

SCREENING OF DIFFERENT ONION GENOTYPES AGAINST THRIPS, *THRIPS TABACI* L. UNDER FIELD CONDITION

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ABSTRACT

Response of different onion genotypes against thrips (*Thrips tabaci* L.) was evaluated Indira Gandhi Krishi Viswa vidyalaya, Raipur (Chhattisgarh) in *Rabi* season 2014-15. 49 onion genotypes were evaluated for resistance to thrips. Among the genotype showed that 4 genotypes were categorized as highly resistant, 21 genotypes as resistant, 20 genotypes susceptible and 4 genotypes as highly susceptible. Genotype ON14-6 had considered as highly resistant because of lowest thrips population score (2.03 thrips per plant) and genotype ASRO-1207 was recorded as highly susceptible because it had highest 7.94 thrips population per plant but it was superior with check variety Agrifound light red (13.11 thrips per plant).

INTRODUCTION

Onion (*Allium cepa* L.) belongs to the family Alliaceae and is well known as the most important vegetable crop in the world. Onion bulb is also used as spices which is composed of carbohydrates (11.0 g), proteins (1.2 g), fiber (0.6 g), moisture (86.8 g), several vitamins and also some minerals (Suresh, 2007). Onion (*A. cepa* L.) is the major vegetable crop for the region owing to its use in green form or as mature bulb or both used as salad and in preparations of immeasurable number of dishes besides its long shelf life for off season market (Kanwar and Akber, 2013). In commercial cultivation of onion, thrips play the key role in reducing the bulb yield and quality of produce. Thrips (*Thrips tabaci* L.) among the insects are the most devastating and prevalent in many parts of India (Gupta *et al.*, 2011). Thrips are minute and invasive pests comprising nearly 5000 species (Anonymous, 2012a; Atakan, 2011). Use of resistant variety is more important due to change in climatic conditions during the growing season. Hence, cultivation of resistant and/or tolerant varieties against onion thrips as a control measure not only become more economical but also environmentally safer than rest of the chemical control measures (Tripathy *et al.*, 2015). Broad spectrum synthetic chemical also result in bioaccumulation and biomagnifications of toxic residues, hence, there is a urgent need to look alternates and safer method use of resistant varieties is recognized an important tool in bio intensive pest management system (Devi *et al.*, 2015). To reduce the risk of usage of pesticides loss of the crop the best method of control of the insect is use of resistant onion cultivars, derived from the resistant genetic resources (Sepahvand *et al.*, 2015). Researchers currently identified thrips resistant cultivars/

genotype that guard against the negative impacts of thrips infestation. Onion varieties on the basis of leaf color can be regarded as resistant or susceptible to onion thrips whereas the length of "days to maturity" is not a significant criteria indicating resistance or susceptibility (Diaz-Montano *et al.*, 2012). Keeping in view the economic importance of onion crop in daily use, where use of insecticide is not desirable, the present studies were undertaken to find out the source of resistance against thrips.

MATERIALS AND METHODS

Experiment on screening of onion genotype against thrips under field conditions was conducted in *Rabi* season 2014-15, at Horticultural Research Farm, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh, India. In the experiment each genotype was consisted three replication having plot size 3.0 m² each and sown the second week of October by adopting recommended practices. The row and plant spacing were maintained at 15 cm and 10 cm, respectively. During of crop investigation was carried out to study the response of 49 (including local check) onion genotypes against thrips. The onion genotypes made available from All India Network Research Project on Onion and Garlic.

Table 1: Pest susceptibility scale against onion thrips

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

The screening was undertaken in field conditions in which population of thrips will be observed at ten days interval from randomly selected five plants in each treatment from three replication. At ten days interval, the number of nymphs and adults of thrips were assessed on leaves (bottom or base of the leaves) in five selected plants by examining each leaf carefully during early morning hours, when the pest was less active. The population data obtained from the field experiment were subjected to square root transformation (Gomez and Gomez,

1984) and also evaluated as highly resistant, resistant, susceptible and highly susceptible genotypes was done. The genotypes were categorized into four groups viz. highly resistance, resistance, susceptible and highly susceptible based on rating scale as suggested by Shaikh *et al.* (2014). For the purpose, mean value of individual genotype (X_i) was compared with mean value of all genotypes (\bar{X}) and standard deviation (sd). The scale used for categorizing different genotypes was as under.

