

RESEARCH REGARDING EXTERNAL ANATOMY OF SPECIES *BRACHYCAUDUS HELICHRYSI* AND *BRACHYCAUDUS CARDUI*

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Abstract: This paper presents data referring to the external morphological characteristics, the biometrical measurements of species *Brachycaudus helichrysi* and *Brachycaudus cardui*. The researches have been carried out for a period of five years, 2005 - 2008 on the potato and 2016 in orchards from the experimental fields of the Didactic Station Timisoara and Varfurile, Arad County. The aptera of *Brachycaudus helichrysi* has a variable color ranging from brown to green and have a slight wax dusting. The body length is 1.6-2.1 mm. The winged adult of *Brachycaudus helichrysi* have an oval body, are smaller than aptera and have a length from 1.3 to 1.9 mm and can be yellow, olive green, or pink. At the *Brachycaudus helichrysi* species the smallest length of the body established for aphids captured in Western zone of Romania was 1.30 mm, while the biggest was 1.90 mm. The average body length was 1.68 ± 0.18 mm. The length of the head and thorax 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 0.30 mm. The thorax width was minimum 0.40 mm and maximum 0.75 mm. The minimum length of the abdomen was 0.70 mm and minimum width was 0.50 mm, the maximum length of the abdomen was 1.15 mm and the maximum width was 0.90 mm. The wingless aphids of *Brachycaudus cardui* have an oval body and grow to a length from 1.8 to 2.5 mm. The alate aphids of *Brachycaudus cardui* have an oval body and grow to a length from 1.7 to 2.4 mm. At *Brachycaudus cardui* the smallest length of the body established for aphids captured in West Zone of Romania was 1.70 mm, while the biggest was 2.40 mm. The average body length was 2.07 ± 0.19 mm. The length of the head and thorax was 1.10 mm and minimum length was 0.65 mm. The minimum width of head was 0.20 mm and the maximum width of head was 0.40 mm. The thorax width was minimum 0.65 mm and maximum 0.95 mm. The length and width of the abdomen was 0.90 mm and minimum width was 0.70 mm, the maximum length of the abdomen was 1.10 mm and the maximum width was 0.70 mm.

Keywords: biometric measures, aphid, *brachycaudus helichrysi*, *brachycaudus cardui*.

INTRODUCTION

Almost all plants in our country are used as a host by one or more species of aphid. These aphids are not only plant feeders, but also frequently vectors of virus that negatively affect plant health.

Aphids weaken their host plants in diverse ways. First, as phloem-feeders, they are diverting for their own profit the nutrients necessary to plant growth and reproduction. Second, during the feeding phase, they inject saliva that could be phytotoxic. Third, aphids transmit numerous viruses: nearly 50% of insect-borne viruses (275 out of 600) are transmitted by aphids (L.R. NAULT, 1994) and (N.I. KATIS ET AL, 2007).

Brachycaudus is a genus of 50 species. About 14 species have plum (*Prunus* spp.) as the primary host. There are species groups associated with different secondary hosts - two of the most common species use daisies (Asteraceae). Other species do not host alternate, living year round on a variety of plant species. Some *Brachycaudus* species still have a sexual stage

in their life cycle, but most do not. *Brachycaudus aphids* may be attended by ants. Some are important crop or fruit tree pests. http://influentialpoints.com/Gallery/Brachycaudus_aphids.htm

Brachycaudus helichrysi is particularly important on apple, plum, cherry, peaches, and almond (Rosaceae) and sunflower and *Chrysanthemum* (Asteraceae), but also attacks a broad range of other crops such as beans, alfalfa, parsley, celery, and a variety of ornamentals. It has been implicated in the transmission of nearly 10 plant viruses. http://aphid.aphidnet.org/Brachycaudus_helichrysi.php

MATERIAL AND METHODS

The biometrical measurements of *Brachycaudus helichrysi* and *Brachycaudus cardui* was made for a total of 30 individuals, species captured from orchards from Didactic Station Timisoara and Varfurile, Arad county, and the dates was prelucrated with statistical analysis.

The aphids have been collected with the yellow vessel traps. Specimens were preserved in ethanol 80% just after they were collected in the field.

To determine accurately the species have consulted the works made by: BLACKMAN, EASTOP (2000A), (2000B), FERICEAN ET AL, (2006), FERICEAN ET AL, (2012), PERJU (2004), REMAUDIERE (1997), WILLIAMS, DIXON (2007).

RESULTS AND DICUSSIONS

The aptera of *Brachycaudus helichrysi* has a variable colour ranging from brown, green have a slight wax dusting. The body length is 1.6-2.1 mm.

The winged adult *Brachycaudus helichrysi* have an oval body, are smaller than aptera and have a length from 1,3 to 1,9 m and can be yellow, olive green, or pink. The antennae are shorter. The head and thorax are dark. The abdomen has pigmented spot. The siphunculi are pale. The cauda is short and blunt.

