www.czasopisma.pan.pl PAN POLSKA AKADEMIA NAUK www.journals.pan.pl

JOURNAL OF PLANT PROTECTION RESEARCH Vol. 49, No. 3 (2009)

DOI: 10.2478/v10045-009-0041-1

THE SPECIES COMPOSITION AND OCCURRENCE OF THRIPS (*THYSANOPTERA, INSECTA*) ON WINTER RYE IN CHOSEN REGIONS OF POLAND

*Ewa Kąkol**

Department of Plant Protection, University of Podlasie
Prusa 14, 08-110 Siedlce, Poland

Received: September 17, 2008
Accepted: June 22, 2009

Abstract: The work has determined the species composition of thrips and their occurrence of winter rye in the chosen soil-climatic regions of Poland. The occurrence of several species of thrips has been noted on winter rye, with *Haplothrips aculeatus* Fabricius as the dominant one. *Limothrips cerealium* Holiday has extended its occurrence in the western direction of Poland. Thrips on winter rye occurred most amply in the south-western region.

Key words: thrips, winter rye, occurrence, species composition

INTRODUCTION

Thrips are a constant element of harmful corn crops entomofauna, occurring very amply each year (Wałkowski 1991). Recently, there have been reports on the increase in their number (Zawirska and Wałkowski 2000; Szaflińska 2002; Kąkol and Kucharczyk 2004; Mrówczyński *et al.* 2005). The forecast shows further economic changes of cereal crops pests including thrips (Walczak *et al*. 2004). The following factors may pose a threat to corn crops caused by thrips: progressive global warming, the increase in the corn cultivation area, monoculture, the development of new species, common use of combine harvesters and simplified cultivation methods.

The aim of this study was to examine and compare the species composition and number of thrips on winter rye in waxy ripe stage in the chosen soil-climatic regions of Poland.

MATERIALS AND METHODS

The observation of thrips was conducted between 2001 and 2003 in the following climatic-soil regions of Poland (COBORU 1981): I – north – western; II – north – eastern; III – central–western; IV – central-eastern; V – south-western; VI – south-eastern.

In northern regions the study was carried out in 2 localities, in central regions in 4 localities and in southern in 3. The number of localities depended on the size of the specific region. The observation of thrips was conducted in cooperation with the local Plant Protection Inspectorate Offices.

The winter rye ears were gathered either in the 2nd or 3rd decade of June and 1st decade of July, depending on the region. The ears were collected diagonally on production fields not smaller than 0.5 ha. One hundred ears (25 ears x 4 repetitions) were taken and then transported to the laboratory in plastic bags. Next the thrips were extracted and preserved in 70% alcohol mixed with glycerine and lactic acid.

The work determined species composition of thrips and their percentage in population as well as the number of thrips individuals (imago and larvae) in pieces per ear, and the percentage of ears infested by thrips. Adult insects were marked according to the Schliephake and Klimt (1979) key, while the larvae according to Priesner (1964) and Speyer and Parr (1941). The number of thrips was given the analysis of variance, and the importance of differences was verified with Tukey's test on significance level of $p \leq 0.05$.

RESULTS

The thrips collected from winter rye in waxy-ripe stage of grain in six soil-climatic regions of Poland are presented in table 1.

The presence of 11 corn thrips species was noted. The enumerated species are phytophagous with the exception of *A. intermedius* which is a zoophagous predator.

