ECOLOGICAL AND SYSTEMATICAL STUDIES ON THE FAUNA OF ORTHOPTERA OF SAMANLI MOUNTAINS, NORTH WEST OF TURKEY

by
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ABSTRACT

ECOLOGICAL AND SYSTEMATICAL STUDIES ON THE FAUNA OF ORTHOPTERA OF SAMANLI MOUNTAINS, NORTH WEST OF TURKEY

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Orthoptera of Samanlı Mountains was studied faunistically and ecologically by collecting samples between June and October, in the years 2007, 2008, and 2009. In this study 933 specimens belong to 7 families, 15 subfamilies, 53 genera and 75 species have been examined. The examined material is stored at Abant İzzet Baysal Üniversitesi Entomoloji Müzesi (AİBÜEM). 33 of these species are new for this area and *Euchorthippus declivus* (Brisout de Barneville, 1848) is recorded in Turkey for the first time. The colocalizations of the three species which are *Bolua turkiyae* Ünal, 1999 found in the Western Black Sea Region, *Poecilimon kutahiensis* Werner, 1901 found in the Central Anatolia and *Euchorthippus declivus* (Brisout de Barneville, 1848) found in Southeast Europe, in the Samanlı Mountain district showed that this area has been the intersection of these three region and also proved that it was the

transition area of these three faunas. *Tropidopola graeca graeca* Uvarov, 1926 is a member of tropical region and its location in this study is the northernmost record. In this study, it was observed that the north rim of this area showed Black Sea climate and the south rim of that showed Mediterranean climate. In addition, the phenology of the species was determined.

Keywords: Orthoptera, Samanlı Mountains, Fauna, Systematic, phenology.

ÖZET

SAMANLI DAĞLARI'NIN (KUZEY BATI TÜRKİYE) ORTHOPTERA FAUNASI ÜZERİNE EKOLOJİK VE SİSTEMATİK ÇALIŞMALAR

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Samanlı Dağları'nın Orthopter'leri, 2007, 2008 ve 2009 yıllarında Haziran-Ekim ayları arasında örnekleme yapılarak sistematik ve faunistik olarak incelenmiştir. Çalışmada, 7 familya, 15 altfamilya, 53 cins, 75 türe ait 933 Orthopter örneği incelenmiştir. İncelenen örnekler Abant İzzet Baysal Üniversitesi Entomoloji Müzesi'nde (AİBÜEM) saklanmaktadır. Bunlardan 33 tanesi bölge için *Euchorthippus declivus* (Brisout de Barneville, 1848) da Türkiye için yeni kayıttır. Batı Karadeniz Bölgesi'nde bulunan *Bolua turkiyae* Ünal, 1999, İç Anadolu Bölgesi'nde bulunan *Poecilimon kutahiensis* Werner, 1901 ve Güneydoğu Avrupa'da bulunan *Euchorthippus declivus* (Brisout de Barneville, 1848) türlerinin Samanlı Dağları'nda bir arada bulunması, çalışılan alanın bu üç bölgenin kesişimi olduğunu göstermiş ve bu türlerin dağılımı açısından bir geçiş bölgesi olduğunu kanıtlanmıştır. *Tropidopola graeca graeca* Uvarov, 1926 türü tropik bölge elemanıdır ve bu

çalışmadaki kaydı en kuzey kaydı olmuştur. Yapılan çalışmalarda alanın kuzey bakısında Karadeniz, güney bakısında Akdeniz ikliminin hüküm sürdüğü gözlemlenmiştir. Ayrıca türlerin fenolojileri tespit edilmiştir.

Anahtar Kelimeler: Orthoptera , Samanlı Dağları, Fauna, Sistematik, fenoloji.

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To my grand Family .....

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CHAPTER I

1. INTRODUCTION

The initial reports in the literature of the Orhoptera species of Turkey were records of grasshopper infestations rather than systematic studies of the species themselves. The earliest known record on Orthoptera of Izmir district was provided by Lefebvre in 1833. Lefebvre also documented the 1833 invasion in the same district. The next record involves Sureyya Özek's notes on the grasshopper infestation in southwest Anatolia in 1876. Bücher (1918) both documented and actively fought to stop the infestations that spread to the whole Western Anatolian district and emerged in southeastern Anatolia, resuming intermittently with disasterous effects between 1902-1917 (Ünal, 1997). The first systematic research started at the end of the 19th century by Retowsky (1889), Krauss (1896), Bolivar (1899). Werner (1901) provided the earliest comprehensive study on the Ortopteran species of Turkey. The impact of results from these initial studies and the importance of the geographical location caused a surge of foreign interest in field studies in Turkey (Werner 1903, 1905; Kuty, 1907; Ebner, 1910, 1919, 1946; Uvarov, 1928, 1930, 1934, 1940, 1943, 1949, 1952; Ramme, 1930, 1931, 1933, 1942, 1951; Bodenhemier, 1941; Burr, 1947, 1948, 1950, 1951, 1952; Maran, 1957, 1958a, 1958b; Weidner, 1969, 1979; Naskrecki, 1991, 1995). The interest of native

researchers started at the turn of 20th century with Sureyya Özek who collected and presented many specimens to the scientific community, in spite of not writing research reports on the subject himself (Ünal, 1997). Orthoptera research in the years that followed once again had an emphasis on the agricultural effects of the pest (İyriboz, 1940; Erkılıç, 1945; Balamir, 1952, 1962) (Ünal, 1997).

Karabağ, one of the most prominent Turkish researchers, made important contributions to the literature on Orthoptera taxonomy and fauna with over 30 articles, published between 1948-1980. Research on the taxonomy and fauna of Orthoptera species continued with Karabağ's students (Demirsoy, 1973, Salman, 1978, Gümüşsuyu, 1968, Güneş, 1984), alongside with agricultural studies (Tutkun, 1967, 1973, 1978, 1979, 1981, 1986; Akıncı, 1981, 1984; Emirgüner, 1959). Scientific interest in Turkey's Orthoptera species has been taken up by the next generation of native researchers in recent years (e.g., Çıplak, 1991, 1995, 1996; Ünal, 1995, 1997, 1999, 2003a, 2003b, 2004a, 2004b, 2005, 2006) (Ünal, 1997).

