The Pharma Innovation Journal 2023; 12(7): 3072-3074

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2023; 12(7): 3072-3074

www.thepharmajournal.com
Received: 08-04-2023
Accepted: 11-05-2023

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Screening of onion varieties against onion thrips (*Thrips tabaci* L.)

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Abstract
The field experiment was conducted during *rabi* 2019-2020 at Horticultural farm of BTC College of Agriculture and Research Station, Bilaspur, Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G.). Screened variety namely Nasik red, N-53, Poona red, Light red gavran and Poonam light red against onion thrips (*Thrips tabaci* L.) variety Poona light red was found highly resistant with lowest overall mean 03.12 thrips/plant, Light red gavran and Poona red varieties both were fall in resistant category. The variety N-53 was observed as susceptible, whereas variety Nasik Red was recorded highly susceptible variety with overall mean 08.48 thrips/plant.

Keywords: Onion, screening, thrips, varieties

Introduction
Onion (*Allium cepa* L.) is also known as pyaj in India due to different valued properties like flavor, aroma and unique relish and sapor "Queen of the kitchen". Onion has been valued as a food and a medicinal plant since ancient times. The important bulb crop next to garlic. Most widely cultivated and consumed vegetable across the globe. The onion belongs to the family of "Amaryllidaceae" and genus of "*Allium*" India is the second largest producer of onion in the world next only to China but the productivity of onion in India is very low. (NHB, 2015). India is the large producer of onion as compare to other bulb crops with the production of 23262.33 thousand metric tonnes from 1284.99 thousand hectares. (Anonymous, 2017-2018). The onion plant is attacked by several insect pests like thrips, onion fly, cut worms and tobacco caterpillars etc. The onion thrips (*Thrips tabaci* L) (Thysanoptera: Thripidae) is a major insect pest that causes significant yield losses. In India, it is an important insect pest that affect onion yield by direct feeding as well as reducing the quality and quantity by rasping and sucking the leaves and other tissues of onion crops. Onion thrips has become a global pest of increasing concern in commercial onion production, because of its development of resistance to insecticides, ability to transmit plant pathogens and frequency of producing more generations at high temperatures. Onion thrips feed directly on leaves, causing blotches as well as distort the bulbs and convert them into under size causing yield loss >50% but can be even more problematic by transmitting viral disease like Iris yellow spot virus (IYSV) (Diaz-Montano *et al*., 2011) [6].
To reduce the risk of pesticide application and resulting yield losses of onion. Yield loss due to Onion thrips into among the insect pest complex, *Thrips tabaci* L. is most serious insect infesting up to 34-43 percent loss of yield (Krishna Kumar *et al*.,2001) [7], Heavy yield loss caused even 90 percent has also been reported on onion when thrips attack the early crop stages of crop growth (Anonymous., 1984) [2]. Adult and nymph both are caused infestation on sheath portion of plant due to because of its destructive rasp to cell saps after the symptoms view of oozing leaves become dry and twisted from apex developing into white patches. For the better management and reducing the losses we need to know varietal screening against the *Thrips tabaci* L. (Anil Kumar 2016) [1].

Material and Methods
Demonstrate 5 onion varieties were investigated for response against onion thrips. Onion varieties available from local market in Bilaspur, Chhattisgarh, India. Transplanted for the purpose and the observations on the basis of number of thrips per plant were taken on 10 plants selected randomly in each plot on weekly bases with the help of magnifying lance after first appearance till to the harvesting of the crop. The data was transformed in to square root transformation and then statistical analysis was done for assessing the varieties for relative

susceptibility to *T. tabaci.* The varieties were grouped in to four categories *viz*. highly resistance, resistance, susceptible and highly susceptible based on number of thrips per plant, rating scale as suggested by (Sheikh *et al.* 2014) [10].

For the purpose, the average value of individual genotypes (Xi) was compared with the mean value of all genotypes (x) and standard deviations (sd). The scale used to classify the different genotypes was as follows.

Table 1: Pest susceptible scale against *Thrips tabaci* L.

