

The Occurrence of Thrips (*Thysanoptera*, Insecta) on Winter and Spring Wheat in Chosen Regions of Poland

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The work has determined the species composition as well as the number of thrips gathered on winter and spring wheat in milk-waxy ripe stage in six soil-climatic regions of Poland. The occurrence of 15 thrips species has been noted, nine of which were associated with cereals. They occurred most amply in south-western Poland. In all regions under study the following species were noted to exist in greater numbers: *Frankliniella tenuicornis* (Uzel), *Limothrips denticornis* Haliday and *Haplothrips aculeatus* (Fabricius). *Limothrips cerealium* Haliday was dominant in all western regions of Poland whereas *Haplothrips tritici* (Kurdjumov) in the south-eastern region.

Keywords: Thrips, *Thysanoptera*, winter wheat, spring wheat, species composition.

Thrips (*Thysanoptera*) do not pose a threat to corn crops in Poland. However, in literature there are reports on the increase in their number (Zawirska and Wałkowski, 1997; Kąkol and Miętkiewski, 2002; Szeplińska, 2002). It can be assumed that the systematic increase in the acreage of cereal crops observed from the 1990s is of some importance here. In the year 2002, the increase was 70.2% (2001 yearbook). The following factors, typical of market economy may favour further increase in the *Thysanoptera* fauna of cereals: monoculture, common usage of combine harvesters, which are popular, and simplified cultivation methods.

The aim of this study was to examine species composition and the number of thrips occurring on winter and spring wheat in the chosen soil-climatic regions of Poland.

Material and Methods

In 2002, the observation of thrips on winter and spring wheat was conducted in 18 localities in six soil-climatic regions of Poland (Fig. 1).

The work determined:

– the species composition of the gathered thrips and their percentage in the population (Table 1, Fig. 1);

- the number of thrips (in individuals per ear) (Fig. 2);
- the percentage of ears infested by thrips (Fig. 3);
- the percentage of imago in the population (Fig. 4).

To achieve the goal 100 ears (25 ears \times 4 repetitions) in milk-waxy ripe stage were gathered from each area. The ears were chosen randomly and collected in plastic bags. The collecting took place on production fields not smaller than 0.5 ha. The winter wheat ears were gathered from 29 June to 19 July and those of spring wheat from 8 July to 29 July. The thrips were extracted over white blotting paper and preserved in 70% alcohol with glycerine. Adult insects were marked according to the Schliephake and Klimt (1979) key, while the larvae according to Priesner (1964) and Speyer and Parr (1941).

