Short paper

Aphids living on Stipa (Poaceae) in Iran: Chaetosiphella longirostris Wieczorek, 2008 (Hemiptera: Aphididae: Chaitophorinae) as a new record

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Abstract: During the study of aphid fauna of Kerman province, Iran, an aphid species, Chaetosiphella longirostris Wieczorek, 2008 (Hem.: Aphididae: Chaitophorinae), was collected on Stipa arabica Trin. & Rupr. (Poaceae), which is reported here for the first time from Iran. This is the second aphid species reported on Stipa in Iran. Since there were some morphological differences between the original description of C. longirostris and Iranian population, here we made a diagnostic comparison. The biometric data of the Iranian population of C. longirostris is given and compared with the original description.

Keywords: Aphid, fauna, taxonomy, Iran, morphological differences, new record

Introduction

The genus Stipa L. (Poaceae) is comprised of about 400 species throughout the world with about 90-100 species distributed in the old world (Freitag, 1985; Barkworth and Everett, 1987). Plants belonging to this genus are annual and perennial species usually growing in the arid and dry regions; however, some species, with primitive morphological characteristics, grow in semi-arid regions, too (Freitag, 1985). Many Stipa species are among the important forage crops, which occur in grasslands or in savanna habitats (Freitag, 1985). In Iran, they are distributed in various regions of the country and about 20 Stipa species have been recorded (Mozaffarian, 1998).

Plants in the genus Stipa are infested by a number of aphids. There are about 26 aphid species living on Stipa in the world (see Table 1) (Remaudière and Remaudière, 1997; Holman, 2009; Blackman and Eastop, 2018). So far, only one aphid species (i.e. Chaetosiphella stipae) has been recorded on Stipa in Iran on Stipa capensis in Fars and Tehran provinces and on Stipa hohenakeriana in Markazi province (Hodjat, 2005; Rezwani, 2010).


Blackman and Estop (2006) mentioned that in the collection of Aphidoidea in the British Museum (Nat. Hist.), London, UK, there are some undescribed species of this genus.

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Moreover, two specimens labelled as “C. stipae subsp. mediteranea” stored in the collection of BMNH, collected by Ilharco in Portugal (1959), and later determined as C. stipa subsp. mediteranea by Hille Ris Lambers, is characterized by very long apical rostral segment. Examination of the material collected at the same locality by Wieczorek (2008), stored in the Aphid Collection of Estacão Agronomica Nacional, Oeiras (Portugal) showed that these specimens were new species and were named as Chaetosiphella longirostris (Wieczorek, 2008).

Table 1 Aphid species living on Stipa in the world (Remaudière and Remaudière, 1997; Wieczorek, 2008; Holman, 2009; Blackman and Eastop, 2018).

