KSÜ Tarım ve Doğa Derg 25 (1): 133-139, 2022
KSU J. Agric Nat 25 (1): 133-139, 2022
DOI:10.18016/ksutarimdoga.vi.866486

Sinop ve Kastamonu (Türkiye)'da Dağılım Gösteren Cercopidae (Hemiptera: Auchenorrhyncha: Cicadomorpha) Türlerinin Taksonomik Yönden Değerlendirilmesi

Rukiye TANYERİ[1], Ünal ZEYBEKOĞLU[2]
[1]Department of Biology, Faculty of Arts and Science, Sinop University, Sinop, Turkey, [2]Department of Biology, Faculty of Arts and Science, Ondokuz Mayıs University, Samsun, Turkey
[1]https://orcid.org/0000-0001-9994-8783, [2]https://orcid.org/0000-0003-1646-5999
✉: rtanyeri@sinop.edu.tr

ÖZET
Bu çalışmada 2016-2018 yıllarında Sinop ve Kastamonu'dan toplanan Cercopidae familyasına ait örnekler incelenmiştir. *Cercopis* ve *Triechphorella* cinslerine ait 3 tür tespit edilmiştir. Tespit edilen türlerin genel morfolojik özellikleri, dişi ve erkek genital yapılarının çizimleri, bazı vücut kısımlarının ölçümleri, Türkiye ve dünyadaki dağılımları verilmiştir. Örneklerle ilgili kısa ekolojik notlardan bahsedilmektedir. Ayrıca tespit edilen türlerin elitral renk/desen varyasyonuna dair veriler de incelenmiştir.

Araştırma Makalesi

Makale Tarihçesi
Geliş Tarihi : 22.01.2021
Kabul Tarihi : 06.05.2021

Anahtar Kelimeler
Cercopidae
Türkiye
Taksonomi

Evalution of Cercopidae (Hemiptera: Auchenorrhyncha: Cicadomorpha) Species Distributed in Sinop and Kastamonu (Turkey) in Taxonomic Terms

ABSTRACT
In this study, specimens belonging to Cercopidae collected from Sinop and Kastamonu in 2016-2018 were evaluated. Three species belonging to to genus *Cercopis* and *Triecphorella* were identified. General morphological characteristics, drawings of male and female of genital structures, measurements of some body parts, distributional data (Turkey and in the world) and collection localities of the species were given. Brief ecological notes on examples are mentioned. The data about the elytral color/pattern variation of identified species were also examined.

Research Article

Article History
Received : 22.01.2021
Accepted : 06.05.2021

Keywords
Cercopidae
Turkey
Taxonomy

To Cite: Tanyeri R, Zeybekoğlu Ü 2022. Evalution of Cercopidae (Hemiptera: Auchenorrhyncha: Cicadomorpha) Species in Sinop and Kastamonu (Turkey) in Taxonomic Terms. KSU J. Agric Nat 25 (1): 133-139. DOI: 10.18016/ksutarimdoga.vi.866486.

INTRODUCTION

Cercopidae is the most diverse group in the Cercopoidea (Hemiptera: Auchenorrhyncha) superfamily. This family includes xylem-sucking insects containing 1500 species belonging to 150 genera. Since Cercopidae nymphs produce a frothy secretion, the family name is foamy cicadas or spittlebugs and also known as froghoppers because adults have well jumping ability (Cryan and Svenson, 2010). thşs group has a dominant distribution in tropical and subtropical areas of the world. Almost 70% of the identified species have tropical distribution. In most species, adults are characterized by having colorful elytral patterns. Adults feed on leaves and stems of various plants, and nymphs on the roots (Liang and Fletcher, 2002; Liang and Webb, 2002). The family of members is 6-12 mm in size and characterized by their colored elytra. There are two simple eyes on the vertex. The femur is not thick in the front legs. Pronotum is usually flat, slightly curved. The posterior tibia is round, has 1-2 spines. The head is narrower than the pronotum (Holzinger et al., 2003).