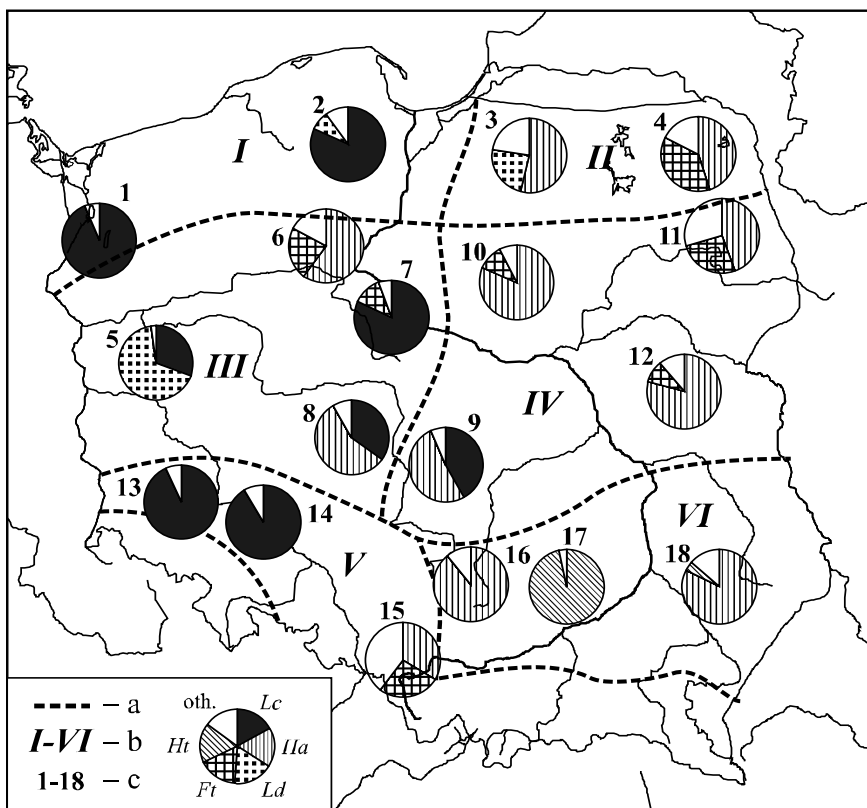


Fig. 1. Thrips species occurring most frequently on research stations in soil-climatic regions of Poland
 a – borders of regions; b – soil-climatic regions: I – north-western, II – north-eastern,
 III – central-western, IV – central-eastern, V – south-western, VI – south-eastern;
 c – stations of research: 1 – Pyrzyce, 2 – Kościerzyna, 3 – Bartoszyce, 4 – Suwałki, 5 – Sulęcín,
 6 – Tuchola, 7 – Radziejów, 8 – Turek, 9 – Poddębice, 10 – Działdowo, 11 – Mońki, 12 – Siedlce,
 13 – Złotoryja, 14 – Środa Śląska, 15 – Bielsko Biała, 16 – Koniecpól, 17 – Pińczów, 18 – Biłgoraj;
 species: Ft – *Frankliniella tenuicornis*, Lc – *Limothrips cerealium*, Ld – *Limothrips denticornis*,
 Ha – *Haplothrips aculeatus*, Ht – *Haplothrips tritici*, oth. – other species

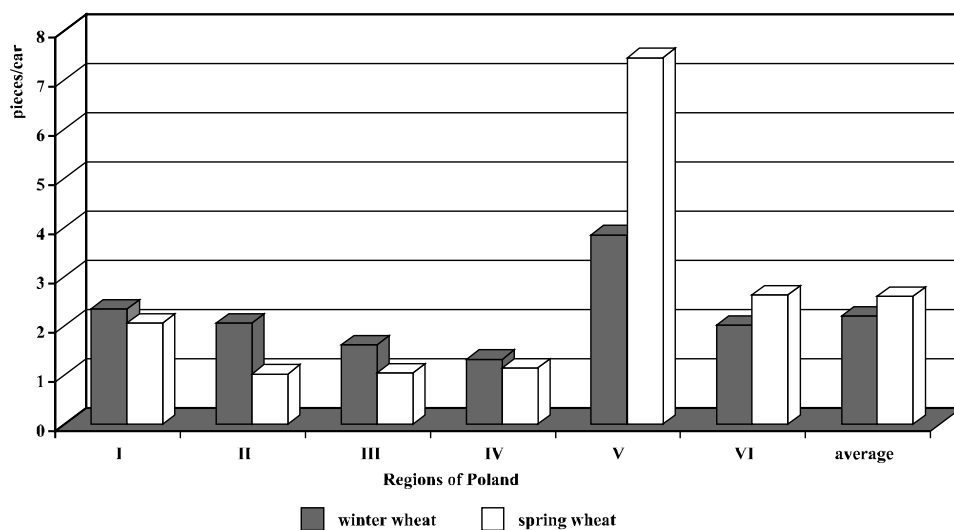


Fig. 2. The number of thrips on winter and spring wheat in the milk-waxy stage in the chosen regions of Poland

