PREFERENCES OF *DIABROTICA VIRGIFERA VIRGIFERA* LE CONTE ADULTS FOR SUNFLOWER

Raluca TRUSCA, Ioana GROZEA

Banat's University of Agricultural Science and Veterinary Medicine Timişoara
Calea Aradului no.119, 300645 Timişoara, Romania
E-mail: raluca_trusca@yahoo.com
ioana_entomol@yahoo.com

Abstract: *Diabrotica virgifera virgifera Le Conte is a species of European importance. In our country, in recent years attention has been directed toward host plants. This paper comes as a response to the question whether there are other plants to ensure their survival and breeding, except maize. The literature mentions that the main host plant for Diabrotica virgifera virgifera species is corn (Zea mays). Several other crops, such as sunflower, winter wheat and clover are mentioned in literature as secondary host plants, but no real damage has been observed in the field. The researches were carried out in doctoral experience installed in experimental area field belonging to USAMVB Resort Timisoara. Experimental lot was founded in May, through studies and experimental techniques and seeding of variants. Experience was conceived through the whole surface sowing experiment, in which was then placed a cage of isolation, each cage, in fact, representing a repetition. Diabrotica virgifera virgifera adults were introduced into each cage after their mass occurrence in maize field. Tracking and measuring their feeding mode and setting the plant organs favorite in terms of percentage of attack were made by regular observations at an interval of 7 days. Plants in cages have been maintained as required by technological growth and development links of sunflower. Following observations found that in three repetitions, all plants analyzed were attacked only in the inflorescence. In conditions of isolation Diabrotica virgifera virgifera Le Conte adults are attracted mainly by sunflower inflorescence parts (petals, pollen). The leaves were not attacked. Towards attack percentage recorded in isolation cages it can be observed that all analyzed sunflower plants showed blossom attack starting at a low 25%, in early August and reaching a very high consumption, 75% by the end of August*

Key words**:** *WCR, Diabrotica virgifera virgifera Le Conte, adult, feeding, sunflower, cage isolation.*

INTRODUCTION

Diabrotica virgifera virgifera Le Conte is a much discussed species at European level in recent years, especially in Romania. Accidentally, in year of 2010, during monitoring activities by reading of traps installed in maize fields, on other plants than maize were observed numerous individuals adults of *Diabrotica virgifera v. Le Conte* in a process of intense feeding on leaves and flowers (GROZEA et al, 2011). This paper comes as a response to the question whether there are other plants to ensure their survival and breeding.

According to a Report of a Pest Risk Analysis evaluated in 2006 by WIEBE LAMMERS et al, in Netherlands, the main host plant for *Diabrotica virgifera virgifera* Le Conte species is corn (*Zea mays*). Several other crops, such as sunflower, winter wheat and clover are mentioned in literature as secondary host plants, but no real damage has been observed in the field. However, feeding, egg laying and development of insects was observed on several species of plants from the *Fabaceae, Asteraceae, Cucurbitaceae* families but little is known about the fertility of adults emerging from these secondary hosts.

Adult Diabroticites including western corn rootworm, *Diabrotica virgifera virgifera* Le Conte, consume pollen of corn, squash, sunflower, and other species (SISI LIN and CHRISTOPHER A. MULLIN).

The longevity of adult females of *Diabrotica virgifera virgifera* maintained on diets of squash blossoms, sunflower ray florets or inflorescences, goldenrod (*Solidago canadensis*) inflorescences was significantly reduced compared with those maintained on maize ears. However, species survived for extended periods on these diets and produced viable eggs (SIEGFRIED and MULLIN, 1990).

Pollen feeding insects can perceive pollen odor and use it to distinguish between diffrent pollen types and host plants (DOBSON and BERGSTRÖM, 2000).

Phagostimulants components for *Diabrotica virgifera virgifera* species found in *Helianthus annuus* pollen are: histidine (42% of 83.8 µmol amino acid/g pollen), proline, aspartic acid, asparagines, and alanine (BENEDICT HOLLISTER and C.A. MULLIN, 1998).