Table 2: Screening of different onion genotypes against thrips, *Thrips tabaci* L. during Rabi 2014-15.

S.No.	Genotypes	30 DAT	40 DAT	50 DAT	60 DAT	70 DAT	80 DAT	90 DAT	100 DAT
1	ASRO-1201	0.00(1.00)	0.73(1.31)	0.20(1.09)	1.00(1.39)	1.03(1.42)	3.20(2.01)	27.21(5.30)	29.80(5.41)
2	ASRO-1238	0.04(1.03)	1.20(1.48)	0.29(1.13)	1.27(1.47)	1.48(1.57)	4.53(2.34)	25.72(5.16)	28.20(5.40)
3	ASRO-1207	0.02(1.02)	1.13(1.46)	0.27(1.12)	1.20(1.48)	0.50(1.22)	1.60(1.61)	29.83(5.55)	32.33(5.69)
4	ASRO-1273	0.01(1.01)	1.07(1.43)	0.14(1.07)	0.53(1.23)	0.46(1.20)	1.47(1.56)	12.10(3.61)	44.33(6.69)
5	ASRO-1203	0.01(1.00)	1.07(1.43)	0.25(1.11)	0.87(1.36)	0.32(1.15)	1.07(1.41)	10.85(3.44)	53.33(7.31)
6	ASRO-1229	0.00(1)	0.93(1.38)	0.04(1.02)	0.27(1.12)	0.86(1.36)	2.67(1.90)	9.03(3.16)	51.53(7.21)
7	ASRO-1227	0.04(1.03)	1.20(1.48)	0.14(1.07)	0.53(1.23)	0.79(1.33)	2.47(1.86)	6.31(2.7)	78.13(8.88)
8	ASRO-1275	0.00(1)	0.93(1.38)	0.68(1.29)	1.33(1.50)	0.46(1.20)	1.47(1.56)	13.16(3.76)	94.67(9.77)
9	ASRO-1215	0.00(1)	0.87(1.36)	0.14(1.06)	0.53(1.23)	1.24(1.49)	3.80(2.11)	7.50(2.91)	75.33(8.72)
10	ASRO-1271	0.00(1)	0.80(1.34)	0.54(1.23)	1.00(1.40)	0.23(1.11)	0.80(1.34)	9.52(3.4)	79.40 (8.95)
11	ASRO-1236	0.04(1.03)	1.20(1.48)	0.14(1.07)	0.53(1.23)	1.28(1.51)	3.93(2.20)	11.36(3.51)	71.20(8.47)
12	OSR -1367	0.11(1.08)	0.67(1.29)	1.23(1.49)	3.80(2.18)	3.77(2.14)	11.40(3.52)	35.11(6.00)	92.27(9.65)
13	OSR -1372	0.02(1.01)	1.20(1.48)	1.05(1.43)	3.27(2.06)	3.00(1.97)	9.00(3.15)	53.31(7.37)	89.13(9.49)
14	OSR -1377	0.00(1)	0.93(1.38)	0.46(1.20)	2.47(1.86)	3.17(2.03)	9.80(3.28)	47.57(6.96)	85.40(9.28)
15	OSR -1381	0.00(1)	1.00(1.41)	0.68(1.29)	2.13(1.76)	3.01(1.97)	8.27(3.03)	39.76(6.38)	83.60(9.17)
16	OSR -1370	0.00(1)	0.80(1.34)	0.50(1.22)	1.60(1.61)	1.75(1.63)	5.47(2.53)	41.70(6.53)	84.53(9.22)
17	OSR -1374	0.00(1)	0.73(1.31)	0.59(1.26)	1.87(1.68)	3.07(2.00)	6.93(2.81)	51.30(7.23)	53.80(7.40)
18	OSR -1379	0.00(1)	0.80(1.34)	0.41(1.18)	1.33(1.52)	0.65(1.28)	9.20(3.19)	43.73(6.68)	46.20(6.85)
19	ASRO-1217	0.00(1)	0.87(1.36)	0.30(1.13)	1.00(1.41)	1.50(1.55)	3.00(1.94)	83.83(9.21)	86.33(9.33)
20	ASRO-1222	0.03(1.02)	1.13(1.45)	0.17(1.08)	0.60(1.26)	2.71(1.87)	4.53(2.29)	92.23(9.65)	94.73(9.78)
21	ASRO-1224	0.00(1)	0.73(1.31)	0.34(1.15)	1.13(1.45)	4.44(2.30)	4.60(2.19)	57.72(7.66)	60.20(7.81)
22	ASRO-1289	0.11(1.09)	0.67(1.28)	0.21(1.1)	0.73(1.31)	4.42(2.32)	4.80(2.38)	75.10(8.72)	67.60(8.26)
23	ASRO-1283	0.00(1)	1.00(1.41)	0.26(1.12)	0.87(1.36)	3.65(2.12)	3.87(2.17)	103.76(10.23)	106.27(10.3)
24	ASRO-1279	0.01(1.01)	1.07(1.43)	0.59(1.26)	1.87(1.68)	4.24(2.21)	4.73(2.30)	98.93(9.99)	101.40(10.0)
