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The abundance and population dynamics of onion thrips (*Thrips tabaci* Lind.) in leek under field conditions

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Abstract. In 2003–2005 an abundance of onion thrips (*Thrips tabaci* Lind.) was investigated in two leek varieties - 'American flag' and 'Campus'- at the Lithuanian Institute of Horticulture. Leeks were damaged by onion thrips every year, but only in 2005 were 100% of the plants infested. In 2003, there were on average 2.2 and 4.2 thrips per plant in 'American flag' and 'Campus' respectively. Intensity of thrips injury (according to 0–5 points scale) ranged from 1.5 to 1.7 points at the end of the season. Similar patterns were recorded in 2004. In 2005 the mean number of thrips was 13.2 and 13.0 per plant in 'American flag' and 'Campus' leek cultivars respectively. Intensity of injury at the end of the growing season ranged from 3.4 to 3.0 points. The highest abundance of onion thrips was in late July and early August 2004–2005. Only in 2003 was the maximum number of thrips reached in 'Campus' in September. There were no significant differences in the number of thrips between 'American flag' and 'Campus' leek cultivars. Low and medium correlation between the number of thrips and the incidence of purple blotch (*Alternaria porri*) at the beginning of infestation was found .

Key words: *Allium porum* L., *Alternaria porri*, *Thrips tabaci* Lind

INTRODUCTION

Thrips tabaci is the most serious pest of onion and leek in Central Europe (Legutowska 1997, Richter et al., 1999). Onions and leeks are very capable of compensating for damage done by thrips (Lewis, 1997, Richter et al., 1999). Therefore, the impact of infestation of a crop depends on many factors: the size of the thrips population, the plant growth stage, the duration of the infestation, and the suitability of weather for population growth (Lewis, 1997). In onions, several studies have shown that some genotypes of bulb onions are resistant to *T. tabaci* (Coundriet et al., 1979; Brar et al., 1993) depending on leaf structure and growth form (Terry, 1997). The different onion varieties have different susceptibility to *T. tabaci* infestation (El Gendi, 1998).

MATERIALS AND METHODS

In 2003–2005 the abundance of pests was investigated in two leek varieties - 'American flag' and 'Campus'- at the Lithuanian Institute of Horticulture. 'American flag' is an early variety, foliage attitude – prostrate; 'Campus'- mid-later variety, foliage attitude - intermediate. Early varieties are most suitable for Lithuanian conditions, because they have a shorter vegetation period, but mid-late varieties have

the highest contents of dry soluble solids (Dambrauskienė, 1998). Leeks were planted in two blocks, 10 x 45 cm. Samples of 40 randomly chosen plants were collected from each block every 5–6 days. *T. tabaci* were shaken from plants onto white paper and counted. The degree of each plant infestation by purple blotch was evaluated in August. In September, at the end of the field experiment, the degree of thrips infestation was evaluated. Intensity of the damages was established by formula $R = \Sigma(n \cdot b) / N$, where n= number of plants damaged at the same level, b= level of damage (according to 0–5 points scale), N = number of plants in the sample.

RESULTS AND DISCUSSION

Leeks were damaged by onion thrips every year, but only in 2005 were 100% of plants were infested (Fig.1). According to Legutowska (1997), in central Poland all leek plants were damaged by *T. tabaci* from late July to the time of harvest. The mild but wet Atlantic climate of Lithuania is generally unsuitable for *T. tabaci*. Although July 2003 was hot, the first thrips were not found until 22 July (Fig.2). First peak was observed at the beginning of August in both varieties, but the maximum number of thrips was reached in 'Campus' in September. It confirms the results presented by researchers that the maximum density of thrips on leeks in central Poland was found in August and September (Legutowska, 1997) and in Germany in August (Richter et al., 1999).

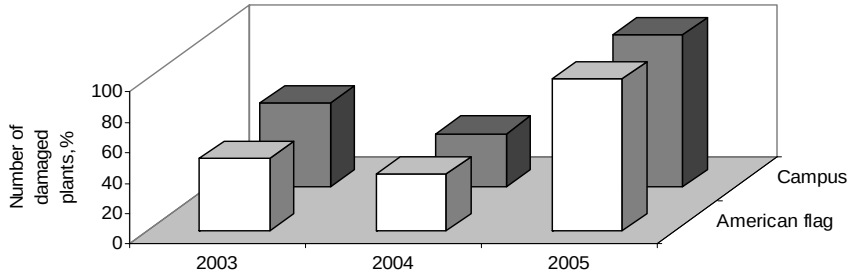


Fig. 1. Number of plants damaged *by Thrips* tabaci in time of mass infestation.

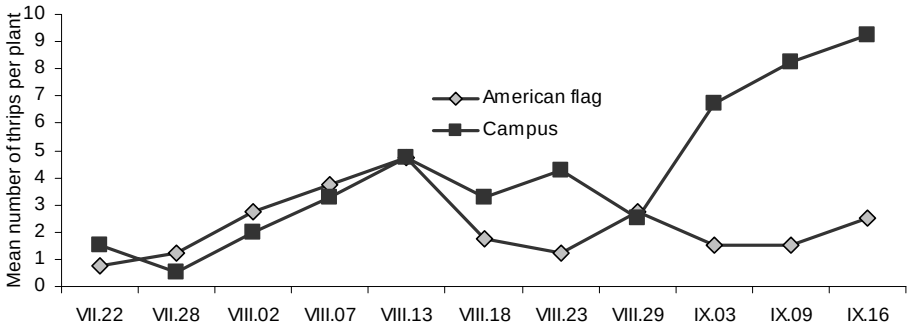


Fig. 2. Population dynamic of *Thrips tabaci* in leek, Babtai, 2003.

