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Contribution to the Orthoptera (Insecta) fauna of farming terraces in aspat (Strobilos) ancient city and its territorium, Bodrum, Muğla, Western Turkey

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Abstract

This paper provides information about the Orthoptera fauna of farming terraces in Aspat (Strobilos) ancient city and its territorium, Bodrum, Muğla, western Turkey, during the years of 2008-2009. As a result of this study twenty-six species and nine subspecies belong to Acrididae, Gryllidae and Tettigoniidae families were identified. Among them *Eupholidoptera smyrnensis* (Brunner von Wattenwyl, 1882), *Poecilimon sanctipauli* Brunner von Wattenwyl, 1878 and *Acrida anatolica* Dirsh, 1949 were the most abundant species. Totally 22 species/subspecies were recorded for the first time from Muğla province of Turkey.

Keywords: Acrididae, Gryllidae, Tettigoniidae, Orthoptera, fauna, Turkey

1. Introduction

With the works carried out in Anatolia which is a very rich open air museum, numerous civilizations reaching from past to present are being unearthed and these areas open up to cultural tourism.

Recently, in Turkey as in the world, with cultural tourism supporting nature and agricultural tourism together has begun to stand out. In this context, an interdisciplinary project was conducted in the ancient city and its surroundings known for its history going back to the B. C. 7th Century and formerly called Strobilos, today called Aspat, and the subject was discussed in different aspects (Diler 2010).

In this paper, aiming to reflect the results of the first interdisciplinary research in an ancient city in Turkey, during the studies conducted in Aspat region, the species belonging to the Orthoptera were considered faunistic and, evaluated in terms of the method of collection and their seasonal presence.

2. Material and Methods

In this study, Orthoptera fauna of farming terraces in Aspat (Strobilos) ancient city and its territorium (27°26'E and 37°02'N), Bodrum, Muğla, western Turkey have been evaluated. Studies have been conducted in 500 hectares of land during the years of 2008-2009. Material have been monitored by bait trap, handpicking (by hand, on the ground, understone, underbark), knock down, light trap, bait trap, pitfall trap and sweeping net sampling at two weeks' intervals. Material have been deposited in the collection of Lodos Entomological Museum, Turkey (LEMT) of Ege University, Izmir and Aksaray University, Entomology Museum (A. Mol Coll.), Aksaray, Turkey.

The collected specimens were identified by using Harz (1969) ^[1], Gümüşsuyu (1976) ^[2], Demirsoy (1977) ^[3], Mol (2007) ^[4], Çıplak *et al.* (2009) ^[5], Cigliano *et al.* (2019) ^[6].

3. Results and Discussion

In this study, twenty-six species and nine subspecies belong to three families of Orthoptera have been recorded. As a result, totally 566 specimens have been recorded in this area.

3.1 Family Acrididae MacLeay, 1821

3.1.1 Subfamily Acridinae MacLeay, 1821

3.1.1.1 *Acrida anatolica* Dirsh, 1949

Material examined: Muğla: Bodrum, Aspat, 29.VI.2009, sweeping net, 6 exs. (6 ♂) (nymph), on the ground, 8 exs. (8 ♂) (nymph); 19.VII.2009, sweeping net, 3 exs. (3 ♂) (nymph), 3 exs.

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(3 ♂) (nymph); 10.VIII.2009, sweeping net, 4 exs. (4 ♂) (1 nymph); 16.VIII.2009, sweeping net, 1 ex. (1 ♂); 18.IX.2009, sweeping net, 2 exs. (2 ♂) (1 nymph); 16.X.2009 sweeping net, 1 ex. (1 ♂); Aspat, 06.VII.2008, sweeping net, 1 ex. (1 ♀) nymph; 15.VIII.2008, sweeping net, 1 ex. (1 ♂) 1 dişi, 1 nymph (♂); 19.VII.2009, sweeping net, 7 exs. (7 ♂) (6 nymph); 23.VIII.2009, light trap, 1 ex. (1 ♀); 24.VIII.2009, sweeping net, 3 exs. (3 ♂) (nymph), 2 exs. (1 ♂ 1 ♀); 18.IX.2009, sweeping net, 2 exs. (2 ♂); 16.X.2009, sweeping net, 1 ex. (1 ♂); 13.XI.2009, sweeping net, 1 ex. (1 ♀), 1 ex. (1 ♂). Totally 48 specimens.