25	ASRO-1285	0.00(1)	0.80(1.33)	0.39(1.17)	1.27(1.50)	5.50(2.50)	5.67(2.56)	86.36(9.34)	88.87(9.46)
26	ASRO-1230	0.00(1)	0.73(1.31)	0.30(1.13)	1.00(1.41)	0.27(1.12)	0.73(1.31)	48.37(7.02)	50.87(7.19)
27	ASRO-1220	0.00(1)	0.93(1.38)	0.54(1.23)	1.73(1.64)	1.32(1.5)	1.27(1.500)	85.93(9.32)	88.47(9.43)
28	ASRO-1287	0.00(1)	0.80(1.34)	0.25(1.11)	0.87(1.36)	0.37(1.16)	0.67(1.28)	86.87(9.37)	92.40(9.64)
29	ASRO-1291	0.00(1)	0.80(1.33)	0.28(1.13)	0.93(1.38)	2.28(1.75)	2.27(1.78)	84.87(9.26)	87.40(9.4)
30	OSK-1354	0.00(1)	0.80(1.34)	0.23(1.11)	0.80(1.34)	0.85(1.36)	1.00(1.40)	60.70(7.85)	80.20(8.97)
31	OSK-1323	0.11(1.08)	0.67(1.29)	1.17(1.47)	3.60(2.10)	2.39(1.83)	2.87(1.96)	60.93(7.86)	84.47(9.23)
32	OSK-1347	0.09(1.07)	0.53(1.23)	0.10(1.04)	0.40(1.18)	2.25(1.80)	2.73(1.93)	58.87(7.73)	82.80(9.13)
33	OSK-1344	0.11(1.08)	0.67(1.28)	0.23(1.11)	0.80(1.34)	3.39(2.08)	3.60(2.10)	84.10(9.22)	86.60(9.30)
34	OSK-1349	0.02(1.01)	0.87(1.36)	0.54(1.24)	1.73(1.65)	1.15(1.46)	1.20(1.48)	81.76(9.09)	84.27(9.23)
35	OSK-1362	0.00(1)	0.73(1.31)	0.50(1.22)	1.60(1.61)	3.54(2.11)	3.53(2.09)	78.87(8.93)	81.40(9.03)
36	OSK-1364	0.11(1.09)	0.67(1.29)	0.50(1.22)	2.00(1.73)	3.84(2.18)	4.07(2.18)	111.40(10.60)	113.93(10.72)
37	OSK-1352	0.00(1)	0.80(1.34)	0.32(1.15)	1.07(1.43)	2.48(1.85)	2.53(1.85)	102.50(10.17)	105.00(10.23)
38	OSK-1359	0.00(1)	0.87(1.36)	0.74(1.32)	2.33(1.80)	4.65(2.37)	4.80(2.26)	63.83(8.05)	66.33(8.10)
39	OSK-1357	0.00(1)	0.73(1.31)	0.57(1.25)	1.80(1.67)	4.22(2.27)	4.20(2.27)	93.03(9.69)	89.53(9.50)
40	ON14-25	0.00(1)	0.80(1.33)	0.48(1.21)	1.53(1.59)	3.13(2.02)	3.13(2.02)	77.63(8.86)	93.47(9.70)
41	ON14-11	0.00(1)	0.80(1.34)	0.57(1.25)	1.80(1.66)	5.28(2.50)	5.40(2.52)	99.31(10.01)	82.80(9.14)
42	ON14-9	0.11(1.08)	0.67(1.29)	0.57(1.25)	1.80(1.67)	2.43(1.84)	2.47(1.85)	62.23(7.95)	79.40(8.95)
43	ON14-6	0.00(1)	0.87(1.26)	0.52(1.23)	1.67(1.63)	1.77(1.63)	1.80(1.67)	99.50(10.02)	100.33(10.04)
44	ON14-1	0.00(1)	0.27(1.12)	0.14(1.06)	0.53(1.23)	4.85(2.41)	5.07(2.36)	59.13(7.75)	96.33(9.84)
45	ON14-4	0.00(1)	0.87(1.36)	0.48(1.21)	1.53(1.59)	2.25(1.78)	2.33(1.81)	86.87(9.37)	89.40(9.50)
46	ON14-27	0.00(1)	0.60(1.26)	0.75(1.32)	2.40(1.82)	3.60(2.13)	3.40(2.09)	86.11(9.33)	89.60(9.50)
47	ON14-17	0.00(1)	0.60(1.26)	0.94(1.39)	2.93(1.96)	2.31(1.80)	2.47(1.85)	72.66(8.58)	85.27(9.27)
48	ON14-15	0.00(1)	0.80(1.34)	0.68(1.29)	2.13(1.75)	3.90(2.20)	4.07(2.24)	83.42(9.18)	85.93(9.20)
49	Agrifound Light Red	0.18(1.08)	0.96(1.40)	0.91(1.38)	4.03(2.23)	7.72(2.94)	10.53(3.39)	90.34(9.55)	118.87(10.94)
	C.D.	0.008	0.15	0.094	0.27	0.461	0.647	0.17	1.27
	SE(m)	0.003	0.05	0.034	0.09	0.164	0.22	0.064	0.458
	Grand mean								

