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## Screening of different varieties of pomegranate against *Scirtothrips dorsalis* Hood

SR Shinde, Dr. AK Bhowmick and Dr. AK Shukla

**Abstract**

Screening of different commercial and ornamental cultivars of pomegranate was done with two different parameters. One by counting actual number of thrips found per plant and by per cent infestation of thrips found per plant. Investigations were carried out for the research work on "Screening of different varieties of pomegranate against *Scirtothrips dorsalis* Hood."

The pooled data presented in tables revealed that among fruit bearded cultivars 'Ruby' recorded least per cent fruit infestation (52.14) which is found significantly superior over rest of the treatments followed by 'Nayna' recorded 64.44 per cent fruit infestation, 'Ganesh' recorded 67.45 per cent fruit infestation and 'Bhagwa' recorded 72.67 per cent fruit infestation all these are found second most resist treatments and at par with each other. As usual 'Mridula' recorded highest per cent fruit infestation (80.05) followed by Ja. Seedless and 'Arakta' which were recorded as 78.48 and 78.23 per cent fruit infestation per plant respectively.

With this given pooled data most resistant cultivar is enlisted with decreasing order other than Daru and Nana was as like this: Ruby > Nayna > Ganesh > Bhagwa > G-137 > Arakta > Ja. Seedless > Mridula. 'Ruby' is highly resistant while 'Mridula' is highly susceptible cultivar among commercially used cultivars.

**Keywords:** Pomegranate against *Scirtothrips dorsalis*, *Punica granatum* L

**Introduction**

The pomegranate (*Punica granatum* L.) is one of the oldest known edible fruits. This is emerging as one of the commercially important fruit crops of tropical and subtropical regions of the world. The name pomegranate is derived from two Latin words 'pōmum' (apple) and grānātum (seeded). It belongs to the family 'Lythraceae' formerly was placed in 'Punicaceae'. The genus *Punica* includes two species, *P. granatum* the edible pomegranate native to Iran and northern India and the other being *Punica protopunica* Balf., which is native to the Island of Socotra and is not of economic importance. In India, pomegranate is popularly known as *Anar*, *Dalimb*, *Dalima* or *Dodima* in different states.

It is a very important and useful crop because of its wide acceptability to environmental and soil conditions (Tous, J. and L. Ferguson, 1996) [7]. It is an important fruit crop of arid and semiarid regions of the world. Pomegranate cultivation is one of the most remunerative and attractive farming enterprises in the arid and semi-arid regions of India. Several varieties like Alandi (Vadki), Dholka, pomegranate GKVK1, IIHR Selection, Spanish Ruby, Jyothi, Ruby, Muskat Red, G-13, Mridula, Ganesh, Arakta and Bhagawa, Super Bhagawa etc. are grown in different regions but 'Bhagawa' is the most popular variety today. India is the largest producer of pomegranate with production of 28.45 lakh MT through area of 2.34 lakh ha (<sup>1</sup>NHB, 2017-18), with 70% area in Maharashtra, followed by Gujarat, Karnataka, Telangana, Andhra Pradesh, Rajasthan, Madhya Pradesh and few other states.

Thrips are important pest of pomegranate deteriorating fruit quality and it is found throughout year. It has become a major constraint in the production of appropriate quality fruits of pomegranate for domestic and export markets. Pomegranate thrips, *Scirtothrips dorsalis* Hood is the most widespread, polyhouse and destructive pest with a wide range of host plants viz., vegetables, flowers and fruits. In the light of above discussion, the present investigations entitled "Screening of different varieties of pomegranate against *Scirtothrips dorsalis* Hood."

**Materials and Methods**

The trials were carried out at ICAR-National Research Centre on Pomegranate (ICAR-NRCP), Solapur for screening out different varieties of pomegranate against thrips *Scirtothrips dorsalis*

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Hood. Screening of popular varieties of pomegranate was done in *Hasta Bahar* (winter) season 2016-17 and 2017-18. Present trial was conducted in H-6 block of ICAR-NRCP, Solapur.

### Treatments

Ten commercial and ornamental varieties i.e. Bhagwa, Ganesh, G-137, Mridula, Arakta, Daru, Nayna, Rubby, Jalore seedless and Nana were selected. All the varieties were above three years old.