Note: This species have a wide distribution in all regions of Turkey (Demirsoy, 1977) ^[3].

3.1.2 Subfamily Calliptaminae Jacobson, 1905

3.1.2.1 *Calliptamus barbarus pallidipes* Ramme, 1951

Material examined: Muğla: Bodrum, Aspat, 29.VI.2009, sweeping net, 1 ex. (1 ♂), sweeping net, 1 ex. (1 ♀), on the ground, 6 exs. (2 ♂ 4 ♀); 19.VII.2009, sweeping net, 1 ex. (1 ♀); 24.VIII.2009, sweeping net, 1 ex. (1 ♀); 18.IX.2009, sweeping net, 1 ex. (1 ♀), sweeping net, 2 exs. (1 ♂ 1 ♀); 16.X.2009, sweeping net, 1 ex. (1 ♂); Aspat, 29.VI.2009, sweeping net, 2 exs. (1 ♂ 1 ♀), 1 ex. (1 ♀); 19.VII.2009, sweeping net, 1 ex. (1 ♀), 2 exs. (1 ♂ 1 ♀), 1 ex. (1 ♂); 24.VIII.2009, sweeping net, 1 ex. (1 ♀) (nymph); 18.IX.2009, sweeping net, 3 exs. (1 ♂ 2 ♀); 16.X.2009, sweeping net, 1 ex. (1 ♀); 21.X.2008, pitfall, 1 ex. (1 ♂); 13.XI.2009, sweeping net, 1 ex. (1 ♂), 1 ex. (1 ♂). Totally 29 specimens.

Note: This species have a wide distribution in all regions of Turkey (Demirsoy, 1977) ^[3].

3.1.2.2 *Calliptamus tenuicercis tenuicercis* Tarbinsky, 1930

Material examined: Muğla: Bodrum, Aspat, 19.VII.2009, sweeping net, 1 ex. (1 ♀); 13.XI.2009, sweeping net, 2 exs. (1 ♂ 1 ♀); Aspat, 29.VI.2009, on the ground, 1 ex. (1 ♀); 18.IX.2009, sweeping net, 1 ex. (1 ♀). Totally 5 specimens.

Note: This is the first record to Muğla province.

3.1.3 Subfamily Catantopinae Brunner von Wattenwyl, 1893

3.1.3.1 *Sphenophyma rugulosa* (Stal, 1876)

Material examined: Muğla: Bodrum, Aspat, 29.VI.2009, (1 ♀); 16.X.2009, sweeping trap, 1 ex. (1 ♀); 25.XII.2009, aspirator, 1 ex. (1 ♂); Aspat, 01.VIII.2008, knock down, coniferous, 2 exs. (1 ♂ 1 ♀), *Celtis* sp., 1 ex. (1 ♀), *Quercus* sp., 1 ♀; 29.XI.2008, pitfall, 1 ex. (1 ♀); 31.I.2009, pitfall, 1 ex. (1 ♀); 18.IX.2009, sweeping trap, 2 exs. (2 ♂); 13.XI.2009, sweeping net, 1 ex. (1 ♀), 3 exs. (3 ♂), pitfall, 1 ex. (1 ♀). Totally 16 specimens.

Note: This is the first record to Muğla province.

3.1.4 Subfamily Cyrtacanthacridinae Kirby, 1910

3.1.4.1 *Anacridium aegyptium* (Linnaeus, 1764)

Material examined: Muğla: Bodrum, Aspat, 01.VIII.2008, knock down, *Quercus* sp., 1 ex. (1 ♂) nymph, *Acacia* sp., 1 ex. (1 ♂) (nymph); 01.V.2009, sweeping net, 1 ex. (1 ♀); 29.VI.2009, knock down, 1 ex. (1 ♂) (nymph); 19.VII.2009, sweeping net, (1 ♀) nymph; 23.VIII.2009, knock down, 1 ex. (1 ♂) nymph. Totally 6 specimens.

Note: Previously reported from Muğla (Bodrum, Milas) (Karabağ, 1958) ^[7].

3.1.5 Subfamily Gomphocerinae Fieber, 1853

3.1.5.1 *Dociostaurus brevicollis* (Eversmann, 1848)

Material examined: Muğla: Bodrum, Aspat, 23.V.2009, sweeping net, 1 ex. (1 ♀); Aspat, 23.V.2009, sweeping net, 1 ex. (1 ♀); 18.IX.2009, sweeping net, 1 ex. (1 ♂). Totally 3 specimens.