<table>
<thead>
<tr>
<th>Aphid species</th>
<th>Subfamily</th>
<th>Tribe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anoecia stipae Mamontova 1968</td>
<td>Anoeciinae</td>
<td></td>
</tr>
<tr>
<td>Atheroides karakumi Mordvilko 1948</td>
<td>Chaitophorinae</td>
<td>Siphini</td>
</tr>
<tr>
<td>Atheroides serrulatus Haliday 1839</td>
<td>Chaitophorinae</td>
<td>Siphini</td>
</tr>
<tr>
<td>Carolinaia rhois (Monell 1879)</td>
<td>Aphidinae</td>
<td>Macrosiphini</td>
</tr>
<tr>
<td>Chaetosiphella massagetaica Kadyrbekov 2005</td>
<td>Chaitophorinae</td>
<td>Siphini</td>
</tr>
<tr>
<td>Chaetosiphella stipae HilleRisLambers 1947</td>
<td>Chaitophorinae</td>
<td>Siphini</td>
</tr>
<tr>
<td>Chaetosiphella stipae ssp. setosa HilleRisLambers 1947</td>
<td>Chaitophorinae</td>
<td>Siphini</td>
</tr>
<tr>
<td>Chaetosiphella tschernavini (Mordvilko 1921)</td>
<td>Chaitophorinae</td>
<td>Siphini</td>
</tr>
<tr>
<td>Diuraphis tritici (Gillette 1911)</td>
<td>Aphidinae</td>
<td>Macrosiphini</td>
</tr>
<tr>
<td>Dysaphis ubsanurensis Ivanovskaya 1973</td>
<td>Aphidinae</td>
<td>Macrosiphini</td>
</tr>
<tr>
<td>Forda formicaria von Heyden 1837</td>
<td>Eriosomatinae</td>
<td>Fordini</td>
</tr>
<tr>
<td>Forda marginata Koch 1857</td>
<td>Eriosomatinae</td>
<td>Fordini</td>
</tr>
<tr>
<td>Forda pavlovae Mordvilko 1901</td>
<td>Eriosomatinae</td>
<td>Fordini</td>
</tr>
<tr>
<td>Geoica utricularia (Passerini 1856)</td>
<td>Eriosomatinae</td>
<td>Fordini</td>
</tr>
<tr>
<td>Holmania chaetosiphon Szelegiewicz1964</td>
<td>Aphidinae</td>
<td>Macrosiphini</td>
</tr>
<tr>
<td>Hysteroneura setariae (Thomas 1878)</td>
<td>Aphidinae</td>
<td>Aphidini</td>
</tr>
<tr>
<td>Melanaphis pyaria (Passerini 1861)</td>
<td>Aphidinae</td>
<td>Aphidini</td>
</tr>
<tr>
<td>Metopolophium dirhodum (Walker 1849)</td>
<td>Aphidinae</td>
<td>Macrosiphini</td>
</tr>
<tr>
<td>Paracletus cimiciformis von Heyden 1837</td>
<td>Eriosomatinae</td>
<td>Fordini</td>
</tr>
<tr>
<td>Rhopalosiphum maidis (Fitch 1856)</td>
<td>Aphidinae</td>
<td>Aphidini</td>
</tr>
<tr>
<td>Rhopalosiphum padi (Linneaus 1758)</td>
<td>Aphidinae</td>
<td>Aphidini</td>
</tr>
<tr>
<td>Schizaphis graminum (Rondani 1852)</td>
<td>Aphidinae</td>
<td>Aphidini</td>
</tr>
<tr>
<td>Sipha (Rungsia) maydis Passerini 1860</td>
<td>Chaitophorinae</td>
<td>Siphini</td>
</tr>
<tr>
<td>Sipha (Rungsia) elegans Del Guercio 1905</td>
<td>Chaitophorinae</td>
<td>Siphini</td>
</tr>
<tr>
<td>Sitobion avenae (Fabricius 1775)</td>
<td>Aphidinae</td>
<td>Macrosiphini</td>
</tr>
<tr>
<td>Sitobion fragariae (Walker 1848)</td>
<td>Aphidinae</td>
<td>Macrosiphini</td>
</tr>
<tr>
<td>Slavum lentiscoides Mordvilko 1927</td>
<td>Eriosomatinae</td>
<td>Fordini</td>
</tr>
</tbody>
</table>
The importance of aphid fauna in agriculture, horticulture and forestry is well known, but aphid fauna of rangeland and wild plants have not been studied comprehensively. The aim of this study was to identify the aphid species associated with *Stipa* plants in Kerman province, Iran. Here, we report *Chaetosiphella longirostris* as a new record for aphid fauna of Iran feeding on and collected from *Stipa arabica*.

**Materials and Methods**

Aphids were collected using different methods. The most satisfactory way of obtaining aphids is by examining plants foliage carefully for colonies. The infested plant parts were cut and placed into plastic bags. Some indicators such as existence of aphid’s honeydew, ants’ attendance and predators were used to find the aphid colonies/individuals. Later aphids on plants were collected by a paintbrush. When there was no trace of aphids on plants, beating on to a white tray placed underneath the plant was done very carefully. Specimens were either preserved in ethanol 75% or mounted on slides and deposited in the Aphidology Research Group Aphid Collection (ARGAC), Institute of Science and High Technology and Environmental Sciences, Graduate University of Advanced Technology (KGUT), Kerman, Iran and in the insect collection of the Zoological Museum of Shahid Bahonar University of Kerman, Kerman, Iran (ZMSBUK).
Abbreviations used in the text are as follows: ANT, antennae length; ANTI, ANTII, ANTIII, ANTIV, ANTV, ANTVb, antennal segments I, II, III, IV, V, and the base of antennal segment V, respectively; ANTIII Base, basal diameter of antennal segment III; PT, processus terminalis; URS, ultimate rostral segment; 2HT, second segment of hind tarsus; SIPH, siphunculus; ABD TERG, abdominal tergites.

