

Variation in Onion Thrips Number per Plant Among Onion Plant Introduction Accessions

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Abstract

Onion thrips are a detrimental onion insect pest that reduces bulb size and yield and is difficult to control. They are attracted to onion leaves that are blue to bluish green in color and have a thick waxy coating. Some research suggests that onion thrips are less attracted to leaves that are light green in color and possess little or no wax on their surface. In the Western U.S., *Iris yellow spot virus* is a devastating foliar onion disease that is spread by onion thrips. Onion germplasm, that is less attractive to thrips feeding, would aid in the development of disease tolerant cultivars. Seventy-five onion plant introduction accessions from the U.S. germplasm collection were selected because they possessed a low amount of leaf bloom (degree of wax deposition) in a previous evaluation. Accessions were evaluated for the number of thrips per plant when thrips number was counted from ten plants per plot at four separate times throughout the growing season. No thrips control means were used during the growing season. In general, thrips number per plant increased from 12 to 14 weeks post transplanting while the number decreased afterwards up to 20 weeks. At this time, there were fewer thrips per plant than at 12 weeks post transplanting. At 14 weeks, PI 248753, PI 248754, PI 274780, and PI 288272 averaged less than three thrips per plant that less than most entries tested and less than the average number of thrips per plant for all entries, 21. These accessions produced dark green leaves that had a moderate amount of waxy coating. They may have potential use in developing onion cultivars that are less preferred by thrips and possibly more disease tolerant.

Introduction

Adult and larval onion thrips can cause considerable feeding damage on onions (Fig. 1).

Onion germplasm may differ in leaf characteristics important for thrips feeding.

Screening onion germplasm for thrips number per plant would be beneficial in the development of cultivars with reduced thrips numbers.

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USDA United States Department of Agriculture
National Institute of Food and Agriculture

Materials and Methods

Accessions with less leaf wax or collected from center of origin were selected.

75 accessions from USDA collection, split into 2 groups based on # of plants/plot.

Seed sown in flats with Metro Mix 510 in Jan. 2009.

Transplanted to field in Apr. 2009.

RCBD, 3 reps, 2 lines/plot, 1.5 or 3.0 m length.

Number of onion thrips (adult + larva) counted from 10 plants per plot on four separate dates.

Table 1. Number of onion thrips per plant counted at four times throughout the 2009 growing season in 1.5 m length plots.

Entry	Onion thrips (Number/plant) Weeks after transplanting			
	12	14	16	20
PI 124525	3.5	6.8	5.6	---
PI 142790	2.7	18.1	20.2	1.2
PI 168962	5.4	29.7	22.1	0.0
PI 168966	6.9	33.7	15.3	0.9
PI 172701	6.7	20.0	17.6	2.6
PI 179627	4.3	17.2	16.7	---
PI 200874	5.2	29.1	19.1	1.2
PI 239633-1	0.9	9.9	5.4	3.1
PI 248753	2.2	0.5	2.1	---
PI 256048	3.7	21.0	23.2	4.0
PI 264631	9.5	23.9	21.4	17.0
PI 273211	3.6	19.0	23.9	20.3
PI 288073	5.4	18.2	22.2	16.9
PI 288902	5.9	18.3	16.9	8.2
PI 288903	3.7	23.5	23.7	8.8
PI 288908	7.9	20.8	26.9	0.9
PI 288909	7.3	41.0	17.8	2.3
PI 289690	3.6	22.2	18.0	0.5
PI 342943	8.7	25.3	22.4	2.7
PI 391509	2.0	7.2	14.6	7.8
PI 430371	3.2	11.0	2.2	---
PI 433332	3.2	20.4	20.0	7.4
PI 546096	2.5	21.5	31.3	12.4
PI 546100	3.2	18.3	28.6	6.2
PI 546162	12.1	22.1	27.8	7.5
PI 546174	5.4	33.0	33.3	7.2
PI 639911	5.4	30.5	21.3	---
PI 639913	9.5	38.4	24.4	3.8
Mean	5.0	21.5	19.4	5.0
LSD (5%)	NS	17.7**	13.7**	8.4***

Results

Thrips number per plant generally increased from 12 to 14 weeks post transplanting while the number decreased from 16 to 20 weeks (Tables 1 and 2).