RESULTS AND DISCUSSION

Overall, 49 genotypes were screened out against the thrips insect pest infestation along with the following results obtained for their relative. The genotype ON14-6 had the lowest thrips population score (2.03 thrips per plant) followed by OSK-1364 (2.39 thrips per plant). Among the highly resistant genotypes, the genotype ON14-25 had the highest thrips population score (2.93 thrips per plant) followed by ON14-

17 (2.80 thrips per plant). The thrips population score of resistant genotypes ranged from 3.08 to 4.93 thrips per plant (Table 3). The genotype OSK13-52 showed the least thrips population score (3.08 thrips per plant) followed by ON14-11 (3.09 thrips per plant) and ON14-9 (3.53 thrips per plant), whereas it was highest in ASRO-1285 (4.93 thrips per plant) followed by OSK-1349 (4.73 thrips per plant) and OSR-1370 (4.70 thrips per plant). The thrips population score of susceptible genotypes ranged from 4.76 to 6.28. The genotype

Table 2: Cont.....

S.No.	110DAT	120DAT	130DAT	140DAT	150DAT	160DAT	170DAT	180DAT	Mean
1	91.43(9.61)	110.27(10.54)	102.77(10.18)	54.16(9.54)	61.10(7.88)	5.20(2.47)	5.00(2.44)	0.00(1)	5.54
2	84.76(9.26)	90.27(9.54)	96.77(9.88)	42.16(8.43)	56.70(7.59)	6.47(2.72)	6.27(2.69)	1.17(1.45)	4.45
3	78.03(8.89)	88.53(9.40)	82.03(9.11)	41.24(8.27)	30.56(5.61)	3.60(2.14)	3.40(2.08)	1.27(1.49)	7.94
4	80.97(9.05)	110.13(10.38)	91.63(9.62)	54.08(9.33)	40.91(6.47)	3.33(2.08)	3.10(2.01)	1.86(1.69)	6.28
5	74.37(8.68)	87.87(9.41)	74.37(8.68)	40.64(8.27)	34.33(5.94)	3.07(2.01)	2.86(1.95)	2.10(1.74)	4.06
6	76.62(8.81)	74.13(8.38)	78.63(8.92)	33.64(7.15)	38.57(6.29)	4.60(2.36)	4.40(2.31)	0.60(1.26)	3.98
7	82.30(9.12)	93.80(9.72)	83.30(9.18)	21.36(5.94)	42.07(6.56)	4.47(2.33)	4.27(2.28)	0.73(1.31)	6.13
8	98.02(9.95)	106.53(10.35)	98.03(9.95)	28.6(6.70)	58.14(7.69)	3.40(2.09)	3.20(2.03)	1.47(1.56)	6.49
9	88.62(9.46)	95.47(9.79)	81.63(9.09)	33.08(7.16)	39.30(6.34)	5.80(2.56)	5.60(2.56)	0.60(1.26)	6.26
10	82.23(9.12)	87.40(9.38)	83.23(9.17)	34.56(7.61)	42.07(6.56)	2.67(1.91)	2.46(1.84)	2.54(1.87)	6.2
