RESEARCH REGARDING EXTERNAL ANATOMY OF SPECIES *APHIS FABAE*

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Abstract: *This paper presents data referring the morphological characteristics and biometrical measurements of Aphis fabae, species captured from potato, carrots and tomatoes cultivations for a period of three years, from Didactic Station Timisoara and Varfurile, Arad county. The aphids have been collected with the yellow vessel traps on a two days. At Aphis fabae apterous adult have green-brown or black ovoid body and big marginal tubercles on prothorax and on abdominal segments I and VII; body length varies from 1.8 to 2.4 mm. Alatae aphid are more elongate with head and thorax shiny black; oviparous females with distinctly swollen hind tibiae and abdomen is black-green. The smallest length of the body established for aphids captured in West Zone of Romania was 1.40 mm, while the biggest was 2.20 mm. The average body length was 1.83 ± 0.20 mm. Regarding the length of the head and thorax, it may be noticed that the maximum length of these parts was 0.95 mm and minimum length was 0.50 mm. The average value calculated for the length of these parts was 0.77 ± 0.12 mm. The minimum width of head was 0.20 mm and the maximum width of head was 0.45 mm. The average value calculated for head width was 0.32 ± 0.05 mm. As far as the thorax width is concerned, this was minimum 0.40 mm and maximum 0.80 mm. Mean thorax width was 0.61 ± 0.02 mm the minimum length of the abdomen was 0.80 mm and minimum width was 0.50 mm, the maximum length of the abdomen was 1.40 mm and the maximum width was 1 mm. The mean length of the abdomen was 1.06 ± 0.12 mm, while the average value calculated for abdomen width was 0.79 ± 0.14 mm. In the existent literature, there is little information referring to biometric measurement and for these reasons, knowing the following aspect is of paramount importance.*

Key words: *Aphis fabae, behaviour, life cycle, biometrical measurements*

INTRODUCTION

Although sometimes called 'blackfly', the black bean aphid is actually a true bug (a member of the order Hemiptera, suborder Aphidinea, superfamily Aphidoidea, family Aphididae, subfamily Aphidinae, tribe Aphidini, subtribe Aphidina, genus Aphis). (Buczaki, 2002).

Other common names include blackfly, bean aphid and beet leaf aphid. In the warmer months of the year it is found in large numbers on the underside of leaves and on the growing tips of host plants including various agricultural crops and many wild and ornamental plants. Both winged and wingless forms exist and at this time of year, they are all females. They suck sap from stems and leafs and causes distortion of the shoots, stunted plants, reduced yield and spoiled crops. This aphid also acts as a vector for viruses that cause plant disease and the honeydew. (http://en.wikipedia.org/wiki/Black_bean_aphid)

All true bugs are united by the possession of specialised piercing and sucking mouthparts, which are used in this species to obtain plant juices. It is this characteristic, coupled with its prolific reproductive capabilities that have made the species a notorious enemy of farmers and gardeners alike. This widespread aphid is a minute species with a small head and bulbous abdomen. The body is blackish or dark green in colour and the membranous wings are held angled over the body (like a roof) when at rest. Not all individuals possess wings, and the wingless forms have squatter bodies than winged specimens. Two tube-like protrusions at the rear of the abdomen, known as cornicles, are the openings of wax glands. This wax protects the aphid from certain predators. (http://www.arkive.org/black-bean-aphid/aphis-fabae/)

MATERIAL AND METHODS

The researches have been carried out for a period of three years, in the experimental field of the Didactic Station Timisoara (STN) and Varfurile, Arad county. The aphids have been collected with the yellow vessel traps on a two days.