Some Cercopidae species have potential to cause significant damage to economically important plants. In particular, they cause harm in rice either through by feeding or as a vector of phytoplasmas (Paladini et al., 2018). Several species are known to cause significant damage to forage grasses and sugarcane by feeding (Peck et al., 2001).

The first records from our country belonging to the Cercopidae family, which has 93 species in the Palearctic Region, were given by Fieber (1872) and Fahringer (1922). Metcalf (1961), listed 4 species from Turkey. Lodos and Kalkandelen (1981), prepared a checklist of Cercopidae family of Turkey. Kartal et al., (1994) conducted a taxonomic study on Cercopidae species in Samsun and its surroundings. Turkey Cercopidae fauna comprises of 7 species: *Cercopis distincta* (Melichar, 1896), *C. intermedia* Kirschbaum, 1868, *C. sanguinolenta* (Scopoli, 1763), *C.*

septemmaculata (Melichar, 1903), *C. vulnerat*a Rossi, 1807, *Haematoloma dorsata* (Ahrens, 1812) and *Triecphorella geniculata* (Horvath, 1881) (Lodos and Kalkandelen, 1988; Önder et al., 2011).

The purpose of this study is to determine the species of Cercopidae distributed in Sinop and Kastamonu provinces in the West Black Sea Region of Turkey. And it has also been intended to evaluate the species in taxonomic terms and take data about the elytral color/pattern variation of the species.

MATERIAL and METHOD

The specimens were collected from Sinop and Kastamonu provinces in the West Black Sea Region of Turkey between 2016 and 2018 (Figure 1). The sampling of the adults was implemented biweekly intervals between May and July. The spittlebugs were frequently collected from the herbaceous plants in humid habitats near water sources, such as mini-meadows, streamsides and roadsides. In the sampling of the adults, a standard sweeping net and a handheld aspirator were used. The specimens were prepared by standard insect preparation and identified according to (Dusolier, 2004; Holzinger, 2003; 2008) by the first author. An overview photograph of dry samples was taken with Canon EOS 70D model camera connected to Zeiss Stem 2000-C stereomicroscope. The shapes of genital structures were drawn using Zeiss discovery V-20 stereomicroscope attached drawing attachment.

The specimens are deposited in Sinop University, Faculty of Arts and Sciences, Department of Biology, Invertebrata Laboratory.

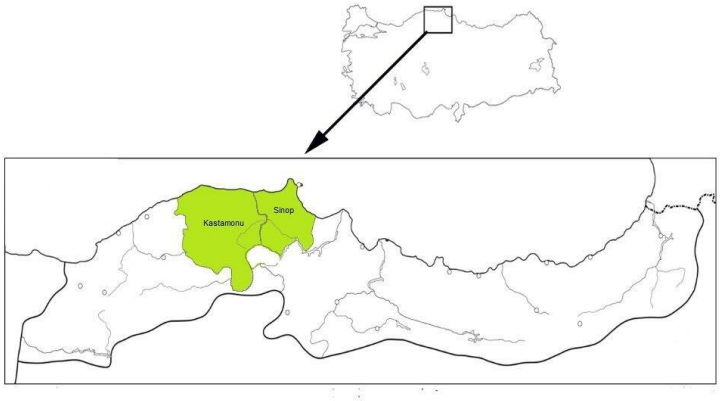

Figure 1. Study area
Şekil 1. Çalışma alanı

RESULTS

The specimens collected during fieldwork in Sinop and Kastamonu provinces were identified, and it has been determined that 3 species were found in the region belonging to Cercopidae family. One of these *Cercopis intermedia* Kirschbaum, 1868 is that has a large distribution area in Turkey; the other is *Cercopis vulnerata* Rossi, 1807 and the third one is *Triecphorella geniculata* (Horvath, 1881). It was determined that the samples belonging to the *Cercopis* genus have a high rate of color and pattern variation (Figures 2, 4). Morphometric measurements some body parts of species are shown in Table 1, 2 and 3. With this study, it can be stated that *C. intermedia* is recorded for the first time from Sinop and Kastamonu, *T. geniculata* is the first record for the local fauna of Kastamonu.