Note: This is the first record to Muğla province.

3.1.5.2 *Dociostaurus maroccanus* (Thunberg, 1815)

Material examined: Muğla: Bodrum, Aspat, 24.V.2008, sweeping net, 1 ex. (1 ♂). Totally 1 specimen.

Note: Previously reported from Muğla (Fethiye, Marmaris, Yatağan) (Balamir & Bellik, 1952; Mol, 2007) ^[4].

3.1.5.3 *Chorthippus bornhalmi* Harz, 1971

Material examined: Muğla: Bodrum, Aspat, 19.VII.2009, sweeping net, 1 ex. (1 ♀); 13.IX.2009, sweepingnet, 1 ex. (1 ♀). Totally 2 specimens.

Note: This is the first record to Muğla province.

3.1.5.4 *Chorthippus vagans* (Eversmann, 1848)

Material examined: Muğla: Bodrum, Aspat, 27.XII.2008, sweeping net, *Rhaphanus* sp., 1 ex. (1 ♂). Totally 1 specimen.

Note: This is the first record to Muğla province.

3.1.5.5 *Pararcyptera labiata* (Brulle, 1832)

Material examined: Muğla: Bodrum, Aspat, 24.V.2008, sweeping net, 1 ex. (1 ♀), pitfall, 2 exs. (2 ♀); pitfall, 1 ex. (1 ♀); 07.VI.2008, pitfall, 1 ex. (1 ♀). Totally 5 specimens.

Note: This is the first record to Muğla province.

3.1.6 Subfamily Oedipodinae Walker, 1871

3.1.6.1 *Acrotylus insibricus insibricus* (Scopoli, 1786)

Material examined: Muğla: Bodrum, Aspat, 29.VI.2009, knock down, 1 ex. (1 ♂), on the ground, 1 ex. (1 ♀); 18.IX.2009, sweeping net, 5 exs. (5 ♂); Aspat, 18.IX.2009, sweeping net, 1 ex. (1 ♀); 16.X.2009, sweeping net, 1 ex. (1 ♂), 1 ex. (1 ♂). Totally 10 specimens.

Note: This is the first record to Muğla province.

3.1.6.2 *Aiolopus simulatrix simulatrix* (Walker, 1870)

Material examined: Muğla: Bodrum, Aspat, 19.VII.2009, sweeping net, 1 ex. (1 ♂); Aspat, 01.VIII.2008, pitfall, 1 ex. (1 ♀); 09.VIII.2009, light trap, 1 ex. (1 ♀); 18.IX.2009, sweeping net, 1 ex. (1 ♂); 16.X.2009, sweeping net, 1 ex. (1 ♂); 19.X.2009, light trap, 4 exs. (1 ♂ 3 ♀); 13.XI.2009, on the ground, 1 ex. (1 ♀); 25.XII.2009, light trap, 1 ex. (1 ♂). Totally 11 specimens.

Note: This is the first record to Muğla province.

3.1.6.3 *Aiolopus strepens* (Latreille, 1804)

Material examined: Muğla: Bodrum, Aspat, 19.VII.2009, light trap, 1 ex. (1 ♂); 24.VIII.2009, pitfall, 1 ex. (1 ♀);

13.XI.2009, sweeping net, 1 ex. (1 ♀). Totally 3 specimens.

Note: Previously reported from Muğla (Köyceğiz) (Karabağ *et al.*, 1980)^[9].

3.1.6.4 *Oedipoda aurea* Uvarov, 1923

Material examined: Muğla: Bodrum, Aspat, 16.X.2009, sweeping net, 1 ex. (1 ♂); Aspat, 24.V.2008, sweeping net, 9 exs. (5 ♂ 4 ♀); 13.XI.2009, sweeping net, 1 ex. (1 ♀). Totally 11 specimens.

Note: This species have a wide distribution in all regions of Turkey (Demirsoy, 1977)^[3].

3.1.6.5 *Oedipoda miniata miniata* (Pallas, 1771)

Material examined: Muğla: Bodrum, Aspat, 29.VI.2009, on the ground, 1 ex. (1 ♀); 18.IX.2009, sweeping net, 2 exs. (1 ♂ 1 ♀); Aspat, 29.VI.2009, on the ground, 1 ex. (1 ♂), 1 ex. (1 ♀), 1 ex. (1 ♂); 19.VII.2009, sweeping net, 1 ex. (1 ♂); 10.VIII.2009, sweeping net, 1 ex. (1 ♂), 1 ex. (1 ♀); 24.VIII.2009, sweeping net, 2 exs. (1 ♂ 1 ♀); 16.X.2009, sweeping net, 2 exs. (1 ♂ 1 ♀). Totally 13 specimens.