Table 1. Mean number of *Thrips tabaci*, incidence of thrips damage and relation between amount of thrips and incidence of *Alternaria porri*, Babtai, 2003–2005.

Varieties	Mean number of *Thrips tabaci* per plant during vegetation			Incidence of thrips damage at the end of vegetation			Correlation coefficient between the amount of thrips and incidence of *Alternaria porri*		
	2003	2004	2005	2003	2004	2005	2003	2004	2005
'American flag'	2.22	1.93	13.19	1.5	1.3	3.4	0.295	0.317	0.607
'Campus'	4.20	1.69	12.98	1.7	1.2	3.0	0.441	0.361	0.597
LSD_{05}	2.005	0.674	1.509	-	-	-	-	-	-

Summer of 2004 was cold and rainy, but the first thrips were not recorded until 30 July (Fig. 3). The abundance of thrips was not high: the maximum was registered in the end of July - beginning of August. Summer of 2005 was warmer in comparison with 2004, but colder than in 2003. July 2005 was warm and dry and the thrips invasion was the earliest (Fig.4). In this season thrips abundance was the highest because meteorological conditions were favorable for their development. The maximum of thrips abundance was registered at the end of July - beginning of August.

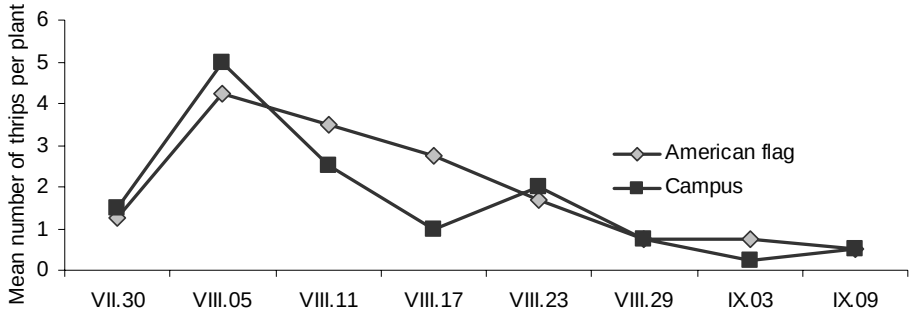


Fig. 3. Population dynamic of. *Thrips tabaci* in leek, Babtai, 2004.

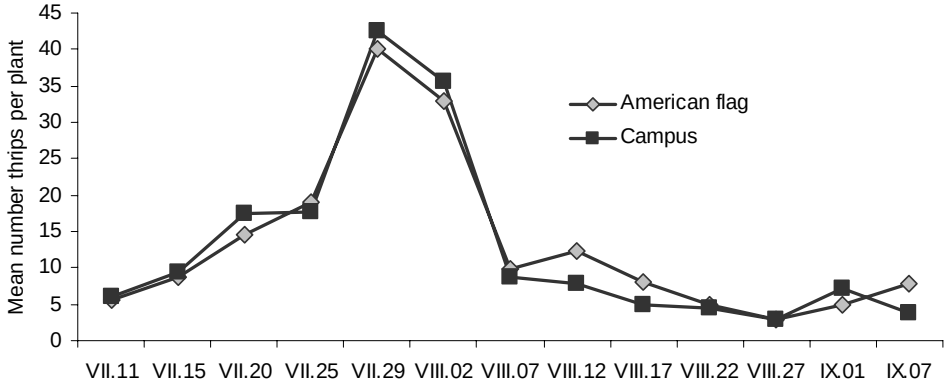


Fig. 4. Population dynamic of *Thrips tabaci* in leek, Babtai, 2005.

There were on average 2.2 and 4.2 thrips per plant in ‘American flag’ and ‘Campus’ respectively in 2003 (Table 1). Intensity of thrips injury ranged from 1.5 to 1.7 points at the end of the season. Similar patterns were recorded in 2004. In 2005 the mean number of thrips was 13.2 and 13.0 per plant in ‘American flag’ and ‘Campus’ leek. Intensity of injury at the end of the growing season ranged from 3.4 to 3.0 points. No significant difference in the number of thrips was found between ‘American flag’ and ‘Campus’ leek cultivars (Table 1). The correlation between the number of thrips and the incidence of purple blotch (*Alternaria porri*) was weak in 2003-2004, at the beginning of infestation in varieties ‘American flag’ and ‘Campus’, but there was medium correlation in 2005 (Table 1). According to Cartwright et al., (1995) lesions of *Alternaria porri* were larger and more numerous in plants infested by *T. tabaci*.

Results obtained will be used for creation of a program of integrated leek protection.

CONCLUSIONS

The highest abundance of onion thrips was at the end of July and beginning of August. No significant difference in the number of thrips between ‘American flag’ and ‘Campus’ leek cultivars was found.

There was weak and medium correlation between the number of thrips and the incidence of purple blotch (*Alternaria porri*) at the beginning of infestation..

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