Investigations conduced by HORVATH and HATVAN (2003) between years 1995-2001, unequivocally found that sunflower fields are primarily visited by female adults. The extent of damage and population density has shown decreasing intensities ranging from edge field to its center. Females sometimes pierce the peel and sunflower petals while pollen is the favorite food, they consume also nectar. So, it probably causes quantifiable economic loss as well.

MATERIAL AND METHODS

Research has been conducted in the doctoral experience installed in the experimental farm area belonging USAMVB Resort Timisoara.

Experimental field was established during May 12 -13, 2011, during which technical studies have been carried out and also seeding of variants. For the sowing was used ES-ASRTIMIS sunflower hybrid. Quantification of emergence plants was carried out from May 20 to May 25.

Experience was conceived through the whole surface sowing experiment, in which was then placed an isolation cage, each cage representing in fact a repetition. An isolation cage (2 m height and 1 m width) ensured the growth of six plants of sunflower imposed by plant height and distance required between plants (images set 1, photo 1). Cages were made in a special workshop and then transported into the field.

Biological material, *Diabrotica virgifera virgifera* adults were introduced in each cage after they appear massively in corn nearby the experimental field. Therefore, on the August 1, 2011 were collected 50 adults and placed in each cage.

Foto 1 Installing insolation cages in experimental fiel (original)

Foto 2 Analysis of plants in the cage isolation (original)

Image set 1: Aspects of the installing isolation cages in the experimental field and readings made in each variant

Tracking and measuring their feeding mode and establishing the favorite plant organs in terms of percentage attack of plants preferred it was done through regular observations at an interval of 7 days. Plants in cages have been maintained as required by technological links in growth and development of sunflower (images set 1, photo 2).

Displacement to the experimental field was achieved with the help of the equipping car of Entomology and Agricultural Zoology discipline.

RESULTS AND DISCUSSIONS

Following observations found that in all three rehearsals, all plants analyzed were attacked only in the inflorescence (Table 1, 2, 3). Each plant analyzed presented blossom attack.

Concerning on the attack percentage recorded in cage 1, it can be seen that all sunflower plants analyzed at first reading (early August) showed blossoms attacked by adults on a low level (25%) (photo 3) and sufficiently clear (50%) (table 4).

The second reading, from mid-August shows a blossom attack progression toward obvious attack (50%) and strong one (75%) (Table 5) (photo 4). Observations made in the third decade of August (Table 6) showed that adults have continued feeding on blossoms, so that over the next 7 days, they were visible at some level (75%).

Table 1

Numerical parameters of leaves and flowers attacked and not attacked by *Diabrotica virgifera virgifera* Le Conte adults, registered at the first reading (August 7, 2011), in the experimental field of SD-USAMVBT

Repetition/cage	Number plant	Total leaf	Total flowers	Number of leaves attacked	Number of flowers attacked
Repetition I (cage 1)	Plant 1	18	1	0	1
	Plant 2	17	1	0	1
	Plant 3	19	1	0	1
	Plant 4	19	1	0	1
	Plant 5	20	1	0	1
	Plant 6	18	1	0	1
Repetition II (cage 2)	Plant 1	17	1	0	1
	Plant 2	17	1	0	1
	Plant 3	18	1	0	1
	Plant 4	19	1	0	1
	Plant 5	21	1	0	1
	Plant 6	19	1	0	1
Repetition III (cage 3)	Plant 1	18	1	0	1
	Plant 2	20	1	0	1
	Plant 3	19	1	0	1
	Plant 4	17	1	0	1
	Plant 5	20	1	0	1
	Plant 6	19	1	0	1

Easily could see *Diabrotica virgifera virgifera* species preference for sunflower petals and pollen. Petals were uniformly perforated by holes of various sizes and irregular shapes. An evolutionary stage of attack led them dry completely, so that within a week they were dried. Regarding pollen, adults consumed pollen from blossom only; almost all have fallen on the ground or leaves being avoided.

