.04) | 17.64 (4.25) | 24.44 (4.98) | 28.17 (5.35) | 31.80 (5.68) | 19.34 (4.45) | 21.69 (4.71) |
| 07 | Godavari | 18.03 (4.30) | 29.17 (5.44) | 42.70 (6.57) | 51.24 (7.19) | 62.14 (7.91) | 26.17 (5.16) | 38.23 (6.22) |
| 08 | Gondal | 14.60 (3.87) | 28.54 (5.38) | 39.70 (6.32) | 48.40 (6.99) | 59.54 (7.75) | 24.77 (5.02) | 35.93 (6.03) |
| 09 | IC-49350 | 12.80 (3.64) | 24.84 (5.03) | 31.37 (5.63) | 41.04 (6.44) | 50.40 (7.13) | 21.70 (4.71) | 30.36 (5.55) |
| 10 | Jalgaon Sel | 17.87 (4.26) | 29.67 (5.49) | 37.60 (6.17) | 47.17 (6.90) | 56.20 (7.53) | 27.70 (5.31) | 36.04 (6.04) |
| 11 | Jamnagar | 20.00 (4.52) | 37.87 (6.19) | 46.30 (6.84) | 60.40 (7.80) | 71.47 (8.48) | 29.74 (5.48) | 44.29 (6.69) |
| 12 | Jawahar MP2 | 15.17 (3.95) | 31.37 (5.64) | 41.67 (6.49) | 54.90 (7.44) | 64.90 (8.09) | 33.64 (5.84) | 40.27 (6.39) |
| 13 | Kalyanpur Sel | 14.06 (3.81) | 26.64 (5.21) | 39.30 (6.31) | 43.30 (6.61) | 53.17 (7.32) | 23.74 (4.91) | 33.36 (5.82) |
| 14 | Kalwan Local | 10.97 (3.39) | 29.60 (5.48) | 37.94 (6.20) | 44.40 (6.70) | 53.47 (7.34) | 28.54 (5.39) | 34.15 (5.89) |
| 15 | Koachi Sel | 20.04 (4.53) | 34.74 (5.93) | 48.64 (7.00) | 58.40 (7.67) | 67.74 (8.26) | 31.74 (5.68) | 43.55 (6.64) |
| 16 | Mansoor Local-1 | 12.14 (3.55) | 24.64 (5.01) | 30.50 (5.57) | 39.90 (6.36) | 45.17 (6.75) | 26.34 (5.17) | 29.78 (5.50) |
| 17 | NHRDF Sel | 20.67 (4.60) | 33.57 (5.83) | 40.70 (6.41) | 53.44 (7.34) | 62.20 (7.92) | 22.00 (4.73) | 38.76 (6.27) |
| 18 | PB-11 | 23.87 (4.93) | 37.37 (6.15) | 52.37 (7.26) | 63.47 (8.00) | 73.34 (8.59) | 38.87 (6.27) | 48.22 (6.98) |
| 19 | PB-16 | 16.00 (4.06) | 32.97 (5.78) | 46.04 (6.82) | 55.34 (7.47) | 69.44 (8.36) | 35.80 (6.02) | 42.59 (6.56) |
| 20 | PB Sel-15-1 | 14.97 (3.92) | 32.57 (5.75) | 39.64 (6.33) | 46.17 (6.82) | 50.30 (7.13) | 30.67 (5.58) | 35.71 (6.02) |
| 21 | Pimpri-2 | 10.64 (3.33) | 21.37 (4.67) | 33.54 (5.83) | 41.14 (6.45) | 53.84 (7.36) | 24.67 (5.01) | 30.86 (5.60) |
| 22 | Solan Local | 23.94 (4.94) | 37.37 (6.14) | 50.44 (7.13) | 62.17 (7.91) | 69.84 (8.39) | 37.00 (6.11) | 46.79 (6.88) |
| 23 | Shweta | 23.57 (4.90) | 41.24 (6.46) | 46.14 (6.82) | 59.97 (7.77) | 72.34 (8.53) | 40.37 (6.39) | 47.27 (6.91) |
| 24 | Punjab Local | 13.00 (3.67) | 26.07 (5.15) | 37.27 (6.13) | 42.17 (6.53) | 49.10 (7.04) | 26.70 (5.21) | 32.38 (5.73) |
| 25 | Rahuri Sel-2 | 9.20 (3.09) | 21.97 (4.73) | 34.57 (5.91) | 41.07 (6.45) | 46.77 (6.85) | 28.87 (5.41) | 30.40 (5.55) |
| 26 | Rajkot Local | 11.90 (3.49) | 24.20 (4.97) | 33.67 (5.83) | 40.50 (6.40) | 56.77 (7.53) | 29.90 (5.51) | 32.83 (5.77) |
| 27 | RHRG-7 | 16.50 (4.10) | 33.00 (5.77) | 44.84 (6.73) | 50.24 (7.12) | 59.07 (7.72) | 31.47 (5.65) | 39.18 (6.30) |
| 28 | Phule Baswant (Check) | 6.80 (2.69) | 13.70 (3.76) | 20.27 (4.55) | 26.50 (5.19) | 34.74 (5.93) | 18.27 (4.32) | 20.05 (4.53) |
| 29 | Phule Nilima (Check) | 17.74 (4.27) | 36.53 (6.08) | 49.80 (7.09) | 57.04 (7.58) | 69.14 (8.34) | 29.77 (5.50) | 43.34 (6.62) |
| | S.E.± | 0.15 | 0.17 | 0.19 | 0.14 | 0.18 | 0.18 | 0.06 |
| | C.D. at 5% | 0.41 | 0.49 | 0.54 | 0.41 | 0.50 | 0.50 | 0.18 |