Results

Chaetosiphella longirostris Wieczorek, 2008 (Chaitophorinae: Siphini)

Apterous viviparous females: Body color in living specimens is dark brown to black. Color of mounted specimens on slide: antennal segments I, II and V dark brown, III and IV pale brown. Head, thorax and abdominal tergites brown. Coxa and femur dark brown, front and middle tibia pale brown, hind tibia dark brown to black. Rostrum brown (Fig. 1).

Morphological characters: Body elongate, oval-shaped, 2.02-2.29 mm long. Head and prothorax not fused. Abdominal tergites sclerotized, II-VII fused. Hairs numerous, placed on wart-like bases, not arranged in visible rows. Thorax and marginal hairs pointed, thorn-like. Hairs of head are thorn-like. Antenna short, 5-segmented, 0.31-0.35 times the body length. Antennal segment III with 6-10 hairs. The longest hair on ANTIII 1.81-2.55 times as long as basal width of ANTIII. Eyes normal, ocular tubercles distinct. Rostrum long, reaching to hind coxae, the apical segment stiletto-shaped with 5-6 hairs. URS very long 0.26-0.29 mm. First tarsal segments with five hairs, empodial hairs spatulate. Siphunculi pore-shaped, placed at anterior margin of abdominal segment V. Cauda broadly rounded (Fig. 1). Complete biometric data were also compared with the original description, presented in Table 2.

A key to aphid species living on Stipa in Iran is provided below:

**Biology:** This aphid lives on *Stipa arabica* (Poaceae) leaves and are visited by ants.

**Materials examined:** A total of 12 apterous viviparous females were examined; ARG00135, Iran: Kerman province, Sirjan, Hossein-abad, N29°42’E55°55’, 2248m. a.s.l., 13 May 2014, leg. S. Mosapour, 4 apterous viviparous females (ZMSBUK) and 4 apterous viviparous females (ARGAC). ARG00136, Iran: Kerman province, Kuhpayeh, N30°26’E57°12’, 2084m. a.s.l., 19 May 2006, leg. M. Mehrparvar, 4 apterous viviparous females (ARGAC).

**Discussion**

Chaetosiphella longirostris is the second aphid species reported on *Stipa* in Iran. Following the original description, some morphological differences were found between the specimens of *C. longirostris* collected in Iran and those that were collected in Portugal (see Table 2). It could be supposed that the gap observed is probably derived from different environmental conditions (Madjdzadeh and Mehrparvar, 2009), geographical distribution (Madjdzadeh and Mehrparvar, 2009) and host plants (Madjdzadeh et al., 2009; Mehrparvar et al., 2012). These factors are among the most important aspects that can contribute to the differentiation between aphid populations (Madjdzadeh and Mehrparvar, 2009; Madjdzadeh et al., 2009; Mehrparvar et al., 2012). Besides the different geographical distribution for Portuguese and Iranian populations, it should be mentioned that the Portuguese population was collected on *Ammophila arenaria*, while the Iranian ones were on *Stipa arabica.*
Table 2: Biometric data of apterous viviparous females of *Chaetosiphella longirostris* (Hemiptera: Aphididae: Chaitophorinae) Wieczorek, 2008. The data of specimens collected in Iran are compared to Portugal population described by Wieczorek, 2008.

