

DIABROTICA VIRGIFERA LE CONTE – A NEW THREAT TO MAIZE CROPS IN POLAND AND MEASURES TAKEN AGAINST THE PEST

Agnieszka Sahajdak¹, Paweł K. Beres², Tomasz Konefal³

¹The State Plant Health and Seed Inspection Service,
Wspólna 30, 00-930 Warszawa, Poland
e-mail: a.sahajdak@piorin.gov.pl

²Institute of Plant Protection, Experimental Station,
Langiewicza 28, 35-101 Rzeszów, Poland
e-mail: p.beres@ior.poznan.pl

³The State Plant Health and Seed Inspection Service, Central Laboratory,
Żwirki i Wigury 73, 87-100 Toruń, Poland
e-mail: t.konefal@piorin.gov.pl

Accepted: June 21, 2006

Abstract: In this paper we present the first occurrence of the *Diabrotica virgifera* Le Conte in Poland and the measures taken against this pest. The specimens of western corn rootworm were found in South-Eastern Poland (Podkarpackie voivodeship) at the end of August and in September of 2005.

Key words: *Diabrotica virgifera*, first occurrence, Poland, quarantine pest, maize

The western corn rootworm (*Diabrotica virgifera* Le Conte) is one of the most hazardous maize pests. This species was introduced to Europe in 1992 (Bača 1993; Levine and Oloumi-Sadeghi 1991; Maceljski and Igrc Barčić 1993). Till now it has been recorded in the majority of European countries (Lipa 2004a, b; EPPO 2006).

In connection with the high level of the threat to maize crops, *D. virgifera* is recognized as a quarantine pest in all countries of the European Community, including Poland. The State Plant Health and Seed Inspection Service (SPHSIS) is responsible for the supervision of detection, recording and preventing the spread of quarantine pests on the territory of Poland.

SPHSIS has conducted coordinated monitoring activities for the pest since 2004 in order to discover potential occurrence of this pest. The monitoring program consists of inspections of maize plantations and use of insect traps. Inspections are, among others, based on visual examination of maize plants in the field during vegetation period. Two types of traps, based on a synthetic pheromone and a floral attractant,

are used within the framework of the monitoring program.

Surveys are conducted according to the principles harmonized for all units of SPHSIS and approved by the General Inspector of Plant Health and Seed Inspection. These guidelines were prepared on the basis of scientific studies on *D. virgifera* and guidelines of international official plant-health bodies and organizations (European Commission, European and Mediterranean Plant Protection Organization). SPHSIS cooperates with the Institute of Plant Protection in Poznań in the field of detection and eradication of the pest.

In 2004, as many as 6884 inspections covering 5841 plantations (ca. 36650 ha) were carried out. Total number of used traps (both types) was 251, placed in 173 locations.

The monitoring was continued in 2005. Inspections were carried out on 6213 plantations of maize (ca. 36680 ha). As many as 239 traps (both types) were placed in 192 locations until the first finding of *D. virgifera*.

As a result of monitoring activities, individuals of *D. virgifera* were found in South-Eastern Poland (Podkarpackie voivodeship) at the end of August and in September of 2006 (Bereś 2006; Bereś et al. 2006).

First records from Poland are the following (Fig. 1):

1. Dukla, UTM code: EV 49, 22.08.2005, 1 ♀ (at the Rzeszów-Barwinek international road leading from the border crossing, between Poland and Slovakia);
2. Łąka, EA 75, 25.08.2005, 4 ♀♀, 1 ♂ (maize plantation near the Rzeszów-Jasionka airport);
3. Jasionka, EA 74, 29.09.2005, 3 ♀♀ (maize plantation near the Rzeszów-Jasionka airport).

Information campaign was started immediately after first occurrence of the pest. It was addressed mainly to farmers from the infested areas. Information leaflets and posters were prepared within the framework of this campaign. Training meetings for farmers, representatives of local authorities and services operating in the agriculture were carried out as well.

The most probable hypothesis concerning the outbreak of the pest on the territory of Poland is based on the assumption that the pest entered from the neighbouring countries: Slovakia and/or Ukraine. Two ways can be considered as a probably entry. The first is related to the human activity: motor or plane transport (roads from the points of entry, and the Rzeszów-Jasionka airport are not far from the places of occurrence of the pest). Natural migration of the pest is also very probable – insects could be moved with the winds.

Detailed proceeding in the case of the occurrence of *D. virgifera* on the territory of the European Community is laid out in the Commission Decision of October 24, 2003 on emergency measures to prevent the spread within the Community of *D. virgifera* (2003/766/EC). This procedure was transferred into Polish plant health law and established as the regulation of the Minister of Agriculture and Rural Development (Dz. U. z 2004 Nr 82).

According to above mentioned regulations, demarcated zones shall be defined: a focus zone around the field where the pest has been captured, of at least 1 km radius and a safety zone around the focus zone of at least 5 km radius. Buffer zone around the focus and safety zone may be also defined, when it is necessary. Appropriate eradication measures shall be ensured in these zones.