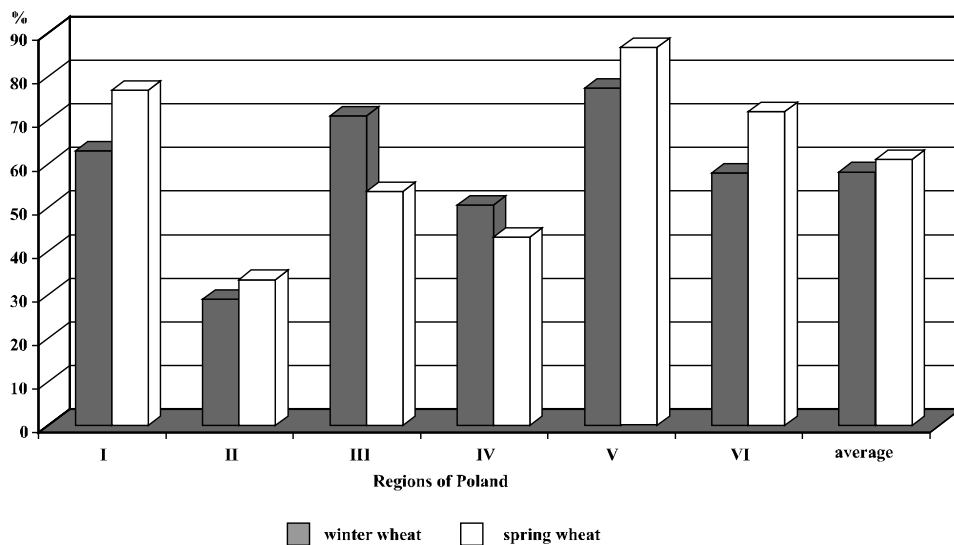


Fig. 3. The percentage of ears infested of winter and spring wheat in the milk-waxy stage in the chosen regions of Poland

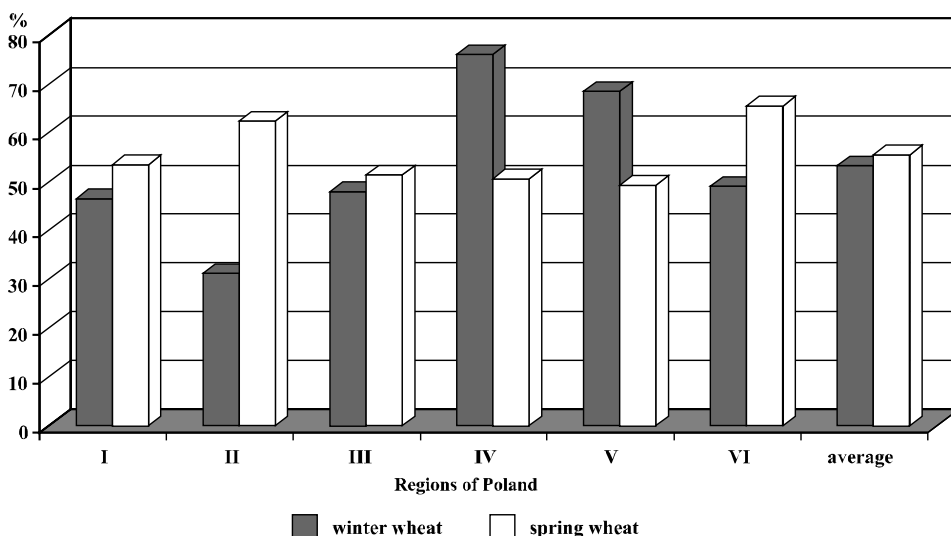


Fig. 4. The percentage of imago in the populations on winter and spring wheat in the milk-waxy stage in the chosen regions of Poland

Results

The presence of 15 thrips species on winter and spring wheat was noted during the research in 2002. Nine of these are associated with monocotyledons and they appeared on both types of cereals. Other species (*Frankliniella intonsa*, *Thrips atratus*, *Thrips fuscipennis*, *Thrips angusticeps*, *Thrips tabaci*) are typical of ubiquitous dicotyledons and one species (*Aeolothrips intermedius*) is a predator. Their percentage among the gathered individuals was insignificant. A frequent occurrence of *Haplothrips aculeatus* was marked on both types of cereals; its individuals constituted 24% on winter wheat and 26% on spring wheat of all of the gathered thrips. The presence of this species as well as those occurring more rarely, such as *Frankliniella tenuicornis* and *Limothrips denticornis*, was noted in all the fields under study.

