

A New Species of *Oligoglana* Horváth, 1912 (Hemiptera: Cicadidae) from Mediterranean Region of Turkey

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ABSTRACT

Oligoglana sirintaylan sp. n. is defined from Saklıkent in Mediterranean Turkey, which are part of the Taurus Mountains. Taurus Mountains are known for their high diversity and endemism rate of both plants and animals. The new species has a characteristic morphology and is distinguished from all other species of the genus *Oligoglana* Horváth also by its behavioural character. It prefers the subalpine zone and lives in gramineous vegetation.

Keywords: Cicadettinae, *Oligoglana sirintaylan* sp n., morphology, acoustic signals

INTRODUCTION

Anatolia is geologically teen massive. However, this area is one of the most active centres in all geological epoch. Due to intense volcanic and textural activity, different environmental conditions have led to the formation of high structures in dissimilar constitute (single mountains, mountain ranges) in the mountainous framework. In former western literature Anatolia is remarked to as Asia Minor by virtue of its high altitude (Turkmen, 2018).

Asia Minor divided four phytogeographical provinces of Turkey and these are: Mediterranean, Euxine, Mesopotamia, Irano-Anatolia. From these, Mediterranean includes the Mediterranean Taurus, Antitaurus, and Aegean Anatolia up to the Bursa provinces in the north (Çıplak, 2003).

The Taurus Mountains are lost of prominent for Anatolia biodiversity. In the course of history, ice-field refugia have become noteworthy centres of speciation and many endemic species have come in view in these areas. Many endemic species from the vertebrates, invertebrates, and plants also have been distributed in the Taurus Mountains (Çetintaş & Sözen, 2015). Taurus Mountains are located on the way of distribution Aegean plate species, via terrestrial corridors between Greece and Anatolia. These corridors created possibilities for faunal exchanges between the two sister plates, Anatolia, and Crete (Çıplak, 2004; Çıplak, Heller, & Willemse, 2010; Mol, 2020). This has been demonstrated for both some Cicada and Orthoptera species (Gogala & Trilar, 2014; Çıplak et al, 2010). This idea has been supported by making recent studies on *Oligoglana* Horváth, 1912 species (Hemiptera, Cicadidae) (Gogala, Tomi, & Drosopoulos, 2011; Mol, 2020).

Generally according to the results of the morphologically studies conducted at different time intervals, it is shown that 29 species belonging to Cicadidae family are distributions and nine of these are endemic in Turkey (Nast, 1972; Lodos & Kalkandelen, 1981; Duffels & Laan, 1985; Demir, 2007; Önder, Tezcan, Karsavuran, & Zeybekoğlu, 2011; Mol, 2020). Turkey, as well as the use of morphological characteristics of the species in taxonomic studies related to Cicadidae recently characterized, they also began to be used with acoustics characteristics (Zeybekoğlu et al., 2011; Mol, Zeybekoğlu, & Akyürek, 2013; Mol, 2017; 2020). Acoustics characteristics are used to appoint the taxonomic intercourse, in addition to that, it has been prospective to differentiate the buddy species and to elucidate the taxonomic status of vernacular populations with petty morphological differences by song patterns among the Cicada species, such as *Oligoglana* (Gogala, Puissant, & Trilar, 2017; Mol, 2020).

Previous studies reported that 12 species in the genus *Oligoglana* Horváth, 1912 distribution in the world (Dimitriev, 2017) and five of them have been recorded from Turkey: *O. parvula* (Fieber, 1876) (recorded from Amasya); *O. tibialis* (Panzer, 1798) (recorded from Ankara, İzmir, Hatay, and Adana); *O. sibilatrix* (Horváth, 1901) (recorded from İzmir, Mersin, and Kahramanmaraş), *O. turcica* (Schedl, 2001) (recorded from Gaziantep, Hatay, and Kahramanmaraş), and *O. gogalai* Mol, 2020 (recorded from Antalya) (Demir, 2019; Mol, 2020).

A New Species of Oligoglana Horváth, 1912 (Hemiptera: Cicadidae)

The main purposes of the present paper are to contribute to Anatolian biodiversity studies by determining a new species of the Turkish *Oligoglana* fauna by using the morphological descriptive characters and acoustics signals.

MATERIAL AND METHODS

Collecting of specimens

This study was carried out between 2015 and 2018 from Saklıkent of Antalya province which is located in the Mediterranean region of Turkey (Fig. 1). After having recorded the songs of *Oligoglana* males, they were collected with a sweeping net. The collected specimens were first put into alcohol and later stored as a dry material. Male genitalia were dissected and soaked into KOH at room temperature. Figures and measurements were obtained by using a digital camera (Leica DFC 295) and attached to stereo-microscope (Leica Z6 APO). Morphological studies were carried out using dry specimens after soaking them in alcohol and water. Terminology follows Moulds (2012) and Gogala et al., (2017). The specimens were diagnosed by comparing them with data provided in Gogala et al, 2008, 2009, 2017; Gogala, Tomi, & Drosopoulos, 2011; Gogala, Drosopoulos, & Trilar, 2012, 2017, Mol, 2020 and Boulard et al, 2022. The material is deposited in Aksaray, University Central Research Laboratory, Entomological Museum, (A. Mol collection), ASUBTAM (Aksaray/Turkey).

