

**OBSERVATIONS REGARDING THE DEVELOPMENT STAGES  
OF THE APPLE MINING CARTEPILLAR  
(*LEUCOPTERA MALIFOLIELLA* COSTA.)**

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**Abstract**

*Fruit tree culture has been a basic concern to mankind since ancient times, due to the special role occupied by fruit in human nutrition, because their complex nutrient content. Apple takes the third place in the world's production after banana and orange fruit growing, and in temperate areas constitutes the main species.*

*A number of pests cause damage to the apple crops, mining moths being one of them. Observations on the mining moth, conducted in the Romanian orchards, have shown that their distribution is different from one area to another. Scientific analyses showed increasing attack developed over time since the first records.*

**INTRODUCTION**

Apple culture presents a great significance for our country, because this species finds the favorable growing and developing conditions, in most of the regions, ensuring an increase in the quality and quantity of the production.

Many decades ago, groups of mining moths were signalled in the fauna. Those groups have spreaded massively, and have raised some issues of phytosanitary practice.

Apple mining cartepillar (*Leucoptera malifoliella* Costa.) is found in all the areas of our country.

In a relatively short period of time, due to the high biological potential of the specie, and to the lack of measures, meant to prevent this pest from spreading, in the apple plantations, pear, cherry and sour cherry from Arad, Timiș, Hunedoara, Alba, Sibiu, Bihor, Satu-Mare, Maramureș, Sălaj, Cluj, Bistrița-Năsăud, Mureș, Caraș-Severin, Mehedinți, Dolj, Olt, Gorj, Argeș, Vâlcea, Vrancea, Buzău, Dâmbovița, Suceava, Călărași, have recorded a series of attacks of large frequency and intensity.

## MATERIAL AND METHODS

The scientific experiments, conducted in 2009-2010, were located at farm no.1 in S.C Pomicola Strejesti-Olt, in an intensive plantation of 12 years old, summer apple, from the PRIMA variety, at planting distances of 3.5/2 m. Here had been signaled a very important population of mining moth.

The study of the external morphology of the development stages, for the apple mining moth (adult, egg, larvae, chrysalis) was determined through observation studies and biometrical determinations, carried out with the binocular magnifier. Examined: 100 butterflies, 50 eggs, 100 mature larvae and 50 chrysalises.

In order to observe and describe the stages of egg, larvae and chrysalis, were collected from the fields. attacked shoots.

The shoots were isolated in growing cylinders. Their turgor was kept, in order to maintain the viability of the development stages within the galleries.

The observation studies, carried out regarding the development stages (adult, egg, larvae and stern) and on generations, were conducted in natural conditions, in orchards and in controlled laboratory conditions. For this research technique, growing cages, gauze sleeves (Figure 1), trap belts (Figure 2), and pheromone traps were used.



**Fig. 1. Gauze sleeve**



**Fig. 2. Belt trap fixed on the three**

## RESULTS AND DISCUSSION

### Adult stage

Butterfly has a wingspan around 5.7-7.7 mm (in average 6.6 mm) (Table 1). The anterior wings have a silver metallic colour, and their distal half has a characteristic drawing with dark color stripes, which are bordering black and white spots, separated by bright colored spaces in ocher. All over the distal edge it presents

fringes. The posterior wings have a maroon colour and presents very long fringes, on the entire length of the edge. These values correspond to those cited in literature [4].

Table 1

Variations of wingspan in the big minier of apple  
(*Leucoptera malifoliella* Costa)

No. of analysed adults	Length (mm)
7	5.7
15	5.9
32	6.3
26	6.8
15	7.3
5	7.7
<b>Average of 100 butterflies</b>	<b>6.6</b>

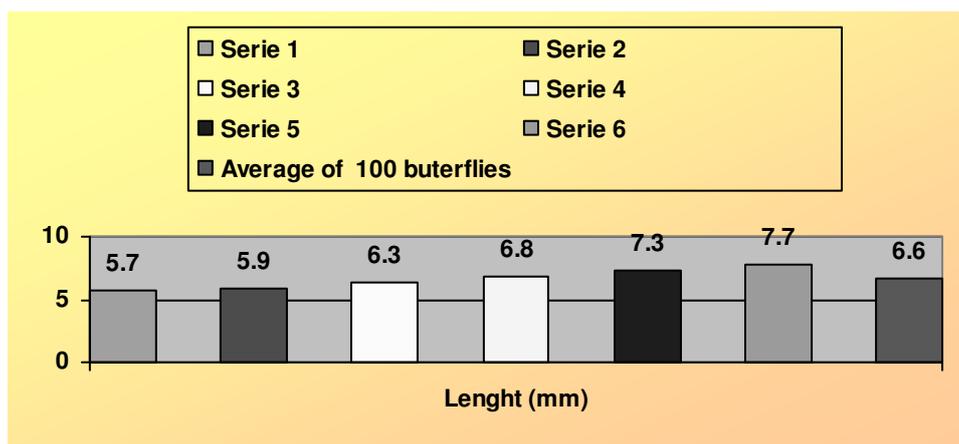


Fig. 3. Variations of wingspan in the big minier of apple  
(*Leucoptera malifoliella* Costa.)