RESULTS AND DICUSSIONS

Apterous adult have green-brown or black ovoid body and big marginal tubercles on prothorax and on abdominal segments I and VII; body length varies from 1.8 to 2.4 mm

Alatae aphid are more elongate with head and thorax shiny black; antennae not exceeding 2/3 of body length; oviparous females with distinctly swollen hind tibiae and abdomen is black-green

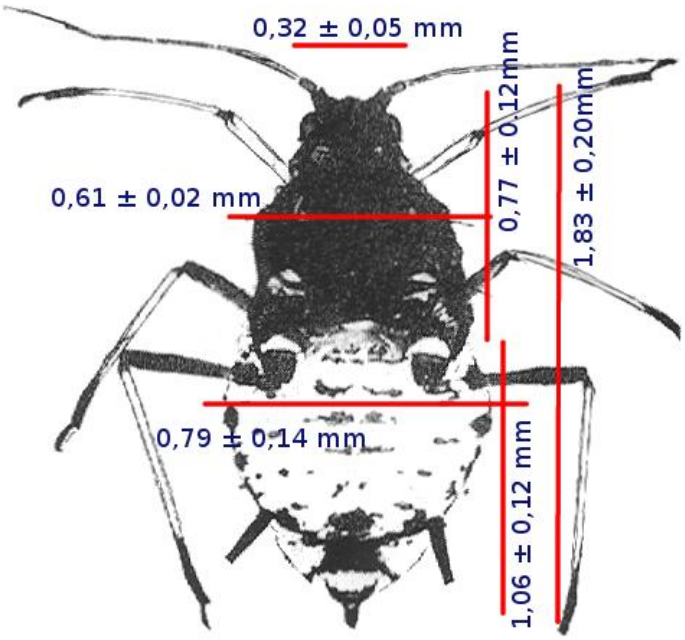

Figure 1: The body length of *Aphis fabae*

It can be observed that, out of a total of 30 individuals of the species *Aphis fabae*, (table 1) the smallest length of the body established for aphids captured in West Zone of Romania was 1.40 mm, while the biggest was 2.20 mm. The average body length was 1.83 ± 0.20 mm. (figure 1)

By analyzing the data presented in the table regarding the length of the head and thorax, it may be noticed that the maximum length of these parts was 0.95 mm and minimum length was 0.50 mm. The average value calculated for the length of these parts was 0.77 ± 0.12 mm.

Table 1

Biometrics measures *Aphis fabae*

Nb. art.	Body length (mm)	Head+thorax length (mm)	Head width (mm)	Thorax width (mm)	Abdomen (mm)	
					Length	Width
1	2,10	0,90	0,40	0,80	1,20	1
2	1,70	0,60	0,30	0,70	1,10	0,80
3	1,80	0,80	0,30	0,60	1,10	0,80
4	1,90	0,90	0,30	0,60	1	0,80
5	1,95	0,95	0,30	0,60	1	0,9
6	1,70	0,80	0,20	0,60	0,90	0,7
7	1,80	0,70	0,30	0,65	1,10	0,8
8	1,40	0,60	0,30	0,50	0,80	0,5
9	1,65	0,75	0,20	0,50	1	0,5
10	1,60	0,70	0,30	0,60	0,90	0,7
11	2,20	0,90	0,40	0,8	1,30	1
12	2,20	0,80	0,40	0,70	1,40	1
13	2,10	0,80	0,45	0,70	1,30	0,90
14	1,80	0,70	0,30	0,55	1,10	0,80
15	1,70	0,80	0,30	0,50	1	0,70
16	1,50	0,50	0,25	0,40	1	0,50
17	1,50	0,60	0,30	0,50	0,90	0,55
18	1,50	0,50	0,30	0,50	1	0.60
19	1,85	0,75	0,35	0,60	1,10	0,85
20	1,90	0,95	0,35	0,60	0,95	0,80
21	1,90	0,85	0,30	0,65	1,05	0,85
22	2	0,90	0,40	0,70	1,10	0,90
23	2	0,95	0,35	0,65	1,05	0,85
24	2	0,85	0,30	0,60	1,15	0,80
25	1,85	0,70	0,30	0,60	1,15	0,85
26	1,80	0,80	0,30	0,60	1	0,80
27	1,75	0,65	0,30	0,55	1,10	0,85
28	1,95	0,85	0,35	0,65	1,05	0,80
29	1,90	0,80	0,35	0,60	1,10	0,85
30	1,80	0,80	0,30	0,60	1	0,90
Average	1.83	0.77	0.32	0.61	1.06	0.79
Average deviation	0,04	0,02	0,01	0,02	0,02	0,03
Standard deviation (s)	0.20	0.12	0.05	0.09	0.12	0.14
(m) Min	1,40	0,50	0,20	0,40	0,80	0,50
(M) Max	2,20	0,95	0,45	0,80	1,40	1

The minimum width of head was 0.20 mm and the maximum width of head was 0.45 mm. The average value calculated for head width was 0.32 ± 0.05 mm.