The species observed only in the western regions of Poland was *Limothrips cerealium*, whose specimens constituted 50% of those gathered from winter wheat and 58% from spring wheat. It occurred most frequently in the north-western region, where it totaled 93.2% in winter wheat and 74% in spring wheat.

The presence of *Haplothrips tritici* was noted only in the south-eastern region, its individuals made up 78.5% of those gathered from winter wheat and 56.7% from spring wheat (Table 1).

The average number of thrips on winter wheat was 2.20 specimens per ear and 53% of the infested ears. On spring wheat, however, 2.60 specimens per ear were found and

Table 1

Thrips species collected from winter (1) and spring (2) wheat in soil-climatic regions of Poland (I – north-western, II – north-eastern, III – central-western, IV – central-eastern, V – south-western, VI – south-eastern); number of specimens and percentage (in brackets)

Species	Region of Poland		I		II		III		IV		V		VI	
	Wheat		1	2	1	2	1	2	1	2	1	2	1	2
<i>Aeolothrips intermedius</i> Bagnall	–	6	4	1	2	–	–	3	–	15	–	–	–	–
		(1.7)	(1.1)	(0.6)	(0.3)			(0.7)		(0.7)				
<i>Anaphothrips obscurus</i> (Müller)	2	1	28	7	7	2	2	4	83	25	–	–	–	–
	(0.5)	(0.3)	(7.4)	(4.3)	(1.1)	(0.6)	(0.4)	(0.9)	(7.2)	(1.2)				
<i>Aptinothrips rufus</i> Haliday	1	2	7	–	29	2	3	3	–	1	–	4	–	–
	(0.3)	(0.6)	(1.9)		(4.7)	(0.6)	(0.6)	(0.7)		(0.05)		(1.0)		
<i>Aptinothrips stylifer</i> Trybom	–	–	11	–	2	1	–	–	–	–	–	1	–	–
			(2.9)		(0.3)	(0.3)						(0.2)		
<i>Chirothrips manicatus</i> Haliday	–	–	2	1	1	–	1	1	3	5	1	–	–	–
			(0.5)	(0.6)	(0.2)		(0.2)	(0.2)	(0.3)	(0.2)	(0.3)			
<i>Frankliniella intonsa</i> (Trybom)	2	–	1	–	–	–	–	–	–	–	–	–	–	–
	(0.5)		(0.3)											
<i>Frankliniella tenuicornis</i> (Uzel)	1	6	89	41	109	20	33	56	40	23	8	12	–	–
	(0.3)	(1.7)	(23.5)	(25.5)	(17.7)	(6.5)	(6.6)	(12.7)	(3.5)	(1.2)	(2.4)	(3.0)		
<i>Limothrips cerealium</i> Haliday	370	263	–	–	260	47	119	25	952	1868	–	–	–	–
	(93.1)	(74.7)			(42.4)	(15.3)	(23.7)	(5.7)	(82.9)	(88.7)				
<i>Limothrips denticornis</i> Haliday	4	5	49	11	18	18	14	27	6	17	3	12	–	–
	(1.0)	(1.4)	(13.0)	(6.8)	(2.9)	(5.8)	(2.8)	(6.2)	(0.5)	(0.8)	(0.8)	(3.0)		
<i>Thrips angusticeps</i> Uzel	–	–	–	–	13	–	–	–	–	5	–	–	–	–
					(2.1)					(0.2)				
<i>Thrips atratus</i> Haliday	–	–	1	–	–	–	–	1	–	–	–	–	–	–
			(0.3)					(0.2)						
<i>Thrips fuscipennis</i> Haliday	–	–	–	–	–	–	–	–	–	2	–	–	–	–
										(0.1)				
<i>Thrips tabaci</i> Lindeman	–	–	3	20	1	1	1	7	–	1	–	3	–	–
			(0.9)	(12.4)	(0.2)	(0.3)	(0.2)	(1.6)		(0.05)		(0.6)		
<i>Haplothrips aculeatus</i> (Fabricius)	17	69	182	79	170	218	329	312	64	143	62	144	–	–
	(4.3)	(19.6)	(48.2)	(49.8)	(27.6)	(70.6)	(65.5)	(71.1)	(5.6)	(6.8)	(18.0)	(35.5)		
<i>Haplothrips tritici</i> (Kurdjumov)	–	–	–	–	3	–	–	–	–	–	–	270	230	–
					(0.5)							(78.5)	(56.7)	
Marked individuals	397	352	377	160	615	309	502	439	1148	2105	344	406		
(imago + larvae)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)		