Although the Uludağ-Köroğlu mountain stretch and the Bosphorus area have previously been surveyed, documentation on Orthoptera fauna is scarce for the Samanlı Mountains located in between the two districts. This study presents a survey of the Samanlı Mountains are in an attempt to understand the extent of similarity of its fauna to those of Marmara, West Black Sea and Central Anatolia, in order to assess whether this region can be considered as a bridge between Europe and Anatolia that enables the spread of species by way of Thrace.

Samanlı Mountain range starts near the Sakarya River on the east, and stretches westbound to abut on the Marmara Coast. It is located between the İzmit Bay and Sapanca Lake on the North side, and Gemlik Bay and İznik Lake on the South side, falling in the provincial limits of Yalova, Bursa, Bilecik, Sakarya, and Kocaeli. The area consists of rough terrain where the altitude starts as low as the sea level on the North rim, and rises to a peak of 1600 m at Kartepe (1602 m.), Karakaya Hill (1222 m.), Bayrak Hill (1073 m.), Mercimek Hill (993 m.), Sivritepe (903 m.). Both the climate and the flora are similar to those of the Black Sea region on the North rim where humidity is high due to being on the coast, and receiving frequent rainfall. Mediterranean climate and flora prevail southwise, interrupted by patches of steppes typical the Central Anatolian region. The area involves a high density of human settlement. In addition to a high prevalence of industrial plantations, there is common agricultural use of the land including crops, as well as olive groves and orchards on south, and hazelnut groves on north. Dense forests can be found in areas that are not otherwise used by human.

Aim of this study to determine the Orthoptera fauna of the Region, to understand the extent of similarities of the Orthoptera fauna of the Samanlı Mountains and the regions Marmara, West Black Sea and Central Anatolia, to estimate whether this region can be considered as a bridge between Europe and Anatolia.

CHAPTER II

2. MATERIAL AND METHODS

The Orthoptera species were collected throughout 28 field studies on June to October in 2007, 2008 and 2009 from 82 different locations of Samanlı Mountains.

The habitat properties, especially the ground structure and vegetation type were noted at the field locations where the Orthoptera species were sampled. Reported location properties include name of the place and the district along with the GPS record and photographs taken at the time of sampling, altitude, climate conditions, and the quality and extent of human impact.

Orthoptera species were collected using a net or by hand. Unidentified nymphs were collected live and brought to the laboratory in a bug cage. Adults were killed in a jar using ethylacetate. In order to prevent the fast decay of the thin cuticle, abdomen of most *Ensifera* species were incised ventrally to remove internal organs and fill the abdominal cavity with cotton. This operation was not necessary for *Caelifera* species due to their decay-resistant thick cuticles. After killing, all samples were placed in special envelopes with sampling records.

Enveloped samples were brought to the laboratory for identification and storage. They were softened in vessels for 1-2 days before pinning. Some groups were dried with their wings stretched open to be able to visualize the vein and colour patterns necessary for diagnosis. Male genital organs were removed, cleaned unsklerationed part, placed on a piece of cardboard and pinned next to the relevant species. Dry specimens, pinned in a posture to display the body and extremities, were labelled with the name and altitude of location, date of collection, and name of collector.

The diagnostic key was constructed using literature that involved original reports, descriptions, and figures of species identified in Turkey fauna (Harz, 1969; Demirsoy, 1977; Gümüşsuyu, 1981; Ünal, 1999, 2003a, 2003b, 2004a, 2004b)

Diagnostic key:

The keys to taxa used in this study had previously been applied to diagnose Samanlı Mountains' Orthoptera (Harz, 1969; Demirsoy, 1977; Gümüşsuyu, 1981; Ünal, 1999, 2003a, 2003b, 2004a, 2004b). The original keys that had been prepared on the basis of external morphological characters of adult individuals were proofread with minor additions for enhancing use efficiency. Photographs were taken when a character was ambiguous with respect to the description in the key.

Material Examined:

The name and altitude of the field location, the date of collection, and the number of male and female specimens were recorded for each species. The number of individuals was noted for diagnosed nymphs.

Distribution:

Two types of information regarding species distribution were reported. The first involved the distribution of species on earth, with reference to the last publication to report a given species on a particular geographical location. The second involved the distribution of species in Turkey, with city names as district labels.

Figure 2.1. The sampling locations in Samanlı Mountains.

Localities with explanation:

1. Sakarya, Sapanca, 36 m, 12.6.2007: The area on the North side of the mountain was mostly covered with grass and shrub. Both the temperature and humid high.
2. Kocaeli, Kartepe, 1290 m, 12.6.2007: The area on the North side of mountain was mostly covered with forest. In addition, it involved a meadow-like bushy opening. The temperature was low with low humidity. Specimens were sampled from open areas.
3. Kocaeli, Karamürsel, Kızderbent Village, 235 m, 13.6.2007: This area located on the South side of the mountain was like a valley covered with grass and shrub. The temperature was low with low humidity.

4. Sakarya, Sapanca, Fevziye Village, 40.66° N, 30.29° E, 6.6.2008: The area located on the Nort side of mountain was mostly covered with orchards. Samples were taken from the border of road. The temperature was low with low humidity.
5. Sakarya, Sapanca, close to Fevziye Village, 6.6.2008: The area located on the North side of mountain was mostly covered with orchards. Samples were taken from the border of road. The temperature was low with low humidity and windy.
6. Sakarya, Sapanca, İkramiye Village, 40.62° N, 30.27° E, 6.6.2008: The area located on the Nort side of mountain is next to a stream. The ground was covered with round pebbles. Samples were taken from among pebbles. The temperature was low with high humidity.
7. Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 6.6.2008; 24.8.2008; 3.6.2009;. 22.7.2009; 5.8.2009; 10.8.2009; 21.8.2009; 16.9.2009; 9.10.2009: The area that was the highest part of Samanlı Mountains mostly covered with forest, however the peak was open and covered with grass, windy with humidity. Sampling was mostly performed on the open field. (Figure 5.6.)
8. Kocaeli, Kartepe, decended form peak 5th km, 6.6.2008: The area was a small opening in forest covered with shrubs. The temperature was like peak, but no wind.
9. Kocaeli, Derbent, 6.6.2008: The area that was lowland covered with high grass. The temperature was so low with high humidity. Sampling was performed near road.
10. Sakarya, city center, 7.6.2008: The area that was located in city centre was marshy. The weather was cloudy.

