

## STUDIES ON SOME DIAGNOSTIC AND BIOECOLOGICAL CHARACTERISTICS OF *LIRIOMYZA HUIDOBRENSIS* (BLANCHARD) IN POLAND

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**Abstract:** The most important distinctive features and some morphological and bionomic characteristic of *Liriomyza huidobrensis* are presented in this paper.

**Key words:** *Liriomyza huidobrensis*, distinctive features

### INTRODUCTION

Studies carried out in the years 1996–1998 in the Department of Plant Protection Methods in Agricultural University in Poznań on the occurrence of *Liriomyza huidobrensis* (Blanchard) on plants grown under cover demonstrated the presence of this quarantine pest being a new one in Poland (Baranowski and Dankowska 1998; 1999). This work presents the method of glasshouse inspection and indicates some important identification characteristic features of this pest species. Some laboratory studies on the morphology and on selected parameters of the bionomics of this species were carried out as well.

### MATERIAL AND METHODS

The collected material (mined leaves, pupae) was brought to the laboratory and the leaves were placed into plastic bags while pupae into test glass tubes and reared. The pupae were kept until adult emergence. The adult insects were poisoned with chloroform. The males were separated and their genital organs were prepared according to the method described by Baranowski (1989). The morphological studies took into consideration following parameters the dimensions of adult individuals (50 males and 50 females) and the length and width of pupae measured on 100 individuals. Bionomical studies were carried out under laboratory conditions at the constant temperature of 26°C and 12 hour day length. The length of development of the particular stages (eggs, larvae, pupae) in days and total development time were recorded. The bean plants of “Złota Saxa” cultivar were used as the host plant. Two

bean seeds soaked in water earlier for 24 hours were placed into a cup filled with substrate. When the first leaves started to emerge the plants were moved into a compartment with *Liriomyza huidobrensis* adults emerging from infested bean plants. The conducted observations included analysis of the shape of traces of feeding number of mines, number of pupae on leaves and the places of pupation.

## RESULTS

Inspection method of either plants in the glasshouse or leaf samples is as follows:

### 1. Analysis of leaves for the presence of:

- a) feeding punctures – feeding punctures do not represent any distinctive features, they only signal the fact of presence of females,
- b) location of mines on the leaf – excrements arranged inside the mines in the form of a continuous line permit the initial classification of the type of *Liriomyza*; in *Liriomyza huidobrensis*, the mines frequently are lined along the main veins of leaves,
- c) pupae – in *Liriomyza*, the pupating takes place on the surface on leaves, or on the substrate.

### 2. Exterior traits of an adult insect (Fig. 1).

Head:

Ori – lower orbital setae

Ors – upper orbital setae, bigger than the lower ones

Cz<sub>iii</sub> – the third member of the feeler is dark, significantly bigger

Vte – parietal external feelers on a dark background

Vti – parietal internal feelers on a dark background

Trunk:

Ac – central dorsal setae are irregular, in four rows

Dc – four setae are intradigital, the fourth one is smaller

Mspl – the lateral intratruncal plate, most frequently black on  $\frac{3}{4}$  of the area from the bottom

Wings:

D – long central cell

C – the costal veinlet extends to the central veinlet <sub>1+2</sub>

M<sub>3+4</sub> – the last part of the central veinlet is at least by  $2\frac{1}{4}$  longer than the one before the last one

Abdomen:

End of the abdomen in males and females (Fig. 2)

### 3. Separation of males

### 4. Preparation of the copulation organs in males (Fig. 3).

The results of morphological studies are shown in table 1, and the results of biological investigations are presented in tables 2–3. The measurements of the body length of both sexes indicate that the males were smaller than the females. The length of males was on the average 1.8 mm, while that of the females was 2.00 mm. The total time of the development of *L. huidobrensis* under the established conditions was 23.5 days, whereby the longest period was the pupation stage, i.e. from