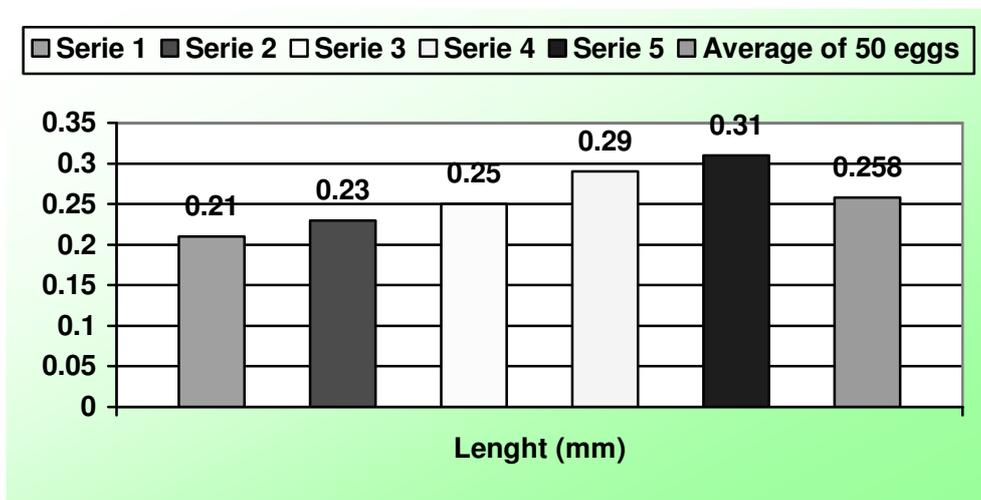
#### Egg stage

The egg of the big minier of apple (*Leucoptera malifoliella* Costa.), has an ellipsoidal shape, with a dirty-white color, which has greenish tint when it is layed. The length of the *Leucoptera malifoliella* Costa. eggs, varied between 0.21 and 0.31 mm, an average of 0.258 mm (Table 2, Figure 4), in the conditions of the Strejesti-Olt fruit-growing area.

Table 2

**Length variation in the apple big minier caterpillar  
(*Leucoptera malifoliella* Costa)**

No. of analysed eggs	Lengths (mm)
3	0.21
17	0.23
15	0.25
11	0.29
4	0.31
<b>Average of 50 eggs</b>	<b>0.258</b>



**Fig. 4. Length variation in the apple big minier caterpillar  
(*Leucoptera malifoliella* Costa.)**

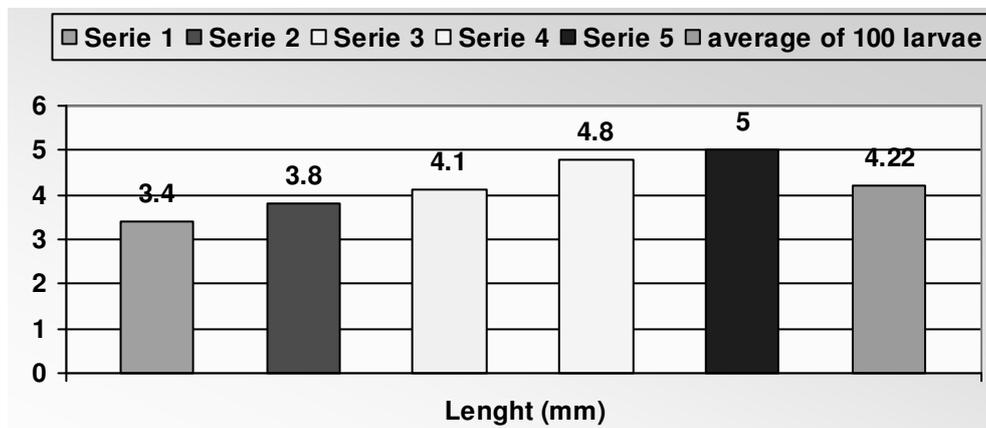
**Larvae stage**

The studies conducted in the climateric conditions found at the Strejesti-Olt fruit-growing area, revealed that the larvae of *Leucoptera malifoliella* Costa, have a dark-green colour, based on the larvae age, and their dimension are between 32.4-5.00 mm, with an average of 4.22 mm (Table 3 and Figure 5).