Note: Previously reported from Muğla (Weidner, 1969)^[10].

3.1.6.6 *Parapleurus alliaceus alliaceus* (Germar, 1817)

Material examined: Muğla: Bodrum, Aspat, 18.IX.2009, sweeping net, 1 ex. (1 ♂); Aspat, 10.VIII.2009, sweeping net, 1 ex. (1 ♂). Totally 2 specimens.

Note: This is the first record to Muğla province.

3.1.6.7 *Scintharista notabilis mirame* Uvarov, 1941

Material examined: Muğla: Bodrum, Aspat 01.V.2009, sweeping net, 1 ex. (1 nymph); 29.VI.2009, on the ground, 1 ex. (1 ♂); 13.XI.2009, sweeping net, 1 ex. (1 ♂). Totally 3 specimens.

Note: This is the first record to Muğla province.

3.1.6.8 *Sphingonotus theodori theodori* Uvarov, 1930

Material examined: Muğla: Bodrum, Aspat, 17.IX.2009, light trap, 1 ex. (1 ♀). Totally 1 specimen.

Note: This is the first record to Muğla province.

3.2 Family Gryllidae Laicharting, 1781

3.2.1 Subfamily Oecanthinae Blanchard, 1845

3.2.1.1 *Oecanthus pellucens* (Scopoli, 1763)

Material examined: Muğla: Bodrum, Aspat, 29.VI.2009, sweeping net, 1 ex. (1 ♂); Aspat, 29.VI.2009, sweeping net, 1 ex. (1 ♂); 24.VIII.2009, sweeping net, 1 ex. (1 ♂) nymph, knock down, 1 ex. (1 ♀); 18.IX.2009, knock down, 1 ex. (1 ♂) (nymph); 13.XI.2009, sweeping net 1♂. Totally 6 specimens.

Note: This is the first record to Muğla province.

3.2.2 Subfamily Gryllomorphae Saussure, 1877

3.2.2.1 *Gryllomorpha dalmatina* (Ocskay, 1832)

Material examined: Muğla: Bodrum, Aspat, 16.X.2009, under stone, 1 ex. (1 ♂); 27.XII.2008, under bark, 1 ex. (1 ♂). Totally 2 specimens.

Note: This is the first record to Muğla province.

3.3 Family Tettigoniidae Krauss, 1902

3.3.1 Subfamily Decticinae Kirby, 1906

3.3.1.1 *Anadrymadusa albomaculata* (Karabağ, 1956)

Material examined: Muğla: Bodrum, Aspat, 19.VI.2008, bait trap, 2 exs. (1 ♂ 1 ♀) (nymph); 20.VII.2009, bait trap, 1 ex. (1 ♂); 15.VIII.2008, bait trap, 1 ex. (1 ♂); 24.VIII.2009, bait trap, 1 ex. (1 ♀); 18.IX.2009, bait trap, 1 ex. (1 ♀). Totally 6 specimens.

Note: Previously reported from Muğla (Fethiye) (Karabağ, 1961)^[11].

3.3.1.2 *Drymedusa limbata limbata* Brunner von Wattenwyl, 1882

Material examined: Muğla: Bodrum, Aspat, 23.VI.2009, bait trap, 1 ex. (1 ♂); 29.VI.2009, bait trap, 1 ex. (1 ♀); Bodrum, Aspat, 19.VI.2008, bait trap, 1 ex. (1 ♂). Totally 3 specimens.

Note: Previously reported from Muğla (Fethiye) (Karabağ, 1961)^[11].

3.3.1.3 *Bucephaloptera convergens* Karabağ, 1950

Material examined: Muğla: Bodrum, Aspat, 09.VIII.2009, light trap, 1 ex. (1 ♀); 17.IX.2009, light trap, 1 ex. (1 ♀); 23.IX.2009, light trap, 1 ex. (1 ♀); 16.X.2009, light trap, 2 exs. (2 ♂). Totally 5 specimens.

Note: This is the first record to Muğla province.