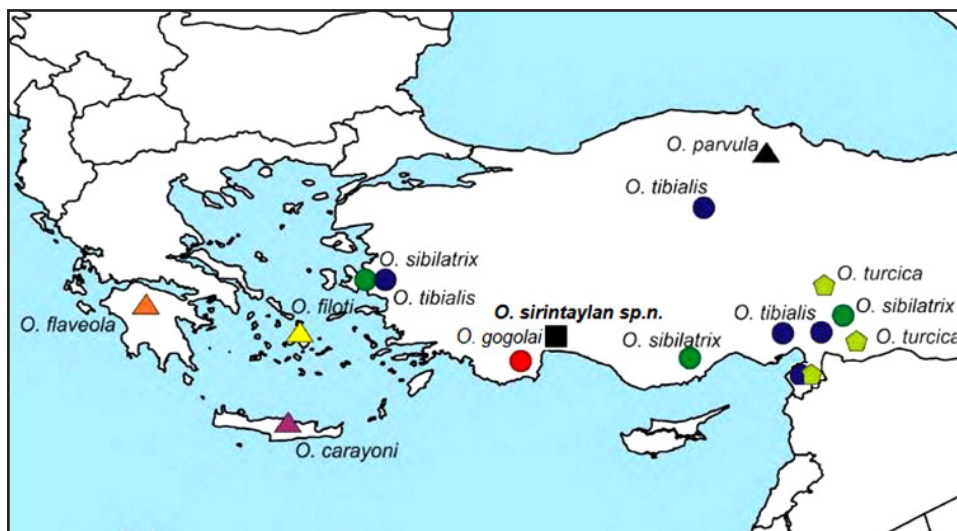


Figure 1. A map of Turkey with localities of all *Oligoglana* species found till now in Turkey including the new species, *O. sirintaylan* sp. n. (map revised from Mol 2020).

Song recording and analysis

Song recordings were made in the field using a Tascam DR-100mkII recorder with a Philips SBC ME 570 condenser microphone (frequency response from 50

to 20.000 Hz). The male songs were digitized at 48.000 samples per second and analyzed with custom-designed software (W. Schulze) developed in LabVIEW 7 (National Instruments, Austin, TX, USA) and Turbolab 4.0 (Stemmer AG). The ambient temperature at localities was during our recordings between 28-30°C. The Song terminology follows Trilar & Gogala (2010), and Gogala et al., (2017). The following terms were used: *Calling song*, song produced by a male; *phrase*, a first-order assemblage of echeme; echeme, the repeated unit of a phrase.

According to Gogala & Drosopoulos (2006) the song of *Oligoglana flaveola* (Brullé, 1832) comprises 4 tymbal clicks unit (inward movement of a tymbal producing a very soft clicks and the outward movement a loud one). Especially the duration of 4 double clicks unit is a very important bioacoustics characteristics for some *Oligoglana* species (Mol, 2020). In this study this characteristics were used to differentiation between new species and *O. gogalai* Mol, 2020.

RESULTS

A new *Oligoglana* species are described as a result of this study and now the species number has risen to six in Turkey.

Systematics

Family: Cicadidae Latrielle

Subfamily: Cicadettinae Buckton

Tribe: Cicadettini Buckton

Genus: *Oligoglana* Horváth, 1912

According to Gogala et al., (2017) and Dmitriev (2017), the genus *Oligoglana* can be characterised as it follows: Body length 11.9-12.7 mm, ratio length/width of fore wings 2.3-2.6 in males and 2.6-2.8 in females; fore wings rounded at apex; M and CuA meeting basal cell with their stems completely fused; hind wings with 5 apical cells; male terga II and III slightly enlarged and sternum VIII as long or slightly shorter than sternum VII; abdomen gradually narrowed caudad; claspers hooked anterolaterad; uncus small and duck-bill shaped; and the dorsal beak of pygofer well developed and basal lobe in ventral view showing inner tooth present.

***Oligoglana sirintaylan* sp. n.**

Type material. Holotype (Male). Turkey, Antalya, Saklıkent, under the observatory, southwest slope, (N 36°50.03, E 030°18.38), 5.07.2015, 1887 m., Leg. A. Mol. Paratypes: 10♂, 5♀; 2018, 5♂, 2♀; Leg. A. Mol, D. Şirin, M. S. Taylan. The material is deposited of Aksaray University Central Research Laboratory, Entomological Museum (A. Mol collection), Aksaray, Turkey.