Moreover, the population of thrips included the species of *Thrips* sp. kind, such as *T. angusticeps*, *T. atratus*, *T. flavus*, *T. fuscipennis*, *T. tabaci*. The presence of the above mentioned species seems to be accidental. Three wingless species were observed in the population of corn thrips,

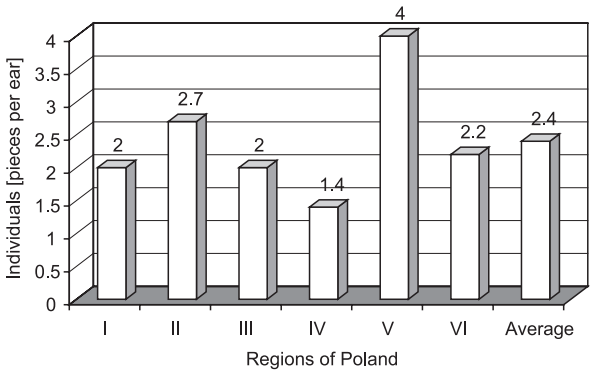
*Corresponding address:
mietkier@ap.siedlce.pl

Table 1. Thrips species collected from winter rye in waxy-ripe stage in soil-climatic regions of Poland (average from three years)

Species	Region of Poland						Region's average
	I	II	III	IV	V	VI	
Aelothrips intermedius Bagnal	0.5*	0.2	0.6	0.1	0.1	0.2	0.3
Anaphothrips obscurus Műller	1.4	–	0.6	0.7	1.4	0.4	1.0
Aptinothrips rufus Haliday	6.2	0.1	0.8	0.2	0.3	0.8	1.4
Aptinothrips stylifer Trybom	0.5	–	0.1	–	0.2	0.7	0.3
Chirothrips manicatus Haliday	0.8	5.2	2.6	1.3	0.7	0.5	1.8
Frankliniella intonsa Trybom	0.1	0.1	–	0.1	0.4	–	0.1
Frankliniella tenuicornis Uzel	0.1	0.1	–	0.1	0.4	–	0.1
Haplothrips aculeatus Fabricius	68.7	91.7	80.9	83.7	69.3	84.5	80
H. tritici Kurdjumov	–	–	–	–	–	9.7	–
Limothrips cerealium Haliday	19.2	–	7.1	0.6	20.0	–	7.9
L. denticornis Haliday	1.4	1.5	6.7	1.8	7.0	1.4	3.3
Thrips sp.	0.3	0.5	0.7	0.9	–	0.1	0.4
Identificated individuals	677	1163	1957	2431	3036	1212	10476 total

*percentage of the species in population

these are: *A. obscurus*, *A. rufus* and *A. stylifer*. The following species were typical of all regions: *A. intermedius*, *A. rufus*, *Ch. manicatus*, *H. aculeatus* and *L. denticornis*. However, the differences in species percentage in the population in soil-climatic regions of Poland were noted down. By far, the most dominant species on winter rye in all regions was *H. aculeatus*. Its percentage in the population varies from 68.9 in north-western region to 91.7 in north-eastern region. The species which occurred in great numbers in 3 western regions was *L. cerealium*. Its percentage ranges from 7.1 to 20. The frequent presence of *L. denticornis* was observed in the central and south-western Poland and constituted about 7%. *H. tritici* occurred on winter wheat only in south-eastern region and was only 10%. *Ch. manicatus* occurred most frequently in north-eastern region where it made up 5%. The percentage of other thrips was insignificant and constituted from 0,1% to 2%. The number of thrips and the winter rye ears infested by thrips in the waxy ripe stage are presented in figures 1 and 2.



NIR p ≤ 0.05 for regions – 0.73

Fig. 1. The number of thrips on winter rye in the chosen regions of Poland (the average from 3 years)

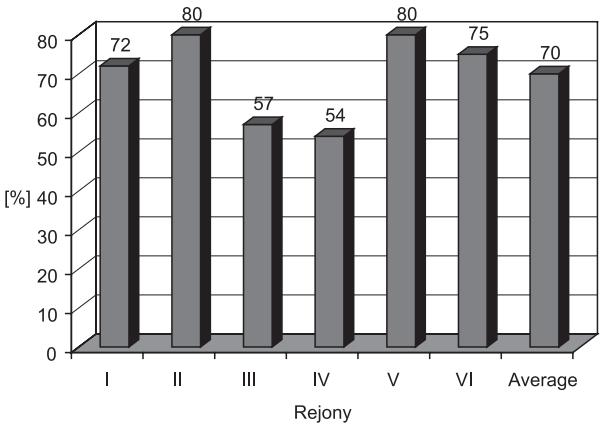


Fig. 2. The percentage of winter rye ears infested by thrips in the chosen regions of Poland (the average from 3 years)

