INVESTIGATIONS REGARDING THE COLORADO POTATO BEETLE (*LEPTINOTARSA DECEMLINEATA*) ON SOME SPECIES OF POTATO TO DIDACTICAL BASE OF TIMISOARA USAB AND HATEG LOCALITY, HUNEDOARA DISTRICT

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Abstract: *Among the years 1923-1925 at the laboratories of biological investigations, of Harvard University it were took place experiments that followed to a publication of a report concerning the selection capacity of the nutrition by the Colorado beetle. Recently, it was published one or two additional works referring to choose as testifier plant of the potato by the Colorado beetle and thus that problem appeared good for investigation. Besides its importance as pest of the potato cultures the Colorado beetle was of special interest by the cause of obviously change of its type of nutrition with leaves of domestic potato (Solanum tuberosum) that took place with more than a century ago, when it was firstly remarked that it feed with the leaves of wild potato (Solanum rostratum). However, the preferences of that pest face to the testifier weren't so clear and that meant it were realized some studies by more entomologist from abroad, while in our country the investigations in that domain were poor and in consequences it might be completed and further improved. After the bibliographic study made, the main purpose of the investigations was to identify some Romanian and abroad species of Solanum tuberosum preferred as testifier plant the Colorado beetle and with a great sensibility to its attack, in regions (heal and plain) to the weather conditions. For realizing some investigations during the years 2012, the experimental field was placed to Didactical Base of Timisoara USAB, Timis district and to familiar farm from Hateg locality, Hunedoara district.Species taken in study were: the Romanian local species and Marfona Dutch species. Between the two species of potato taken in study, the Marfona Dutch species was the one with a bigger sensibility to the attack of Colorado being obviously preferred by it.Taken in view the two regions with different weather conditions, the pest density was higher to the plain (Timisoara locality), than to the hill (Hateg locality).In conclusion, we could say that the hill region was one more favorable for potato culture than the plain region because it wasn't a place with a highest risk for the attack of Colorado beetle, and the damages produced weren't too high for the culture; and so far the species cropped, were better to the culture of Romanian local species because was more resistant to the beetle attack comparative with the Dutch species, which was more sensitive.*

Key words**:** *Colorado Potato Beetle, potato species, attack, sensibility*

INTRODUCTION

Chrysomelidae include one of the big taxonomic groups of plant feeders insects. One of the single characteristics of that families was the fact that the majority species fed with leaves and a high degree of affinity face to the host plant. The body shape relative short and the capacity to suffer a complete metamorphosis without doubt had contributed to evolutive success of that group, that was illustrated through the species diversity. *Chrysomelidaele* gave important sources for the experimental analysis of the relations among insects, host plant. (HSIAO, 1988).

Entomologist generations learnt that Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say), initially lived on the east versant of Bedrock Mountains and fed with with leaves and wild potatoes, *Solanum rostratum*; but, then when the colonists went towards west

and planted potatoes, *Solanum tuberosum*, at the lap of mountains, the beetle accepted that new host, and ulterior went to east from a plant of potatoes to another. (SANDERSON, 1921, METCALF and FLINT, 1928, DAVIDSON and LYON, 1979, citated by CASAGRANDE, 1985).

Intraspecific variation, in adaptation of an oligophagous insect to host plant represented an adaptation modification among the populations of a species and could play an essential role in specification. Colorado Potato Beetle, *Leptinotarsa decemlineata* (Say), was an oligophagous insect that infested ten species of plants from *Solanaceae* family domestic and wild, from those the most important were *Solanum tuberosum*, *Solanum rostratum* and *Solanum elaeagnifolium*. HSIAO (1978), evaluated the increase and reproductive success of every beetle population, after some studies made on seven species of *Solanaceae*, and observed a low affinity of Colorado Potato Beetle for the host plant. That didn't observe considerable differences among those populations on different hosts.

CASAGRANDE (1982) realized a study through, *Solanum berthaultii* Hawkes was compared with species of *Solanum tuberosum* L., to observe the impact that the species had on population dynamics of *Leptinotarsa decemlineata* (Say). After the experiments analyzed that observed the surviving deposit and adults hibernation was reduced with 95% and respectively 96%, on *Solanum berthaultii* in report with *Solanum tuberosum*. In laboratory experiments, that observed the adults survive weren't affect by the species *Solanum berthaultii*, but the larva survive was significantly reduced and the development stage was prolonged. After the observations realized in the field noted the spauwing deposit, and larva time of survive, and the development cycle on *Solanum berthaultii* increased in report with *Solanum tuberosum*.

MATERIAL AND METHODS

In present work, it proposed to study larva populations of Colorado Potato Beetle because those represented a pest group with the biggest balance of damages in the potatoes cultures, with direct results on the quality and quantity of tubercle production (fig. 1.).

a b

Figure 1: Larva presence of Colorado Potato Beetle in a very big number in the experimental field from Didactical Base of USAB Timisoara (a) and experimental field from familial ferm from Hateg locality (b)

To realize those investigations in the year 2012, the experimental field was placed at Didactica Base of USAB Timisoara, Timis district and to familial ferm from Hateg locality, Hunedoara district (fig. 2.).

a b

Figure 2: Experimental field from Didactical Base of USAB Timisoara, 2012 (a); experimental field from familial ferm from Hateg locality, 2012 (b)

For potatoes crop were choosed netherlander Marfona species and local Romanian, that usually manifested in the culture as sensitive species to the attack of Colorado Potato Beetle (fig. 3.).

a b

Figure 3: *Solanum tuberosum*-species of netherlander Marfona (a); Romanian local species (b)

The experiences concerning the attack produced by Colorado Potato Beetle were realized in 3 repetitions and every repetition with a number of 10 plants, in case of both species taken in study.