Description

Measurements: The body length from head to tip of abdomen is 12.8–14.4 mm in males and 15-17 mm in females; body length from the head to tip of tegmina is

A New Species of Oligoglena Horváth, 1912 (Hemiptera: Cicadidae)

18-20 mm in males and 17.2-19.5 mm in females. The tegmina length is 10.5-15.2 in males and 11-15 mm in females and maximum width tegmina is 4.5-6 in males and 4.5-6.2 mm in females (Table 1).

Male: Head black; middle of the ocellus and frons, supra-antennal plate and edge of postclypeus yellowish (Fig. 2c); mentum in basally yellowish, apically dark brownish in bottom and brownish yellow in laterally in the holotype and blackish in the some paratype. Rostrum blackish brown and extending to anterior margin of the nearly middle of third coxa; pronotum blackish, lateral angles of pronotal collar pronounced and yellowish, tip of the pronotal collar and $\frac{3}{4}$ of middle of the pronotum yellowish, some male paratype not yellowish; dark basal spot on pronotal collar diagonally semi-connected with both part of pronotum. Mesonotum black, with two yellow band in the middle of holotype, some paratype absent or H shaped pattern between submedian and lateral sigilla. Scutal depression black, cruciform elevation blackish in the holotype and brownish in the some paratype; lateral edge of it yellowish. Mesonotal posterior ridge near the wing groove yellowish, metanotum basilaterally and posteriorly yellowish (Fig. 2a)

Ventral side of thorax black with whitish yellow markings. All coxa brownish, with blackish markings (blackish in the some paratypes except edge); all trochanter blackish with yellow marking in the apically. Fore femora with three big and one small spines (Fig. 2d), tibiae blackish-brown, tarsus basally yellowish-black apically yellowish-brown. Pretarsal claws basally yellowish, apically brownish.

Abdominal sternite 1 on tip of the tymbals with whitish markings, terga 3–7 black with yellowish red borders. Tymbal membranes of the first abdominal segments (without tymbal covers) with four long and three short ribs in addition to the tymbal plate. Opercula kidney-shaped and whitish apically blackish basally, some paratype apically grayish, basally black, not overlapping, broadly rounded, with straight whitish spine (meracanthus) (Fig. 2b). Sternite I and II blackish. Abdominal sterna III through VI yellowish black with dark reddish margins. Apical half of sternum VII depression. Sternum VIII yellow, slightly shorter than sternum VII. Abdominal segments triangular in cross section, dorsally forming a rounded ridge. Half of Anepisternum 2, anepimeron 2, katepimeron and epimeral lobe blackish other parts whitish in the holotype and blackish white some paratype.

Tegmina and hind wings transparent, without markings, basally dark yellow, apically blackish. Tegmina not rounded at the apex, 2.42 times as long as wide, the paratype 2.38-2.60 times as long as wide. 8 apical cells on front wing, 5 on hind wing. Two paratype 9 apical cell in front wing and five paratype 6 apical cell in hind wing. Ulnar cell is I, 1.9 times longer than apical cell I, the paratype 1.4-1.95. Basal cell of the first wing transparent, basal membrane orange. Base of costal cell of hind wing orange. Veins basally yellowish, apically blackish, costal vein blackish laterally, upper yellowish, apically blackish; subcostal vein yellowish, basal cell vein dark yellowish; some paratypes all veins yellowish black (Fig. 2e). Head, pronotum, circle of eyes, behind of mesonotum, gena, lorum, coxa, trochanter, femur, anepisternum,

katapisternum, anepimeron covered with dense setae. Abdominal tergite and sternite including genitalia covered with sparse setae (Figs. 2b, 2f, and 2j).

The upper lobe and basal lobe of pygofer yellowish (Figs. 2h), remaining part blackish; some paratypes ventrally and basal half blackish, dorsally yellowish brown. Upper lobe of the pygofer positioned nearly middle of pygofer basal lobe of the pygofer with prominent spine (Fig. 2h). Aedeagus brownish (Fig. 2k). Uncus blackish brown, claspers short, opposite with basal lobe spine. Median lobe long; anal styles white with brownish marking longitudinally (Fig. 2i).