### Observations

Randomly three plants were selected from each variety for observation. Data were recorded by two ways i.e. through average number of thrips on twigs per plant and per cent fruit infestation per plant. For recording observations four twigs were selected from each selected plant in four directions (North-South-East-West) and counted number of thrips per twig and final number of thrips per plant were counted by summation of four twigs. In case of fruits counted total number of fruits per plant and number of infested fruits showing symptoms of thrips infestation were recorded.

The data was recorded at ten days interval. No insecticide sprays were taken during observation period. Thrips were tapped on white card sheet for easy observation. Actual numbers of thrips dropped on the sheet were counted. Numbers of thrips population recorded on twigs per plant and per cent infested fruits per plant were calculated.

- Number of thrips per plant = Sum of thrips counted on four different directed twigs of plant.

In fruit per cent infested fruits were counted with following formula

$$\text{Per cent fruit per plant} = \frac{\text{Number of Infested fruits on plant} \times 100}{\text{Total number of fruits on plant}}$$

### Data analysis

The experimental data were subjected to statistical analysis. The experiment was analysed in Randomized Block design. The percentage values were transformed into arc sin values before undertaking the statistical analysis. The thrips count in numbers was converted into  $n + 0.5$  value for statistical analysis.

Standard statistical method of analysis of variance was applied for the analysis of the data. The T' test of significance at 5% level was used for testing the null hypothesis in order to determine whether the treatment effects were real or otherwise.

### Results and Discussion

The field trials were conducted with objectives 'Screening of different varieties of pomegranate against pomegranate thrips' at ICAR-NRCP campus. The experimental findings are presented in this chapter.

Screening of different commercial cultivars of pomegranate was done with two different parameters. One by counting actual number of thrips found per plant and by per cent infestation of thrips found per plant. The data showing the percentage of infestation caused by *S. dorsalis* on ten pomegranate cultivars on ten days interval basis during 2017 and 2018 is presented in Tables 1.

### Average number of thrips on twigs per plant

In year 2017 Cultivar 'Nana' has no found any thrips infestation on plant. The average number of thrips found per plant was shown in Table 01 reveals that, among remaining cultivar 'Daru' was recorded lowest thrips infestation (average 16.45 thrips per plant) which is found superior over rest of the treatments. Cultivar 'Ruby' recorded second lowest infestation (average 17.86 thrips per plant) of thrips which is found at par with 'Nayna' and 'Bhagwa' recorded average 18.86 and 19.18 thrips per plant respectively. Followed by 'Arakta', recorded average 24.68 thrips per plant. Cultivar 'Mridula' is found highest average number of thrips (25.86) per plant which is found at par with 'Ganesh' and 'G-137' recorded average 24.09 and 25.55 thrips per plant respectively found more susceptible to thrips.

In 2018 as like previous year, Cultivar 'Nana' has no found any thrips infestation on plant. Cultivar 'Ruby' and 'Daru' found most resistance with recording average 18.91 thrips per plant and found superior over rest of the treatments. Cultivar 'Nayna' are the second highest resist cultivars against thrips recorded 21.00 thrips per plant which was found at par with 'Bhagwa' and 'Ja. Seedless' recorded 22.23 and 22.91 average thrips per plant respectively. Followed by 'Ganesh', 'Mridula' and 'Arakta' recorded 25.27, 26.23 and 26.32 thrips per plant respectively and found at par with each other. With recording 28.64 average thrips per plant cultivar 'G-137' found most susceptible cultivar against thrips among tested cultivars.

**Table 1:** Screening of different varieties of pomegranate against *S. dorsalis* by counting average number of thrips on twigs.