RESULTS AND DISCUSSIONS

Leptinotarsa decemlineata could cause in the potatoes cultures damages until 80%.

The cultures attacked and un treated could be compromised, that was very important to know the insects density on the plants to make efficient treatments that reduced the number of pest populations.

From data analyzed in table 1, it resulted that in the year 2012, in the potatoes culture from experimental field of Timisoara, the larva number/plant on the variants in experimental field before the treatment, to both species taken in study oscillated between 63 and 170.

The Marfona netherlander species was visible preferred by Colorado beetle, the larva/plant density was more higher (110-170 larva/plant) comparative with the local Romanian species (63-89 larva/plant).

From the collected and analyzed data in the year 2012, it showed that the density of larva populations of *Leptinotarsa decemlineata*/plant on the variants of experimental field from Hateg, before the treatment to both species taken in study, oscillated between 21-106 species.

The same as in the experimental field from Timisoara locality, and to familial ferm from Hateg locality, the whole netherlander species demonstrated to be more sensitive to that pest attack (90-106 larva/plant), comparative with the local species which was more resistant (21-55 larva/plant).

Table 1

Larva density of *Leptinotarsa decemlineata* collected from the experimental fields before the treatment

Date of observation	Stationar	Species	Number larva/plant				
			V_1	V_2	V_3	V_4	V_5
01.06.2012	Didactical Base of USAB Timisoara	Marfona-netherlander	170	144	121	141	110
		Local-romanian	89	65	63	77	77
08.06.2012	Familial ferm from Hateg locality	Marfona-netherlander	106	104	100	99	90
		Local-romanian	55	45	42	33	21

From data analyzed results that in potatoes culture was registered a major density of larva/plant, that meant the economic stage of damage to that insect (2-4 larva/plant) were passed.

The smallest number of larva *Leptinotarsa decemlineata* identified on the variant 5, to both species in the both geographical regions.

The biggest number of beetle larva was identified on the variant number 1. (fig. 4.).

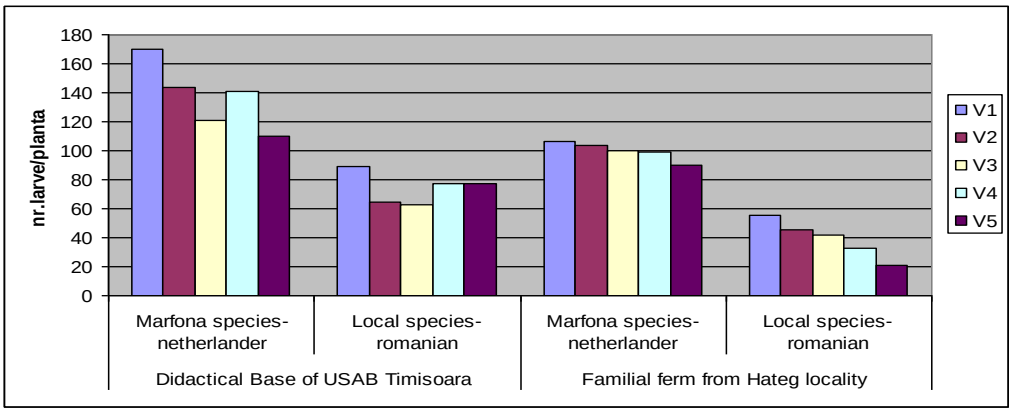

Figure 4: Larva number of Colorado Potato Beetle/plant from the potatoes culture, 2012

After investigations realized it had observed that in the experimental field placed in Hateg locality, Hunedoara district, the attack of Colorado Potato Beetle wasn't alike intense as in the plain region, such as, in the field placed to Didactical Base of USAB Timisoara.

Thus, we concluded the fact that hill region was better to potatoes culture against the plain, not being attacked much intense by Colorado Potato Beetle, probably by the cause of climatic conditions, of lower temperatures; and about the species taken in study, the species netherlander Marfona was visible preferred by the pest comparative with the local Romanian species, that hadn't an affinity face to that host plant.

CONCLUSIONS

In the year 2012 the economic stage of pest in case of Colorado Potato Beetle (*Leptinotarsa decemlineata*) in the potatoes culture from the both climatic regions was passed (2-4 larva/plant).

From the two species of potatoes taken in study, the Marfona Netherlander species was with a bigger sensibility to Colorado Potato Beetle being obviously preferred by that one.

The local Romanian species wasn't the most "adaptable" for Colorado Potato Beetle though the two host plants examined.

Taking in view the two regions with different climatic conditions, the pests density was higher to the plain (Timisoara locality), than to the hill (Hateg locality).

In conclusion, we could say that the hill region was more favorable to potatoes culture than to the plain region because it wasn't a region with a very hight risk for the attack of Colorado Potato Beetle, and the damages produced the culture weren't so high; and about the species cultivated, was better for the culture of Romanian local species because was more resistant to the beetle attack comparative with netherlander species, which was more sensitive.

The results obtained until now suggested that the adaptation study of beetle populations to the host plant, *Solanum tuberosum*, different species, were al level of investigation in Romania, and the rases formation or biotope adapted to a host plant of oligophagous insects might be initially preceded by geographical isolation and the preferences face to the host plant, if that one was preferred or non-prefered.

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