BEANS AND PUMPKIN AS ATTRACTIVE PLANTS FOR *DIABROTICA VIRGIFERA VIRGIFERA* LE CONTE ADULTS

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Abstract: *Accidentally, in the last year (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. The researches carried out in western part of Romania, in a small plot of maize grown (in stage silk appeared) in combination with beans and pumpkin (this kind of plots are common). Special attention was drawn to the fact that although there is pheromone traps on maize plant the adult preferred beans leaves and flowers. The studies about the preferences of adult Diabrotica virgifera virgifera Le Conte on different type of host plants was observed in field condition, in cages of isolation. Following the results of these primary data we mention that is important to emphasize attractiveness of Diabrotica virgiferea virgifera Le Conte adults for other plants than maize plants. Is clearly evident the preference of adults for pumpkin (mean of 38.5 individuals/RI, RII, RIII, RIV), followed by maize (32.0 individuals/ RI, RII, RIII, RIV) and beans (29.5 individuals/ RI, RII, RIII, RIV). The number of adults feeding on the flowers, pollen or silk in isolation cage was assigned higher (54 adults/maize, 48 adults/pumpkin and 46 adults/bean) than number of adults feeding on the leaves (14 adults/beans, 12 adults/pumpkin and 6 adults/maize). Taking into consideration the sex ratio, the number of males and females varied from host plant to host plant. After our observations and information from literature regarding other species of genus Diabrotica, we conclude that adults of Diabrotica virgifera virgifera Le Conte could turn to other crops than corn for feeding but also for egg laying. If is happened in natural conditions of beans crop or other potentially host plant then we have to take protection measures by introduction of appropriate crop rotation. Activities were carried out under financially support of the PN-II-ID-PCE-2007-1/RO project.*

Key words: *Diabrotica virgifera virgifera Le Conte, adult, feeding, pumpkin, beans maize.*

INTRODUCTION

One factor responsible for the success of invading animal science is their capacity of the biotic and abiotic settings of their new habitat (WILLIAMSON, 1996).

Diabrotica virgifera virgifera Le Conte is one of the species with a great capacity of spreading and adaptation to new habitats demonstrated by the rapidly spreading in Europe, from 1992 until now. Many researches were made in America and Europe from the first occurrence. One of these was driven on feeding of adults and their behavior in searching of host plants.

Studies regarding preference of adult WCR for pollen of some plants highlighted that these are attracted by maize but other plants, too especially weeds plants from corn fields. Female and male differed significantly in their use of alternative pollen resources (MOESER and VIDAL, 2003).

Unlike other species of genus *Diabrotica, D. virgifera* have a small range of host plants known. The preferences of all species (variety) of *Diabrotica* differ so much from species to species.

The studies on preferred plants show that *Diabrotica virgifera* developed very well

on Monocotyledonae, while *Diabrotica speciosa* preferred soybeans and peanuts (but not so well on pumpkin, beans and potato) and *Diabrotica viridula* preffered maize as adult (WALSH, 2003).

The adults of *Diabrotica undencipunctata* howardi attack many cultivated plants: maize, *Cucurbitaceae* (*Cucumis sativus, Cucumis melo, Cucurbita pepo, Citrullus vulgaris*), groundnut (*Arachis hypogea*), soybean (*Glicine max*), beans (*Phaseolus vulgaris*) and other legumes, sweet potato (*Ipomoea batatas*) (FRENCH, 1978).

Regarding the feeding behaviour, if flowers are available adults will feed on them rather than leaves causing reductions in yield, but the flowers is not available they prefer the foliage of cucurbits to other crops (EPPO, 1998).

In response to the question of what adults are attracted the researches shown that volatile chemicals from silk have a good role. The behavioral response of species *Diabrotica virgifera virgifera* and *Dabrotica barberi* to the host plant was typified by perception, orientation to the source, random movement and search with reorientation (PRYSTUPA et all, 1987).

Weeds can provide alternative source of foods for adults of *Diabrotica virgifera*. In this sense, some studies showing the influence of weeds in corn plantings on abundance of adults. Numerous adults were collected from weeds, especially mixed weeds comparative with D. *barberi* more abundance on broadleaf weeds (PAVUK and STINNER, 1994).

MATERIAL AND METHODS

The studies about the preferences of adult *Diabrotica virgifera virgifera* Le Conte on different type of host plants was observed in field condition, in cages of isolation (1m/1m), 3 plants (maize-1 plant, beans-1 plant and pumpkin-1 plant)/cage. The cage was isolated used insulating plastic mesh of green color. In each cage was introduced of 100 individuals (50 males and 50 females). There were installed 4 cages of isolation (Cage 1-RI, Cage 2-RII, Cage 3-RIII and cage 4-RIV). Of course, the sex-ratio was established.

For highlight the adults' attractiveness for leaves, flowers, silk or pollen was installed a special in 3 cages of isolation (0.5/0.5m), cage 1-1 maize plant, cage 2-1 beans plant and cage 3 -1 pumpkin plant. In each cage were introduced 60 adults (males and females) and was observed their movement and damage on different of parts of plants.

Cages of isolation were placed in a corn field from Sag locality, Timis County in west of Romania.