11. Kocaeli, Bahçecik, between Servetiye and Kazandere, 40.62° N, 29.89° E, 984 m, 8.6.2008: The area located on the Nort side of mountain was an opening in forest was covered with shrubs. The weather was cloudy.
12. Kocaeli, Bahçecik, Servetiye, 40.63° N, 29.90° E, 741 m, 8.6.2008: The area located on the Nort side of mountain was the small opening in forest was covered with shrubs. The weather was cloudy and temperature was low.
13. Kocaeli, Gölcük, 40.71° N, 29.91° E, 43 m, 8.6.2008: The area was close the Gölcük lake, mostly covered with long grass and shrubs and also a small border of sand. The weather was wind and temperature was low.
14. Kocaeli, Karamürsel, Yalakdere, 40.61°N, 29.57° E, 160 m, 21.6.2008: The area on the Nort side of mountain was an arable field bordered with long grass and bush. The temperature was warm.
15. Bursa, İznik, 40.59°N, 29.52° E, 98 m, 21.6.2008: The area the South of mountain was covered least grass, mostly soil and bordered with orchards. Sampling was performed near road. The weather was warm.
16. Bursa, İznik, Kızderbent, 40.56°N, 29.52° E, 236 m, 21.6.2008: The area on the South side of mountain was a sloppy steppe and there were some shrubs. The weather was too windy.
17. Yalova, Esenköy, 40.63° N, 28.07° E, 176 m, 22.6.2008: The area was scrub mostly dry. The weather was warm with wind. Sampling was performed between shrubs and on shrubs.
18. Yalova, Esadiye, 40.56° N- 29.29° E, 305 m, 22.6.2008: The area is steppe, mostly covered with dry grass. The weather was warm.
19. Bursa, Gemlik, Şahinyurdu, 660 m, 22.6.2008: The area located on the South of mountain was steppe, mostly covered with dry grass and small bushes. The

temperature was low with windy weather. (Figure 5.10.)

20. Kocaeli, Karamürsel, between Karapınar and İhsaniye, 40.65942″ N, 29.60513″ E, 402 m, 23.8.2008: The area located on the Nort side of mountain was an arable field that was mostly covered with thorny plant.
21. Kocaeli, Karamürsel, Çamdibi, 40.58° N, 29.54° E, 144 m, 23.8.2008: The area located on the Nort side of mountain was between gardens and forest that was covered with grass and bush. The temperature low with windy weather.
22. Bursa, İznik-Orhangazi road, 40.48° N, 29.54° E, 90 m, 23.8.2008: The area located on the mountain pass that was near the road which was border with grass. The temperature was so high.
23. Kocaeli, Karşıyaka, 40.69° N, 29.93° E, 190 m, 24.8.2008: The area located on the Nort side of mountain, that was near the city centre, was covered with short grass.
24. Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008: The area located on the Nort side of mountain was near a dry stream and arable field covered with dry grass. The temperature was low and weather was dry. Sampling was performed in both locations.
25. Sakarya, Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m, 30.8.2008: The area located on the Nort side of mountain, that was the small opening in forest, was covered with dry grass and bush. The temperature was low and weather was dry.
26. Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008: The area located on the South of mountain, that was like a savanna, was covered with dry grass and also there was marshy monocot plant heaps, however

ground was dry. The temperature was so low.

27. Bursa, İznik, between Elbeyli and Gürmüzlü, 40.49° N, 29.75° E, 406 m, 30.8.2008: The area located on the South of mountain was covered with scrubs and pines, and also rocky ground. The temperature so low with humidity.
28. Bursa,between İznik and Elbeyli, 40.45° N, 29.71° E, 86 m, 30.8.2008: The area located on the South of mountain was located between olive grove and road that was bordered with grass and marshy place.
29. Kocaeli, Bahçecik, İrşadiye, 40.64499″ N, 29.80507″ E, 500 m, 31.8.2008: The area located on the Nort side of mountain, that was the open field, was covered with fern and long grass. The weather was cloudy with wind.
30. Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355 m, 31.8.2008; 23.7.2009: The area located on the South of mountain was covered with grassy and bushy like vegetation. The weather was cold with wind.
31. Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008: The area was forest and the small opening in forest was covered with mostly shrubs and rarely dry grass. The weather was warm with wind.
32. Yalova, Armutlu, Mecidiye, 40.5194′ N, 28.8894′ E, 400 m, 1.9.2008: The area was the opening area in forest was covered with dry grass and bush. The temperature was low and with strong wind.
33. Yalova, Soğucak, 40.59876″ N, 29.27377″ E, 110 m, 1.9.2008: The area was scrubby roaderal vegetation, mostly rocky ground. The temperature was low with weather was windy and rained slowly.
34. Kocaeli, Kartepe, 40.64° N, 30.11° E, 1400 m, 3.6.2009: The area was a small opening in forest covered with shrubs. The temperature was like peak,

but no wind. (Figure 5.11.)

35. Yalova, Altınova, between Soğuksu and Karadere, 40.65° N, 29.49° E, 32 m, 5.6.2009: The area was stream side that was covered with pebble and send and bordered with grass and bush. The temperature was not low.
36. Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380 m, 6.6.2009; 24.7.2009: The area located on the South of mountain was covered with shrubs. The temperature was high with wind. (Figure 5.4.)
37. Bursa, İznik, Elbeyli, 40.49° N, 29.73° E, 293 m, 6.6.2009: The area located on the South of mountain was located over olive grove and covered with dry grass. The temperature was low with humidity.
38. Bursa. İznik, Çandarlı, 40.56° N, 29.85° E, 816 m, 6.6.2009: The area located on the South of mountain was roaderal grassy land and also green. The weather warm with humidity.
39. Bursa. İznik, between Kutluca and Hacıosman, 40.57° N, 29.82° E, 976 m, 6.6.2009: The area located on the South of mountain was the small opening between forest and road that was covered with bush. The temperature was low with wind.
40. Kocaeli, Kartepe, between 1600-1500 m, 1.7.2009: The area was a small opening in forest covered with shrubs. The weather was warm with humidity, but no wind.
41. Kocaeli, Derbent, Acısu, 40.72877″ N, 30.07275″ E, 62 m, 1.7.2009; 9.10.2009: The area located on the South of Samanlı Mountains was marshy lowland that was covered with grass and grass like monocot plant. The ground was mostly covered with water. The temperature was low with humidity.