Table 2

Numerical parameters of leaves and flowers attacked and not attacked by *Diabrotica virgifera virgifera* Le Conte adults, registered at the second reading (August 14, 2011), in the experimental field of SD USAMVBT

Repetition/cage	Number plant	Total leaf	Total flowers	Number of leaves attacked	Number of flowers attacked
Repetition I (cage 1)	Plant 1	16	1	0	1
	Plant 2	17	1	0	1
	Plant 3	16	1	0	1
	Plant 4	17	1	0	1
	Plant 5	20	1	0	1
	Plant 6	17	1	0	1
Repetition II (cage 2)	Plant 1	17	1	0	1
	Plant 2	18	1	0	1
	Plant 3	16	1	0	1
	Plant 4	18	1	0	1
	Plant 5	21	1	0	1
	Plant 6	20	1	0	1
Repetition III (cage 3)	Plant 1	19	1	0	1
	Plant 2	17	1	0	1
	Plant 3	19	1	0	1
	Plant 4	18	1	0	1
	Plant 5	21	1	0	1
	Plant 6	20	1	0	1

Tabel 3

Numerical parameters of leaves and flowers attacked and not attacked by *Diabrotica virgifera virgifera* Le Conte adults, registered at the third reading (August 21, 2011), in the experimental field of SD-USAMVBT

Repetition/cage	Number plant	Total leaf	Total flowers	Number of leaves attacked	Number of flowers attacked
Repetition I (cage 1)	Plant 1	16	1	0	1
	Plant 2	16	1	0	1
	Plant 3	15	1	0	1
	Plant 4	17	1	0	1
	Plant 5	19	1	0	1
	Plant 6	17	1	0	1
Repetition II (cage 2)	Plant 1	18	1	0	1
	Plant 2	17	1	0	1
	Plant 3	16	1	0	1
	Plant 4	16	1	0	1
	Plant 5	19	1	0	1
	Plant 6	19	1	0	1
Repetition III (cage 3)	Plant 1	18	1	0	1
	Plant 2	18	1	0	1
	Plant 3	17	1	0	1
	Plant 4	18	1	0	1
	Plant 5	19	1	0	1
	Plant 6	19	1	0	1

Table 4

Percentage of aggression made by adults sp. *Diabrotica virgifera virgifera* Le Conte in the inflorescence of sunflower (August 7, 2011, SD-USAMVBT)

	Percentage on flower attack %														
	REPETITION I					**REPETITION II**					**REPETITION III**				
	No attack	25 %	50 %	75 %	100 %	No attack	25 %	50 %	75 %	10 0 %	No attack	25 %	50 %	75 %	100 %
Plant 1															
Plant 2															
Plant 3															
Plant 4															
Plant 5															
Plant 6															

Table 5

Percentage of aggression made by adults sp. *Diabrotica virgifera virgifera* Le Conte in the inflorescence of sunflower (August 14, 2011, SD-USAMVBT)

	Percentage on flower attack %														
	REPETITION I					**REPETITION II**					**REPETITION III**				
	No attack	25 %	50 %	75 %	100 %	No attack	25 %	50 %	75 %	10 0 %	No attac k	25 %	50 %	75 %	100 %
Plant 1															
Plant 2															
Plant 3															
Plant 4															
Plant 5															
Plant 6															

Tabel 6

Percentage of aggression made by adults sp. *Diabrotica virgifera virgifera* Le Conte in the inflorescence of sunflower (August 28, 2011, SD-USAMVBT)

	Percentage on flower attack %														
	REPETITION I					**REPETITION II**					**REPETITION III**				
	No attack	25 %	50 %	75 %	100 %	No attack	25 %	50 %	75 %	10 0 %	No attac k	25 %	50 %	75 %	100 %
Plant 1															
Plant 2															
Plant 3															
Plant 4															
Plant 5															
Plant 6															

Atac 25%
Atac 50%
Atac 75%

Photo 3 Sunflower blossom poorly attacked by adults (original)

Photo 4 Sunflower inflorescence strongly attacked by adults (original)

Set images 2, Aspects of the mechanism of attack of adults on inflorescences

CONCLUSIONS

In isolation conditions, *Diabrotica virgifera virgifera* Le Conte adult species are attracted mainly by sunflower inflorescence parts (petals, pollen). The leaves were not attacked.

Regarding percentage attack recorded on the in isolation cages can be seen that all sunflower plants analyzed showed blossom attack starting at low level, 25% in early August and reaching a very strong consumption by the end of August, 75%.

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