The most frequent occurrence of the thrips on winter rye could be observed in south-western region (Fig. 1, 2). Their average number from 3 years of observation totaled 4.0 specimens per ear and 80% of the ears were infested. In four regions their number varied from 2 to 2.7 specimens per ear and the infested ears made up from 57 to 80%. The thrips occurred least frequently in central-eastern region where their number was 1.4 specimen per ear with 54% of infested ears. Their average number in the six regions of Poland was 2.4 specimens per ear with 72% of infested ears.

DISCUSSION

The research of the species composition of thrips brings to a conclusion that two species *L. cerealium* and *H. tritici* used to have a very limited extent. The former could be found in western regions whereas the latter in south-eastern one. According to Zawirska and Wałkowski (2000) *L. cerealium* belongs to species characteristic of the Atlantic climate. Therefore it seems that the extent of this spe-

cies developed in the southern direction with continental climate features. Szaflińska (2002) reported the existence of the species in the central part of Wielkopolska while Jackowski and Hurej (2002) observed it near Opole.

In some of the regions *Frankliniella intonsa* and *F. tenuicornis* did not occur on winter rye while earlier observations note their frequent occurrence on corn (Gromadska and Rolko 1971; Luterek 1977; Adomas 1981).

Ch. manicatus, which is tightly connected with grasses, was observed on winter rye in north and central eastern regions. It can be concluded that in the areas where there is greenland in agricultural structure of land, there appear migrations of members of species from grass to corn.

H. tritici, on the other hand, known as a winter and spring wheat monophague (Zawirska 1990; Zawirska and Wałkowski 2000) in south-eastern Poland, extended its feeding basis to winter rye ears.

The dominant species on winter rye in all soil-climatic regions of Poland was *H. aculeatus* with the percentage in population ranging from 68.7 to 91.7.

My observations concerning the domination on of *H. aculeatus* seem to confirm the previous research of the species composition of thrips on corn crops (Miętkiewski *et al*. 1991; Kąkol and Miętkiewski 2002; Jackowski and Hurej 2000). *L. cerealium* constituted a major part in thrips population on winter rye only in separate years in central western Poland (Szaflińska 2002).

CONCLUSION

The presence of 17 thrips species on winter rye in chosen soil-climatic regions of Poland was noted. Eleven of these are associated with Graminae plants family. Other species from *Thrips* sp. type constituted an accidental element on the corn crops. The species dominant in 6 soil-climatic regions of Poland was *H. aculeatus* Fabr. Its average percentage in the population made up 80%. *L. cerealium* (Hal.), an Atlantic climate species, extended its territorial reach in the south-western direction with continental climate features. *H. tritici* Kurdjumov, considered to be winter and spring wheat monophague in south-western Poland, occurred amply in winter rye ears which confirms the development of the feeding basis of the species. Thrips were the most frequent in the south-western region of Poland while in the central-eastern part of Poland they proved to be the least common.

REFERENCES

Adomas J. 1981. Skład gatunkowy i dynamika występowania przylżeńców (*Thysanoptera*) na pszenicy jarej w okolicy Olsztyna. Ochrona Roślin nr 2: 3–5.

Gromadska M., Rolko A. 1971. Kształtowanie się liczebności populacji *Thysanoptera* na owsie. Zesz. Nauk. UMK, Toruń, Biol. 29 (14): 119–129.

Jackowski J., Hurej M. 2000. Thrips (*Thysanoptera*) on cereal species mixtures in the Opole region Poland. Pol. Pismo Entomol. 69: 377–388.

Kąkol E., Miętkiewski R. 2002. Występowanie i szkodliwość wciornastków (*Thripidae*) na pszenicy jarej. Prog. Plant Protection/Post. Ochr. Roślin 42 (2): 647–650.