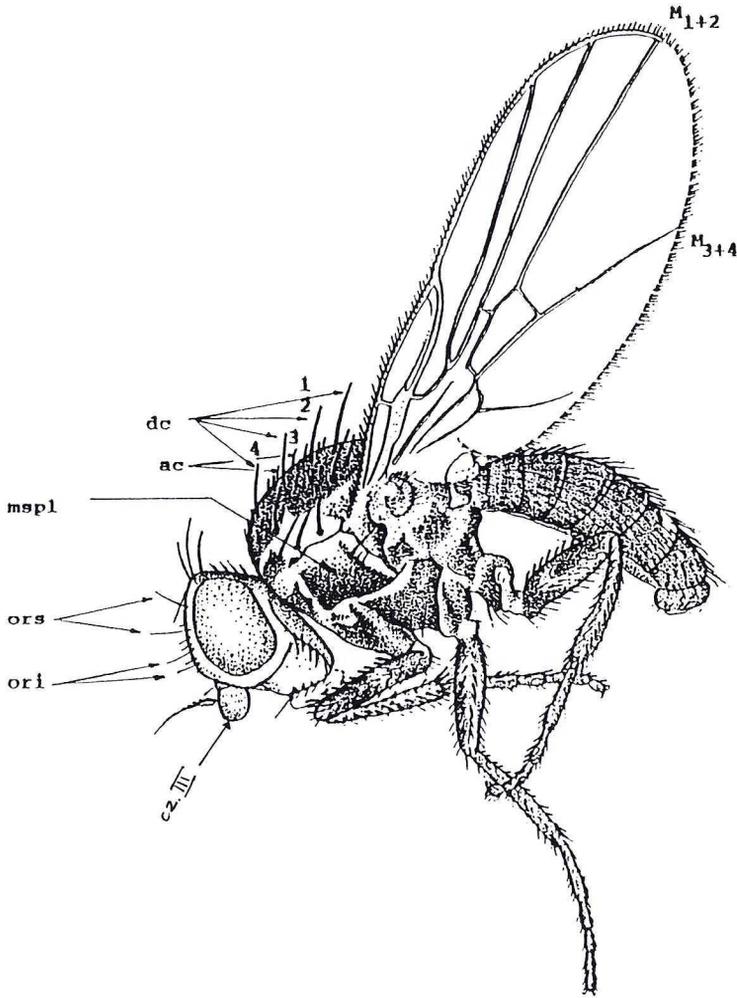


Fig. 1. Side view of *Liriomyza huidobrensis* adult

the moment when the larvae left the leaf till the formation of pupae and the emergence of adult individuals. This phase lasted 11.8 days (Tab. 2). The mean number of feeding traces on the leaves, the mean number of mines and pupae, and the places of pupation are shown in table 3. On the average, on one leaf, there was found 62.1 traces of feeding, and 5.1 mines making 8.3% of the total number of feeding traces. The percentage of larvae mortality in the mines was high approaching about 70% during the whole period of the experiment. The analysis of the places of pupation showed that 46.7% of larvae pupated on the ground, 20% on the underside side of the leaf, and 33.3% on the upper side of the leaf. 64% of females and 36% of males emerged from the collected pupae.