RESULTS AND DISCUSSIONS

Following the results of these primary data we mention that is important to emphasize attractiveness of *Diabrotica virgiferea virgifera* Le Conte adults for other plants than maize plants. So, first observations were made accidentally, in a research fields that would target other host plants than maize plants. The maize crop was mixed with pumpkin and beans, frequently in small areas, cultivated in this part of country. In last year, July 2010 in a field from Resita, Caras-Severin County we observed that adults have preferred more pumpkin and beans flowers than corn silk or pollen. This step was the first from follow studies started last year.

The adults of *Diabrotica v.* preferred for feeding the flowers of pumpkin (*Cucurbita maxima*) (figure 1) and leaves or flowers of beans (*Phaseolus vulgaris*) (figure 2, 3 and 4).

The data from table 1 show the preference of adults for pumpkin (mean of 38.5 individuals/RI, RII, RIII, RIV), follow maize (32.0 individuals/ RI, RII, RIII, RIV) and beans (29.5 individuals/ RI, RII, RIII, RIV). Analyzing these data in more details the number of adults varied in each from those four cages of isolation (repetitions).

Figure 1 Adults of *DvvLC* adults on pumpkin flower

Figure 2 Aspects of damage *DvvLC* adults on bean leaves

Figure 3 Aspects of damage *DvvLC* adults on leaves and flower of bean

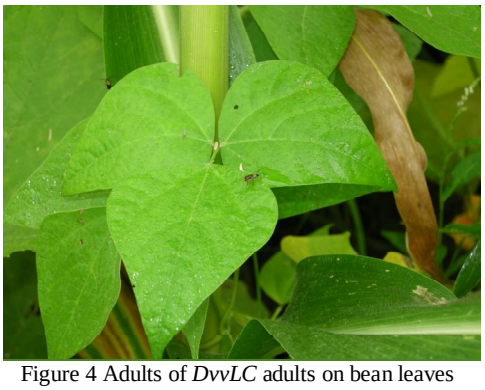

Figure 4 Adults of *DvvLC* adults on bean leaves

Table 1

The number of *Diabrotica v.v. LC* adults on maize**, beans and pumpkin***, in cages of isolation*

Repetition (cage of isolation)	Male/Female/Total M+F	Host plant		
		Maize	Beans	Pumpkin
RI-cage 1	M	16	18	16
	F	12	15	23
	T	28	33	39
RII- cage 2	M	19	15	16
	F	16	15	19
	T	35	30	35
RIII-cage 3	M	15	14	21
	F	12	13	25
	T	27	27	46
RIV-cage 4	M	23	11	16
	F	15	17	18
	T	38	28	34
Mean of repetition (T)		32.0	29.5	38.5

*In each cage of isolation were introduced 100 adults (50 males and 50 females) of *Diabrotica virgifera virgifera le Conte*

**Adults were observed feeding on silk, pollen and leaves

***Adults were observed feeding on flowers and leaves

The adults' attractiveness for leaves, flowers, silk or pollen is clearly evident in table 2. The number of adults feeding on the flowers, pollen or silk in isolation cage was assigned higher (54 adults/maize, 48 adults/pumpkin and 46 adults/bean) than number of adults feeding on the leaves (14 adults/beans, 12 adults/pumpkin and 6 adults/maize).

Taking into consideration the sex ratio, the number of males and females of *Diabrotica virgifera v LC* varied from host plant to host plant (figure 5). More female than males were on pumpkin plants (21.25 F and 17.25 males). The same case for beans plant was registered (15 F and 14.5 M). In case of maze the males were predominant (18.25 M and 12.75 F).

Table 2

The adults' attractiveness for leaves, flowers, silk or pollen

Type of host plant		Number of adults inserted in isolation cage*	Number of adults feeding on the leaves in isolation cage	Number of adults feeding on the flowers, pollen or silk in isolation cage
Common name	Scientific name			
Maize	*Zea mais*	60	6	54
Beans	*Phaseolus vulgaris*	60	14	46
Pumpkin	*Cucurbita maxima*	60	12	48

*The adults of *Diabrotica v.v.LC* were introduced in a cage of isolation (0.5m/0.5m)

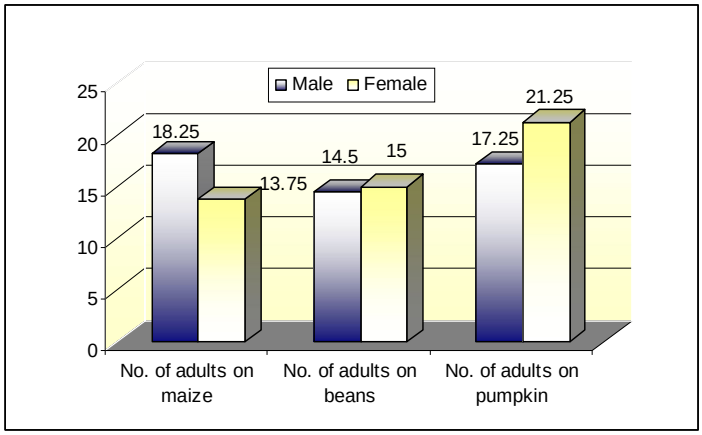

Figure 5 Number of males and females of *Diabrotica virgifera v LC* on different host plant in a cage of isolation 1m/1m (in each cage of isolation were introduced 50 males and 50 females

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CONCLUSIONS

After our observations and information from literature regarding other species of genus Diabrotica, we conclude that adults of *Diabrotica virgifera virgifera* Le Conte could turn to other crops than corn for feeding but also for egg laying. If is happened in natural conditions of beans crop or other potentially host plant then we have to take protection measures by introduction of appropriate crop rotation.

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