Kąkol E., Kucharczyk H. 2004. Occurrence of thrips on the winter and spring wheat in chosen regions of Poland. Acta Phytopat. Entomol. Hung. 39 (1–2): 263–269.

Luterek D. 1977. Przylżeńce występujące na zbożach. Ochrona Roślin nr 7: 7–10.

Mrówczyński M., Wachowiak H., Boroń M. 2005. Szkodniki zbóż – aktualne zagrożenie w Polsce. Prog. Plant Protection/Post. Ochr. Roślin 45 (2): 930–932.

Miętkiewski R., Żurek M., Stankiewicz Cz., Starczewski J. 1991. Występowanie wciornastków (*Thysanoptera*) w kłosach żyta, pszenicy i pszenżyta oraz wpływ ich żerowania na niektóre właściwości fizjologiczne i skład chemiczny ziarna. Zesz. Nauk. s. Roln. WSRP Siedlce 29: 187–200.

Preisner H. 1964. Ordnung *Thysanoptera* (Fransenflűger, *Thripse).* Akademie Verlag, Berlin, 242 pp.

Schliephake G., Klimt K. 1979. *Thysanoptera, Fransenflűger*. Veb Gustav Fischer Verlag, Jena: 94–331.

Speyer E.R., Parr W.J. 1941. The external strukture of some *Thysanoptera* larve. Trans. R. Ent. Soc. 91 (11): 559–635.

Szaflińska D. 2002. *Thysanoptera* of cereals in central Wielkopolska. Acad. Sci. 50: 177–181.

Walczak F., Jakubowska M., Skorupsza A., Tratwal A., Wójtowicz A., Złotkowski J. 2004. Szkodliwość ważniejszych agrofagów roślin uprawnych w Polsce w 2003 roku. Prog. Plant Protection/Post. Ochr. Roślin 44 (1): 496–512.

Wałkowski W. 1991. Wzrost znaczenia szkodników zbóż w Polsce. Ochrona Roślin nr 5/6: 17–20.

Zawirska I. 1990. *Thysanoptera* – Przylżeńce. p. 65–70. W : „Wykaz Zwierząt Polski" (W. Razowski). PAN, Wrocław t. I.

Zawirska I., Wałkowski W. 2000. Fauna and importance of thrips (*Thysanoptera*) for rye and winter wheat in Poland. J. Plant Protection Res. 40: 36–55.

POLISH SUMMARY

SKŁAD GATUNKOWY I WYSTĘPOWANIE PRZYLŻEŃCÓW *(THYSANOPTERA)* NA ŻYCIE OZIMYM W WYBRANYCH REJONACH POLSKI

W latach 2001–2003 określono występowanie wciornastków na życie ozimym w wybranych rejonach klimatyczno-glebowych Polski. W tym celu w fazie dojrzałości woskowej ziarna zbierano kłosy na polach produkcyjnych. W zależności od rejonu, zbioru kłosów dokonano w II i III dekadzie czerwca oraz w I dekadzie lipca. Na życie ozimym stwierdzono występowanie 17 gatunków wciornastków. Gatunkiem dominującym we wszystkich rejonach był *Haplothrips aculeatus* Fabr. Średni udział tego gatunku w Polsce w populacji wciornastków wynosił 80%. *Limothrips cerealium* (Hal.) powiększył swój obszar terytorialnego występowania w kierunku południowo-zachodnim o cechach klimatu kontynentalnego. *H. tritici* Kurdj. zaliczany do monofagów pszenicy ozimej i jarej w rejonie południowo-wschodniej Polski licznie występował w kłosach żyta ozimego. Świadczy to o rozszerzeniu bazy pokarmowej gatunku. Wciornastki na życie ozimym najliczniej występowały w rejonie południowo-zachodnim Polski. Najmniejszą ich liczebność odnotowano w rejonie środkowo-wschodnim Polski.