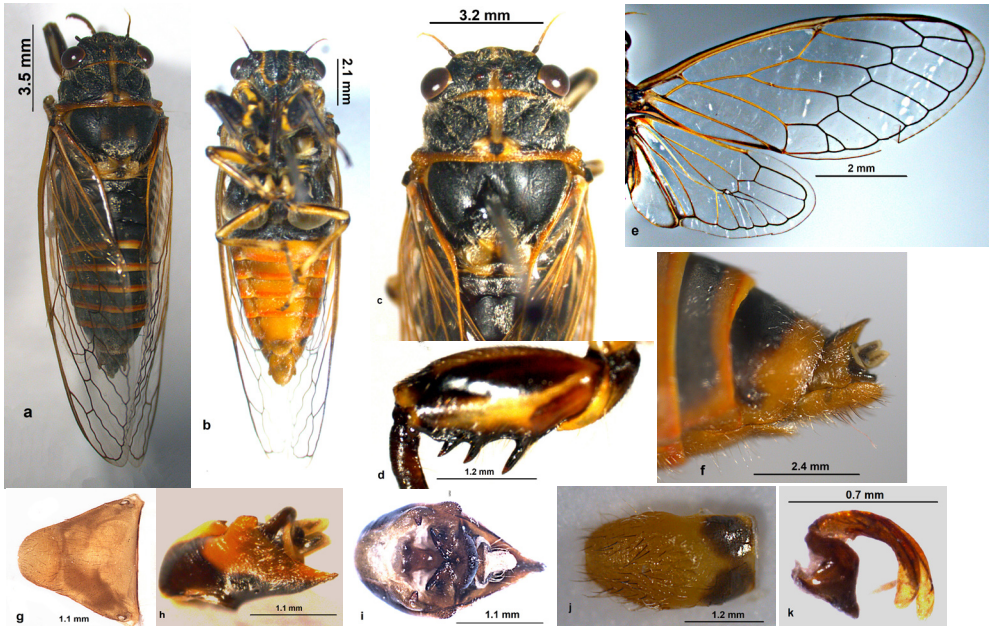


Figure 2. *O. sirintaylan* sp. n. male: a) male seen from above, b) body from below, c) head, pronotum mesonotum, d) fore femora, e) tegmina and wing, f) genitalia from lateral, g) sternite VII, h) pygofer from lateral, i) male genitalia from above, j) hypandrium, k) aedeagus.

Female: Generally differs from males in coloration. Mesonotum lighter than in males and with yellow H-shaped pattern between submedian and lateral sigilla (Figs. 3a and 3b). Tegmina 2.6-2.8 times as long as maximum width, Ulnar cell I is 2-2.5 times longer than apical cell I (Figs. 3e). Subgenital plate as in Fig. 3f, ovipositor 5.2 (4.2-6.2) mm and tip of it triangular with tubercles apically (Fig 3g). Tergite IX top and lower blackish and middle yellowish (Fig. 3f). Abdominal tergite and sternite including genitalia covered with long and dense setae (Fig. 3h).

A New Species of Oligoglena Horváth, 1912 (Hemiptera: Cicadidae)

Table 1. Morphological characteristics of *Oligoglena sirintaylan* sp. n. from Turkey. All measurements in mm.

| Characteristics | Male | | Female | |
|-------------------------------------------------------|------|-------------------|--------|------------------|
| | N | Average (range) | N | Average (range) |
| Tip of the cown to apical margin of the forewing | 12 | 19 (18-20) | 4 | 17.5 (17.2-18) |
| Body length | 12 | 13.61 (12.8-14.4) | 7 | 15.6 (14.8-16.5) |
| Length of crown | 7 | 1.2 (0.91-1.6) | 7 | 1.4 (1-1.8) |
| Min. distance betw. ocular sutures | 7 | 1.90 (1.68-2.4) | 7 | 1.96 (1.7-2.3) |
| Medial length of frons | 7 | 0.51 (0.43-0.6) | 7 | 0.5 (0.4-1.7) |
| Medial length of pronotum | 7 | 1.65 (1.43-2) | 7 | 1.74 (1.4-2.2) |
| Medial length of mesonotum | 7 | 2.61 (1.95-3) | 7 | 2.37 (1.9-2.8) |
| Length of right fore wing | 7 | 12.2 (10.8-15.2) | 7 | 12.4 (11-15) |
| Length of ulnar cell 1 | 7 | 3.72 (3.2-5) | | |
| Length of dorsal margin of left fore femur | 6 | 2.2 (1.9-2.6) | 7 | 2.21 (1.7-2.8) |
| Length of anterior margin of basal cell | 7 | 1.2 (0.9-1.6) | 7 | 1.23 (0.85-1.7) |
| VII. Sternit | 6 | 1.92 (1.7-2) | | - |
| Length of pygofer in lateral view | 6 | 2.16 (1.9-2.3) | | - |
| Aedeagus length | 2 | 0.6-0.9 | | - |
| Hypandrium length (male) / Ovipositor length (female) | 6 | 2.26 (2.0-2.5) | 7 | 5.2 (4.2-6.2) |