3.3.1.4 *Eupholidoptera smyrnensis* (Brunner von Wattenwyl, 1882)

Material examined: Muğla: Bodrum, Aspat, 01.V.2009, by hand, 1 ex. (1 ♂); 23.V.2009, sweeping net, 1 ex. (1 ♂); 29.VI.2009, sweeping net, 1 ex. (1 ♂); on the ground, 1 ex. (1 ♂); 19.VII.2009, sweeping net, 1 ex. (1 ♀); Aspat, 21.III.2009, sweeping net, 1 ex. (1 ♂) nymph; 11.IV.2009, sweeping net, 3 exs. (3 ♂) nymph, 1 ex. (1 ♂) nymph, 1 ex. (1 ♂) nymph; 01.V.2009, sweeping net, 1 ex. (1 ♂) nymph; 23.V.2009, sweeping net, 1 ex. (1 ♂) nymph, 2 ex. (2 ♂) nymph, bait trap, 13 exs. (7 ♂ 6 ♀); 24.V.2008, bait tarp, 12 exs. (10 ♂ 2 ♀); 07.VI.2008, bait trap, 41 exs. (33 ♂ 8 ♀), 13 exs. (9 ♂ 4 ♀); 19.VI.2008, bait tarp, 51 exs. (37 ♂ 14 ♀), 24 exs. (20 ♂ 4 ♀); 01.VIII.2008, pitfall, 1 ex. (1 ♂); 24.VI.2009, bait trap, 1 ex. (1 ♀); 29.VI.2009, sweeping net, 2 exs. (1 ♂ 1 ♀), bait trap, 2 exs. (1 ♂ 1 ♀), 2 exs. (2 ♀), 3 exs. (2 ♂ 1 ♀); 06.VII.2008, bait trap, 26 exs. (18 ♂ 8 ♀), 21 exs. (15 ♂ 6 ♀); 19.VII.2009, light trap, 1 ex. (1 ♂); 20.VII.2009, bait trap, 9 exs. (2 ♂ 7 ♀); 10.VIII.2009, bait trap, 1 ex. (1 ♀), 1 ex. (1 ♀); 16.X.2009, light trap, 2 exs. (2 ♂). Totally 241 specimens.

Note: Previously reported from Muğla (Marmaris) (Çıplak *et al.*, 2009)^[5].

3.3.1.5 *Metrioptera bispina* (Bolivar, 1899)

Material examined: Muğla: Bodrum, Aspat, 29.VI.2009, sweeping net, 1 ex. (1 ♀); 19.VII.2009, sweeping net, 1 ex. (1 ♀); 09.VIII.2009, light trap, 1 ex. (1 ♀). Totally 3 specimens.

Note: This is the first record to Muğla province.

3.3.1.6 *Platycleis incerta* (Brunner von Wattenwyl, 1882)

Material examined: Muğla: Bodrum, Aspat, 13.XI.2009, on the ground, 1 ex. (1 ♂); Aspat, 16.X.2009, light trap, 1 ex. (1 ♂), sweeping net, 1 ex. (1 ♂); 13.XI.2009, sweeping net, 1 ex. (1 ♀). Totally 4 specimens.

Note: This is the first record to Muğla province.

3.3.1.7 *Platycleis veyseli* Koçak, 1984

Material examined: Muğla: Bodrum, Aspat, 29.VI.2009, sweeping net, 1 ex. (1 ♂); Aspat, 19.VII.2009, sweeping net, 3 exs. (1 ♂ 2 ♀); 18.IX.2009, sweeping net, 1 ex. (1 ♀). Totally 5 specimens.

Note: This is the first record to Muğla province.

3.3.2 Subfamily Phaneropterinae Kirby, 1906**3.3.2.1 *Acrometopa syriaca* Brunner von Wattenwyl, 1878**

Material examined: Muğla: Bodrum, Aspat, 29.VI.2009, on the ground, 1 ex. (1 ♂); Aspat, 23.V.2009, pitfall, 1 ex. (1 ♂), nymph. 19.VII.2009, light trap, 1 ex. (1 ♂), 09.VIII.2009, light trap, 2 exs. (1 ♂ 1 ♀). Totally 5 specimens.

Note: This is the first record to Muğla province.

