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Recent Data to the Distribution of Western Corn Rootworm (*Diabrotica virgifera virgifera* LeConte) in Hungary

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The Hungarian plant protection organization has been performing western corn rootworm monitoring over the past four years. In 1998 three different trapping activities were carried out at 150 monitoring sites. Hungarian pheromone traps and Multigard® (yellow sticky) traps were used from July 1 to September 30. The number of catches and the average catches/trap in 1998 were lower than the catch numbers in 1997. In 1998, the pest spread to a lesser degree than in 1997.

Key words: Western corn rootworm, *Diabrotica virgifera virgifera.*

After its first occurrence in Yugoslavia, the western corn rootworm (WCR), *Diabrotica virgifera virgifera* LeConte, reached the southern border of Hungary in the summer of 1995. The International Working Group on Ostrinia and other Maize Pests (IWGO), the Food and Agriculture Organization of the United Nations (FAO) and the European and Mediterranean Plant Protection Organization (EPPO), recognizing the high risk imposed by and the importance of the pest, created an international forum for the countries of the region. The Hungarian plant protection organization has been participating in the program of the Working Group (Princzinger et al., 1998a, b) Princzinger and Ripka, 1998). In July 1997, the FAO initiated a Technical Cooperation Programme (TCP) project for reducing or possibly preventing the WCR damage, with the participation of Bosnia-Herzegovina, Croatia, Hungary and Romania.

Materials and Methods

The Monitoring Network for 1998 was established according to the Hungarian experiences in trapping obtained in 1996–97 as well as to the scope and aims determined in the FAO TCP project. Based on it, a new front-line was defined/outlined in the southern and south-eastern counties of Hungary, at the edge of the current northern distribution of

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the pest, where the front-line monitoring sites were established, placed 7–10 km apart. Based on trapping results obtained in 1997, front-line traps were placed in 1998 at 56 sites in 8 counties along the border area where WCR occurrence was noted (Tables 1 and 2). The Hungarian sex-pheromone traps were placed out in corn fields at intervals of 7 to 10 km from each other and operated from July 1 to September 30. Within 30 days, the traps were replaced. Catches were recorded on a 10-day interval. In addition to the front-line traps, an additional 78 traps were placed in the uninfested area. Within the infested area 16

Table 1

Number of western corn rootworm monitoring locations in different trapping systems in Hungary in 1998

County	Permanent trap	Front-line trap	Uninfested trap zone areas		Total
			II	III	
Baranya	3	5	–	–	8
Bács-Kiskun	3	7	–	–	10
Békés	3	–	–	–	3
Csongrád	4	–	–	–	4
Hajdú-Bihar	–	9	3	–	12
Tolna	2	10	–	–	12
Somogy	–	6	2	–	8
Fejér	–	2	6	4	12
Pest	1	6	3	2	12
Jász-N.-Sz.	–	11	5	1	17
Győr-M.-S.	–	–	4	4	8
Szabolcs-Sz.-B.	–	–	3	8	11
Zala	–	–	2	2	4
Veszprém	–	–	–	4	4
Vas	–	–	–	5	5
Heves	–	–	–	5	5
Nógrád	–	–	–	4	4
Borsod-A.-Z.	–	–	–	5	5
Komárom-E.	–	–	–	4	4
Budapest	–	–	–	2	2
Sum total	**16**	**56**	**28**	**50**	**150**

permanent traps were placed to determine WCR population levels (Table 1). In 1998, permanent traps were operated at 16 sites in 6 counties where WCR were caught in 1996 and 1997, according to the guidelines of the FAO project (Table 4). The pheromone and Multigard® yellow sticky traps were placed within 50 m of each other. Traps were monitored at intervals decadely. New pheromone and yellow sticky traps were placed at each site after 30 days, and between the time of trap replacement, WCRs were removed from the sticky surface once counted. The traps were monitored from early July through the end of September. The counts were recorded for each trap, each sampling period, each trap location and each date of each collection.

