THRIPS (*THYSANOPTERA: INSECTA*) ON WINTER WHEAT IN TIMIȘ COUNTY, ROMANIA

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Abstract *. Thrips species have always been some of the main pests in winter wheat crops. Damages caused by this species are either directly by feeding on leaves flowers or fruit, or indirect acting as vectors of viruses. Due to the lack of knowledge on the thrips fauna in western Romania and also the importance of this crop for local farmers, the aimed of this paper is to survey the thrips species associated to winter wheat crops in Timis County, Romania. Thrips were collected from 5 varieties of winter wheat from November to June 2016 – 2017. The monitoring of thrips adults was made using colored sticky traps and the monitoring of thrips larvae was made using the method of ears sampling. The collected material was transported by specific methods in the Entomology laboratory at the Faculty of Agriculture Timisoara. With the help of stereozoom microscope there were determinate the thrips species and also the number of larvae/ear. The most commonly found thrips species was Haplothrips tritici Kurdjumov. According with the present studies, the following thrips species also occur in winter wheat crops, in western Romania: Haplothrips aculeatus Fabricius, Frankliniella tenuicornis Uzel, Frankliniella occidentalis Pergande, Frankliniella tritici Fitch, Frankliniella intonsa Trybom, Limothrips denticornis Haliday, Limothrips angulicornis Jablonowski, Limothrips cerealium Haliday, Aptinothrips rufus Gemelin, Anaphothrips obscures Műller, Stenothrips graminum Uzel, Thrips physapus Linnaeus and Aeolothrips intermedius Bagnall. According to farmers from western Romania, their losses range from 20% to 40% depending on the severity of the thrips infestation. Thrips damage is usually higher during the dry season and warmer temperature.*

Keywords*: thrips species, varieties, winther wheat, Timiș county, damage*

INTRODUCTION

Winter wheat (*Triticum aestivum* L.) is one of the most important cereal crops in the world and is grown in various climatic conditions. Productions may present significant increases if during the growing season; farmers shall take appropriate measures to reduce the attack of harmful insects. Some of the most important pests that can reduce wheat yield by up to 15-30% are thrips (WHEAT INSECT CONTROL RECOMMENDATIONS).

Thrips are representatives of the order Thysanoptera, which is presented as a homogenous group of insects with the body of very small dimensions (0.5 - 5 mm), wings hyaline, fringes on the edges and one main rib, very poorly demarcated. Until present day a total of 5,000 species have been scientifically determined, they belonging to two suborders: *Terebrantia* and *Tubulifera* (MOUND, 1997).

The thrips species that attack cereals are usually found behind the sheath of the flag leaf, feeding on the steam. Also thrips are attacking leaves and ears (KAKOL & KUCHARCZYK, 2004).

The damage are produced both adults and larvae. When thrips are present in large numbers they are causing damage to tissue that they eat, this becoming silvery (LARSSON, 2005).

From thrips species that are damaging to winter wheat, we mention: *Haplothrips tritici, Haplothrips aculeatus and Limothrips cerealium* (ANDJUS, 2004).

After CZENCZ (1994), *Haplothrips aculeatus* is a species with great ecological plasticity, which seriously damaged the wheat crop in cooler areas of Europe. Afterthe same

author, *Limothrips cerealium* and *Haplothrips tritici* harm at the same time together, especially in Paleartic regions with hot summers.

The aim of this research paper is to determine the thrips species present in winter wheat crops from western part o Romania (Timiș County) and also, to establish the qualitative and quantitative ratio between this thrips species.

MATERIAL AND METHODS

1. The research fields

In order to establish the occurrence of thrips species associated with winter wheat, they were chosen 5 varieties of winter wheat, as follow: Exotic, Cubus, Sobbel, Renan, and Apache. The varieties were chosen because of their properties of higher quality as compared to other varieties available. These varieties were randomly sampled during November to June 2016 – 2017 from the beginning of the vegetation period up to harvesting. The soil that have been carried out the researches, was a soil of good quality, a typical cadmic chernozem soil, mollic horizons are rich in organic matter, highly saturated with bases, react neutrally in terms of soil pH and high humus reserve.