No difference between entries at 12 weeks.

At 14 and 16 weeks, PI 248753, PI 248754, PI 274780, and PI 288272 had fewer thrips (<3) than most entries tested.

PI 271039 and PI 289689 also had a reduced number of thrips per plant when counted at 14 and 16 weeks.

From previous research, all identified accessions possessed dark green foliage rather than blue-colored foliage and were small in plant size than most other accession.

PI 289689 produced glossy foliage while the other accessions produced foliage with a light waxy coating.



Fig. 1. Onion thrips feeding on onion leaves.

Conclusions

Thrips number per plant changes throughout the growing season.

Differences in the number of thrips per plant existed among accessions.

Several accessions had low numbers of thrips per plant.

Foliage color and plant size may be related to thrips number per plant.

Table 2. Number of onion thrips per plant counted at four times throughout the 2009 growing season in 3.0 m length plots.

Entry	Onion thrips (Number/plant) Weeks after transplanting			
	12	14	16	20
G 32590	25.3	42.3	11.4	4.3
G 32787	12.9	41.9	15.3	5.5
PI 164361	11.3	22.8	12.9	3.5
PI 164807	8.2	4.1	5.9	---
PI 165498	13.9	9.4	9.2	1.4
PI 171475	11.3	32.3	18.7	2.1
PI 171477	6.9	27.2	17.8	2.1
PI 172702	9.1	19.6	21.4	1.3
PI 172703	9.0	16.7	14.6	4.1
PI 172704	13.0	13.7	9.5	2.9
PI 174018	4.9	32.9	15.0	0.4
PI 174024	11.4	43.9	14.3	3.9
PI 177242	13.5	20.8	19.4	4.4
PI 179164	6.9	18.6	22.3	2.6
PI 182138	17.6	31.0	22.5	16.1
PI 183660	14.1	25.0	14.6	2.9
PI 233186	9.3	23.9	17.9	8.3
PI 239633-2	3.4	15.7	9.0	2.2
PI 248754	7.5	2.2	6.1	1.2
PI 249899	13.3	23.9	22.8	13.8
PI 251325	14.3	21.5	18.0	1.1
PI 255557	19.3	32.5	27.1	4.2
PI 256049	12.3	31.9	22.7	1.8
PI 258956	13.7	6.1	11.4	3.0
PI 264320	5.8	11.5	18.7	5.1
PI 264321	8.6	32.3	15.9	4.0
PI 264648	8.8	28.4	21.1	5.3
PI 269306	16.7	15.7	26.6	12.8
PI 271039	9.0	7.7	6.9	---
PI 274780	10.2	2.5	2.6	---
PI 288270	9.4	13.9	11.1	0.7
PI 288272	6.0	2.8	1.1	---
PI 289689	3.2	5.7	2.8	0.3
PI 293756	15.0	25.2	23.2	8.1
PI 318886	21.8	30.0	24.9	6.0
PI 321385	11.3	11.7	23.7	9.3
PI 343049	10.8	22.1	17.5	2.3
PI 344392	15.1	26.3	20.6	5.8
PI 433330	20.8	43.2	26.5	9.7
PI 546101	3.5	16.5	21.6	10.4
PI 546106	8.9	32.8	35.7	6.3
PI 546115	7.7	16.0	21.9	6.5
PI 546140	9.6	27.9	10.1	---
PI 546188	3.9	14.4	14.3	5.1
PI 546192	5.7	14.6	17.6	8.0
PI 639912	11.9	30.6	33.7	7.1
PI 639915	11.5	23.7	30.2	3.5
PI 639916	19.2	19.9	21.2	6.0
Mean	11.1	21.4	17.3	5.1
LSD (5%)	NS	16.9***	13.3***	7.7*