

## ***Thrips tabaci* as a pest of leek cultivated in different conditions**

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**Abstract:** During 1999 and 2000 research was carried out on the frequency and seasonal dynamics of *Thrips tabaci* adults and larvae on leek plants cultivated in monocrop and intercropping. The adults and larvae were most numerous in monocrop, infesting the plants in the highest degree and making them unmarketable. Intercropping plants: carrot, clover and bean reduced the number of thrips and plant infestation by about 50%. Intercropping with French bean reduced the weight of the vegetable crop more than carrot and clover.

**Key words:** *Thrips tabaci*, leek, *Allium porrum*, intercropping plants, IPM

### **Introduction**

Agriculture in Poland is fragmented. The overwhelming majority of farms are rather small and unspecialised, where both cereals and vegetables are cultivated on small areas. In these conditions, using insecticides seriously increases the costs of production, which becomes unprofitable. On the other hand, small areas and using non-chemical methods of cultivation contribute to "ecological" food production. Intercropping is one way of reducing pest insect populations in such vegetable crops. *Thrips tabaci* Lindemann is the most serious pest of onion, leek and cabbage in Central Europe (Legutowska 1997, Richter et all. 1999, Theunissen, Legutowska 1991). Some research on the role of intercropping plants in *T. tabaci* colonisation of leek and onion plants has been done before. In the research, undersowing vegetable crops with clover reduced the number of *T. tabaci* adults and larvae and increased the quality of yield and its market value (Belder, Elderson 1999, Legutowska, Kucharczyk 2000, Theunissen, Schelling 1997).

### **Objectives and methods**

The aim of the study was to find which plant: white clover (Palestine), carrot (Jaguar), or French bean (Forum) would be best for reducing *T. tabaci* populations infesting leek plants, and how the species of intercrop affects the quality and the final yield of leeks. A field experiment was carried out in Ożarów Mazowiecki (near

Warsaw), in the region with long traditions of vegetable cultivation, but also greatly infested with thrips. Leeks (Jolant) were planted together with white clover, carrot and French bean and in monoculture (monocrop). The intercropping plants were sown in rows of 80 cm width and the leeks were planted between the rows. Each of the four plots was replicated four times (together 16 plots were controlled). Within two years (1999-2000), every week samples of 10 randomly chosen plants were collected from each plot. Both adults and larvae of *T. tabaci* were selected in the laboratory into separate tubes with 75% ethyl alcohol and were counted. In October, at the end of the field experiment, 50 leek plants were collected from each plot (together 800 plants each year), the degree of thrips infestation was evaluated and each plant was weighed separately.

### **Results**

During the two-year field research, 172,145 specimens of *T. tabaci* were collected. In 1999, 11 samples were collected from each plot. Together 123,963 specimens of *T. tabaci* were gathered from leek plants, among them 19,873 adults and 104,090 larvae. The highest number of specimens - 45 % (7,132 adults and 48,536 larvae) was collected in leek monocrop, 20 % - in intercropped plots with carrot (4,323 adults, 21,187 larvae), 18 % - in intercropped plots with white clover (4,323 adults, 18,322 larvae). The smallest number of specimens was collected in

intercropped plots with French bean – 17 % of all, among them adults were similar in number to those collected from leeks intercropped with clover and carrot, but the number of larvae was lower (16,042 larvae). Adults were most numerous on all plots in the first half of August. The period with the highest number of larvae extended from the second half of August to the first days of September. The differences between the number of larvae in intercropped and monocropped plots were lower than between adult forms. Both adults and larvae were numerously recorded in the monocropped plots. Among the intercropping plants French bean, sown between the rows of leek, best reduced the thrips infestation (Figs 1,2).

In 2000, the spring was very dry and hot, causing the plants to grow much more slowly. The first thrips were recorded one month later than in 1999. From each plot 8 samples were collected.