61% of the ears were infested (*Figs 2 and 3*). The largest number of thrips, both on winter and spring wheat was found in the south-western region of Poland. It was 3.90 specimens and 77% infested ears on winter wheat, and 7.50 and 87% on spring wheat, respectively. In the other regions, the following data were collected: between 1.30 and 2.40 specimens per ear and from 51% to 63% ears dominated on winter wheat, and from 1.0 to 2.60 specimens per ear and between 53% and 72% on spring wheat (*Figs 2 and 3*). The percentage of imago in the population ranged from 31.2% to 69% on winter wheat and from 50% to 65% on spring wheat (*Fig. 4*).

Discussion

It is difficult to compare our results with the literature because the research of the *Thysanoptera* fauna of cereals in Poland is not thorough enough. A series of observations of the number of thrips on cereals was carried out in some years near Olsztyn, Poznań, Opole and Siedlce (Adomas, 1982; Żurańska, 1985; Jackowski and Hurej, 2000; Miętkiewski et al., 1991; Kąkol, 2002; Kąkol and Miętkiewski, 2002). While relating the results of our research from 2002 to others, usually older reports, it should be noted that the number of thrips on cereals is increasing.

The most extensive research on the occurrence of thrips on cereals was conducted by Zawirska and Wałkowski (2000). These authors marked the presence of 11, so-called cereal species (which were also observed in our study), as well as rare, accidental species of the Thrips genus. According to the authors the most frequent species on winter wheat was *Haplothrips aculeatus*. In north-eastern Poland, *Limothrips denticornis* and *Frankliniella tenuicornis* were also noted to be equally common species. Moreover, Adomas (1982) and Żurańska (1985) reported frequent occurrence of the two species on winter and spring wheat near Olsztyn. Zawirska and Wałkowski found *Limothrips cerealium* only in Western Pomerania. According to Szeplińska (2002), the presence of this species was observed near Poznań. The author explains that the percentage of this species amounted to 3% of all thrips population in 1990, whereas in 1993 it increased to 12%. However, *L. cerealium* was not found on cereals between 1997 and 1998 in the Opole region (Jackowski and Hurej, 2000). The research carried out in 2002 indicates the development of the species in the southern direction.

Recent research also confirmed the presence of numerous *Haplothrips tritici* in wheat cultivation in the central-eastern region of Poland. Single individuals were also observed near Siedlce (Kąkol, 2002).

Conclusion

Thrips (*Thysanoptera*) did not pose a threat to winter and spring wheat cultivation in 2002. However, when one compares the intensity of their occurrence, especially in certain regions with published works, it is evident that their number is increasing. Thrips were most frequent on winter and spring wheat in the south-western part of Poland. The presence of nine thrips species closely associated with cereals and six accidental species was noted. *Frankliniella tenuicornis*, *L. denticornis*, *H. aculeatus*, and *L. cerealium* proved to be the most common species whereas *Haplothrips tritici* and *Limothrips cerealium* have a limited territorial reach. *Haplothrips tritici* occurs amply only in south-eastern Poland, under the influence of continental climate, while *L. cerealium* exists in three regions of western Poland under the Atlantic climate.

Acknowledgements

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