Table 2

Front-line trapping scheme of western corn rootworm in Hungary in 1998
(Number of monitoring locations)

Road-number/Road section	Counties							
	Somogy	Baranya	Tolna	Fejér	Bács-Kiskun	Pest	Jász-Nagykun-Szolnok	Hajdú-Bihar
6 (Barcs–Szigetvár)	2	3	–	–	–	–	–	–
67 (Szigetvár–Kaposvár)	2	2	–	–	–	–	–	–
61 (Kaposvár–Dombóvár)	2	–	1	–	–	–	–	–
61 (Dombóvár–Tamási)	–	–	4	–	–	–	–	–
61 (Tamási–Simontornya)	–	–	4	–	–	–	–	–
61 (Simontornya–Cece)	–	–	–	1	–	–	–	–
61 (Cece–Dunaföldvár)	–	–	1	1	–	–	–	–
52 (Dunaföldvár–Solt)	–	–	–	–	1	–	–	–
52 (Solt–Kecskemét)	–	–	–	–	5	–	–	–
411 (Kecskemét–Cegléd)	–	–	–	–	1	3	–	–
4 (Cegléd–Szolnok)	–	–	–	–	–	3	1	–
4 (Szolnok–Törökszentmiklós)	–	–	–	–	–	–	3	–
4 (Törökszentmiklós–Kisújszállás)	–	–	–	–	–	–	3	–
4 (Kisújszállás–Püspökladány)	–	–	–	–	–	–	4	1
42 (Püspökladány–Berettyóújfalu)	–	–	–	–	–	–	–	4
42 (Berettyóújfalu–Biharkeresztes)	–	–	–	–	–	–	–	3
42 (Biharkeresztes–Ártánd)	–	–	–	–	–	–	–	1
Number of monitoring field/county	**6**	**5**	**10**	**2**	**7**	**6**	**11**	**9**
Sum total in Hungary				**56**				

Table 3

Summarized result of western corn rootworm front-line trapping in Hungary in 1998

County	Number of monitoring location	Number of location with detected WCR	Percentage	Total catches	Trapping range
Baranya	5	3	60	11	1–7
Somogy	6	1	16,6	2	2
Tolna	10	2	20	3	1–2
Fejér	2	1	50	1	1
Bács-Kiskun	7	0	0	0	–
Pest	6	2	33,3	2	1
Jász-Nagykun-Szolnok	11	1	9	1	1
Hajdú-Bihar	9	0	0	0	–
Sum total/average	**56**	**10**	**17,8**	**20**	**1–7**

Table 4

Summarized result of permanent trapping to determine western corn rootworm population level in Hungary in 1998

County	Location number	Caught beetles		Average beetles/trap	
		pheromone	Multigard	pheromone	Multigard
Baranya	3	189	11	63	3.6
Bács-Kiskun	3	361	39	120.3	13
Békés	3	322	3	107.3	1
Csongrád	4	918	31	229.5	7.7
Tolna	2	0	0	0	0
Pest	1	0	0	0	0
Sum total/average	**16**	**1790**	**84**	**111.8**	**5.2**

Trapping for containment and control program

In the second part of the monitoring/trapping activity, Hungarian pheromone and Multigard® yellow sticky traps were placed in pairs at 5 sites along the leading edge of the WCR infestation in Hungary as described by Edwards et al. (1998). Both pheromone and Multigard® traps were used in order to capture both males and females. The males were attracted to the pheromone traps, while both females and males were attracted to the Multigard® traps. When a catch was recorded on either trap at any location, 12 sets of paired pheromone and Multigard® traps, the pair being placed within 50 m of each other, were placed at 1 km increments radiating out in 4 directions (up, down, left, and right as one views the traps as if standing in Yugoslavia and looking toward the trap within their country) from the original pair. This arrangement allowed for 3 new pairs of traps over a distance of 3 km beyond the original trap. If the second set of traps or any original set of traps recorded catches, additional pairs of traps were placed at 1 km increments radiating out until no more WCRs were caught or until the end of September. Each trap pair was checked every 10 days and the result recorded on a standardized record form using the code developed for this project (Edwards et al., 1998). All traps were changed at intervals of 30 days. No trap pair was replaced more than 3 times during the trap monitoring period. Additional traps were added using the same arrangement when catches were made on other traps within the trapping grid. Paired traps were only added in one or more of the four directions if other traps were not already in place. In 1998, the five observation sites were at Pincehely and Dalmand (Tolna county), Előszállás (Fejér county), Törökszentmiklós (Jász-Nagykun-Szolnok county) and Nagykőrös (Pest county) (Table 5).