Category of resistance	Scale for Resistance
Highly Resistant (HR)	Xi< X -sd
Resistant (R)	Xi > X- sd < X
Susceptible (S)	Xi > X< (X+ sd)
Highly Susceptible (HS)	Xi > (X+sd) < (X +2sd)

Result and Discussion

The total 5 onion varieties *viz*. Nasik red, N-53, Poona red, Light red gavran and Poona light red were considered for the purpose. All varieties were classified as highly resistant, resistant, susceptible and highly susceptible according to rating scale suggested by sheikh *et al*, 2014 [10]. On the basis of pest susceptibility scale against onion thrips (Table 2). Poona light red variety was categorized as highly resistant and average thrips population varies from 00.08 thrips/plant (77 DAT) – 11.18 thrips/plant (126 DAT) with overall mean 03.12 thrips/plant. Light red gavran and Poona light red varieties were found resistant. Average thrips population in Light red gavran and Poona light red varieties varies from 00.13 and 00.15 thrips/plant (77 DAT) – 11.38 and 15.58 thrips/plant (126 DAT) with overall mean 03.53 and 05.22 thrips/plant respectively. N-53 variety was recorded susceptible with average thrips population varies from 0.17 thrips/plant (77 DAT) – 25.13 thrips/plant (126 DAT) and overall mean 06.60 thrips/plant. Nasik red variety recorded with higher average thrips population among all the varieties and varies from 0.40 thrips/plant (77 DAT) – 31.60 thrips/plant (126 DAT) and overall mean 08.48 thrips/plant was highly susceptible. The mean population thrips score of highly resistant group ranged was < 3.18 thrips per plant (Table 2). The variety Poona light red had lowest population of onion thrips scored (3.12 thrips/plant), while the highest thrips population of scored were variety local check Nasik red (6.32 thrips/plant). The average population of thrips were scored highly resistant variety Poona light red with 4.04 thrips/plant population. These also supported by Patel *et al.*, (2012) [8] among the twelve genotypes / cultivars of onion screened for thrips susceptibility at Anand, Gujarat, JRO-2000-181 was found highly resistant (HR) by recording significantly lower population of thrips and higher yield of bulbs followed by Gujarat White Onion-1 and Talaja red.

Table 2: Varietal susceptibility scale against onion thrips.

Based on population of thrips/plants: $\bar{X}$ =5.39 and sd = 2.21		
Category of resistance level	**Scale**	**varieties ($\bar{X}$ N)**
Highly resistance	$\bar{x}$ < 3.18	Poona light red (3.12)
Resistance	$\bar{x}$ > 3.18<5.39	Light red gavran (3.53) Poona red (5.22
Susceptible	$\bar{x}$ >5.39<7.60	N - 53 (6.60)
Highly Susceptible	$\bar{x}$ >7.60<9.81	Nasik red (8.48)

Source rating scale as suggested by sheikh *et al*, 2014 [10]

Table 3: Screening of different onion varieties against thrips,(*Thrips tabaci* L.)

S. No.	Varieties	17/02/2020 (77DAT)	24/02/2020 (84DAT)	02/03/2020 (91DAT)	09/03/2020 (98DAT)	16/03/2020 (105DAT)	23/03/2020 (112DAT)	30/04/2020 (119 DAT)	06/04/2020 (126 DAT)	13/04/2020 (133DAT)	20/04/2020 (140DAT)	Overall Mean
1	Nasik red	00.40 (00.93)	00.40 (00.95)	02.10 (01.44)	02.10 (01.44)	04.80 (02.17)	10.65 (03.17)	19.10 (04.36)	31.60 (05.62)	12.93 (03.60)	01.70 (01.30)	08.48 (02.42)^{a}
2	N-53	00.17 (00.81)	00.23 (00.85)	01.41 (01.21)	01.48 (01.21)	04.23 (02.05)	04.25 (02.03)	15.53 (03.91)	25.13 (05.01)	11.88 (03.45)	01.80 (01.08)	06.60 (02.19)^{b}
3	Poona red	00.15 (00.80)	00.18 (00.82)	01.55 (01.24)	01.55 (01.24)	03.50 (01.87)	04.40 (02.06)	14.85 (03.84)	15.58 (03.95)	10.40 (03.23)	00.98 (00.99)	05.22 (01.93)^{c}
4	Light red gavran	00.13 (00.79)	00.18 (00.81)	01.48 (01.20)	01.48 (01.20)	03.8 (01.94)	02.65 (01.62)	05.33 (02.30)	11.38 (03.37)	8.70 (02.95)	01.00 (01.00)	03.53 (01.66)^{d}
5	Poona light red	00.08 (00.76)	00.08 (00.76)	00.88 (00.93)	00.80 (00.89)	03.12 (01.75)	03.73 (01.86)	03.93 (01.97)	11.18 (03.32)	07.03 (02.65)	00.83 (00.90)	03.12 (01.56)^{d}
CD at 5%												00.03
SEm ±												00.12

Figures in Parenthesis are square root $\sqrt{Xi}$ + 0.5 transformation, PTO = Pre-treatment observation, DAS= Day after transplanting.

Conclusion

In varietals screening against onion thrips, Poona light red variety was found highly resistant, Light red gavran and Poona red varieties both were fall in resistant category. The variety N-53 was observed as susceptible whereas variety Nasik red was recorded highly susceptible variety.

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