11	72.30(8.56)	75.80(8.76)	73.30(8.62)	33.88(7.57)	32.93(5.82)	5.93(2.62)	5.70(2.58)	0.00(1)	4.13
12	95.70(9.83)	104.20(10.24)	97.70(9.93)	32.52(7.42)	56.70(7.59)	13.40(3.79)	13.00(3.74)	8.00(2.99)	5.18
13	92.51(9.67)	107.33(10.39)	92.87(9.68)	32.4(7.40)	51.50(7.24)	11.00(3.46)	10.80(3.43)	5.80(2.60)	5.12
14	87.70(9.41)	91.20(9.59)	85.70(9.31)	30.72(7.21)	45.70(6.83)	11.80(3.57)	11.20(3.49)	6.20(2.68)	4.95
15	87.23(9.39)	93.73(9.72)	88.23(9.44)	26.4(6.57)	40.83(6.46)	10.27(3.35)	10.06(3.32)	5.06(2.45)	4.8
16	87.17(9.39)	92.67(9.67)	87.13(9.38)	32(7.29)	46.83(6.91)	7.47(2.90)	6.92(2.81)	2.20(1.77)	4.7
17	90.83(9.58)	93.33(9.69)	100.83(10.09)	32.2(7.37)	61.13(7.88)	8.93(3.14)	8.72(3.11)	3.70(2.15)	3.86
18	85.63(9.30)	91.47(9.59)	95.64(9.83)	30.8(7.22)	55.83(7.53)	11.20(3.49)	11.00(3.46)	6.20(2.67)	4.76
19	90.50(9.56)	81.67(9.07)	71.13(8.49)	37(7.89)	30.47(5.60)	5.00(2.42)	4.80(2.4)	0.20(1.09)	4.59
20	98.20(9.96)	92.80(9.68)	80.63(9.03)	43.6(8.58)	40.47(6.43)	6.53(2.70)	6.22(2.68)	0.99(1.40)	4.93
21	67.70(8.28)	68.53(8.31)	75.70(8.75)	23.32(6.31)	34.37(5.94)	6.60(2.66)	6.40(2.71)	1.08(1.43)	4.33
22	72.20(8.55)	75.60(8.65)	76.07(8.77)	33.36(7.37)	38.07(6.25)	6.80(2.77)	6.60(2.75)	1.27(1.49)	4.57
23	102.87(10.9)	104.40(10.24)	82.87(9.15)	51.04(9.24)	41.57(6.52)	5.87(2.60)	5.54(2.55)	0.00(1)	5.08
24	103.56(10.22)	100.07(10.02)	99.23(10.01)	48.44(8.99)	57.23(7.63)	6.73(2.73)	6.54(2.74)	1.17(1.45)	5.24
25	86.37(9.34)	86.87(9.35)	79.03(8.94)	40.12(8.21)	41.38(6.50)	7.67(2.93)	7.31(2.87)	2.44(1.83)	4.93
26	72.57(8.57)	51.07(7.21)	83.56(9.19)	20.24(5.88)	43.20(6.64)	2.73(1.93)	2.00(1.71)	0.00(1)	3.98
27	91.27(9.60)	86.47(9.33)	75.94(8.77)	40.28(8.21)	32.63(5.79)	3.27(2.06)	2.06(1.73)	2.51(1.86)	5.65
28	95.87(9.84)	97.40(9.9)	95.87(9.84)	40.84(8.31)	55.57(7.52)	2.60(1.89)	2.34(1.81)	0.20(1.09)	5.78
29	89.54(9.51)	85.40(9.29)	93.87(9.74)	39.04(8.12)	51.66(7.25)	4.27(2.28)	4.06(2.24)	0.73(1.30)	4.8
30	84.70(9.25)	85.20(9.27)	86.70(9.36)	24.32(6.33)	45.03(6.78)	3.00(1.99)	2.82(1.94)	1.28(1.5)	4.43