Table 3

**Length variation of the apple big minier (*Leucoptera malifoliella* Costa.)  
in the climateric conditions of the SCPP Strejești-Olt area**

No. of studied larvae	Length (mm)
6	3.4
34	3.8
30	4.1
22	4.8
8	5.0
<b>Average of 100 larvae</b>	<b>4.22</b>



**Fig. 5. Length variation in the apple big minier (*Leucoptera malifoliella* Costa.)**

#### Chrysalis stage

The chrysalis of the apple big minier (*Leucoptera malifoliella* Costa.) has a reddish - brown colour, of approximately 3 mm. This chrysalis can be found in an cocoon made out of silky threads, which is fusiform and slightly opened at both ends, in a „X” form, through which is fixed on the substrate.

In the climatic conditions of the Strejesti-Olt area, the length of the *Leucoptera maliofoliella* Costa chrysalises, varied between 2.9 - 3.5 mm (Table 4, Figure 6).

**Tabelul 4**

**Length variations in the *Leucoptera malifoliella* Costa chrysalis**

No. of chrysalis studied	Length (mm)
4	2.9
8	3.1
16	3.2
19	3.4
3	3.5
50	3.22



**Fig. 6. Length variations in the *Leucoptera malifoliella* Costa. chrysalis**

**CONCLUSIONS**

1. On the experience, placed in the apple plantation from SC Pomicola Strejesti-Olt, it has been identified the mined moth, species *Leucoptera malifoliella* Costa.
2. The morphological research regarding the stages of this species, confirms the data found in literature, and contributes to it by bringing new information regarding description, adult dimensions and development stages, as follows:
  - adults wingspan can reach about 5.7-7.7 mm (in average 6.6 mm) The anterior wings have a silver metallic colour, and their distal half has a characteristic drawing with dark color stripes, which are bordering black and white spots, separated by bright colored spaces in ocher. All over the distal edge it presents fringes. The posterior wings have a maroon colour and present very long fringeon the entire lenght of the edge. These value correspond with the discription that exists in literature.

- the length of the *Leucoptera malifoliella* Costa. eggs, varies between 0.21 and 0.31 mm, an average of 0.258 mm (Table 2, Figure 4), in the conditions of the Strejesti-Olt fruit-growing area.
- the larvae of *Leucoptera malifoliella* Costa., have a dark and green colour, based on the larvae age, and their dimension are between 32.4-5.00 mm, with an average of 4.22 mm.
- in the climatic conditions of the Strejesti-Olt area, the length of the *Leucoptera malifoliella* Costa chrysalises, varied between 2.9-3.5 mm, with an average of 3.22 mm.

## REFERENCES

1. Alvare J., 1966. *Notas sobre orugas minadoras foliares de arboles frutales*. Blon. Patol. Veg. Ent. aric. 29 (pp. 63-87).
2. Andriescu I., 1986. *Complexul de entomofagi ai microleptidopterelor miniere dăunătoare mărului în Moldova și Oltenia*. Raport la contract de cercetare.
3. Andriescu I., 1989. *Entomofagi paraziți ai speciei Leucoptera scitella Zell., identificați în plantațiile de măr din Oltenia*. Comunicări științifice ICPP București - Băneasa.
4. Balachowschy A.S., 1966. *Entomologie appliqué a l'agriculture*. Tom II, 258-273, 321-328, 267-271 (pp. 19-21).
5. Berar V., 1994. *Cercetări asupra bioecologiei și combaterii moliei miniere Leucoptera malifoliella O.G. Costa*. Teză de doctorat, Timișoara.
6. Blanc M., 1983. *La mineuse cerealée des feuilles en vergers de pommiers dans la vallée de la Durance*. La Déf. De végétaux, no. 224 (pp. 323-331).
7. Briolon G., 1960. *Ricerche su qautra specie di Microlepidopteri minatori delle faghie di Malo. Nepticula malella Staint. e N. pomonella Vaug (Nepticulidae); Leucoptera scitella Zell (Bucculatricidae); Lithocolletis blancadrella F. (Glacilariidae)*. Bul. dell'Instituto di Entomol. di Bologna, V.XXIV (pp. 239-271).
8. Duvlea I. și colab., 1985. *Molia minieră a frunzelor de măr Leucoptera (Cemiostoma) scitella Zell., un dăunător periculos al livezilor*. Horticult. 2, 30-31.
9. Lefter Gh., Berar V., 1990. *Contribuții la studiul biologiei și combaterii moliei miniere a pomilor -Leucoptera scitella Zell.* Analele ICPP, vol. XXV.
10. Man I., 1991. *Cercetări privind cunoașterea biologiei, ecologiei și combaterii moliei minatoare (Leucoptera scitella Zell.)*. Prot. Pl. (SPPT), 1/1991 (pp. 19-31).
11. Mai I., 1992. *Contribuții la studiul biologiei, ecologiei și combaterii moliei miniere a frunzelor Leucoptera scitella Zell.* Lucrările Științifice ale Institutului de Cercetare și Producție pentru Pomicultură Pitești - Mărăcineni, vol. XV (pp. 363-373).