The idea of this trapping activity was to determine the feasibility of trapping out as many WCR beetles as possible. It was hoped that it would be possible to show that the buildup of a WCR population in a given area can be slowed or possibly stopped using this trapping method.

Table 5

Results of western corn rootworm TCCP trapping in Hungary in 1998
(Number of WCR beetles)

County	Locality	August	September	Sum total
Tolna	Pincehely HP1	0	0	0
	Dalmand HP5 U1	1	0	1
Fejér	Előszállás HP2	0	0	0
Jász-Nagykun-Szonok	Törökszentmiklós HP3	0	0	0
Pest	Nagykőrös HP4	0	0	0
Sum total		**1**	**0**	**1**

Results

Cathes were observed on 10 front-line traps (Table 3). The total number of 20 beetles caught in 1998 is much less than the 511 beetles caught in 1997. Newly developed males emerged from the soil on 25 June 1998 near Szeged.

A total of 1874 beetles were caught on the permanent traps (Table 4). The number of catches and the average catches/trap in 1998 were lower than the catch numbers in 1997. The intensive flight activity was observed in August.

In the trapping for containment and control program of the FAO project in Hungary, 1 of 5 traps recorded a catch. Near Dalmand this trap (marked as HP-5 trap) recorded a catch of 1 beetle. This trapping method (control program) proved to be an unsuccessful attempt in our region.

Discussion

It was found that in 1998 the catches of all the trapping methods were behind those of 1997. The spread of WCR in 1997 was more significant than in 1998. At present WCR penetrated from the south to the country at a length of 300–320 km and at a depth of 100–120 km. The area of spread covers 20,000 sq.km.

In the Szeged (Csongrád county) and Végegyháza (Békés county) area, larval damage to roots was noted in 1997 and 1998, too. This damage, however, was not at economic levels.

WCR is widespread on the good quality soil of the corn growing district in the south, south-east counties of Csongrád, Békés, Bács-Kiskun and Baranya. The invasive species established its colonies in the region of Szeged, Mezőhegyes, Kunbaja, Nagylak, Csanádpalota, Bácsalmás and Villány (Fig. 1).

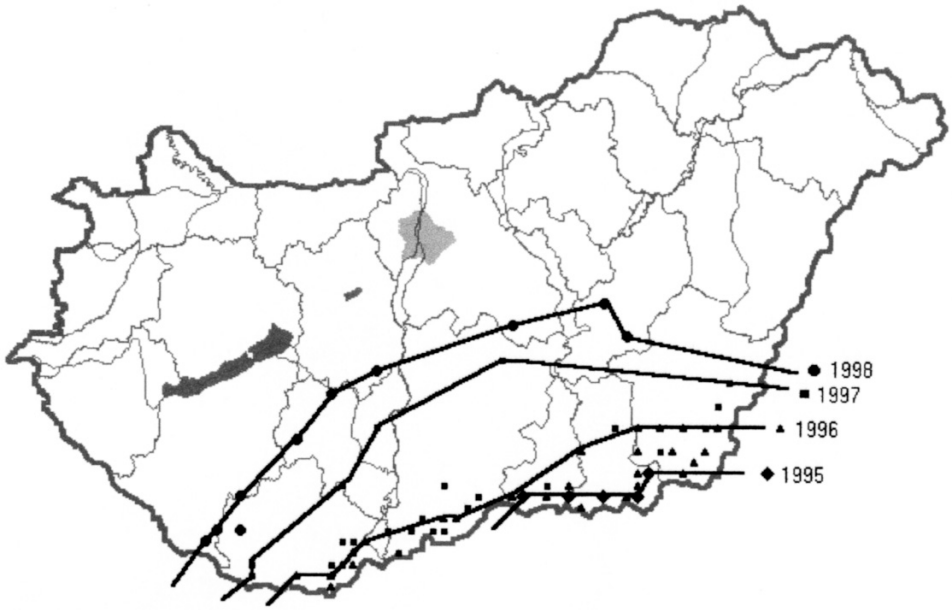

Fig. 1. Distribution of western corn rootworm *(Diabrotica virgifera virgifera)* in Hungary 1995–1998

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