3.3.2.2 *Poecilimon hamatus* (Brunner von Wattenwyl, 1878)

Material examined: Muğla: Bodrum, Aspat, 12.IV.2008, knock down, 1 ex. (1 ♀) (nymph); 26.IV.2008, sweeping net, 1 ex. (1 ♀); 24.V.2008, knock down, *Styrax* spp., 1 ex. (1 ♂); 19.VI.2008, bait trap, 1 ex. (1 ♂). Totally 4 specimens.

Note: Previously reported from Muğla (Datça, Marmaris) (Önder *et al.*, 1999; Ünal, 2005) [12, 13].

3.3.2.3 *Poecilimon ledereri* Ramme, 1933

Material examined: Muğla: Bodrum, Aspat, 12.IV.2008, knock down, 1 ex. (1 ♂); 24.V.2008, knock down, 1 ex. (1 ♀), sweeping net, 2 exs. (2 ♀). Totally 4 specimens.

Note: This is the first record to Muğla province.

3.3.2.4 *Poecilimon sanctipauli* Brunner von Wattenwyl, 1878

Material examined: Muğla: Bodrum, Aspat, 21.III.2009, pitfall, 2 exs. (2 ♂) nymph; 11.IV.2009, sweeping net, 2 exs. (1 ♂ nymph 1 ♀); pitfall, 1 exs. (1 ♂) nymph; 01.V.2009, by hand, 15 exs. (7 ♂ 8 ♀); 23.V.2009, by hand, 10 exs. (5 ♂ 5 ♀); Bodrum, Aspat, 10.V.2008, by hand, 1 ex. (1 ♀); 24.V.2008, sweeping net, 1 ex. (1 ♀), 4 exs. (1 ♂ 3 ♀), 11 exs. (8 ♂ 3 ♀), knock down, 1 ex. (1 ♂), 1 ex. (1 ♀); 26.V.2008, sweeping net, 2 exs. (2 ♀); 28.II.2009, sweeping net, 1 ex. (1 ♂) (nymph), 2 exs. (2 ♂) (nymph), 1 ex. (1 ♂) (nymph), 1 ex. (1 ♂) (nymph); 21.III.2009, sweeping net, 1 ex. (1 ♂) (nymph), 2 exs. (2 ♂) (nymph), 1 ex. (1 ♂) (nymph), 2 exs. (2 ♂) (nymph), 5 exs. (5 ♂) (nymph), 1 ex. (1 ♂) (nymph), 1 ex. (1 ♂) (nymph); 11.IV.2009, sweeping net, 5 exs. (5 ♂) (nymph), 8 exs. (8 ♂) (nymph), 1 ex. (1 ♂) (nymph), 1 ex. (1 ♂) (nymph); 01.V.2009, knock down, 1 ex. (1 ♂) (nymph), 1 ex. (1 ♂) (nymph), 1 ex. (1 ♂) (nymph), by hand, 1 ex. (1 ♂); 23.V.2009, sweeping net, 3 exs. (3 ♂), 9 exs. (7 ♂ 2 ♀); 23.VI.2009, bait trap, 1 ex. (1 ♂). Totally 101 specimens.

Note: Previously reported from Muğla (Datça) (Ünal, 2005) [13].

3.3.2.5 *Saga natoliae* Serville, 1839

Material examined: Muğla: Bodrum, Aspat, 20.VII.2009, light trap, 1 ex. (1 ♂). Totally 1 specimen.

Note: This is the first record to Muğla province.

3.3.2.6 *Tylopsis lilifolia* (Fabricius, 1793)

Material examined: Muğla: Bodrum, Aspat, 19.VII.2009, sweeping net, 1 ex. (1 ♀) nymph; 09.VIII.2009, light trap, 1 ex. (1 ♀). Totally 2 specimens.

Note: This is the first record to Muğla province.

3.3.3 Subfamily Tettigoniinae Krauss, 1902**3.3.3.1 *Tettigonia caudata* (Charpentier, 1845)**

Material examined: Muğla: Bodrum, Aspat, 24.V.2008, bait trap, 1 ex. (1 ♀); 07.VI.2008, bait trap, 1 ex. (1 ♀). Totally 2 specimens.

Note: This is the first record to Muğla province.

3.3.3.2 *Tettigonia viridissima* (Linnaeus, 1758)

Material examined: Muğla: Bodrum, Aspat, 24.V.2008, bait trap, 1 ex. (1 ♀); 19.VI.2008, bait tarp, 1 ex. (1 ♀), 2 exs. (2 ♀); 06.VII.2008, bait trap, 1 ex. (1 ♀). Totally 5 specimens.