31	88.87(9.48)	90.40(9.55)	87.87(9.42)	24.84(6.50)	47.87(6.98)	4.87(2.42)	4.64(2.36)	1.30(1.50)	4.69
32	83.93(9.18)	85.47(9.28)	86.94(9.37)	22.92(6.21)	46.70(6.90)	4.73(2.39)	4.50(2.33)	0.83(1.34)	4.51
33	92.07(9.64)	94.27(9.74)	101.07(10.10)	38.76(8.00)	61.07(7.87)	5.60(2.54)	4.82(2.40)	1.51(1.57)	4.97
34	86.77(9.36)	82.27(9.12)	96.77(9.88)	37.36(7.95)	55.69(7.52)	3.20(2.04)	2.80(1.93)	0.87(1.35)	4.73
35	86.87(9.37)	79.40(8.91)	71.20(8.49)	35.96(7.73)	30.70(5.63)	5.53(2.53)	5.31(2.50)	0.30(1.14)	4.6
36	117.43(10.88)	121.60(11.06)	111.43(10.60)	55.16(9.630)	40.76(6.46)	6.07(2.62)	5.80(2.60)	0.84(1.35)	2.39
37	108.50(10.46)	130.67(11.46)	75.50(8.74)	49.00(8.98)	44.16(6.71)	4.60(2.35)	4.00(2.22)	0.67(1.27)	3.08
38	66.13(8.19)	65.67(8.06)	77.13(8.83)	27.44(6.64)	37.23(6.18)	6.80(2.71)	6.60(2.75)	1.28(1.5)	4.45
39	90.36(9.55)	93.53(9.70)	88.03(9.43)	44.12(8.60)	42.03(6.55)	6.00(2.64)	5.83(2.60)	0.83(1.35)	4.97
40	95.63(9.83)	98.47(9.96)	98.63(9.98)	34.88(7.67)	58.63(7.72)	5.13(2.47)	4.90(2.42)	0.07(1.03)	2.93
41	98.30(9.96)	100.80(10.04)	80.63(9.03)	48.48(8.98)	40.63(6.45)	7.33(2.88)	7.10(2.84)	2.11(1.74)	3.09
42	80.57(9.03)	82.40(9.10)	83.23(9.17)	26.44(6.70)	42.56(6.6)	4.47(2.33)	3.77(2.17)	0.98(1.4)	3.53
43	106.50(10.36)	120.33(11)	74.50(8.68)	48.00(8.99)	52.50(7.31)	3.80(2.19)	3.21(2.04)	0.66(1.27)	2.03
44	97.23(9.91)	119.40(10.96)	96.23(9.86)	23.84(6.36)	55.23(7.49)	7.07(2.78)	6.85(2.79)	1.49(1.57)	3.91
45	91.40(9.61)	92.40(9.64)	92.87(9.68)	40.44(8.27)	51.87(7.27)	4.33(2.30)	4.10(2.25)	0.81(1.33)	4.88
46	95.07(9.80)	87.60(9.40)	86.11(9.33)	40.76(8.28)	45.43(6.81)	5.60(2.56)	4.83(2.40)	1.39(1.54)	3.91
47	96.77(9.88)	103.27(10.20)	88.90(9.48)	32.16(7.36)	46.07(6.85)	4.47(2.33)	4.21(2.27)	0.80(1.32)	2.8
48	96.43(9.87)	98.60(9.96)	103.43(10.21)	50.16(9.18)	66.43(8.21)	6.07(2.65)	5.84(2.61)	1.00(1.40)	5.15
49	116.02(10.81)	146.58(12.14)	116.13(10.82)	137.65(11.77)	72.15(8.55)	13.62(3.82)	11.47(3.52)	7.39(2.89)	13.61
	0.235	1.43	0.114	1.88	0.168	0.52	0.348	0.305	
	0.083	0.516	0.041	0.678	0.06	0.189	0.124	0.108	4.87