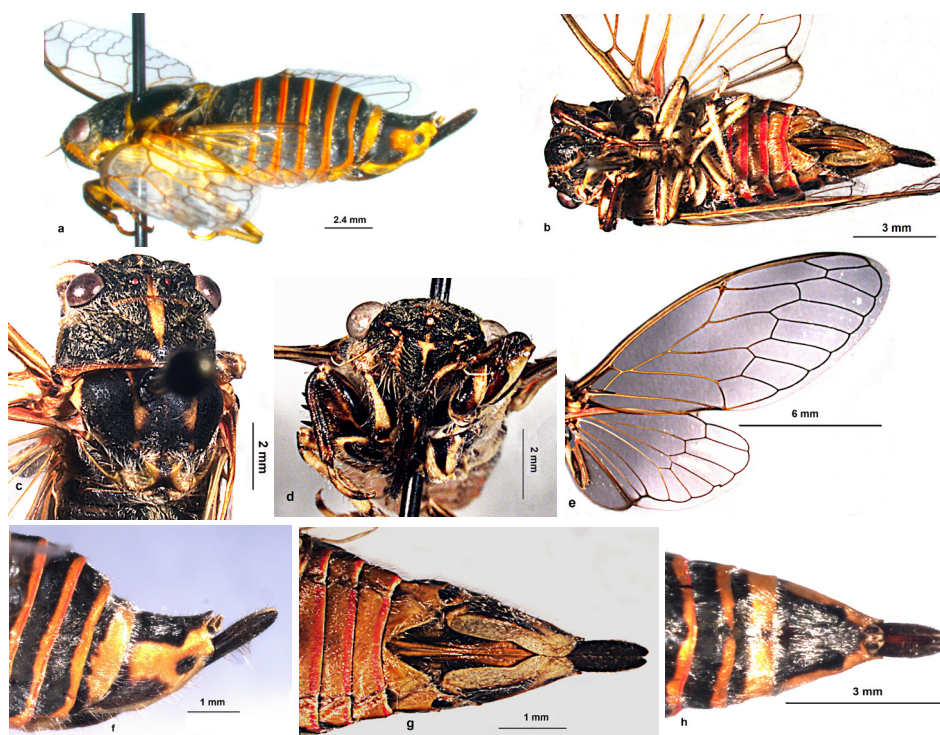


Figure 3. *O. sirintaylan* sp. n. female: a) body from lateral, b) body from bottom, c) head, pronotum and mesonotum, d) head from in front, e) tegmina and wing, f) genitalia from lateral, g) genitalia from bottom, h) genitalia from above.

Song pattern

At the locality, four different males were recorded song and analysed. Male calling song consist of two parts (monotonous and rhythmic part), together forming a complete song with usual duration of many minutes. The calling song consists of repetition of short echemes (S) of similar duration (monotonous-Phrase A) as a basic pattern (Fig. 4a). There are also further three phrases (rhythmic part-phrase B, C, and D) with more or less pattern of the longer (L) and shorter echemes (S). In the phrase B the echemes follow the pattern: LSSSLSSS.... (Fig. 4b), phrase C the echemes follow the pattern LSSLSS....(Fig. 4c), and in the phrase D the pattern is simpler LSLS....(Fig. 4d). Its calling songs consists of 4 tymbal clicks unit (Figs. 4e and 4f). Sometimes this pattern is also changing during a phrase from one to the other. The repetition rate of echemes in a phrase A is typically 9-12 echemes per second.

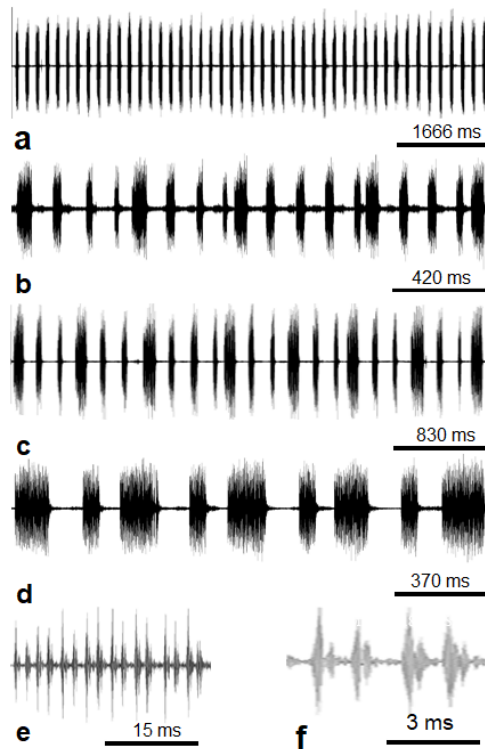


Figure 4. *O. sirintaylan* sp. n. male calling song. a) phrase A, b) phrase B, c) phrase C, d) phrase D, e) more 4 click units (scale= 15 ms), f) two 4 click units.

Element A duration ranges from 1.136-13.343 ms, with element B 342-548 (Table 2), element C 205-386, and element D 155-216 ms. Element A echemes duration 18-78, Element A interval duration between echemes 19-85, Element A echemes number/per seconds 9-12 (Table 3). Long echeme duration 41-84, 44-75, 41-77 ms in elements B, C, and D respectively (Table 4).