MW – Metrological Week

**Table 2:** Evaluation of garlic genotypes against garlic mites, *Tetranychus urticae* Koch and yield.

| Sr. No | Name of genotype | Average number of mites/2.5 cm length of leaf Days after sowing | | | | Average Mites | Yield in q/ha |
|---|---|---|---|---|---|---|---|
| | | 68 | 88 | 108 | 128 | | |
| 1 | Agra Local | 9.07 (3.08) | 10.49 (3.30) | 13.19 (3.70) | 10.07 (3.25) | 10.71 (3.34) | 118.67 |
| 2 | Bhima Omkar | 11.21 (3.42) | 13.07 (3.68) | 17.14 (4.20) | 14.97 (3.92) | 14.09 (3.82) | 89.83 |
| 3 | Delhi Local | 21.14 (4.65) | 24.10 (4.96) | 27.67 (5.31) | 23.02 (4.85) | 23.98 (4.95) | 128.33 |
| 4 | Dindori Local (W) | 11.73 (3.49) | 13.43 (3.73) | 15.47 (3.99) | 11.77 (3.50) | 13.10 (3.68) | 120.50 |
| 5 | Dindori Local (V) | 9.72 (3.19) | 10.56 (3.32) | 12.74 (3.63) | 10.47 (3.31) | 10.87 (3.37) | 90.33 |
| 6 | G-1 | 0.46 (0.98) | 0.95 (1.20) | 1.16 (1.28) | 0.87 (1.15) | 0.85 (1.16) | 128.33 |
| 7 | Godavari | 14.67 (3.88) | 17.87 (4.28) | 21.89 (4.73) | 17.27 (4.20) | 17.90 (4.28) | 96.67 |
| 8 | Gondal | 10.51 (3.30) | 11.56 (3.45) | 13.92 (3.77) | 11.27 (3.39) | 11.80 (3.48) | 133.33 |
| 9 | IC-49350 | 0.74 (1.11) | 0.99 (1.22) | 1.66 (1.47) | 0.96 (1.21) | 1.09 (1.26) | 123.33 |
| 10 | Jalgaon Sel | 6.53 (2.63) | 7.97 (2.90) | 9.52 (3.16) | 7.54 (2.83) | 7.89 (2.89) | 133.33 |
| 11 | Jamnagar | 1.75 (1.50) | 2.29 (1.66) | 3.05 (1.88) | 2.30 (1.65) | 2.35 (1.69) | 125.00 |
| 12 | Jawahar MP2 | 8.16 (2.92) | 9.64 (3.17) | 11.67 (3.48) | 9.80 (3.20) | 9.89 (3.20) | 106.00 |
| 13 | Kalyanpur Sel | 10.77 (3.34) | 11.97 (3.52) | 13.67 (3.76) | 10.74 (3.34) | 11.75 (3.49) | 108.33 |
| 14 | Kalwan Local | 3.14 (1.89) | 4.37 (2.20) | 5.57 (2.45) | 3.98 (2.10) | 4.25 (2.17) | 149.33 |
| 15 | Koachi SEL | 11.57 (3.45) | 12.57 (3.60) | 14.80 (3.90) | 11.70 (3.47) | 12.65 (3.61) | 102.50 |
| 16 | Mansoor Local-1 | 15.39 (3.98) | 16.31 (4.10) | 18.27 (4.32) | 15.57 (4.00) | 16.37 (4.10) | 116.33 |
| 17 | NHRDF Sel | 9.06 (3.07) | 10.47 (3.29) | 12.43 (3.58) | 9.96 (3.22) | 10.46 (3.30) | 120.50 |
| 18 | PB-11 | 16.47 (4.11) | 17.87 (4.28) | 27.56 (5.30) | 22.25 (4.77) | 21.01 (4.64) | 93.33 |
| 19 | PB-16 | 18.88 (4.40) | 20.11 (4.54) | 22.05 (4.75) | 22.14 (4.75) | 20.80 (4.61) | 125.00 |
| 20 | PB Sel-15-1 | 13.67 (3.76) | 17.94 (4.29) | 18.75 (4.39) | 14.04 (3.81) | 16.09 (4.07) | 106.00 |
| 21 | Pimpri-2 | 17.40 (4.23) | 22.64 (4.81) | 25.70 (5.12) | 20.88 (4.62) | 21.65 (4.71) | 121.67 |