Genus: *Cercopis* Fabricius, 1775

Cercopis intermedia Kirschbaum, 1868

(Figures 2-3)

Material

Sinop: 18.06.2016, 41° 56' 995" N 34° 48' 238" E (32 ♀♀); 13.05.2017, 41° 52' 31.3" N 34° 51' 00.6" (15 ♂♂, 42 ♀♀); 14.05.2017, 41° 53' 05.9" N 34° 33' 53.6" E (24 ♂♂, 37 ♀♀); 27.05.2017 , 41° 44' 52.0" N 34° 57' 40.9" E (23 ♂♂, 38 ♀♀), 41° 32' 45.1" N34° 47' 0.01" E (17 ♂♂, 13 ♀♀), 41° 50' 22.0" N 35° 03' 02.2" E (75 ♂♂, 54 ♀♀); 01.06.2017 41° 44' 21.9" N 35° 13' 53.1" E (8 ♂♂, 3 ♀♀); 09.06.2017 42° 00' 52.1" N 34° 58' 24.4" E (8 ♂♂, 13 ♀♀), 41° 59' 41.7" N 34° 54' 00.2" E (83 ♂♂, 13 ♀♀)

Kastamonu: 18.05.2017 41° 27' 35.2" N 33° 39' 38.9" E (63 ♂♂, 47 ♀♀); 19.05.2017 41° 42' 08.7" N 33° 28' 56.3" E (78 ♂♂, 67 ♀♀), 41° 42' 08.4" N 33° 26' 37.0" E (53 ♂♂, 33 ♀♀), (48 41° 38' 35.8" N 33° 07' 13.9" E (♂♂, 34 ♀♀), 41° 39' 33.2" N 33° 08' 02.2" E(73 ♂♂, 54 ♀♀), 41° 36' 45.4" N 33° 07' 02.9" E 41° 58' 25.00" N 33° 48' 27.9" E (23 ♂♂, 13 ♀♀); 20.05.2017 41° 58' 10.7" N 34° 05' 22.7" E41° 55' 31.9" N 34° 10' 56.2" E (54 ♂♂, 33 ♀♀), 41° 41' 34.8" N 33° 57' 43.3" E (90 ♂♂, 65 ♀♀)

Distribution in Turkey: Adıyaman, Amasya, Artvin, Ankara, Antalya, Bitlis, Çanakkale, Çorum, Diyarbakır, Elazığ, Eskişehir, Gaziantep, Giresun, Hakkari, Hatay, Isparta, İstanbul, İzmir, Kahramanmaraş, Kayseri, Konya, Kütahya, Kırklareli, Mardin, Niğde, Rize, Samsun, Siirt, Şanlıurfa, Trabzon, Uşak (Önder et al., 2011; Demir, 2019)

Zoogeographic distribution: Albania, Algeria, Austria, Bulgaria, Czech Republic, France, Germany, Greece, Hungary, Iran, Israel, Italy, Lebanon, Morocco, North Africa, Poland, Portugal, Romania, Russia, Slovakia, Syria, Spain, Switzerland, Turkey, Yugoslavia (Önder et al., 2011; Anonymous, 2021)

Figure 2. *Cercopis intermedia* Kirschbaum, 1868 (♂) (scale bars: 1 mm)
Şekil 2. Cercopis intermedia Kirschbaum, 1868 (♂) (ölçek çubukları: 1 mm)