Note: Previously reported from Muğla (Fethiye) (Önder *et al.*, 1999) [12].

4. Conclusion

As a result of this study, twenty-six species and nine subspecies belong to Acrididae, Gryllidae and Tettigoniidae families were determined. Among them *E.smyrnensis*, *P.sanctipauli* and *A.anatolica* were the most abundant species. Their population is not high. Among those, Twenty-two species were recorded for the first time from Muğla province of Turkey.

The number of species/subspecies collected only in 2008 was seven (20%) (*D.maroccanus*, *C.vagans*, *P.labiata*, *P.hamatus*, *P.ledereri*, *T.caudata* and *T.viridissima*) and in 2009 was seventeen (48.57%) (*C.tenuicercis tenuicercis*, *D.brevicollis*, *C.bornhalmi*, *A.insibricus insibricus*, *A.strepens*, *O.miniata miniata*, *P.alliaceus alliaceus*, *S.notabilis mirame*, *S.theodori theodori*, *O.pellucens*, *B.convergens*, *M.bispina*, *P.incerta*, *P.veyseli*, *A.syriaca*, *S.natoliae*, *T.lilifolia*). The number found in both years (2008-2009) was eleven (31.43%) (*A.anatolica*, *C.barbarus pallidipes*, *S.rugulosa*, *A.aegyptium*, *A.simulatrix simulatrix*, *O.aurea*, *G.dalmatina*, *A.albomaculata*, *D.limbata limbata*, *E.smyrnensis*, *P.sanctipauli*).

During the study, sampling was made with nine different methods and according to these methods, the distribution of the species can be seen in Table 1. When the number of species captured by these methods was examined, twenty six taxa were collected by sweeping net, ten by handpicking on the ground, eleven by light trap, seven by pitfall trap, knock down and bait trap. The number of species captured by other methods was changed between one and three.

The distribution of the samples collected during this study by sampling months and years is given in Table 2. A total of 13 species/subspecies were sampled in march-may, while 27

species/subspecies were sampled in june-august, 21 species/subspecies were sampled in september-november and five species/subspecies were sampled in december-february.

None of those species was observed as an important pest on plants in this area.

Table 1: Status of the studied species according to sampling methods

Specie/subspecies	Sampling method									Total (Number)
	By hand	On the ground	Under stone	Under bark	Pitfall trap	Sweeping net	Knock down	Light trap	Bait trap	
<i>Acrida anatolica</i>	0	8	0	0	0	39	0	1	0	48
<i>Calliptamus barbarus pallidipes</i>	0	6	0	0	1	22	0	0	0	29
<i>Calliptamus tenuicercis tenuicercis</i>	0	1	0	0	0	4	0	0	0	5
<i>Sphenophyma rugulosa</i>	1	0	0	0	3	8	4	0	0	16
<i>Anacridium aegyptium</i>	0	0	0	0	0	2	4	0	0	6
<i>Dociostaurus brevicollis</i>	0	0	0	0	0	3	0	0	0	3
<i>Dociostaurus maroccanus</i>	0	0	0	0	0	1	0	0	0	1
<i>Chorthippus bornhalmi</i>	0	0	0	0	0	2	0	0	0	2
<i>Chorthippus vagans</i>	0	0	0	0	0	1	0	0	0	1
<i>Pararcyptera labiata</i>	0	0	0	0	4	1	0	0	0	5
<i>Acrotylus insibricus insibricus</i>	0	1	0	0	0	8	1	0	0	10
<i>Aiolopus simulatrix simulatrix</i>	0	1	0	0	1	3	0	6	0	11
<i>Aiolopus strepens</i>	0	0	0	0	1	1	0	1	0	3
<i>Oedipoda aurea</i>	0	0	0	0	0	11	0	0	0	11
<i>Oedipoda miniata miniata</i>	0	4	0	0	0	9	0	0	0	13
<i>Parapleurus alliaceus alliaceus</i>	0	0	0	0	0	2	0	0	0	2
<i>Scintharista notabilis mirame</i>	0	1	0	0	0	2	0	0	0	3
<i>Sphingonotus theodori theodori</i>	0	0	0	0	0	0	0	1	0	1
<i>Oecanthus pellucens</i>	0	0	0	0	0	4	2	0	0	6
<i>Gryllomorpha dalmatina</i>	0	0	1	1	0	0	0	0	0	2
<i>Anadrymadusa albomaculata</i>	0	0	0	0	0	0	0	0	6	6
<i>Drymedusa limbata limbata</i>	0	0	0	0	0	0	0	0	3	3
<i>Bucephaloptera convergens</i>	0	0	0	0	0	0	0	5	0	5
<i>Eupholidoptera smyrnensis</i>	1	1	0	0	1	15	0	3	220	241
<i>Metrioptera bispina</i>	0	0	0	0	0	2	0	3	0	3
<i>Platycleis incerta</i>	0	1	0	0	0	2	0	1	0	4
<i>Platycleis veyseli</i>	0	0	0	0	0	5	0	0	0	5
<i>Acrometopa syriaca</i>	0	1	0	0	1	0	0	3	0	5
<i>Poecilimon hamatus</i>	0	0	0	0	0	1	2	0	1	4
<i>Poecilimon ledereri</i>	0	0	0	0	0	2	2	0	0	4
<i>Poecilimon sanctipauli</i>	27	0	0	0	0	65	3	0	1	101
<i>Saga natoliae</i>	0	0	0	0	0	0	0	1	0	1
<i>Tylopsis lilifolia</i>	0	0	0	0	0	1	0	1	0	2
<i>Tettigonia caudata</i>	0	0	0	0	0	0	0	0	2	2
<i>Tettigonia viridissima</i>	0	0	0	0	0	0	0	0	5	5
Total number of individuals	29	25	1	1	12	216	18	26	238	566
Rate (%)	5.12	4.42	0.18	0.18	2.12	38.16	3.18	4.59	42.05	100.00
Total number of taxa	3	10	1	1	7	26	7	11	7	35