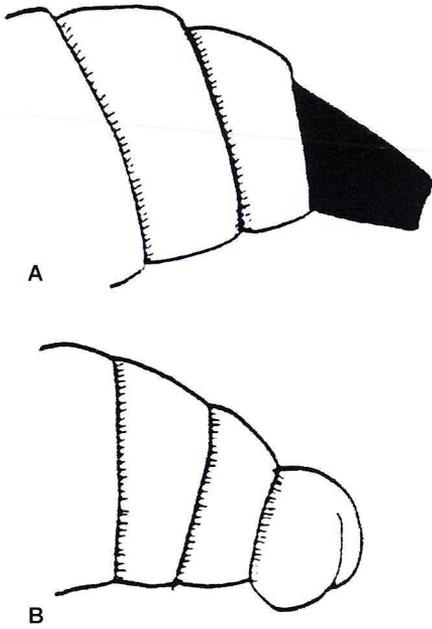


Fig. 2. The abdomen: A – female, B – male

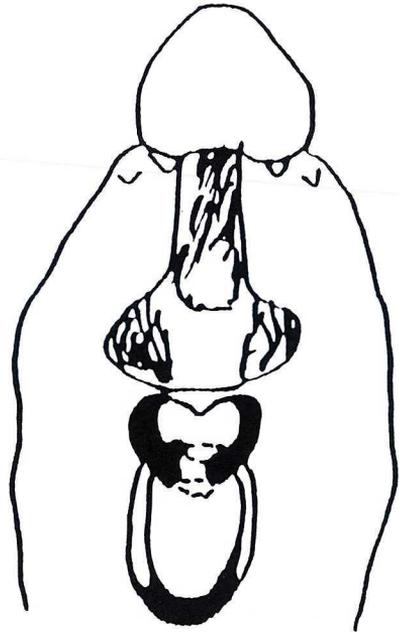


Fig. 3. Aedeagus hood and epiphallus

Table 1. Body dimensions of adult insects and pupae in mm

Number of individuals	Dimensions	Adults		Pupae	
		Females	Males	Length	Width
100	Mean value	–	–	2.0	0.9
100	Min – max	–	–	1.8–2.3	0.8–1.0
50	Mean value	2.1	1.8	–	–
50	Min – max	1.9–2.3	1.7–2.0	–	–

Table 2. Development time of the particular stages of *L. huidobrensis*

Host plant	Mean temperature	Development of the particular stages in days			Total days
		Eggs	Larvae	Pupae	
Bean	+ 26°C	5	6.7	11.8	23.5

Table 3. Number of feeding traces, mines, pupae and pupation places of *L. huidobrensis* under laboratory conditions

Number of damaged leaves	Number of feeding traces	Number of mines	Number of pupae	Number and % of pupae collected on leaves		
				Front side of leaf	Back side of leaf	On the ground
105	6524	539	105	35.0 33.3%	21.0 20%	45.0 46.7%

## DISCUSSION

*Liriomyza huidobrensis* has been known in Poland since 1998 (Baranowski and Dankowska 1998) as a pest of greenhouse plants. It is a species included on the list of organisms harmful for plants and plant products and it is subject to obligatory control in Poland (Anonym 1996). In spite of this, in many regions of the country, this species occurs in great quantities in greenhouse cultivation. The regional and provincial plant protection services have problems with the identification of species and frequently *L. huidobrensis* (Blanchard) is confused with *L. bryoniae* (Meig) occurring in natural conditions in Poland. Therefore, it was necessary to develop a simple "key" for the identification of this pest and to provide the necessary information referring to its morphology and bionomics. Information given in the following publications has been utilized: Bittner (1998), Leuprecht (1992), Moreht (1993) and Spencer (1973).

The presented herewith results are similar with those obtained by Parella (1987), but differ from those presented by Roditakis and Golfinopoulus (1997), according to whom 98% of pupation takes place in the leaf, and only 2% in the soil. Our studies showed that 46.7% individuals pupated in the soil, and the remaining percentage on the underside side or the upper side of leaves. We did not find any pupation inside the leaf, as it is in case of *Phytomyza*.

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## POLISH SUMMARY

CECHY DIAGNOSTYCZNE I BIOEKOLOGICZNE OBSERWACJE  
NAD *LIRIOMYZA HUIDOBRENSIS* W POLSCE

W pracy przedstawiono cechy rozpoznawcze oraz niektóre fragmenty z bionomii *Liriomyza huidobrensis*. Wstępne oznaczenie gatunku można dokonać na podstawie wyglądu zewnętrznego osobników dorosłych. Pod uwagę bierze się rozmieszczenie, barwę i kształt szczecinek umieszczonych na głowie i tułowiu owada dorosłego. Analizuje się także rozmieszczenie żyłek na skrzydłach. Najpewniejszy sposób identyfikacji polega na porównywaniu wypreparowanych narządów kopulacyjnych samców.