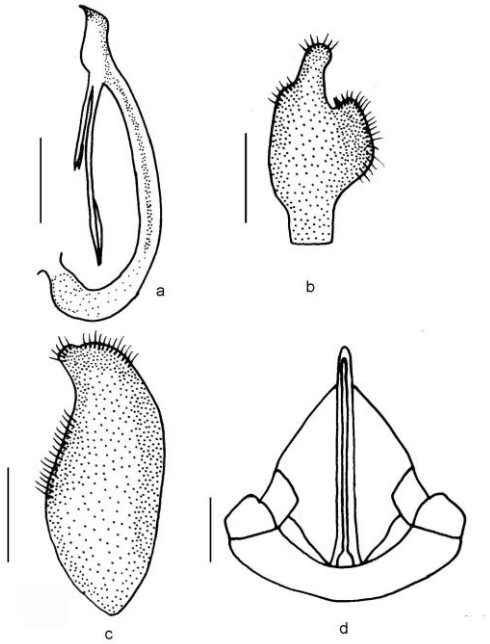

Figure 3. Genital structures of *Cercopis intermedia* a, aedeagus from lateral; b, stylus; C, genital plate; d, the tip of the female abdomen from ventral (scale bars: 0,5 mm)
Şekil 3. Cercopis intermedia türünün genital yapıları a, aedegus yandan; b, stilus; C, genital plak; d, dişide abdomenin uç kısmı ventralden (ölçek çubukları: 0,5 mm)

Table 1. Measurements of body parts of *Cercopis intermedia* (N=number of individuals).
Çizelge 1. Cercopis intermedia'nın vücut kısımlarının ölçüleri (N= birey sayısı).

	Male (N=50)			Female (N=50)		
Body parts (mm)	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**
Body length	8	9.55	8.7	8.25	9.50	8.8
Head width	2	2.25	2.15	2.1	2.5	2.2
Vertex length	0.5	0.75	0.6	0.6	0.75	0.7
Pronotum length	1.5	1.75	1.6	1.5	1.7	1.35
Mesonotum length	1.05	1.6	1.25	1.25	1.5	1.35

Table 2. Measurements of body parts of *Cercopis vulnerata* (N=number of individuals).
Çizelge 2. Cercopis vulnerata'nın vücut kısımlarının ölçüleri (N=birey sayısı).

	Male (N=30)			Female (N=30)		
Body parts (mm)	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**
Body length	9.5	10.7	9.9	9	11	9.74
Head width	2	2.3	2.2	2.1	2.5	2.3
Vertex length	0.5	0.7	0.6	0.5	0.7	0.6
Pronotum length	1.4	1.9	1.7	1.6	2	1.7
Mesonotum length	1.2	1.7	1.5	1.4	1.7	1.5

Table 3. Measurements of body parts of *Triechphorella geniculata* (mm) (N=number of individuals).
Çizelge 3. Triechphorella geniculata'nın vücut kısımlarının ölçüleri (mm) (N=birey sayısı).

	Male (N=31)			Female (N=14)		
Body parts (mm)	**Min.**	**Max.**	**Ave.**	**Min.**	**Max.**	**Ave.**
Body length	6	7	6.57	6.5	7.1	6.8
Head width	1.6	1.8	1.7	1.7	1.9	1.8
Vertex length	0.3	0.5	0.46	0.4	0.5	0.48
Pronotum length	1	1.3	1.2	1.2	1.4	1.3
Mesonotum length	1	1.2	1.06	0.9	1.3	1.1

***Cercopis vulnerata* Rossi, 1807**

(Figures 4-5)

Material

Sinop: 13.05.2017 41° 53' 05.9" N 34° 33' 53.6" E (6♂♂)

Kastamonu: 20.05.201741° 52' 48.9" N 33° 42' 38.0" E (83 ♂♂, 13 ♀♀), 41° 58' 25.00"N 33° 48' 27.9" E (52 ♂♂, 28 ♀♀), 41° 55' 31.9" N 34° 10' 56.2" E (57 ♂♂, 54 ♀♀), 41° 41' 34.8"N 33° 57' 43.3" E (2 ♂♂, 1 ♀), 41° 39' 33.2" N 33° 08' 02.2"E (6 ♀♀); 15.06.2017 41° 52' 49.0"N 33° 42' 38.1" E (1 ♂); 16.06.2017 41° 34' 34.1"N 33° 12' 44.1" E (1 ♂), 19.05.2017 41° 38' 35.8"N 33° 07' 13.9" E (28 ♂♂, 15 ♀♀), 41° 39' 33.2" N 33° 08' 02.2" E (1 ♂,1 ♀) 41° 36' 45.4"N 33° 07' 02.9"E (6 ♂♂, 2 ♀♀).