| Average Number of thrips per plant on Twigs |              |               |               |               |
|---|--------------|---------------|---------------|---------------|
|   | Treatments   | 2017          | 2018          | Polled        |
| 1   | Ganesh       | 24.68 (5.066) | 26.32 (5.226) | 25.50 (5.061) |
| 2   | G-137        | 25.54 (5.152) | 26.32 (5.218) | 25.89 (5.206) |
| 3   | Arakta       | 24.09 (5.002) | 25.27 (5.124) | 24.68 (4.892) |
| 4   | Mridula      | 25.86 (5.183) | 28.64 (5.444) | 27.25 (5.367) |
| 5   | Bhagwa       | 19.18 (4.493) | 22.23 (4.819) | 20.70 (4.700) |
| 6   | Nyana        | 18.86 (4.448) | 21.00 (4.689) | 19.93 (4.422) |
| 7   | Ruby         | 17.86 (4.338) | 18.91 (4.461) | 18.39 (4.281) |
| 8   | Ja. Seedless | 20.50 (4.637) | 22.91 (4.889) | 21.70 (4.843) |
| 9   | Daru         | 16.45 (4.173) | 18.91 (4.461) | 17.68 (4.233) |
| 10  | Nana         | 0.00 (1.000)  | 0.00 (1.000)  | 0.00 (1.000)  |
|   | C.D.         | 0.422         | 0.225         | 0.056         |
|   | SE(m)        | 0.130         | 0.069         | 0.017         |
|   | SE(d)        | 0.184         | 0.098         | 0.024         |
|   | C.V.         | 4.230         | 2.168         | 0.554         |

(Values given in parenthesis are transformed square root values)

In pooled data of 2017 and 2018 revealed that Cultivar 'Daru' found most resistance with recording average 17.68 thrips per plant and found superior over rest of the treatments. Followed by Cultivar 'Ruby' recorded average 18.39 thrips per plant. Followed by cultivar 'Nayna', 'Bhagwa' and per plant. Followed by cultivar 'Nayna', 'Bhagwa' and Ja. Seedless those are recorded average 19.93, 20.70 and 21.70 thrips per plant respectively and those are found at par with each other. In this treatment cultivar 'Mridula' found significantly most susceptible plant against thrips recorded highest (27.25) average number of thrips per plant which is followed by 'G-137',

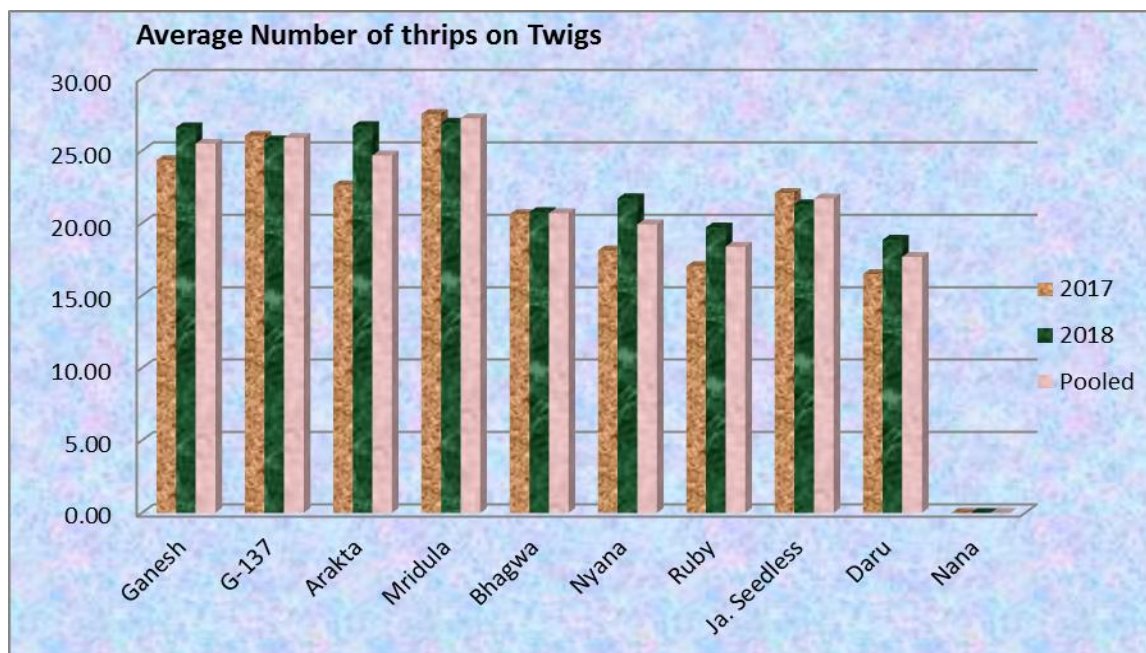


Fig 1: Infestation of thrips on twigs of pomegranate

'Ganesh' and 'Arakta' counted average 25.89, 25.50 and 24.68 thrips per plant which is found at par with each other.