Table 1

Biometrics measures of *Brachycaudus helichrysi*

No. art.	Body length (mm)	Head + thorax length (mm)	Head width (mm)	Thorax width (mm)	Abdomen (mm)	
					Length	Width
Average	1.68	0.72	0.29	0.57	0.97	0.72
Average deviation	0.15	0.10	0.01	0.06	0.09	0.11
Standard deviation (s)	0.18	0.12	0.03	0.07	0.11	0.13
(m) Min	1.30	0.50	0.20	0.40	0.70	0.50
(M) Max	1.90	0.95	0.30	0.75	1.15	0.90

It can be observed that, out of a total of 30 individuals of the alate species *Brachycaudus helichrysi* (Table 1) the smallest length of the body established for aphids captured in West Zone of Romania was 1.30 mm, while the biggest was 1.90 mm. The average

body length was 1.68 ± 0.18 mm.

By analyzing the data presented in the table 1 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 0.72 ± 0.12 mm.

The minimum width of head was 0.20 mm and the maximum width of head was 0.30 mm. The average value calculated for head width was 0.29 ± 0.01 mm.

As far as the thorax width is concerned, this was minimum 0.40 mm and maximum 0.75 mm. Mean thorax width was 0.57 ± 0.06 mm.

Analyzing data on the length and width of the abdomen, it can be seen that the minimum length of the abdomen was 0.70 mm and minimum width was 0.50 mm, the maximum length of the abdomen was 1.15 mm and the maximum width was 0.90 mm. The mean length of the abdomen was 0.97 ± 0.09 mm, while the average value calculated for abdomen width was 0.72 ± 0.11 mm

The wingless aphids of *Brachycaudus cardui* have an oval body and grow to a length of from 1.8 to 2.5 mm. The alate aphids of *Brachycaudus cardui* have an oval body and grow to a length of from 1.7 to 2.4 mm. The colour of body are brownish, brown, green or reddish. The abdomen has a black spot situated on the dorsal surface. Their siphunculi are black, thick. The rostrum is long and reaches the hind coxae. Immature species often have reddish patches on a greenish background.

Table 2

Biometrics measures *Brachycaudus cardui*

No. art.	Body length (mm)	Head + thorax length (mm)	Head width (mm)	Thorax width (mm)	Abdomen (mm)	
					Length	Width
Average	2.07	0.93	0.33	0.76	1.14	0.91
Average deviation	0.19	0.11	0.04	0.09	0.09	0.09
Standard deviation (s)	0.23	0.13	0.05	0.11	0.11	0.11
(m) Min	1.70	0.65	0.20	0.65	0.90	0.70
(M) Max	2.40	1.10	0.40	0.95	1.35	1.10

It can be observed that, out of a total of 30 individuals of the species *Brachycaudus cardui* (Table 2) the smallest length of the body established for aphids captured in West Zone of Romania was 1.70 mm, while the biggest was 2.40 mm. The average body length was 2.07 ± 0.19 mm.

By analyzing the data presented in the table 1 regarding the length of the head and thorax, it may be noticed that the maximum length of these parts was 1.10 mm and minimum length was 0.65 mm. The average value calculated for the length of these parts was 0.93 ± 0.11 mm.

The minimum width of head was 0.20 mm and the maximum width of head was 0.40 mm. The average value calculated for head width was 0.33 ± 0.04 mm.

As far as the thorax width is concerned, this was minimum 0.65 mm and maximum 0.95 mm. Mean thorax width was 0.76 ± 0.09 mm

Analyzing data on the length and width of the abdomen, it can be seen that the minimum length of the abdomen was 0.90 mm and minimum width was 0.70 mm, the maximum length of the abdomen was 1.10 mm and the maximum width was 0.70 mm. The mean length of the abdomen was 1.14 ± 0.09 mm, while the average value calculated for abdomen width was 0.91 ± 0.09 mm.

Comparing the measurements related to the length of the head and thorax, the width of the head and thorax, abdomen width and length, with data from the literature cannot be carried out because we could not find its correspondent in specialized literature consulted.

CONCLUSIONS

At the *Brachycaudus helichrysi* species the smallest length of the body established for aphids captured in Western zone of Romania was 1.30 mm, while the biggest was 1.90 mm. The average body length was 1.68 ± 0.18 mm. The average value calculated for the length of head and thorax was 0.72 ± 0.12 mm. The average value calculated for head width was 0.29 ± 0.01 mm. Mean thorax width was 0.57 ± 0.06 mm. The mean length of the abdomen was 0.97 ± 0.09 mm, while the average value calculated for abdomen width was 0.72 ± 0.11 mm.

At *Brachycaudus cardui* the smallest length of the body established for aphids captured in West Zone of Romania was 1.70 mm, while the biggest was 2.40 mm. The average body length was 2.07 ± 0.19 mm. The average value calculated for the length of head and thorax was 0.93 ± 0.11 mm. The average value calculated for head width was 0.33 ± 0.04 mm. Mean thorax width was 0.76 ± 0.09 mm. The mean length of the abdomen was 1.14 ± 0.09 mm, while the average value calculated for abdomen width was 0.91 ± 0.09 mm.

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