Sowing was done annually in October in the Comloșu Mare locality (latitude, longitude) Timis County, Romania. The experimental field was placed after the randomized block method, in 3 variants and 5 repetitions, each plot size being of 24 m^2.

2. Monitoring the thrips adults using colored sticky traps

Colored sticky traps were used to determine the thrips adults present in winter wheat crop. There were used sticky traps of different colors: blue, yellow, white and red. In each variety was placed one trap. The sticky traps were set up between growth stage 47 and 77. The traps were changed in every month, with a collecting periodicity at each 7 days. Traps were placed at the same height as the ears of the wheat plants (EL-WAKEIL ET AL., 2010).

3. Monitoring of thrips larvae using the method of ears sampling

The observations were carried out using the metric frame of 0,25x0,25 m, when wheat is in flowering stage (GS 65) and milky stage (GS 73), time when thrips larvae reached complete development, but have not yet left ears. Ears inside the metric frame is removed and placed in jars for transport. The collected material was transported by specific methods in the Entomology laboratory at the Faculty of Agriculture Timisoara. With the help of stereozoom microscope there were determinate the thrips species and also the number of larvae/ear.

RESULTS AND DISCUSSIONS

Altogether 14 species have been identified during the two years survey, among them *Limothrips cerealium* Haliday and *Haplothrips tritici* Kurdjumov which are a herbaceous species, were comprising 48,67% of all collected specimens. Other species occurred only in low numbers. The frequent and numerous presence of *Frankliniella tritici* Fitch species in the samples, confirmed the role of the winter wheat plant as the host. *Frankliniella intonsa* Trybom probably chose winter wheat as a food source and substitute plant for breeding (table 1).

Favorable climatic conditions during the growing season in the studied area, characterized by high temperatures and low precipitation, allowed us to collect a large number of specimens. The first specimens were collected in mid-May in both years of research.

Regarding the dynamics of thysanoptera species collected from winter wheat crop, we can say that the increasing in populations' level was observed from the second half of June and early July when it was the maximum peaked.

Table 1.

The thrips species list detected and identified in winter wheat crop

No. indiv./species	**Variety**					**Total**
	Exotic	Cubus	Sobbel	Renan	Apache	
Haplothrips tritici Kurdjumov	11	32	18	50	76	187
Haplothrips aculeatus Fabricius	3	6	3	7	2	21
Frankliniella tenuicornis Uzel	3	1	20	11	16	51
Frankliniella occidentalis Pergande	8	8	5	6	6	33
Frankliniella tritici Fitch	7	3	36	17	48	111
Frankliniella intonsa Trybom	22	11	19	27	19	98
Limothrips denticornis Haliday	-	-	-	-	3	3
Limothrips angulicornis Jablonowski	1	3	-	6	1	11
Limothrips cerealium Haliday Sin. *schmutzi* Priesner	11	35	63	59	66	234
Aptinothrips rufus Gemelin	2	7	6	5	9	29
Anaphothrips obscures Műller	-	13	-	9	1	23
Stenothrips graminum Uzel	1	2	-	-	2	5
Thrips physapus Linnaeus	7	-	7	3	-	17
Aeolothrips intermedius Bagnall	6	-	1	11	24	42
					Total	865

Various species of *Haplothrips*, *Frankliniella* and *Limothrips* genera were reported as pests on winter wheat in different regions of the world (MOUND AND AZIDAH, 2009; GAAFAR ET AL., 2009, 2011; WANG ET AL., 2011). In Romanian scientific literature, just one species, *Haplothrips tritici* Kurdjumov, is mentioned as important pests for winter wheat (MALSCHI, 2003; MALSCHI ET AL., 2015).

The first thysanoptera species collected from the field in May was *Limothrips denticornis* Haliday, followed by *Haplothrips tritici* Kurdjumov and *Haplothrips aculeatus* Fabricius, both collected in the same time, in 20 May 2016. The species *Haplothrips tritici* Kurdjumov was collected in great number from fields in 2017.