Distribution in Turkey: Antalya, Balıkesir, Bartın, Bursa, Eskişehir, Kastamonu, Kocaeli, Konya, Sakarya, Sinop (Altınayar, 1981; Demir, 2005; 2006; Önder et al., 2011; Tanyeri and Zeybekoğlu, 2020)

Zoogeographic distribution: Albania, Austria, Belgium, Britain, Bulgaria, Croatia, Czech Republic, France, Germany, Greece, Hungary, Italy, Moldova, The Netherlands, Norway, Spain, Switzerland, Poland, Romania, Russia (Central Europe), Russia (Southern Europe), Slovakia, Slovenia, Turkey, Yugoslavia (Önder et al., 2011; Anonymous, 2021).

Figure 4. *Cercopis vulnerata* Rossi, 1807 (♂) (scale bar: 1 mm)
Şekil 4. Cercopis vulnerata Rossi, 1807 (♂) (ölçek çubuğu: 1 mm)

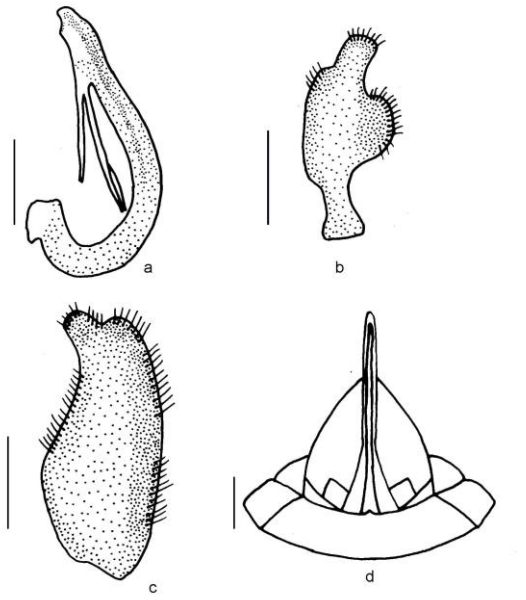

Figure 5. Genital structures of *Cercopis vulnerata* a, aedeagus from lateral; b, stylus; c, genital plate; d, the tip of the female abdomen from ventral (scale bars: 0,5 mm)

Şekil 5. Cercopis vulnerata türünün genital yapıları a, aedegus yandan; b, stilus; c, genital plak; d, dişide abdomenin uç kısmı ventralden (ölçek çubukları: 0,5 mm)

Figure 6. *Triechphorella geniculata* (Horvath, 1881) (♂) (scale bar: 1 mm)

Şekil 6. Triechphorella geniculata (Horvath, 1881) (♂) (ölçek çubuğu: 1 mm)