| 22 | Solan Local | 17.75 (4.27) | 18.97 (4.41) | 19.98 (4.52) | 16.47 (4.12) | 18.29 (4.33) | 121.00 |
| 23 | Shweta | 16.86 (4.16) | 22.89 (4.83) | 31.33 (5.64) | 23.67 (4.91) | 23.69 (4.92) | 99.00 |
| 24 | Punjab Local | 18.50 (4.35) | 20.20 (4.55) | 21.84 (4.72) | 17.47 (4.23) | 19.50 (4.47) | 136.67 |
| 25 | Rahuri Sel-2 | 10.27 (3.27) | 13.50 (3.73) | 16.00 (4.05) | 12.07 (3.54) | 12.95 (3.66) | 128.33 |
| 26 | Rajkot Local | 15.34 (3.98) | 18.67 (4.37) | 20.28 (4.56) | 14.84 (3.91) | 17.29 (4.21) | 73.33 |
| 27 | RHRG-7 | 8.86 (3.03) | 12.33 (3.57) | 13.90 (3.78) | 10.15 (3.25) | 11.31 (3.42) | 120.00 |
| 28 | Phule Baswant (Check) | 9.13 (3.10) | 11.20 (3.42) | 12.47 (3.60) | 9.47 (3.15) | 10.57 (3.32) | 136.67 |
| 29 | Phule Nilima (Check) | 9.52 (3.15) | 11.47 (3.45) | 13.27 (3.70) | 9.00 (3.07) | 10.82 (3.35) | 146.67 |
| | S.E.± | 0.16 | 0.14 | 0.14 | 0.16 | 0.13 | 0.31 |
| | C.D. at 5% | 0.45 | 0.40 | 0.38 | 0.45 | 0.38 | 0.88 |

## Conclusion

The evaluation of different genotypes against garlic thrips revealed that, Agra Local and Bhima Omkar recorded least incidence of average thrips (14.76 and 18.83 thrips / plant, respectively) as compare to standard check i.e. Phule Baswant and Phule Nilima (20.05 and 43.34 thrips / plant, respectively) and it can be used for the further varietal development. The genotypes PB-11 and Shweta recorded highest and significantly superior number of thrips (48.22 and 47.27 thrips / plant, respectively) over check and hence they can be used as

susceptible check in further screening studies. Also, these genotypes can be intercropped alternatively to develop thrips population during further screening studies of garlic.

In case of mite screening for garlic crop, the genotype G-1 and IC-49350 recorded least incidence of mites (0.85 and 1.09 mites / 2.5 cm length of leaf) as compare to standard check i.e. Phule Baswant and Phule Nilima (10.57 and 10.82 mites / 2.5 cm length of leaf, respectively). These two genotypes can be used for development of mite tolerant varieties in garlic. Similarly, genotypes *viz.*, Delhi Local and Shweta, which recorded highest incidence of mites can be used as susceptible check as well as to develop mites population during further screening studies of garlic.

Regarding yield, Kalwan Local (149.33 q / ha) recorded highest yield. It was followed by check, Phule Nilima (146.67 q / ha) and genotype, Punjab Local (136.67 q / ha). However, for above findings further detail studies are essential

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