42. Kocaeli, Bahçecik, 40.66° N, 29.91° E, 209 m, 2.7.2009: The area located on the South of mountain was covered with grassy and bushy like vegetation. The temperature was low with wind.
43. Kocaeli, Gölcük, 40.71390″ N, 29.91543″ E, 300 m, 2.7.2009; 21.8.2009: The area was a garden in the city centre. The temperature was low. Sampling was performed in mass of manure.
44. Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009: The area located on the Nort side of mountain was mostly covered with orchards. Sampling was performed on road border. The temperature was low besides that windy.
45. Yalova. Altınova, Fevziye Village, Valide under bridge, 40.60250″ N, 29.52918″ E, 96 m, 3.7.2009; 25.7.2009; 25.10.2009: The area located on the Nort side of mountain was near to a stream that was covered with pebble, sand, grass and shrubs. The temperature was not so low, humidity low with breeze. (Figure 5.12.)
46. Kocaeli, Karamürsel, Kızderbent Village, 40.55° N, 29.53° E, 265 m, 3.7.2009: The area located on the Nort side of mountain was near to a stream that was included several habitat types, that was steppe, mountain steppe, stream side vegetation, galleria forest and roaderal vegetation. The temperature was not so low and windy. Sampling was performed all of type of vegetation. (Figure 5.9.)
47. Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 3.7.2009; 24.7.2009; 27.9.2009: The area located on the South of mountain was covered with mountain steppe like vegetation and near the Oakwood. Because of field was hilly shoulder, the weather was same there so windy

same there noting wild. The weather was warm. (Figure 5.8.)

48. Kocaeli, Kartepeden decended form peak, 40.64° N, 30.10° E, 1500 m, 22.7.2009: The area was a small opening in forest covered with shrubs and long grass. The weather was cloudy and some there was covered with mist.
49. Kocaeli, between Kartepe and Maşukiye, 40.64° N, 30.11° E, 1300 m, 22.7.2009: The area located on the Nort side of mountain was near the road, the ground mostly covered with rock piece and bush. The weather was cold and misty. Sampling was performed on bush.
50. Kocaeli, Acısu, 40.72° N, 30.11° E, 41 m, 22.7.2009; The area was a bit marshy and grass land. The weather was cloudy with wind.
51. Kocaeli, Bahçecik, İrşadiye, 40.65° N, 29.83° E, 135 m, 23.7.2009: The area located on the Nort side of mountain was covered with rock and short dry grass. The temperature was low with breeze.
52. Kocaeli, Gölcük, Yazlık, 40.70° N, 29.86° E, 16 m, 23.7.2009: The area located on the North side of mountain was inside the city centre that was covered with long grass. The temperature was so low with humidity, no wind.
53. Bursa. İznik, close to Hacıosman Village, 40.60° N, 29.80° E, 1000 m, 23.7.2009: The area located on the mountain ridge was mostly covered with forest and some there was the small opening was covered with fern and shrubs. The weather was the open.(Figure 5.2.)
54. Bursa. İznik, close to Hacıosman Village, 40.58° N, 29.83° E, 935 m, 23.7.2009: The area located on the mountain ridge was a steppe in the opening of forest. The temperature was low and weather was dry with wind.
55. Bursa. İznik, Gürmüzlü, 40.50802″ N, 29.77961″ E, 500 m, 23.7.2009; 22.8.2009: The area located on the South of mountain was road side that was

covered with shrubs. The temperature was low.

56. Yalova, Esenköy, 40.63405″ N, 28.98862 E, 77 m, 24.7.2009: The area was only covered with thorn patch. The temperature so low with strong wind.
57. Bursa, İznik, Boyalıca K., 40.49649″ N, 29.5640″ E, 280 m, 25.7.2009: The area located on the South side of mountain was a steppe field. The temperature was low.
58. Kocaeli, Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 285 m, 25.7.2009; 230m., 17.9.2009: The area was located in a valley. Sampling was performed on a sloppy steppe which include same bush. The temperature was low with weather was little wind.
59. Sakarya, Pamukova, Bakacak, 40.52580″ N, 30.06798E, 630 m, 5.8.2009: The area located on the South of mountain was side of road that was covered with dry grass. The temperature was low and weather was so dry.
60. Bursa, İznik, Sarıağıl, 40.56256″ N, 29.67435″ E, 590 m, 6.8.2009: The area located on South side of mountain was close to the wide shrubs and olive grove, that was covered with dry grass and mown farm. The temperature was so low and weather was dry.
61. Bursa, İznik, Osmaniye, 40.60796″ N, 29.70397″ E, 850 m, 6.8.2009: The area located on South side of mountain was side of road that was covered with sedge. The temperature was not so low and weather was humidity.
62. Kocaeli, Bahçecik, Servetiye, 40.64500″ N, 29.78088″ E, 511 m, 6.8.2009: The area located on North side of mountain was covered with fern, shrubs and among grass. The temperature was so low and weather was dry.
63. Kocaeli, Acısu, 40.71416″ N, 30.13438″ E, 44 m, 21.8.2009: The area located on North side of mountain was near the road and between gardens

that mostly covered with grass and same bush. The temperature was so low and weather was dry.

64. Kocaeli, Bahçecik, Servatiye close to dam, 40.64265″ N, 29.755″ E, 220 m, 21.8.2009: The area located on North side of mountain was inside of a gallery forest that was roadside. The temperature was low and weather was humid.
65. Kocaeli, Gölcük, Şevkatiye K., 40.64508″ N, 29.78090″ E, 500 m, 22.8.2009: The area located on North side of mountain was covered with fern, shrubs and among grass. The temperature was so low and weather was dry.
66. Bursa, İznik, between Hacıosman and Ayvazpınar, 40.61467″ N, 29.74994″ E, 850 m, 22.8.2009: The area located on South side of mountain was covered with fern, shrubs and among dry grass. The temperature was low and weather was dry.
67. Bursa. İznik, Hacıosman, 40.58000″ N, 29.81917″ E, 1000 m, 22.8.2009: The area located on North side of mountain was covered with fern, shrubs and dry grass. Location was good enough, but duo to human constraint there was a low richness. The temperature was low with wind and weather was dry.
68. Kocaeli, between Kocaeli and Acısu,40.73135″ N, 30.06178″ E, 40 m, 16.9.2009: The area was marshy lowland that was surrounded with grass. The temperature was low with humidity.
69. Kocaeli, Bahçecik, Yuvacık, close to dam, 40.6735″ N, 29.96441″ E, 170 m, 16.9.2009: The area located on North side of mountain was the small opening in forest. The weather was cloudy and ground was wet.
70. Bilecek, Osmaneli, Kaynarca, 40.41597″ N, 29.81676″ E, 200 m, 17.9.2009: The area located on South side of mountain was a rocky hill in olive grove that was covered with grass. The weather was warm with wind.

71. Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 17.9.2009; 27.9.2009: The area located on South side of mountain was a marsh that was covered with sedge. The weather was so warm.
72. Kocaeli, between Kocaeli and Acısu, 40.73085″ N, 30.06380″ E, 35 m, 26.9.2009: The area was marshy lowland that was surrounded with grass. The temperature was low with humidity.
73. Yalova, Çiftlikköy, 40.65352″ N, 29.32725″ E, 14 m, 26.9.2009: The area located on North side of mountain was covered with steppe like grass, but was mostly spiny plant. The temperature was so low with wind.
74. Yalova, Altınova, Karadere, 40.65532″ N, 29.49313″ E, 30 m, 27.9.2009: The area located on North side of mountain was stream side that was covered with pebble and grass. The weather was warm.
75. Bursa. İznik, 40.42285″ N, 29.74226″ E, 120 m, 27.9.2009: The area was a small rocky hill that was covered with dry grass. The temperature was low without wind. (Figure 5.7.)
76. Yalova, Çiftlik, 40.68799″ N, 29.44007″ E, 10 m, 9.10.2009: The area was near the cost that was covered with shrubs, bush and dry grass. The temperature was so low with wind.
77. Yalova, Termal,40.61320″ N, 29.16155″ E, 220 m, 10.10.2009: The area was the opening in an intensive forest that was covered with shrubs, bush and grass. The temperature low and humid.
78. Yalova, Çınarcık, Karlık upland, 40.58099″ N, 28.99035″ E, 850 m, 10.10.2009: The area was a plateau that was steppe, and the press of human was so much. The temperature was low with wind. (Figure 5.3.)

79. Yalova, Çınarcık, Delmece upland, 40.56282″ N, 29.00714″ E, 712 m, 10.10.2009: The area was a plateau that was include a marsh and steppe. The temperature low with wind. (Figure 5.5.)
80. Yalova, Armutlu, close to Delmece upland, 40.52518″ N, 28.99259″ E, 670 m, 10.10.2009: The area located on South of mountain was the opening in forest that was separated buy road. The temperature was low.
81. Sakarya, Pamukova, 40.50823″ N, 30.13720″ E, 130 m, 25.10.2009: The area located on South of mountain was the rocky slope that was covered with shrubs. The temperature so low.
82. Bursa, close to İznik, 40.42320″ N, 29.74190″ E, 100 m, 25.10.2009: The area was a small rocky hill that was covered with dry grass. The temperature was low with wind. (Figure 5.1.)

CHAPTER III

3. RESULTS

Order: *ORTHOPTERA* Olivier, 1789

Key to Suborder of *Orthoptera*

1.Tympanum near the base of fore tibia; antenna longer than body (Figure 5.13.) ……..…….. ***Ensifera***

-. Tympanum on each side of the base of abdoman; antenna shorter than body (Figure 5.14.) ……..…… ***Caelifera***

3.1. Suborder: *ENSIFERA* Chopart, 1920

Key to Families of *Ensifera*

1. Tarsi with 3 segment (Figure 5.15.) ……..……..….. 2

-. Tarsi with 4 segment (Figure 5.16) .....……..……..…..…… ***Tettigoniidae***

2. Fore legs similar to the mid legs ……..……..……..……. ***Gryllidae***

-. Fore legs modified into widened digging instruments (Figure 5.17.) …..…..…….. …… ***Gryllotalpidae***

3.1.1. Family: *TETTIGONIIDAE* Krauss, 1902

Key to Subfamilies of *Tettigoniidae*

1. The base of fore tibia almost rectangle, dorsally flat or concave; first and second segment of tarsi without any groove; male subgenital plate without styles (Figure 5.89, Figure 5.95.) ……..…… ***Phaneropterinae***

-. The base of fore tibia not rectangle, dorsally convex; first and second segment of tarsi grooved laterally (Figure 5.18); male subgenital plate bearing a pair of styles (Figure 5.89.) …….. 2

2. Fore tibiae with a dorsal spine on the outside at the distal end (Figure 5.91.) ……. …….. ***Tettigoniinae***

-. Fore tibiae without a dorsal spine on the outside at the distal end …..…… 3

3. Hind tibiae with at least one terminal spine dorsally …..……... ***Conocephalinae***

-. Hind tibiae without a terminal spine dorsally……..…..…...… ***Saginae***

3.1.1.1. Subfamily: *PHANEROPTERINAE* Brunner von Wattevwyl, 1878

Key to the Genus of *Phaneropterinae*

1. Tegmina longer than abdomen; hind wigs longer than tegmina …..…..……. 2

-. Tegmina shorter than abdomen, reduced to small flaps or almost absent ……... 3

2. Fore coxae with a spine, compound eyes oval, opening of the hearing organs reduced to a slit (Figure 5.20.) …..……. ***Tylopsis***

-. Fore coxae without a spine, compound eyes hemispherical, opening of the hearing organs long elliptical lying in mussel-shaped widening of the tibia …… ***Acrometopa***

3. Sulcus in the middle or behind the middle of the pronotum, male tegmina not covered (Figure 5.22.), if their basal part is covered, than the cerci are straight or at most curved a little upward at the apex with a little subapical tooth, female tegmina covered only at the base, if more or if entirely hidden under the pronotum, than the ovipositor curved ventrally (Figure 5.24.) …….……..….... ***Isophya***

-. Sulcus in front or the middle of pronotum (Figure 5.23.), if lying in middle or behind it, the male tegmina covered at the base and cerci curved, female tegmina half or entirely covered, ovipositor straight and only at the apex curved upwards (Figure 5.25.) ……..……. ***Poecilimon***

Genus: *Tylopsis* Fieber, 1853

***Tylopsis lilifolia* (Fabricius, 1793)**

Tylopsis lilifolia (Fabricius, 1793: 36): Ünal, 1999, J. Orthop. Res. No. 8,243, Yalova, Güneyköy, 350m., 7.8.1993, 1♂, 3♀ (M. Ünal).