A New Species of Oligoglena Horváth, 1912 (Hemiptera: Cicadidae)

Table 2. Duration of elements A, B, C and D measured from male calling song of *O. sirintaylan* sp. n. population

| Parameters | Element A durations | Element B durations | Element C durations | Element D durations |
|------------|---------------------|---------------------|---------------------|---------------------|
| Range | 1.136-13.343 | 336-452 | 205-386 | 155-216 |
| M ± sd | (3089.2±2891 | 384±27 | 296.2±26.2 | 184.8±11.6 |
| N | 27) | 5 | 96 | 76 |

Table 3. Song data belonging to element A measured from *O. sirintaylan* sp. n. population

| Parameters | Element A Echemes duration | Element A Interval duration between echemes | Element A echeme number/ per second | Frequency spectrum (kHz) |
|------------|----------------------------|---------------------------------------------|-------------------------------------|--------------------------|
| Range | 18-78 | 19-85 | 9-12 | |
| M ± sd | 54.7±16.2 | 44.9±16.1 | 9.87±0.41 | 7.1-14.6 |
| N | 854 | 854 | 67 | |

Table 4. Duration of long echemes belonging to elements B, C, and D measured from male calling song of *O. sirintaylan* sp. n. population

| Parameters | Long echeme durations of element B | Long echeme durations of element C | Long echeme durations of element D | Totally long echeme duration in Element B, C and D |
|------------|------------------------------------|------------------------------------|------------------------------------|----------------------------------------------------|
| Range | 41-84 | 44-75 | 41-77 | 41-84 |
| M ± sd | 53.3±10 | 53.8±5.8 | 64.5±8.15 | 60.4±8.7 |
| N | 49 | 75 | 82 | 221 |

The duration of short echeme can last 12-36 ms, 12-73 ms, 15-37 ms in elements B, C, and D respectively. Interval between echemes range 20-89, 29-98, and 28-83 ms in elements B, C, and D respectively (Table 5 and 6).

Table 5. Duration of short echemes belonging to elements B, C and D measured from male calling song of *O. sirintaylan* sp. n.

| Parameters | Short echeme durations of element B | Short echeme durations of element C | Short echeme durations of element D |
|------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Range | 12-36 | 12-73 | 15-37 |
| M ± sd | 20.4±5 | 19.4±6.6 | 23.9±3.9 |
| N | 142 | 189 | 79 |

Table 6. Duration of interval between echemes belonging to elements B, C, and D and duration of 1 four click units measured from male calling song of *O. sirintaylan* sp. n. population

| Parameters | Interval between echeme of element B | Interval between echeme of element C | Interval between echeme of element D | Duration 1 four click units |
|------------|--------------------------------------|--------------------------------------|--------------------------------------|-----------------------------|
| Range | 20-89 | 29-98 | 28-83 | 3-4 |
| M ± sd | 60.7±14.2 | 58±14.5 | 43.8±10.2 | 3.06±0.25 |
| N | 193 | 397 | 154 | 302 |

The frequency spectrum of the song ranges from 7.1 to 14.6 kHz.

So far, five species of the genus *Oligoglena* have been reported from Turkey (Fig. 1), namely: *O. parvula* collected from Amasya, *O. tibialis* collected from Ankara, İzmir, Hatay, and Adana; *O. sibilatrix* collected from İzmir, Mersin and Kahramanmaraş; *O. turcica* collected from Gaziantep, Hatay, and Kahramanmaraş, *O. gogalai* collected from Antalya (Demir, 2019; Mol, 2020).

Etymology: Named after Dr. Deniz ŞİRİN (Namık Kemal University, Department of Biology, Tekirdağ/Turkey) and Dr. Mehmet Sait TAYLAN (Hakkari University, Health Services Vocational School Hakkari/Turkey) for their contributions to me recording calling songs and collecting new species materials in the study area.

Morphological diagnosis

O. sirintaylan sp. n. can be differentiated from *O. sibilatrix* using the following characters: (i) body length 13.61 (12.8-14.4) mm, (in *O. sibilatrix* 16 mm), (ii) tegmina basally dark yellow, apically blackish (in *O. sibilatrix* basally colourless, apically brownish), (iii) the ratio st VIII/VII is nearly 1.15-1.3, (in *O. sibilatrix* 2), (iv) the operculum rectangular (in *O. sibilatrix* square), (v) under part of pygofer black (in *O. sibilatrix* pale), (vi) the habitat preferences (1887 m) subalpine zone and graminocolus vegetation (in *O. sibilatrix* habitat with forest zone, 623 m.) (Horváth, 1901).

Oligoglena sirintaylan sp. n. differs from *O. parvula* by the short pseudoparameres, which do not reach the middle of pygofer (in *O. parvula* at rest pseudoparameres long, pointed, reaching the middle of pygofer) and upper lobe of pygofer in the middle (in *O. parvula* upper lobe of pygofer nearly located middle of apically quarter) (Schedl, 1999).