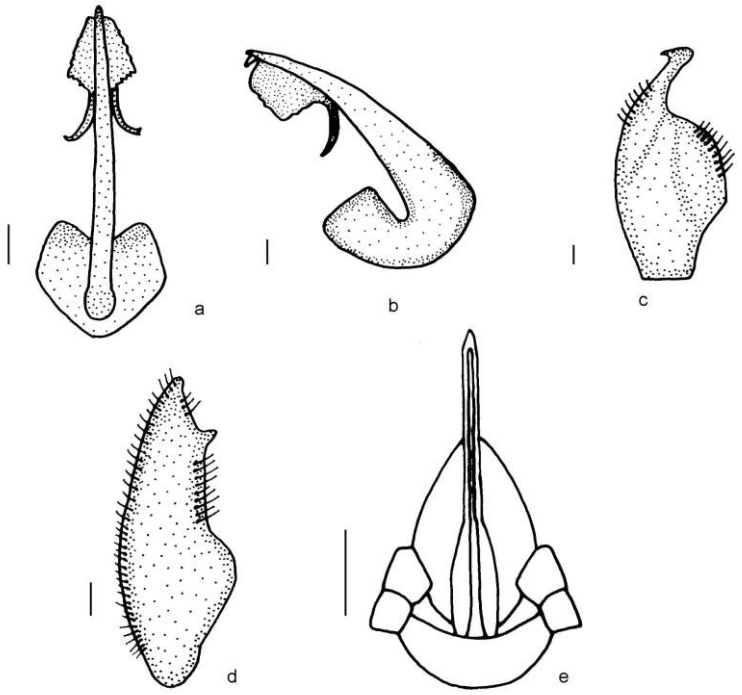

Figure 7. Genital structures of *Triechphorella geniculata* a, aedeagus from ventral; b, aedeagus from lateral; c, stylus; d, genital plate; e, the tip of the female abdomen (scale bars: a, b, c, d: 0,1 mm; d: 0,5 mm)

Şekil 7. Triechphorella geniculata türünün genital yapıları a, aedegus ventralden; b, aedegus yandan; c, stilus; d, genital plak; e, dişide abdomenin uç kısmı ventralden (ölçek çubukları: a, b, c, d: 0,1 mm; d: 0,5 mm)

Genus: *Triecphorella* Nast, 1933

***Triecphorella geniculata* (Horvath, 1881)**

(Figures 6-7)

Material

Kastamonu: 19.05.2017, 41° 39' 33.2" N 33° 08' 02.2" E (64 ♂♂, 45 ♀♀)

Distribution in Turkey: Adana, Amasya, Antalya, Balıkesir, Kahramanmaraş, Konya, Osmaniye, Samsun (Demir, 2005; 2006; Önder et al., 2011; Zeybekoğlu and Karavin, 2010)

Zoogeographic distribution: Croatia, Greece, Near East, Turkey, Yugoslavia (Önder et al., 2011; Anonymous, 2021).

DISCUSSION

Cercopidae which is characterized by their bright color patterns consists of 7 species belonging to 3 genea in Turkey. 3 species, *C. vulnerata*, *C. intermedia*, and *T. geniculata* were determined from the study area.

Because of the elytral color/pattern variation, the diagnosis of the Cercopidae species must be done according to the their genital structures. According to color/pattern, 4 variants belonging to *C. intermedia* were determined. Variation of *C. vulnerata* evaluated from the authors before (Tanyeri & Zeybekoğlu 2020). *T. geniculata*, has a transverse thin red band in the rear part of the fore wings and this feature did not show variation. When these data are evaluated, it is seen that the first results reported regarding the color/pattern variation displayed by *C. intermedia*.

C. vulnerata was collected on sunny slopes, pastures, dry or humid areas with rich herbaceous vegetation and around Kastamonu Hamidiye village over apple trees. Other taxa were collected from herbaceous vegetation. The first adult specimens were collected in the second week of May. It has been observed that adults belonging to the species of this genus exist in nature for a very short time. It has been determined that population densities have decreased considerably since the second week of June, but a few individuals could be collected.

According to literature, *Cercopis* fauna of Turkey consists of 5 species. *C. vulnerata* distinguished from other *Cercopis* taxa by following character; in males, the anterior pair of processes on the apex of the aedeagus is two-thirds the length of posterior pair. In *C. sanguinolenta* and *C. intermedia* the anterior pair is half the length of the posterior pair. *C. sanguinolenta* differs from *C. intermedia* having totally black legs. *C. intermedia* has red knees (Holzinger et al., 2003).