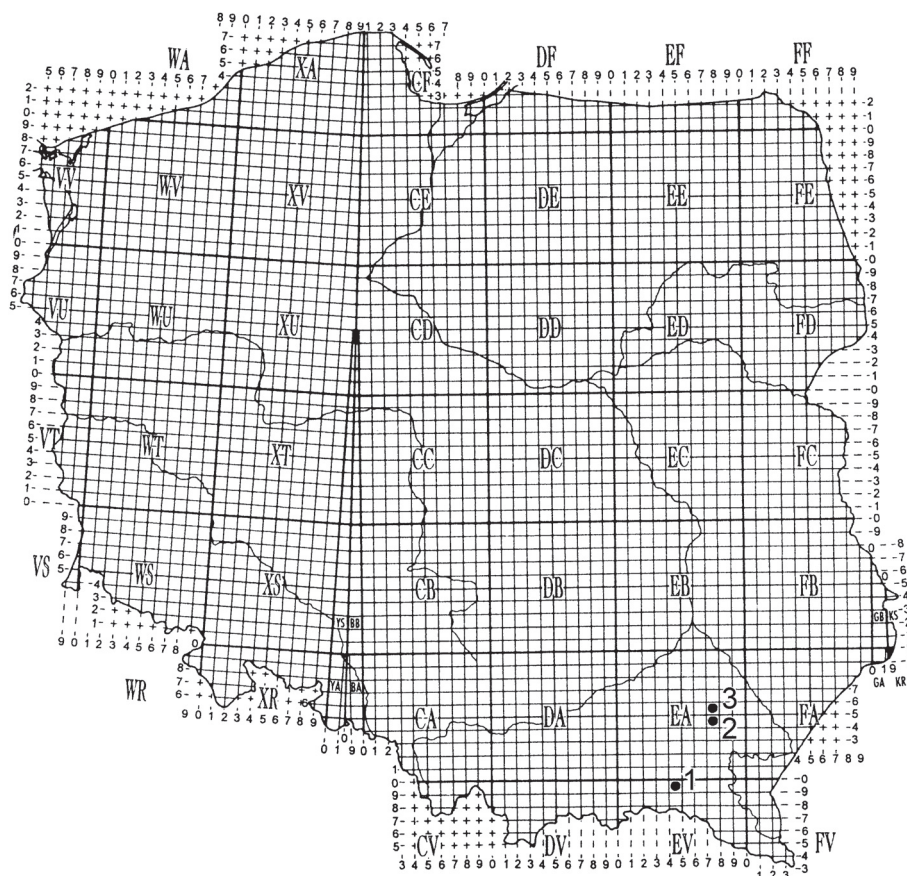


Fig. 1. First records of *Diabrotica virgifera* Le Conte in Poland: 1 – Dukla, 2 – Łąka, 3 – Jasionka (according UTM-system)

Due to the fact that farms which produce maize in Podkarpackie voivodeship are numerous and their size is usually rather small, establishing location of each maize plantation and issuing administrative decisions (with restrictions and obligations) for all of those within the defined zones was not technically possible. Therefore, the regulation of the Minister of Agriculture and Rural Development shall be issued. Ranges of zones and eradication measures will be laid out in this regulation. The issue individual administrative decisions, separate for each farm within zones, by this solution will not be needed.

In case of the focus in Dukla, no zone was defined as just a single specimen was found in a trap located in the town centre, near the international road. Within the radius of 6km around the place there were no maize fields.

In other cases, such aspects as natural borders of woods and forests, roads, rivers, old-river bed of the Wisłok river, and administrative divisions of the region, were taken into consideration while defining zones.

Focus zones cover the area of 10 villages in 3 communities: 7 in Trzebownisko community, 2 in Krasne community and 1 in Głogów Małopolski community. Due to

the fact that safety zones overlapped by 1/3, it was decided to define one safety zone. It covers the area of 19 villages in 6 communities, namely: Głogów Małopolski (8), Krasne (5), Trzebowniko (3), Czarna (1), Łańcut (1), Świlcza (1) and Rzeszów town.

The most effective eradication method is a temporary cessation of maize cultivation or a crop rotation. Therefore, it was decided to prohibit growing maize entirely one year after the occurrence of the pest and to apply two years crop rotation system next year in the focus zone. Farmers shall obligatorily remove volunteer maize plants, carry out control treatments against the pest and clean their machinery off the soil and plant debris before leaving the zone. It is prohibited to harvest maize and to move fresh maize plants and their parts before the end of *D. virgifera* movement (flying activity period of adults), as well as to move soil and any cultivation substrates from fields where maize has been grown.

In the safety zone, it is prohibited to grow maize for one year after the pest occurrence and then to observe at least two year break in maize cultivation on any particular field. Moreover, farmers shall obligatorily carry out control treatments against the pest.