Material Examined:

Kocaeli, Karamürsel, Çamdibi, 40.58° N, 29.54° E, 144 m, 23.8.2008, 3♂, 2♀; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 1♀; Sakarya,

Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m, 30.8.2008, 2♂, 2♀; Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008, 1♂, 3♀.

Distribution:

North Africa, Middle, South and East Europe, Balkans, Anatolia, Middleast, Caucasia, West Asia (Ramme, 1951; Bei-Bienko, 1954; Harz, 1969). Distribution in Turkey: Adana, Afyonkarahisar, Amasya, Ankara, Antalya, Aydın, Balıkesir, Bilecik, Bolu, Burdur, Bursa, Çanakkale, Düzce, Edirne, Erzincan, Erzurum, Eskişehir, Hatay, Isparta, İçel, İstanbul, İzmir, Karabük, Kırklareli, Kocaeli, Kütahya, Malatya, Nevşehir, Sakarya, Samsun, Sinop, Şanlıurfa, Tekirdağ, Zonguldak (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Demirsoy, 1975; Güneş, 1984; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Önder et al., 1999; Sevgili and Çıplak, 2000; Ünal, 1997, 1999, 2001, 2005).

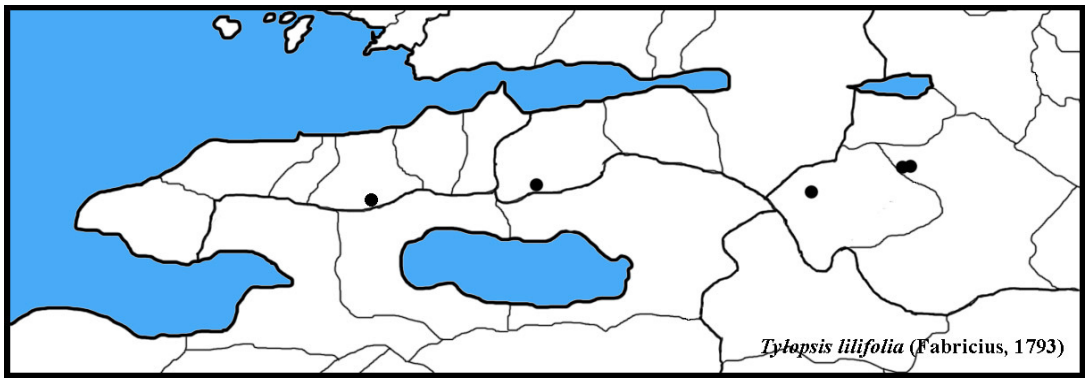

Figure 3.1. The sampling locations of *Tylopsis lilifolia* (Fabricius, 1793) in Samanlı Mountains.

***Acrometopa servillea* (Brullé, 1832)**

Material Examined:

Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 3.7.2009, 1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 24.7.2009, 3♂, 2♀.

Distribution: South and East Europe, Balkans, Anatolia. Distribution in Turkey: İzmir, Eskişehir, İstanbul, Burdur, Bolu, Manisa, Urfa, Ankara. (Karabağ, 1958; Harz, 1969; Karabağ et al., 1980; Ünal, 2005)

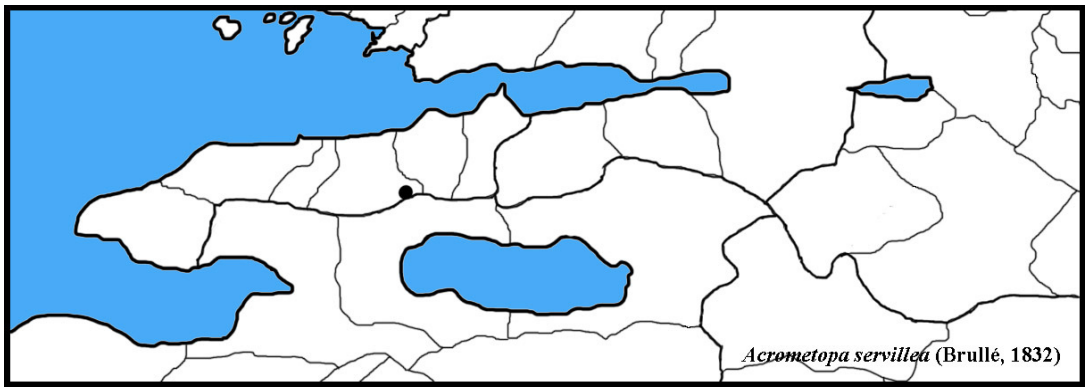

Figure 3.2. The sampling locations of *Acrometopa servillea* (Brullé, 1832) in Samanlı Mountains.

Genus: *Isophya* Brunner von Wattevwyl, 1878

Key to species of *Isophya*

1. Fastigium ¼ to ¾ narrower than scape; fastigium of female ¼ to ½ as narrow as scape …… ***Isophya amplipennis* Brunner von Wattenwyl, 1878**

-. Fastigium broader than, as broad as, or only insignificantly narrower than scape; fastigium of female almost as board or broader than scape …… 2

2. Tegmina clearly longer than the pronotum; tegmina of female with a network of veinlets ……. ***Isophya pavelii*** **Brunner von Wattenwyl, 1878**

-. Tegmina at most as long as the pronotum or shorter; tegmina of female with distinctly longitudinal veins …. ***Isophya rectipennis*** **Brunner von Wattenwyl, 1878**

Isophya amplipennis **Brunner von Wattenwyl, 1878**

Isophya amplipennis Brunner von Wattenwyl, 1878: Ramme, 1951: Karabağ, 1958: Orth. Faun. Turkey, Um. 81, zool., 4: 18; Ünal, 1999,J. Orthoptera Res. No. 8, 243, Sakarya, Pamukova,110 m., 24.4.1994, 3♂, 6♀.

Material Examined:

Kocaeli, Karamürsel, Kızderbent Village, 235 m, 13.6.2007, 1♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 6.6.2008, 1♂, 1♀; Kocaeli, Kartepe, 40.64191″ N, 30.09.987″ E, 1602 m, 24.8.2008, 1♂; Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380 m, 6.6.2009, 1♂, 1♀; Kocaeli, Kartepe, between 1600-1500 m , 1.7.2009, 3♂; Kocaeli, Kartepe, 40.64191″ N,30.09987″ E, 1602 m, 22.8.2009, 1♂, 1♀; Kocaeli, Kartepe, 40.64191″ N,30.09987″ E, 1602 m, 10.8.2009, 2♂.