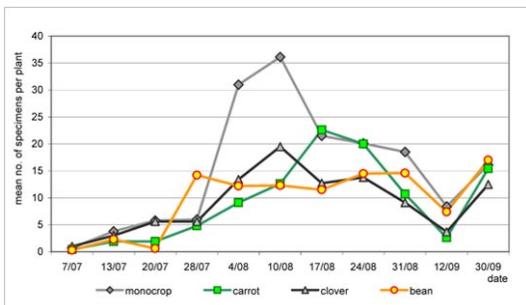


Fig. 1. Seasonal changes in the no. of *Thrips tabaci* adults on leek in 1999

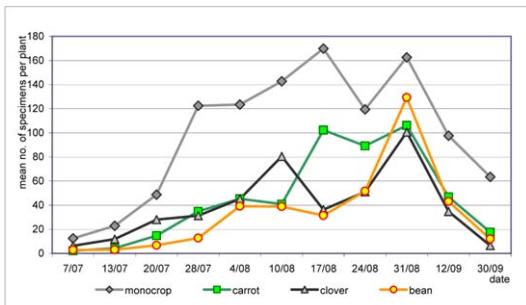


Fig. 2. Seasonal changes in the no. of *Thrips tabaci* larvae on leek in 1999

Together, 48,182 specimens of *T. tabaci* (11,066 adults and 37,116 larvae) were collected. Most of them – 42 % (5,740 adults, 14,398 larvae) were observed in leeks growing in monocrop, 26 % - were collected from intercropping leek/carrot (2 176 adults, 10 252 larvae), 17 % - from intercropping leek/white clover (1 772 adults, 6350 larvae). A similar number of both of these developmental stages – 15 % was observed in leeks intercropped with French bean (1,378 adults, 6,116 larvae). Adults were numerously observed at the beginning of August and larvae in the last week of that month (figs. 3,4).

Leek plants growing in monocrop had the highest weight, but at the same time they were the most infected with thrips, which lowered their marketable quality. The average weight of the white part of plant (without green leaves), on which the marks of thrips feeding

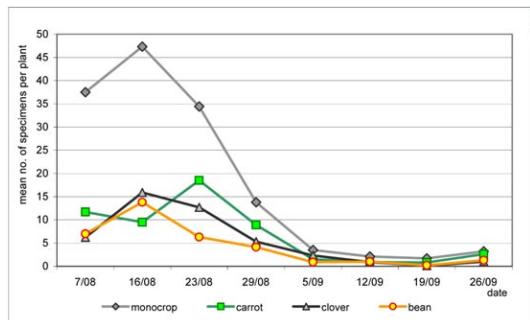


Fig. 3. Seasonal changes in the no. of *Thrips tabaci* adults on leek in 2000

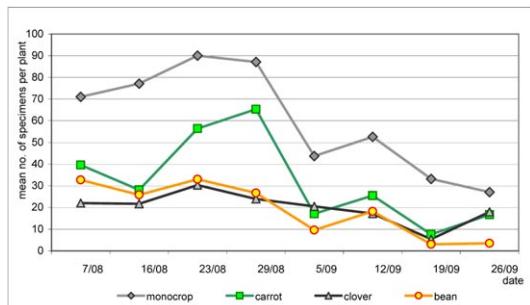


Fig. 4. Seasonal changes in the no. of *Thrips tabaci* larvae on leek in 1999

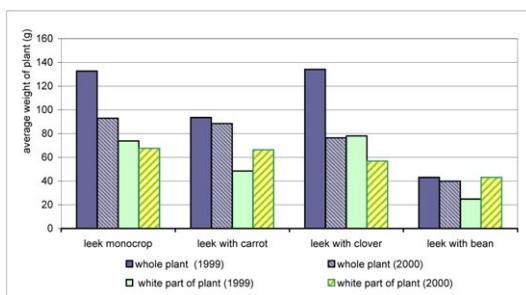


Fig. 5. Differences in weight of whole leek plant and its white part according to the cultivation conditions.

are less visible, was similar in leek growing in monocrop and intercrop with carrot (in 2000) and in intercrop with carrot and clover (in 1999). French bean as an intercropping plant, because of its big size, shaded the plants of leek and made their mass considerably lower (Fig. 5).

### Conclusions

The shorter period of plant growth in 2000 led to the number of collected specimens being more than 60 per cent lower than in 1999. It was particularly visible in larvae, whose number was 65 per cent lower than a year earlier. In spite of the difference in the number of collected thrips, the term of the highest infestation of leek plants was similar in the two years, for adults it was highest about the middle of August and for larvae from the middle of August to the first days of September.

During this research we observed that the *T. tabaci* colonisation rates in the intercropping plots were more than 50 per cent lower in comparison with the leek monocrop. It confirms the results of research conducted earlier with clover as the intercropping plant (Belder, Elderson 1999,

Legutowska, Kucharczyk 2000). Leeks growing in monocropped plots were the most infested with thrips. In spite of their biggest weight the quality of plants was very low which made them unmarketable. French bean was the intercropping plant which best reduced the number of thrips on leek plants but at the same time limited the weight of leeks to the greatest extent.

After the experiment we found that clover and carrot, sown as intercropping plants, limited the number of *T. tabaci* to the greatest extent, as a result of which the marketable quality of leeks was affected to a smaller degree.

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