#### Per cent infestation of thrips on fruit per plant

The presented in Table 02 indicated that the per cent infested fruits by thrips per plant. During 2017 and 2018 cultivar 'Nana' and 'Daru' not bore any fruit on plant so in this table Cultivar 'Nana' and 'Daru' showing nil infestation.

In year 2017 cultivar 'Nayna' is most resistant cultivar against thrips which is recorded 63.37 per cent fruits infestation per plant and found significantly superior over rest of the treatments followed by Cultivar 'Ruby' recorded second lowest fruit infestation (67.37 per cent fruit infestation per plant) which is found at par with 'Ganesh', 'Bhagwa' and 'G-137' recorded 67.41, 72.65 and 76.10 percent fruit infestation per plant respectively. Cultivar 'Ja. Seedless' found most

susceptible cultivar by counting 82.70 per cent fruit infestation per plant followed by 'Mridula' and 'Arakta' those are recorded 81.14 and 78.65 per cent fruit infestation per plant which is found at par with each other.

Data given in 2018 of Table 02 revealed that cultivar 'Ruby' is most resist to thrips attacks on fruit which is shown minimum thrips infestation (51.12) per cent fruit infestation per plant. By recording 65.51 per cent fruits infestation per plant 'Nayna' found second most resistant cultivar in these treatments. All these are found significantly superior over each other followed by 'Ganesh', 'Bhagwa' and 'Ja. Seedless' which were recorded 67.50, 72.69 and 74.26 per cent fruit infestation by per plant. Cultivar 'Mridula' showing highly susceptible results against thrips and recorded 78.96 per cent fruit infestation per plant followed by 'G-137' (76.60) and Arakta (77.80).

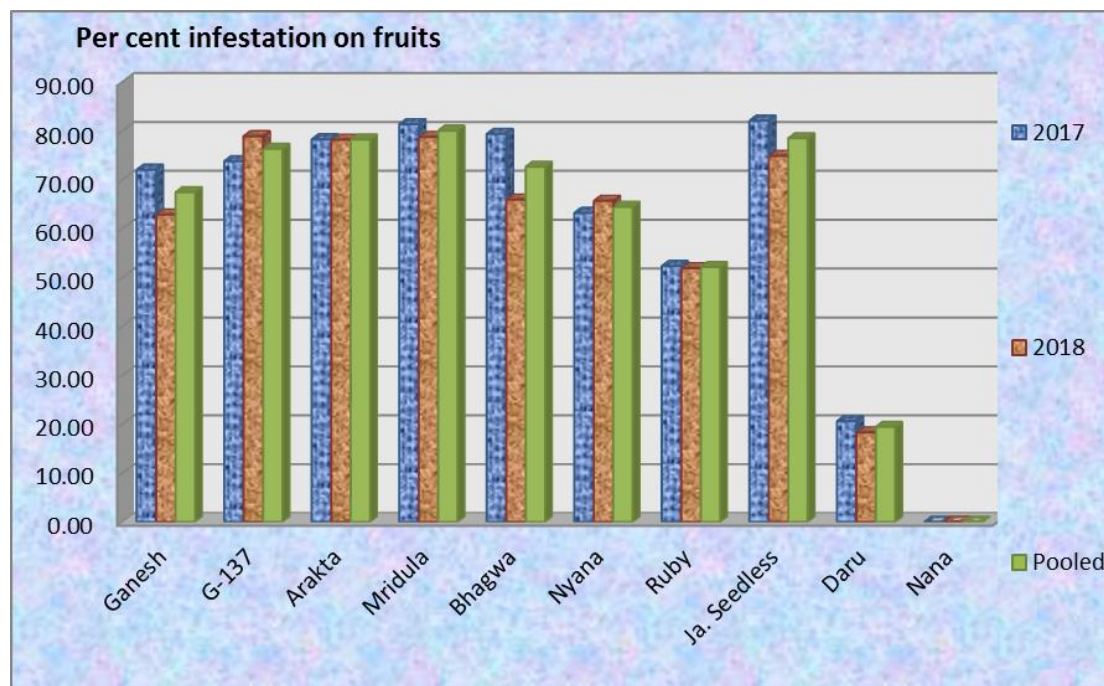
Table 2: Screening of different varieties of pomegranate against *S. dorsalis* by counting per cent infestation on fruits.