<table>
<thead>
<tr>
<th>Characters</th>
<th>Original description (Portugal)</th>
<th>Iranian population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body</td>
<td>2.45-2.62</td>
<td>2.02-2.29</td>
</tr>
<tr>
<td>Body width</td>
<td>0.82-0.04</td>
<td>0.70-0.88</td>
</tr>
<tr>
<td>ANT</td>
<td>0.64-0.75</td>
<td>0.63-0.76</td>
</tr>
<tr>
<td>ANTIII</td>
<td>0.24-0.26</td>
<td>0.24-0.30</td>
</tr>
<tr>
<td>ANTV</td>
<td>0.09-0.10</td>
<td>0.09-0.12</td>
</tr>
<tr>
<td>ANTVb</td>
<td>0.075-0.09</td>
<td>0.07-0.10</td>
</tr>
<tr>
<td>PT</td>
<td>0.08-0.10</td>
<td>0.08-0.12</td>
</tr>
<tr>
<td>Basal Diameter ANTIII</td>
<td>0.02-0.029</td>
<td></td>
</tr>
<tr>
<td>Longest hair on ANTIII</td>
<td>0.05-0.067</td>
<td></td>
</tr>
<tr>
<td>URS</td>
<td>0.26-0.30</td>
<td>0.26-0.29</td>
</tr>
<tr>
<td>2HT</td>
<td>0.17-0.18</td>
<td>0.15-0.19</td>
</tr>
<tr>
<td>Hind femur</td>
<td>0.38-0.42</td>
<td></td>
</tr>
<tr>
<td>Hind tibia</td>
<td>0.76-0.87</td>
<td></td>
</tr>
<tr>
<td>No. URS hair</td>
<td>2</td>
<td>5-6</td>
</tr>
<tr>
<td>No. ANTIII hair</td>
<td>5-7</td>
<td>6-10</td>
</tr>
<tr>
<td>PT/ANTVb</td>
<td>0.75-1.10</td>
<td>1.00-1.33</td>
</tr>
<tr>
<td>URS/2HT</td>
<td>1.40-1.70</td>
<td>1.47-1.71</td>
</tr>
<tr>
<td>ANT/Body length</td>
<td>0.24-0.28</td>
<td>0.31-0.35</td>
</tr>
<tr>
<td>ANTVb/ANTIII</td>
<td>0.30-0.40</td>
<td>0.30-0.35</td>
</tr>
<tr>
<td>ANTV/ANTIII</td>
<td>0.65-0.83</td>
<td>0.60-0.78</td>
</tr>
<tr>
<td>ANTV/ANTIV</td>
<td>1.45-2.20</td>
<td>1.63-2.10</td>
</tr>
<tr>
<td>URS/ANTIII</td>
<td>1.00-1.38</td>
<td>0.90-1.15</td>
</tr>
<tr>
<td>Longest hair on ANTIII Base</td>
<td>2.00-2.40</td>
<td>1.81-2.55</td>
</tr>
</tbody>
</table>

Lengths are in mm. Abbreviations: ANT, antennae length; ANTI, ANTIII, ANTV, ANTVb, antennal segments I, II, III, IV, V, and the base of antennal segment V, respectively; ANTVI Base, basal diameter of antennal segment III; PT, processus terminalis; URS, ultimate rostral segment; 2HT, second segment of hind tarsus; SIPH, siphunculus; ABD TERG, abdominal tergites.

The Iranian specimens were smaller, so that they have shorter body length with more accessory hairs on URS and more hairs on ANTIII. The proportions of PT to ANTVb and ANT to body length are greater in Iranian population than in the Portuguese one, while the proportion of URS to ANTIII is relatively smaller in Iranian population (Table 2).

Wieczorek (2008) mentioned that *C. stipae* subsp. *setosa* from France and *C. longirostris* from Portugal may be treated as a variant population of *C. stipae*. Nevertheless, examination of cotypes of *C. stipae* from Switzerland and samples from Mongolia, Iran, Turkey, Hungary, Czech Republic, Austria and Spain (Wieczorek, 2008), showed significant differences in diagnostic characters such as length and shape of the body, antennal ratios and chaetotaxy, length of URS, proportions of URS to ANTIII and URS to 2HT.

Acknowledgments

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References


Freitag, H. 1985. The genus *Stipa* (Gramineae) in southwest and south Asia.
Notes from the Royal Botanic Garden, Edinburgh, 42: 355-489.
شنطه‌های گیاهان جنس Stipa (Poaceae) در ایران: معرفی Chaetosiphella longirostris Wieczorek, 2008 (Hemiptera: Aphididae: Chaitophorinae)

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چکیده: در این پژوهش یک گونه شته با نام علمی: Chaetosiphella longirostris (Hem.: Aphididae: Chaitophorinae) در ایران از استان کرمان گزارش می‌شود. با این گزارش تعداد شته‌های فعال روی گیاهان جنس Stipa arabica Trin. & Rupr. (Poaceae) در ایران به دو گونه افزایش می‌یابد. از آنجاکه بین نمونه‌های جمع‌آوری شده از ایران و توصیف اصلی این گونه توسط Wieczorek (2008) بحث قرار گرفته‌اند. همچنین داده‌های بیومتریک مربوط به نمونه‌های ایران ارائه و با توصیف اصلی مقایسه شده‌اند.

واژگان کلیدی: شته، فون، رده‌بندی، ایران، اختلاف مورفولوژیک، رکورد جدید