The present results obtained in 2016 – 2017 periods, are in agreement with the results found in the literature (BUTIN & BESHEAR, 1995; KAKOL & KUCHARCZYK, 2004; TUNC, 1976; ZAWIRSKA & WAŁKOWSKI, 2000), which highlighted as main thysanoptera species some of those mentioned by as. Beside the species mentioned in the literature, in the western part of Romania were collected the following species: *Aptinothrips rufus* Gemelin, *Anaphothrips obscures* Műller, *Stenothrips graminum* Uzel, *Thrips physapus* Linnaeus, *Aeolothrips intermedius* Bagnall. We consider the presence of *Anaphothrips obscures* Műller and *Thrips physapus* Linnaeus as being accidental on winter wheat steams.

The complete systematic list of the identified species accompanied by trophic levels, host plants and zoogeographical distribution is given in table 2.

The zoogeographical structure shows the dominance of Holartic elements (35,71%) representing the natural habitats and climate particularities found throughout our country. These elements are followed by West Palaearctic elements (21,43%), Palaearctic and cosmopolitan elements, each with 14,29% and in small percentage (7,14), two species: Euro-Siberian and European.

Regarding with host plants and trophic levels, the majority of the adults and larvae feed on herbaceous plants, ten species prefering Poaceae. In this zone, from the total species collected from the experimental fields, two were facultative zoophagous, the rest of them being phytophagous. So, 7 species are flowers feeders, 3 are flowers and seed feeders, and just 2 feed upon leaves.

Table 2.

The trophic spectrum and zoogeographical distribution of thrips species present in winter wheat crop

Species	Trophic levels	Host plants	Geographical distribution
Haplothrips tritici Kurdjumov	Phytophagous (Flower feeders)	prefer Poaceae and also in flowers of different herbaceous plants	West Palaearctic
Haplothrips aculeatus Fabricius	Phytophagous (Flower and seed feeders)	prefer Poaceae and Cyperaceae, inflorescences of other herbaceous plants	Palaearctic
Frankliniella tenuicornis Uzel	Phytophagous (Flower feeders)	Poaceae, grass	Holartic
Frankliniella occidentalis Pergande	Phytophagous (Flower feeders), zoophagous – facultative predators	herbaceous plants	Holartic
Frankliniella tritici Fitch	Phytophagous (Flower, fruit and seed feeders)	herbaceous, rarely woody	West Palaearctic
Frankliniella intonsa Trybom	Phytophagous (Flower feeders)	herbaceous plants	Euro-Siberian
Limothrips denticornis Haliday	Phytophagous (Flower and seed feeders)	Poaceae	Holartic
Limothrips angulicornis Jablonowski	Phytophagous (Flower feeders)	Poaceae	Holartic
Limothrips cerealium Haliday Sin. *schmutzi* Priesner	Phytophagous (Flower and leaves feeders)	Herbaceous plants	European
Aptinothrips rufus Gemelin	Phytophagous (Flower and seed feeders)	Poaceae, herbaceous plants	Cosmopolitan
Anaphothrips obscures Műller	Phytophagous (Leaves feeders)	Poaceae	Cosmopolitan
Stenothrips graminum Uzel	Phytophagous (Leaves feeders)	Poaceae, preferring *Avena sativa*, on grass and accidentally in flowers of other plants	West Palaearctic
Thrips physapus Linnaeus	Phytophagous (Flower feeders)	Poaceae and also in flowers of different herbaceous plants, grass	Holartic
Aeolothrips intermedius Bagnall	Phytophagous (Flower feeders) facultative predator	Poaceae and also in flowers of different herbaceous plants, grass	Palaearctic

CONCLUSIONS

1. There are 14 thrips species collected from winter wheat crop in Comloșu Marea area
2. *Limothrips cerealium* Haliday is the best represented species in winter wheat crop

3. There are some differences between the thrips fauna in Comloșu Mare area and the one present in the rest of the country, the species *Anaphothrips obscures* Műller and *Thrips physapus* Linnaeus being mentioned for the first time in our country's winter wheat crops
4. The results we obtained referring to the zoogeographical distribution of thrips species were predictable as compared to the situation in Romania, the Holarctic elements being dominant
5. Considering the type of diet, we can say that 12 of the 14 species collected have a phytophagous regime, being preferred herbaceous plants.

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