O. sirintaylan sp. n. can be differentiated from *O. tibialis* using the following characters: (i) the pseudoparameres are short, hardly visible, and not extending median lobe of uncus (in *O. tibialis* the pseudoparameres are long, divergent and much longer than median lobe of uncus), (ii) pronotal collar, its lateral part, anterior and posterior edge of pronotum yellow (in *O. tibialis* blackish), (iii) terga 3–7 black with yellowish red borders (in *O. tibialis* without), (iv) ulnar cell I is 1.5-1.95 times longer than apical cell I in male, 2-2.5 in female (in *O. tibialis* 1.25-1.42 in male, 0.85-1 in female), (v) hind wings with 5 apical cells in male (in *O. tibialis* 6), (vi) ovipositor length 4.2-6.2 mm (in *O. tibialis* 3.93-4.68), and (vii) pygofer inner teeth opposite to claspers (in *O. tibialis* not opposite) (Gogala & Drosopoulos 2006; Gogala et al., 2017; Mol, 2017).

O. sirintaylan sp. n. can be differentiated from *O. turcica* using the following characters: (i) five apical cells in hind wing (in *O. turcica* four), (ii) dorsal beak of pygofer long and acute (in *O. turcica*, short not acute), (iii) pygofer inner teeth under claspers (in *O. turcica* upper), (iv) dorsal beak reaching the tip of the anal styles (in *O. turcica* does not reach the tip of the anal styles), (v) meracanthus straight (in *O. turcica* curved inwards) (Schedl, 2001).

O. sirintaylan sp. n. can be differentiated from *O. gogalai* using the following characters: (i) sternite II black (in *O. gogalai* middle blackish), (ii) abdominal sterna III through VI yellowish black with dark reddish margins (in *O. gogalai* abdominal sterna III through VI yellowish with reddish-orange margins), (iii) half of anepisternum 2, anepimeron 2, katepimeron and epimeral lobe blackish other parts whitish (in *O. gogalai* anepisternum 2, anepimeron 2, katepimeron and epimeral lobe yellowish white), (iv) tergite IX lower blackish (in *O. gogalai* yellowish), (v) claspers short, opposite with basal lobe spine (in *O. gogalai* claspers long, surpass with basal lobe spine), (vi) ovipositor 5.2 (4.2-6.2) mm (in *O. gogalai* 3.2 (3.1-3.3)), (vii) meracanthus straight (in *O. gogalai* outwards) (Mol, 2020).

A New Species of Oligoglena Horváth, 1912 (Hemiptera: Cicadidae)

Based on morphology, the new species can be placed in the same group with *O. filoti* (Gogala & Trilar 2017), *O. flaveola* (Brullé, 1832), *O. carayoni* (Boulard, 1982) and *O. gogalai* (Trilar & Gogala 2010; Gogala et al., 2017; Mol 2020). Overall, it appears to be closest to *O. filoti* and *O. flaveola*. In particular, it displays very close affinities to *O. filoti* on the basis of dark body coloration, colour of pronotum, pseudoparamers and other parts of genitalia.

To distinguish *O. sirintaylan* sp. n. from *O. filoti*, the following characters are important: (i) lateral margin of pronotum, lateral part of the pronotal collar, and pronotal collar yellow (blackish in *O. filoti*), (ii) dark basal spot on pronotal collar diagonally semi-connected with both part of pronotum (completely connected with both part of pronotum in *O. filoti*), (iii) rostrum blackish brown and extending to anterior margin of the nearly middle of third coxa (reaching the posterior tips (distal end) of middle trochanters *O. filoti*), (iv) body with normal setae (dense setae in *O. filoti*), (v) sternum VII from middle to apical part with an elliptical depression absent in *O. filoti*, (vi) inner teeth of *pygofer* positioned lower, not opposite to claspers (opposite in *O. filoti*), (vii) mesonotum with yellow H-shaped pattern between submedian and lateral sigilla (absent in *O. filoti*) (Gogala et al., 2017).

To distinguish *O. sirintaylan* sp. n. from *O. flaveola*, the following characters are important: (i) dark basal spot on pronotal collar diagonally semi-connected with both part of pronotum (not connected in *O. flaveola*), (ii) terga 3–7 black with yellowish red borders (terga 3-7 yellow with lateral patches in both sexes *O. flaveola*), (iii) sternum I and II black (sterna I and II yellow, dark in middle in *O. flaveola*), (iv) the overall coloration of the male is black with yellow and dark reddish markings (overall coloration of the male is yellow in *O. flaveola*), (v) sternite I and II blackish (yellow in *O. flaveola*), (vi) the ratio st VIII/VII is 1.15-1.3 (0.86 in *O. flaveola*) (Gogala et al., 2017).

To distinguish *O. sirintaylan* sp. n. from *O. carayoni* (Boulard) the following characters are important: (i) the overall coloration of the male is black with yellow and dark reddish markings (nearly black in *O. carayoni*), (ii) lateral angles of pronotal collar yellowish (black in *O. carayoni*), (iii) basal membran of tegmina orange (dark red in *O. carayoni*), (iv) abdominal terga 2 through 7 black with yellowish red borders (black with dark red borders in *O. carayoni*), (v) *O. carayoni* is thought to be endemic to Crete (Trilar & Gogala, 2010; Gogala et al., 2017).