The legislation procedure to adopt a new regulation of the Minister of Agriculture and Rural Development, with provisions defining measures to be taken in 2006 and the following years, has been initiated. It was also decided that monitoring should be intensified in 2005 and more traps should be placed in order to define accurately the zones where the pest occurred. These activities were conducted in the Southern and South-Eastern region of Poland which is under threat from the pest occurring in Ukraine, Slovakia and the Czech Republic. Consequently, in September 289 pheromone traps were used in 202 locations. Additional surveys covered 1 136 plantations (ca. 6950 ha).

At the time of *D. virgifera* finding, there were two plant protection products registered for the use against the soil pests of maize (both based on carbofuran) that can be used against larvae occurring in soil. In view of the fact, that there is neither a plant protection product registered that can be used for the adult forms of *D. virgifera* nor a product that could be used for seed dressing, it was decided to start an "ad hoc" registration procedure. The registration procedure and the choice of plant protection product have been done by the Institute of Plant Protection in Poznań.

All measures taken and planned by SPHSIS were the subjects to the assessment by the FVO EC mission in November 2005. The mission assessed these activities generally favorably, with the recommendation to intensify the monitoring program.

REFERENCES

- Baća F. 1993. New member of the harmful entomofauna of Yugoslavia *Diabrotica virgifera virgifera* Le Conte (Coleoptera, Chrysomelidae). *Zaštita Bilja* 45: 125–131.
- Bereš P., Konefał T., Przewoźny M. 2006. Zachodnia kukurydziana stonka korzeniowa w Polsce. *Ochrona Roślin* Nr 2: 28–31.
- Bereš P. 2006. Zachodnia kukurydziana stonka korzeniowa (*Diabrotica virgifera* Le Conte) już w Polsce. *Wieś Jutra* Nr 3: 16–17.
- European Plant Protection Organization. 2006. Present situation of *Diabrotica virgifera* in Europe (2005). http://www.eppo.org/QUARANTINE/Diabrotica_virgifera/diabrotica_virgifera.htm#map-dia
- Levine E., Oloumi-Sadeghi H. 1991. Management of diabroticite rootworms in corn. *Annu. Rev. Entomol.* 36: 229–255.

- Lipa J.J., 2004. Zachodnia stonka kukurydziana (*Diabrotica virgifera* subsp. *virgifera* Le Conte) u granic Polski. Ochrona Roślin Nr 1: 10–11.
- Lipa J.J. 2004. Zachodnia stonka kukurydziana (*Diabrotica virgifera* Le Conte) zagraża Polsce – konieczny monitoring i środki zapobiegawcze. Prog. Plant Protection/Post. Ochr. Roślin 44: 197–202.
- Maceljski M., Igrc Barčić J. 1993. *Diabrotica virgifera virgifera* Le Conte (Coleoptera: Chrysomelidae) – kukuruzna zlatica. Fragm. Phytom. Herbol. 21: 173–185.
- Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 13 kwietnia 2004 w sprawie szczegółowych sposobów postępowania przy zwalczaniu i zapobieganiu rozprzestrzenianiu się zachodniej kukurydzianej stonki korzeniowej, Dz. U. z 2004 Nr 82.

POLISH SUMMARY

DIABROTICA VIRGIFERA LE CONTE – NOWE ZAGROŻENIE DLA UPRAW KUKURYDZY W POLSCE I PODJĘTE ŚRODKI ZWALCZAJĄCE SZKODNIKA

Zachodnia kukurydziana stonka korzeniowa (*Diabrotica virgifera* Le Conte) jest jednym z najgroźniejszych szkodników kukurydzy. Do Europy została zawleczona z Ameryki Południowej w 1992 roku i od tego czasu zaczęła pojawiać się w większości krajów europejskich, w tym również w Polsce. Pierwsze przypadki wystąpienia szkodnika w kraju to: Dukla, UTM: EV 49, 22.08.2005, 1♀; Łąka, EA 74, 25.08.2005 4♀, 1♂; Jasionka, EA 75, 29.09.2005, 3♀♀ (Polska płd.-wsch., województwo podkarpackie). Za zwalczanie szkodnika na terytorium kraju odpowiedzialna jest Państwowa Inspekcja Ochrony Roślin i Nasiennictwa. W momencie stwierdzenia pierwszych ognisk stonki zostało wszczęte postępowanie w celu zwalczania i niedopuszczenia do rozprzestrzenienia się agrofaga, zgodnie z prawodawstwem Unii Europejskiej, nad którym nadzór pełni Państwowa Inspekcja Ochrony Roślin i Nasiennictwa. PIORiN prowadzi także monitoring występowania szkodnika. Działania te były przedmiotem oceny misji kontrolnej Komisji Europejskiej, Biura ds. Żywności i Weterynarii (FVO) w listopadzie 2005 roku.