As far as the thorax width is concerned, this was minimum 0.40 mm and maximum 0.80 mm. Mean thorax width was 0.61 ± 0.02 mm

Analyzing data on the length and width of the abdomen, it can be seen that the minimum length of the abdomen was 0.80 mm and minimum width was 0.50 mm, the maximum length of the abdomen was 1.40 mm and the maximum width was 1 mm. The mean length of the abdomen was 1.06 ± 0.12 mm, while the average value calculated for abdomen width was 0.79 ± 0.14 mm

CONCLUSIONS

The smallest length of the body established for aphids captured in West Zone of Romania was 1.40 mm, while the biggest was 2.20 mm. The average body length was 1.83 ± 0.20 mm. Regarding the length of the head and thorax, it may be noticed that the maximum length of these parts was 0.95 mm and minimum length was 0.50 mm. The minimum width of head was 0.20 mm and the maximum width of head was 0.45 mm. The average value calculated for head width was 0.32 ± 0.05 mm. As far as the thorax width is concerned, this was minimum 0.40 mm and maximum 0.80 mm. Mean thorax width was 0.61 ± 0.02 mm, the minimum length of the abdomen was 0.80 mm and minimum width was 0.50 mm, the maximum length of the abdomen was 1.40 mm and the maximum width was 1 mm.

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BIBLIOGRAPHY

1. BAILLY, R. si colab. Les pucerons des cultures, Ed. Acta, Paris, 1981
2. BLACKMAN, R. L., EASTOP, V. F.:" Aphids on the World's Crops. An Identification Guide", Guide John Wiley and Sons Chichester, London, 1985
3. BEDO E. et all "Studiu comparativ privind zborul afidelor în bazinul Ciuc si câmpul clonal Pãuleni Ciuc în perioada 1987-1995", Anale ICPC Brasov, vol XXIII, Tipografia Romano- Italiana Macovei SA, 1996
4. BUCZAKI, S. - *Fauna Britannica*. Hamlyn, London, 2002.
5. DONESCU D " Principalele specii de afide din cultura de cartof, Anale ICPC Brasov, vol XXII, 1995
6. FERICEAN LIANA MIHAELA, PALAGESIU I " Cercetari privind dinamica speciilor de afide din cultura cartofului la Statiunea Tinerilor Naturalisti, Timisoara", Lucr. St. Fac de Agricultura XXXIX, Partea I Timisoara XXVIII, Ed Agroprint Timisoara, 2007
7. FERICEAN LIANA MIHAELA, N. M. HORABLAGA, I BĂNĂȚEAN – DUNEA, Olga RADA, MIHAELA OSTAN - The behaviour, life cycle and biometrical measurements of *Aphis fabae* Lucr. st. Fac de Agricultura vol 44, 4 Timisoara, 2012
8. FERICEAN LIANA MIHAELA, Teza de doctorat, USAMVB Timisoara, 2008
9. FERICEAN LIANA MIHAELA, PALAGESIU I " Cercetari privind dinamica speciilor de afde din cultura cartofului la Statiunea Tinerilor Naturalisti, Timisoara", Lucr. St. Fac deAgricultura XXXIX, Partea I TimisoaraXXVIII, Ed Agroprint Timisoara, 2007
10. FERICEAN LIANA MIHAELA, PALAGESIU, I, Researches regarding the of potato aphid fauna structure from Varfurile, Lucr. stiint Univ. Craiova vol XXXVII/A, 2007
11. http://en.wikipedia.org/wiki/Black_bean_aphid
12. http://www.arkive.org/black-bean-aphid/aphis-fabae/