| Per cent infestation of thrips on fruit per plant |               |               |               |  |
|---|---------------|---------------|---------------|--|
| Treatments  | 2017          | 2018          | Polled        |  |
| 1 Ganesh  | 67.41 (8.260) | 67.50 (8.275) | 67.45 (8.269) |  |
| 2 G-137   | 76.10 (8.778) | 76.60 (8.809) | 76.35 (8.794) |  |
| 3 Arakta  | 78.65 (8.925) | 77.80 (8.877) | 78.23 (8.901) |  |
| 4 Mridula   | 81.14 (9.063) | 78.96 (8.942) | 80.05 (9.003) |  |
| 5 Bhagwa  | 72.65 (8.569) | 72.69 (8.579) | 72.67 (8.574) |  |
| 6 Nyana   | 63.37 (8.023) | 65.51 (8.155) | 64.44 (8.089) |  |
| 7 Ruby  | 51.12 (7.069) | 53.16 (7.457) | 52.14 (7.290) |  |
| 8 Ja. Seedless                                    | 82.70 (9.144) | 74.26 (8.674) | 78.48 (8.913) |  |
| 9 Daru  | 0.00 (1.000)  | 0.00 (1.000)  | 0.00 (1.000)  |  |
| 10 Nana   | 0.00 (1.000)  | 0.00 (1.000)  | 0.00 (1.000)  |  |
| C.D.  | 0.730         | 0.386         | 0.535         |  |
| SE(m)   | 0.225         | 0.119         | 0.165         |  |
| SE(d)   | 0.318         | 0.168         | 0.233         |  |
| C.V.  | 4.483         | 2.281         | 3.178         |  |

(Values given in parenthesis are transformed square root values)

The pooled data of 2017 and 2018 given in Table 02 revealed that among fruit bearded cultivars 'Ruby' recorded least per cent fruit infestation (52.14) which is found significantly superior over rest of the treatments followed by 'Nayna' recorded 64.44 per cent fruit infestation, 'Ganesh' recorded 67.45 per cent fruit infestation and 'Bhagwa' recorded 72.67

per cent fruit infestation all these are found second most resist treatments and at par with each other. As usual 'Mridula' recorded highest per cent fruit infestation (80.05) followed by Ja. Seedless and 'Arakta' which were recorded as 78.48 and 78.23 per cent fruit infestation per plant respectively.



**Fig 2:** Per cent infestation of thrips on fruits of pomegranate

The data observed on both year reveals that the infestation level of thrips was found more on newly emerged leaves and soft rind fruits. When fruits become more mature or rind become hard infestations of thrips get reduced. More infestation of thrips was observed on fruits having soft rind like Arakta, Mridula while fruits like Ganesh, Bhagwa are found more resistant against thrips. With this given pooled data most resistant cultivar is enlisted with decreasing order other than Daru and Nana was as like this: Ruby > Nayna > Ganesh > Bhagwa > G-137 > Arakta > Ja. Seedless > Mridula. 'Ruby' is highly resistant while 'Mridula' is highly susceptible cultivar among commercially used cultivars. Experimental findings regarding study of screening in pomegranate thrips was very scanty. Similarly Patel

Nareshkumar Mohanlal in 2003 tested five varieties of rose against thrips, amongst five varieties tested, Aifil tower recorded the lowest thrips population 6.31 and 6.26 thrips per flower during 2002 and 2003, respectively. While, Gladiator recorded the highest 7.17 and 7.67 thrips per flower during respective years. Dev in 1964 reported that *Scirtothrips dorsalis* is a major pest and has broad host range. Apart from pomegranate it also attacks tea, grapes, chilli etc. Mannion *et al.* in 2013<sup>[5]</sup> carried out experiment regarding screening eight cultivars such as Angel Face, Don Juan, Pink Summer Snow, Radcon, Radrazz, Radsunny, St. Patrick and Sun Flare of landscape roses which are popular in Florida against *S. dorsalis*.



**Fig 3:** Infested plant parts of Pomegranate by *Scirtothrips dorsalis*

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