Distribution:

South and East Europe, Balkans, Transcaucasia, Anatolia. Distribution in Turkey: Bursa, Anasya, İstanbul, Sinop, Samsun, Edirne, Kocaeli, Adana, Bilecik, Tokat, Urfa, Kastamonu, Sakarya, Bolu, Adana, Tokat (Karabağ, 1958; Harz, 1969; Karabağ et al., 1974, 1980; Ünal, 1999, 2003a).

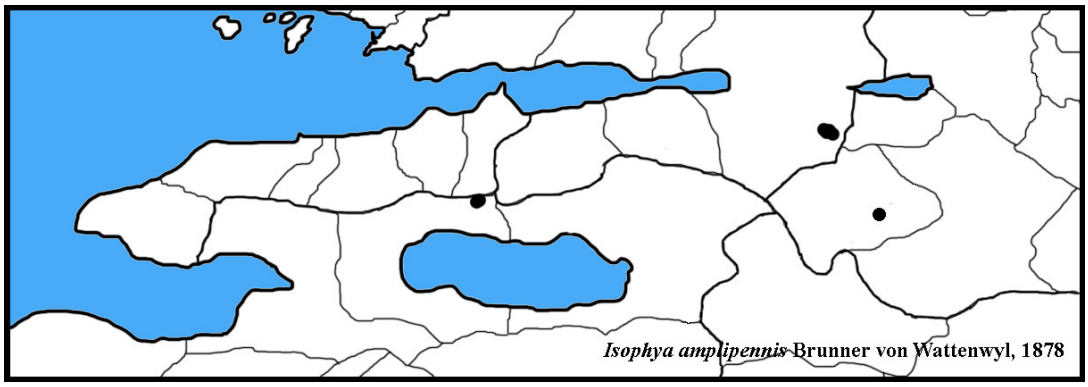

Figure 3.3. The sampling locations of *Isophya amplipennis* Brunner von Wattenwyl, 1878 in Samanlı Mountains.

***Isophya pavelii* Brunner von Wattenwyl, 1878**

Isophya paveli Brunner von Wattenwyl, 1878: Karabağ, 1958, Orth. Faun. Turkey, Um. 81, Zooloji, 4, 22, Bursa, Gemlik, Karabük.

Distribution:

Balkans and Anatolia. Distribution in Turkey: İstanbul, Sinop, Bursa, Ankara, Çanakkale, Bolu, Kastamonu (Karabağ, 1958; Harz, 1969; Ünal, 2003a, 2004a, 2005).

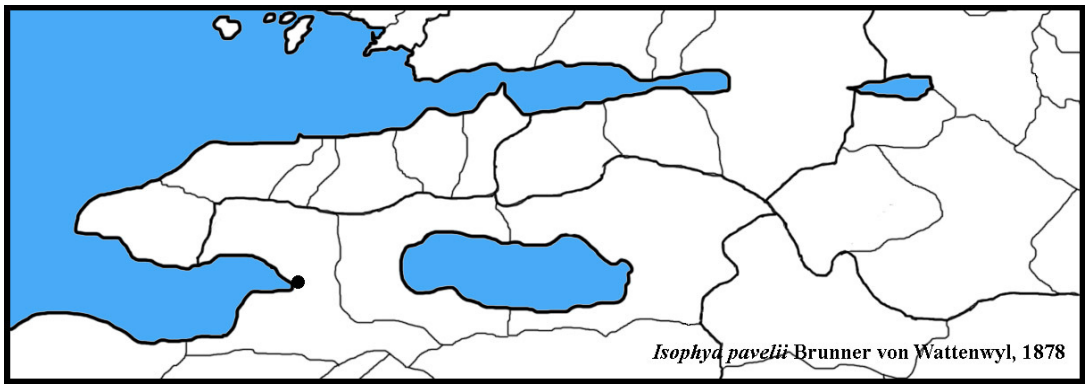

Figure 3.4. The sampling locations of *Isophya pavelii* Brunner von Wattenwyl, 1878 in Samanlı Mountains.

***Isophya rectipennis* Brunner von Wattenwyl, 1878**

Isophya rectipennis Brunner von Wattenwyl, 1878: Ünal, 2005, Transaction of American Entomological Society 131(3+4): 432, Armutlu, Elmakaya-Gözsu, 26-30.vi.1959, 2♂2♀ (E. Can).

Material Examined:

Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380m., 6.6.2009, 3♂, 4♀; Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336m., 3.7.2009, 2♂, 1♀.

Distribution:

East Bulgaria, South Romania, Asia Minor. Distribution in Turkey: Balıkesir, Eskişehir, Ankara, Bolu, Samsun, Bursa, Tekirdağ, İzmir, Düzce, Karabük, Kastamonu, Çankırı, Zonguldak, Çorum, İstanbul (Karabağ, 1958; Harz, 1969; Ünal, 2003a, 2004a, 2005).

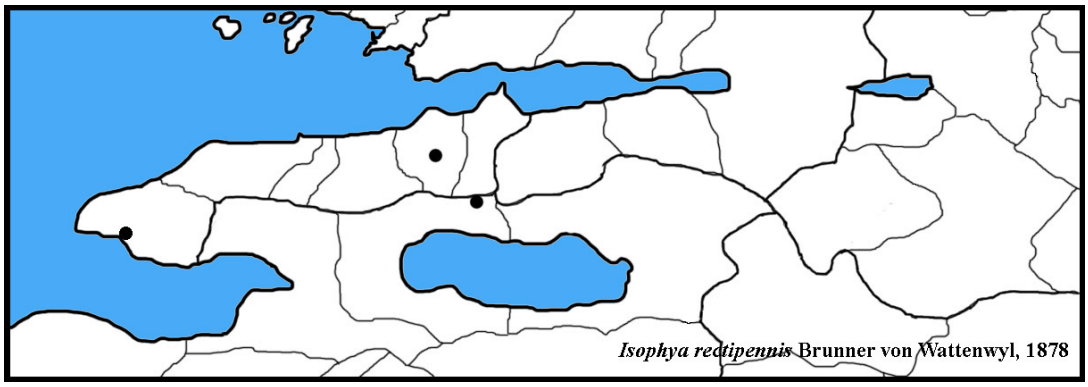

Figure 3.5. The sampling locations of *Isophya rectipennis* Brunner von Wattenwyl, 1878 in Samanlı Mountains.