C. septemmaculata closely looks like *C. sanguinolenta* and *C. intermedia* in terms of genital structures. It is known with limited records from Turkey. However, there is different information about this taxon in the literature. *C. septemmaculata* originally described by Melichar, 1903, was accepted as the morph of *C. sanguinolenta* by Lindberg (1923). The intermittent red band behind the wings resembles 3 points. Nast (1933) accepted *C. septemmaculata* as the synonym of *C. intermedia*. Similarly, Lallemand (1949) evaluated this taxon as a morph. Dlabola (1965) evaluated *C. septemmaculata* as a separate taxon and gave the drawings of the lateral view of the aedeagus by stating its differences with *C. intermedia*. However, in the drawings, the differences between the two taxa are not fully understood. *C. septemmaculata* recorded from Kastamonu (Lodos and Kalkandelen, 1988) was not determined

in this study.

Members of the *Triecphorella* genus have a black-red pattern like *Cercopis* species. However, it is much smaller than *Cercopis* taxa in size. The only known taxon of this genus is *T. geniculata*. It is sampled from an area rich in herbaceous vegetation such as Graminae, Cyperidaceae at the base, at the edge of the river in Kastamonu (Ilıca). The specimens collected in a single locality are associated with the low population density. This may result from specialization to the host plant. However, there is no data on the ecology of this taxon.

Acknowledgements

This study is a part of the first author's phd thesis approved by the Graduate School of Sciences of Ondokuz Mayıs University in August 2019 and supported by Ondokuz Mayıs University Research Fund (Project number: PYO.FEN.1904.16.013).

Contribution of the Authors as Summary

Authors declare the contribution of the authors is equal.

Statement of Conflict of Interest

There is no conflict of interest between the article authors.

REFERENCES

Anonymous 2021f. Fauna Europe (http//faunaeurope.org) (Access date: 10.01.2021).

Altınayar G 1981. Orta Anadolu Bölgesi Tahıl Tarlalarındaki Böcek Faunasının Saptanması Üzerinde Çalışmalar. Türkiye Bitki Koruma Dergisi 21(2): 53- 88.

Cryan JR and Svenson GJ 2010. Family-level Relationships of the Spittlebugs and Froghoppers (Hemiptera: Cicodomorpha: Cercopoidea). Systematic Entomology 35: 393-415.

Demir E 2005. Antalya ilinin Auchenorrhyncha (Homoptera) Fauna ve Taksonomisi Üzerine Araştırmalar. Gazi Üniversitesi Fen Bilimleri Enstitüsü Biyoloji Anabilim Dalı, Doktora Tezi, 235 sy.

Demir E 2006. Preliminary Report on the Auchenorrhyncha (Hemiptera) Fauna of Kazdağı National Park with Two New Records for Turkey. Acta Entomologica Slovenica 14: 89-102.

Demir E 2019. Biodiversity and Zoogeography of Cicadomorpha (excl. Deltocephalinae) Species from Southwestern Turkey (Insecta: Hemiptera). Munis Entomology and Zoology 14:1: 236-243.

Dlabola J 1965. Jordanische Zkaden (Homopetra, Auchenorrhyncha). Acta Entomologica Musei Nationalis 36: 24-57.

Dusolier F 2004. Hemipteres Nouveaux ou rares pou le Massif Armorican (Hexapoda, Hemiptera). Bulletin de Societe des Sciences Nturelles Quest de la France 26: 128-137.

Fahringer J 1922. Eine Rhynchoten Ausbeute aus der Türkei, Kleinasien und den Benaehbarten. Gebieten 1: 296-307.

Fieber, FX 1872. Katalog der Europaisehen Cieaden nach Originalen Mit Benützung Der Neustes Literatür. Wien I-IV, 1-19.

Holzinger WE, Kammerlander I and Nickel H. 2003. The Auchenorrhyncha of Central Europe. Fulgoromorpha, Cicadomorpha excl. Cicadellidae. (Volume:1) Koninklijke Brill NV, 673 p.

