WEED INFESTATION OF WINTER WHEAT WITH MONOCOTYLEDONS WEEDS IN THE INTEGRATED AGRICULTURAL SYSTEMS IN THE YEARS 1997-2006

AKTUÁLNA ZABURINENOSŤ PŠENICE OZIMNEJ JEDNOKLÍČNOLISTOVÝMI BURINAMI V INTEGROVANOM SYSTÉME HOSPODÁRENIA ZA ROKY 1997-2006

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Abstract: *The aims of this study were to investigate the influence of an integrated farming system on development of monocotyledons weed infestation in the winter wheat fields in all production regions of Slovakia. The actual weed infestation was evaluated from 1997 till 2006 in the Slovak Republic, by standard methods common used by EWRS a numerous method per square. The results of the weed survey on arable land conducted in 1997-2006 were applied to asses the distribution and occurrence of weed species with respect to their importance and harmfulness. The most important weeds species were: Elytrigia repens, Apera spica venti, Avena fatua, Echinochloa crus galli, Setaria spp. Alopecurus myosuroides, et cet.*

Súhrn: *Cieľom tejto štúdie bolo zistiť vplyv integrovaného systému hospodárenia na vývoj zaburinenosti porastov pšenice letnej formy ozimnej jednoklíčnolistovým burinami vo všetkých produkčných oblastiach Slovenska. Aktuálna zaburinenosť bola zisťovaná od 1997 do 2006 v Slovenskej Republike. Využitá bola štandardná početná metóda podľa EWRS. Výsledky prieskumu zaburinenosti na ornej pôde, vykonávaného 1997-2006 boli využité na stanovenie rozšírenia a výskytu burinných druhov vzhľadom na ich dôležitosť a škodlivosť. Najvýznamnejšie druhy burín boli: Elytrigia repens, Apera spica venti, Avena fatua, Echinochloa crus galli, Setaria spp., Alopecurus myosuroides, et cet.*

Key words**:** monocotyledon weed, winter wheat, integrated agricultural system
Kľúčové slová: *jednoklíčnolistové buriny, pšenica ozimná, integrovaný systém hospodárenia*

INTODUCTION

On the basis of long term of weed survey in all production regions of Slovakia, which was conducted at Department of Sustainable Agriculture and Herbology of Slovak University of Agriculture in Nitra, the most dangerous monocotyledon weed species in winter wheat were set up. In this article we mention three most dangerous species: *Elytrigia repens, Apera spica venti, Avena fatua*

Elytrigia repens (L.) is a perennial rhizomatous plant attributed to *Poaceae* family. It grows in various soils – acid, neutral, limy and even saline soils. *Elytrigia repens* is very well adapted to different climatic conditions, can grow throughout the year provided temperature, moisture and other environmental factors allow. As a result it is distributed in more than 80 countries of the world (ZIMDAHL, 1993). The occurrence of *Elytrigia repens* is also determined by its biological properties. The main organ of *Elytrigia repens* propagation is an underground stem, called a rhizome. It has a lot of buds that practically have no dormancy period and produce new tillers from early spring to late autumn, only at different intensity (MAHELKA et al, 2007). *Elytrigia repens* growth and spreads during several years in different agricultural crops for example: winter rye, potatoes, spring barley (NEDZINSKIENE et al, 2008)

MATERIALS AND METHOD

The assessment of the most dangerous monocotyledons weed species in winter wheat was conducted in farm of monitoring research conducted in Slovakia during 1997-2006. The fields of pilot farms were selected in 49 farms in maize, sugar beat and potato production region. Farms were selected with relation to crop rotation and tillage management. Common chemical weed practices were used. Present study assessed the actual weed infestation of monocotyledon weed species in winter wheat in latest year of weed survey.

An actual weed infestation was evaluated before application of herbicides with concordance to International scales EWRS (ANONYMOUS, 1988). Screening of each field was made on the quadrant of 1 m^2 area with four replications. One quadrant on each replication (0.7 m by 1.5 m) covers rows and inter-rows cultivation. The four randomly established sample quadrants were situated minimally 20 m from field margin and apart each other, respectively. The fields with same history were selected. Standard mechanical and chemical weed control have been used. The level of infestation was evaluated according to average density of weeds per square meter (Table 1).

Table 1

Evaluation scale of actual weed infestation for excessively dangerous and less dangerous weeds

Group of weeds	Actual weed infestation				
	none	weak	low	medium	heavy
	Infestation level				
	0	1	2	3	4
	Number of weeds per m^2				
Excessively dangerous	-	≤ 2	3-5	6-15	≥ 16
Less dangerous	-	≤ 4	5-8	9-20	≥ 21
Less important	-	≤ 8	9-15	16-30	≥ 31

The received data from pilot farms were computed to whole area of growing crop in maize, sugar beat and potato production region on the base of acreage of evaluated fields and share of winter wheat in structure of growing crops and acreage of sunflower in particular production region. In 2006 the acreage of winter wheat in the Slovak Republic was 387 745 ha. For characteristic of production region see table 2.

Table 2

Characteristic of evaluated production region of the Slovak Republic

Characteristics	Maize production region	Sugar beat production region	Potato production region
Share of total arable land	24 %	16.2 %	18.9 %
Altitude	up to 200 m	up to 350 m	350-500 m
Average year temperature	9.5-10.5 °C	8-9 °C	6.5-8 °C
Average year precipitation	550-600 mm	550-650 mm	700-800mm

RESULTS AND DISSCUSSION

On the basis of weed survey in winter wheat during the years 1997-2006 the most dangerous mocotyledon weeds were *Elytrigia repens, Apera spica venti, Avena fatua*. Results of infestation level with these three weeds on winter wheat are on figures. We can see the increase of weed infestation level of winter wheat with monocotyledon weeds in lower actual weed infestation levels (weak, low). This can cause serious problems in the integrated farming systems with higher costs of cultural and chemical weed control.