Table 2: Status of the studied species according to sampling periods

Species/subspecies	Months												Years	
	1	2	3	4	5	6	7	8	9	10	11	12	2008	2009
<i>Acrida anatolica</i>						+	+	+	+	+	+		+	+
<i>Calliptamus barbarus pallidipes</i>						+	+	+	+	+			+	+
<i>Calliptamus tenuicercis tenuicercis</i>						+	+		+		+			+
<i>Sphenophyma rugulosa</i>	+					+		+	+	+	+	+	+	+
<i>Anacridium aegyptium</i>					+	+	+	+					+	+
<i>Dociostaurus brevicollis</i>					+				+					+
<i>Dociostaurus maroccanus</i>					+								+	
<i>Chorthippus bornhalmi</i>							+		+					+
<i>Chorthippus vagans</i>												+	+	
<i>Pararcyptera labiata</i>					+	+							+	
<i>Acrotylus insibricus insibricus</i>						+			+	+				+
<i>Aiolopus simulatrix simulatrix</i>							+	+	+	+	+	+	+	+
<i>Aiolopus strepens</i>							+	+			+			+
<i>Oedipoda aurea</i>					+					+	+		+	+
<i>Oedipoda miniata miniata</i>						+	+	+	+	+				+
<i>Parapleurus alliaceus alliaceus</i>								+			+			+

<i>Scintharista notabilis mirame</i>						+	+								+	
<i>Sphingonotus theodori theodori</i>										+						+
<i>Oecanthus pellucens</i>							+		+	+		+				+
<i>Gryllomorpha dalmatina</i>											+		+		+	+
<i>Anadrymadusa albomaculata</i>							+	+	+	+					+	+
<i>Drymedusa limbata limbata</i>							+								+	+
<i>Bucephaloptera convergens</i>									+	+	+					+
<i>Eupholidoptera smyrnensis</i>				+	+	+	+	+	+	+					+	+
<i>Metrioptera bispina</i>									+	+						+
<i>Platycleis incerta</i>											+	+				+
<i>Platycleis veyseii</i>							+	+		+						+
<i>Acrometopa syriaca</i>							+	+	+	+						+
<i>Poecilimon hamatus</i>							+	+	+							+
<i>Poecilimon ledereri</i>							+	+								+
<i>Poecilimon sanctipauli</i>				+	+	+	+	+								+
<i>Saga natoliae</i>									+							+
<i>Tylopsis lilifolia</i>									+	+						+
<i>Tettigonia caudata</i>							+	+								+
<i>Tettigonia viridissima</i>							+	+	+							+
<i>Total number of taxa</i>	1	1	2	4	14	21	16	15	14	11	10	4	18	29		

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