Holzinger WE 2008. Die Gemeine Blutzikade (Cercopis vulnerata) das İnsekt des Jahres 2009 (Hemiptera: Auchenorrhyncha: Cercopidae) Beitrage zur Entomofaunistik, 8: 193-203.

Kartal V, Zeybekoğlu Ü and Özdemir G 1994. Samsun Çevresinde Cercopidae Leach, 1815 (Homoptera, Auchenorrhyncha) Familyası Türleri Üzerine Taksonomik Bir Araştırma. Ondokuz Mayıs Üniversitesi Fen Dergisi 5:1: 147-157.

Lallemand V 1949. Revision Des Cercopinae (Homoptera) Premiere Partie. Memories de l'Institut Royal des Sciences Naturelles de Belgique 32:1-193.

Liang AP and Fletcher MJ 2002. Morphology of the Antennal Sensilla in Four Australian Spittlebug Species (Hemiptera: Cercopidae) with implications for phylogeny. Australian Journal of Entomology 41: 39-44.

Liang AP and Webb MD 2002. New Taxa and Revisionary Notes in Rhinaulacini Spittlebugs From Southern Asia (Homoptera: Cercopidae). Journal of Natural History 36: 729–756.

Lindberg H 1923. Zur Kenntnis der Palaarktischen, Cicadina I. Cercopidae. Entomologischen Helsingfors 3: 34-43.

Lodos N and Kalkandelen A 1981. Preliminary List of Auchenorrhyncha with Notes on Distribution and Importance of Species in Turkey VI. Families Cercopidae and Membracidae. Türkiye Bitki Koruma Dergisi 5:3:133-149.

Lodos N and Kalkandelen A 1988. Preliminary List of Auchenorrhyncha with Notes on Distribution and Importance of Species in Turkey XXVII (Addenda and Corrigenda). Türkiye Entomoloji Dergisi 12 (1): 11-22.

Metcalf ZP 1961. General Catalogue of the Homoptera. Fas VII. Cercopoidea Pt. 2 Cercopidae. North Carolina State College, Raleigh, United States of America, 607 p.

Nast J 1933. Beitrage Zur Morhologie und Geographisehen Verbreitung Der Mitteleuropaischen und Mediterranen Arten Aus der Subfamilie Cercopinae (Homoptera, Cercopidae). Annales Musei Zoologici Polonici 10: 7-32.

Önder F, Tezcan S, Karsavuran Y and Zeybekoğlu Ü 2011. Türkiye Cicadomorpha, Fulgoromorpha ve Sternorrhyncha Kataloğu, Meta Basım, 157, İzmir.

Paladini A, Domahovski AC, Krinski D and Foerster LA 2018. Reports of New Wing Color Polymorphism and Taxonomic Information to Cercopids (Auchenorrhyncha: Cercopidae) from Upland Rice Crop, Pará State, Brazil. Brazilian Journal of Biology 78:4: 728-735.

Peck D, Castro U, Lopez F, Morales A, Rodriguez J 2001. First Records of the Sugar Cane Forage Grass Pest, *Prosapia simulans* (Homoptera: Cercopidae) from South America. The Florida Entomologist 84:3: 402-409.

Tanyeri R and Zeybekoğlu Ü 2020. Color/Pattern Variation of *Cercopis vulnerata* Rossi, 1807 (Auchenorrhyncha: Cercopidae) Populations of Northwestern Turkey. Karadeniz Fen Bilimleri Dergisi 10(2): 266-273.

Zeybekoğlu Ü and Karavin M 2010. Özellikleri Az Bilinen *Triechphorella geniculata* Horvath, 1881 (Hemiptera, Cicadomorpha, Cercopidae) Üzerine Taksonomik Araştırma. 20. Ulusal Biyoloji Kongresi, 21-25 Ağustos, Bildiri Özetleri Kitabı, 698-699, Denizli, Türkiye.