Check list of importance of monocotyledon weeds in the cereals is very variable from SCHROEDER et al. (1993). Because nowadays the level of soil cultivation is lower than in the 1980s. When weed survey was made by the collective of EWRS.

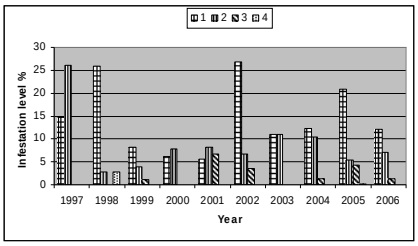

Figure1. Weed infestation of winter wheat with AVEFA in maize production region

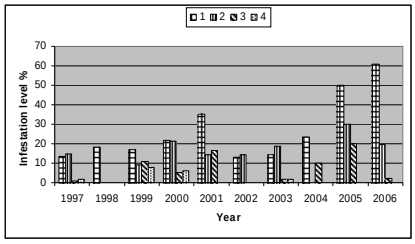

Figure2.Weed infestation of winter wheat with AVEFA in sugar beat production region

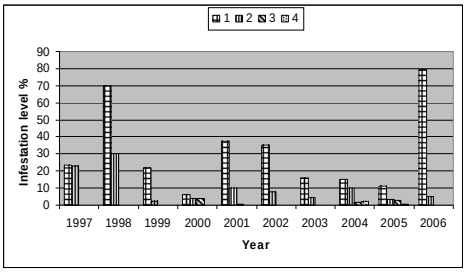

Figure3. Weed infestation of winter wheat with AVEFA in potato production region

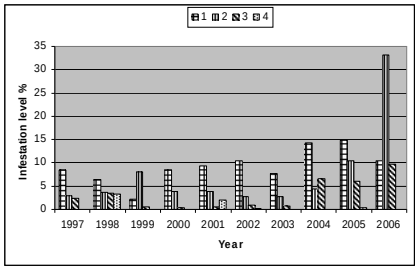

Figure 4. Weed infestation of winter wheat with ELYRE in maize production region

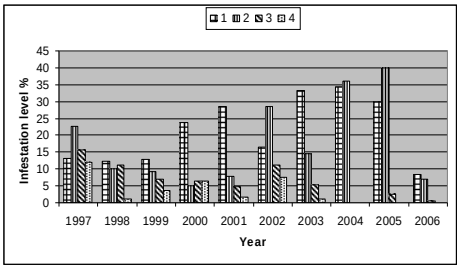

Figure 5. Weed infestation of winter wheat with ELYRE in sugar beat production region

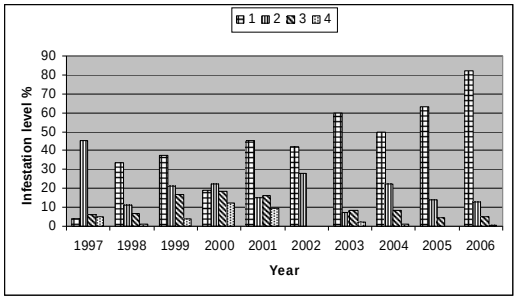

Figure 6. Weed infestation of winter wheat with ELYRE in potato production region

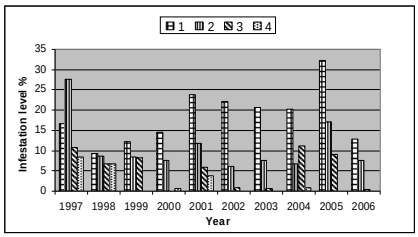

Figure 7. Weed infestation of winter wheat with APESV in maize production region

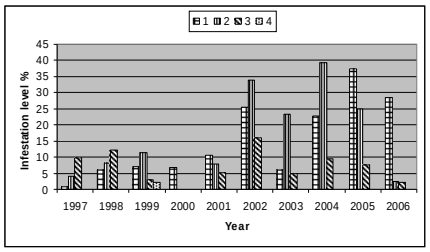

Figure 8. Weed infestation of winter wheat with APESV in sugar beat production region

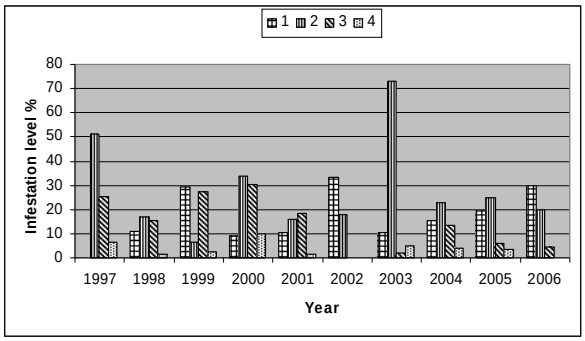

Figure 9. Weed infestation of winter wheat with APESV in potato production region

CONCLUSIONS

The most important monocotyledons weed species in winter wheat are *Elytrigia repens Apera spica-venti, Avena fatua, Echinochloa crus-galli, Setaria spp. and Alopecurus miosuroides.*

The most important effect on monocotyledon weeds infestation level of winter wheat has:

- Agricultural systems
- Ploughing – during and after vegetative period,
- Weather conditions

ACKNOWLEDGEMENTS

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