Acoustic diagnosis

The new species has some differences from *O. filoti* in terms of acoustic characteristics, which include the following: (i) the duration of echemes in phrase A is 54.7 ± 16.2 , (in *O. filoti* 25.5 ± 4.3), the duration of interval between echemes in phrase A is 44.9 ± 16.1 , (in *O. filoti* 98.7 ± 6.5), (iii) phrase B duration of short echeme is 20.4 ± 5 (in *O. filoti* 7.7 ± 4.5 ms), (iv) the frequency spectrum is in the range of 7.1-14.6 kHz (in *O. filoti* 10.8-17.8 kHz), and (v) the number of short echemes between long echemes is 1-3 (in *O. filoti* stable 2) (Gogala et al., 2017).

The new species has the following differences from *O. flaveola* in terms of acoustic characteristics: (i) duration of 4 tymbal clicks is 3.06 ± 0.25 ms (in *O. flaveola* 8 ± 1), (ii)

short echemes in the basic phrase A are often composed more than 4 of such basic 4-clicks units (in *O. flaveola* it composed from 3 and sometimes 2), song consist of SSSS/LSSSL/LSSL/LSLS (in *O. flaveola* SSS/LSSL/LSLS), the frequency spectrum ranges between 7.1-14.6 kHz (in *O. flaveola* 13.5-16 kHz) (Gogala et al., 2017).

The new species has some differences from *O. carayoni* in terms of acoustic characteristics and some of these are: i) song structure SSSS/LSSSL/LSSL/LSLS (in *O. carayoni* SSS/LSSL/LLL), ii) the duration of interval between echemes in phrase A is 44.9 ± 16 (in *O. carayoni* 91.6 ± 14.6), iii) the duration of echemes in phrase A is 18-78 (54.7 ± 16.2), (in *O. carayoni* 14.0-37.9), iv) rhythmic part consists of series with 1 to 3 echemes followed by one longer echeme (in *O. carayoni* 2 to 4 very short echemes), v) duration of 4 tymbal clicks is 3.06 ± 0.25 ms (in *O. carayoni* 8 ± 0.9), the frequency spectrum ranges from 7.1-14.6 kHz (in *O. carayoni* carrier frequency maximum is between 10.8 and 14.7) (Trilar, & Gogala, 2010; Gogala et al., 2017; Boulard et al., 2022).

The new species has some differences from *O. gogalai* in terms of acoustic characteristics and some of these are: i) it has low amplitude song (in *O. gogalai* high amplitude), ii) the duration of element D is 184.8 ± 11.6 (in *O. gogalai* 309.2 ± 20.4), iii) the duration of echemes in phrase A is 54.7 ± 16.2 (in *O. gogalai* 24.2 ± 9), iv) duration of 4 tymbal clicks is 3.06 ± 0.25 (in *O. gogalai* 5 ± 1), the duration of interval between echemes in phrase D is 43.8 ± 10.2 (in *O. gogalai* 120 ± 52.6).

Ecology: The new species sitting on the grass and herbaceous plants close to the ground and perennial plant (Fig. 5). At the locality, no other songs of Cicadidae species were recorded.

CONCLUSIONS AND DISCUSSION

According to Mol (2020) and as a result of this study, the species number has risen to six in Turkey and these are; *O. parvula*; *O. tibialis*; *O. sibilatrix*, *O. turcica*, *O. gogalai* and *O. sirintaylan* sp. n. Of these six species, the last three are endemic for Anatolia. All three endemic species are distributed in the Taurus Mountains, which proves how important the Taurus Mountains are in terms of plant and animal diversity.

Based on morphology and bioacoustics characteristics, the new species can be placed in the same group with *O. filoti*, *O. carayoni*, *O. flaveola*, and *O. gogalai* (Trilar & Gogala 2010, Gogala et al., 2017, Mol, 2020). First tree species endemic for Eagean island and *O. flaveola* recorded from in the Peloponnesse, continental Greece (Gogala et al., 2017). Faunistics resemblance between the Turkish mainland and Greece were reported for some cicada species: *Lyristes gemellus* Boulard, 1988 and *Pagiphora aschei* Kartal, 1978 (Trilar & Gogala, 2012; Simoes & Quartau, 2013).

Studies conducted in recent years (Mol, 2020, and this study) show us that there is still a lot of work to be done for Turkey's *Oligoglana* species.

A New Species of Oligoglena Horváth, 1912 (Hemiptera: Cicadidae)



Figure 5. *O. sirintaylan* sp. n. type locality. Photograph: Dr. Deniz ŞİRİN.

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A New Species of Oligoglana Horváth, 1912 (Hemiptera: Cicadidae)

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