* DAT: Day After Transplanting; *Figure in parenthesis are square root transformed value

Table 3: Pest susceptibility scale

Category of resistance	Scale	Varieties
Based on population of thrips/plant : = $x = 4.87$ and $sd = 1.66$		
Highly resistant	$x_i < 3.07$	OSK-1364, ON14- 25, ON14-6, ON14-17
Resistant	$x_i > 3.07 < 4.73$	ASRO-1238, ASRO-1203, ASRO-1229 ASRO-1236, OSR-1370, OSR-1374, ASRO-1217, ASRO-1224, ASRO-1285, ASRO-1230, OSK-1354 OSK-1323, OSK-1347, OSK-1349, OSK-1362, OSK-1352, OSK-1359, ON14-11, ON14-9, ON14-1, ON14-27
Susceptible	$x_i > 4.73 < 6.39$	ASRO-1201, ASRO-1273, ASRO-1227, ASRO-1215, ASRO-1271, OSR-1367, OSR-1372, OSR-1377, OSR-1381, OSR-1379, ASRO-1222, ASRO-1283, ASRO-1279, ASRO-1220, ASRO-1287, ASRO-1291, OSK-1344, OSK-1357, ON14-4, ON14-15
Highly Susceptible	$x_i > 6.39 < 8.05$	ASRO-1207, ASRO-1275, ASRO-1289, Agrifound light red

OSR-1379 showed least (4.76 thrips per plant) plant damage score followed by OSR-1381 (4.80 thrips per plant), ASRO-1291 (4.80 thrips per plant) and ON14-4 (4.88 thrips per plant) while it was highest in the genotype ASRO-1273 (6.28 thrips per plant) followed by ASRO-1215 (6.26 thrips per plant) and ASRO-1271 (6.20 thrips per plant). The thrips population score of highly susceptible genotypes ranged from 6.49 to 7.94 thrips per plant (Table 3). The genotype ASRO-1275 showed least (6.49 thrips per plant) thrips population per plant while it was the highest in the genotype ASRO-1207 (7.94 thrips per plant) but it is significantly superior over check variety Agri found light red 13.11 thrips per plant.

These finding was conformed with earlier findings of Diaz-montano *et al.* (2010) who reported, among forty-nine onion cultivar highly resistant cultivar found Colorado 6 and NMSU 03-52-1 had the lowest numbers of *T. tabaci*, suggesting strong antibiosis and/or antixenosis. Similarly, Alimousavi *et al.* (2007) observed that the genotypes "Meshkan", "Sefid-e-Kurdistan", "Sefid-e-Qom" and "Eghlid" had the lowest thrips infestation and percentage of leaf infestation. Similar finding have been reported by Boateng *et al.* (2014) studied the onion germplasm resistance to onion thrips, *Thrips tabaci* L. during 2009 through 2011, average abundance of thrips decreased with time on all genotypes in 2009, thrips per plant per day were 1.5, 1.4, and 1.2 for commercial cultivars, plant introductions, and OLYS05N5, respectively, thrips were most abundant (7.8 per plant/day) on PI 546096 among the selected plant introductions in 2010 and had the lowest seasonal average (0.1 per plant/day) on PI 248753. Tripathy *et al.* (2013) found similar result who evaluated the tolerance of different lines or twenty one varieties of onion to onion thrips, thrips infestation revealed that NRCRO-3, NRCWO-3, NRCWO-4 and VG-19 showed tolerance to thrips and Bhima Super, NRCWO-3, NRCRO-4 and the control, Arka Niketan produced significantly high total bulb yield had better tolerance to thrips. Similarly, Patel *et al.* (2012) studied that JRO-2000-181 had highly resistant and significantly lowest thrips population (7.57/plant) and higher bulb yield (56.83 t/ha) followed by Gujarat White Onion-1 (9.61 thrips/plant and bulb yield of 49.11 t/ha) and Talaja red (9.87 thrips/plant and bulb yield of 48.44 t/ha).

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