Genus: *Poecilimon* Fischer, 1853

Key to species of *Poecilimon*

1. Male cercus with single tooth at apex …… ***Poecilimon kutahiensis*** **Werner, 1901**

-. Male cercus multidentate at apex (Figure 5.92.) ……..……..……...… 2

2. Cercal apex of male with 1-15 inner teeth (Figure 5.94.) ……...…..……..… 3

-. Cercal apex of male without inner tooth ……..…… 6

3. Male subgenital plate with short and broad apex 4

-. Male subgenital plate with clearly longer and narrow apex (Figure 5.89.) 5

4. Cercal apex of male with at most 3 inner teeth …... ***Poecilimon kocaki*** **Ünal, 1999**

-. Cercal apex of male with 10-15 inner teeth …….……...

……...…… ***Poecilimon sureyanus*** **Uvarov, 1930**

5. Cercal apex of male with at least several inner teeth (Figure 5.93.); Posterior margin of male subgenital plate concex (Figure 5.95.) …….....

……. ***Poecilimon turciae*** **(Ramme, 1951)**

-. Cercal apex of male always with single inner tooth (Figure 5.94.); Posterior margin of male subgenital plate concave (Figure 5.89.) ……
…….. ***Poecilimon bosphoricus*** **Brunner von Wattenwyl, 1878**

6. Body large; male subgenital plate disticntly long, reaching half of cercus, apex slightly concex..... ***Poecilimon anatolicus*** **Ramme, 1933**

-. Body smaller; male subgenital plate short, reaching at most to base of cercus, apex slightly truncate or slightly concave 7

7. Male cercus with 1-3 dorsal teeth (Figure 5.96.) ……..……
…….. ***Poecilimon bidens*** **Retowski, 1889**

-. Male cercus without dorsal teeth (Figure 5.92.) .....
……. ***Poecilimon miramae*** **Ramme, 1933**

Poecilimon anatolicus **Ramme, 1933**

Poecilimon anatolicus Ramme, 1933: Ünal, 1999, J. Orthoptera Res. No. 8, 244, Bursa, İznik, 470, 7.8.1993, 1♂ (M. Ünal).

Distribution:

South East Europe, Anatolia, Middleast, West – south Asia. Distribution in Turkey: Bursa, Çanakkale, Tekirdağ, Edirne (Karabağ, 1958; Harz, 1969; Karabağ et al., 1980; Ünal, 1999, 2004a, 2004b).

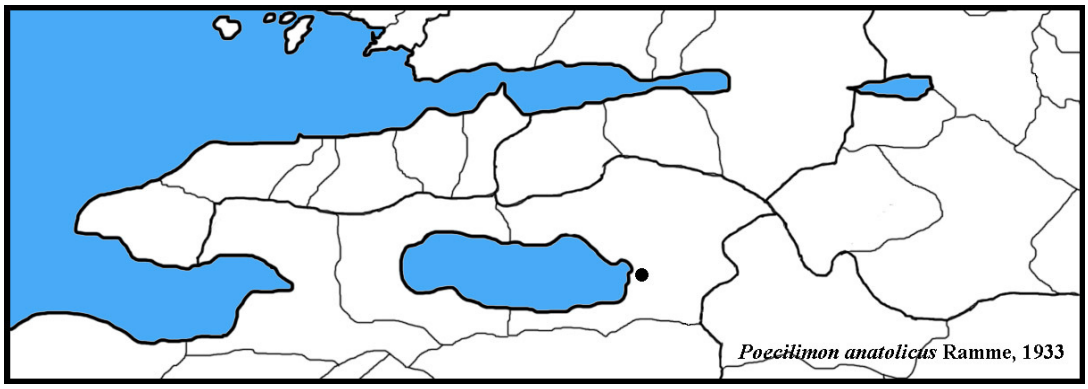

Figure 3.6. The sampling locations of *Poecilimon anatolicus* Ramme, 1933 in Samanlı Mountains.

***Poecilimon bidens* Retowski, 1889**

Maternial Examined:

Yalova, Altınova, between Soğuksu and Karadere, 40.65° N, 29.49° E, 32m., 5.6.2009, 5♂; Kocaeli, Kartepe, between 1600 m and 1500 m, 1.7.2009, 2♂, 2♀; Yalova. Altınova, Fevziye Village, Valide Under bridge, 40.60250″ N, 29.52918″ E, 96m., 3.7.2009, 4♂.

Distribution:

Thracia, North-west Anatolia. Distribution in Turkey: İstanbul (Karabağ, 1958; Harz, 1969; Ünal, 2004a).

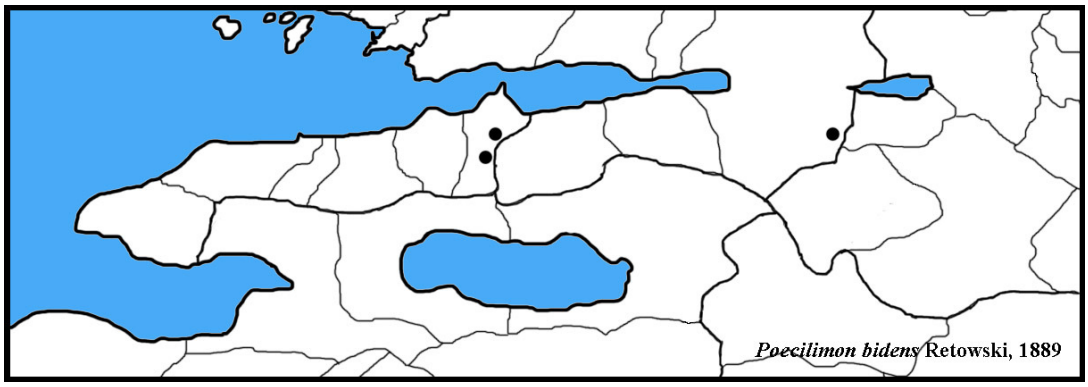

Figure 3.7. The sampling locations of *Poecilimon bidens* Retowski, 1889 in Samanlı Mountains.

***Poecilimon bosphoricus* Brunner von Wattenwyl, 1878**

Materrial Examined:

Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 6.6.2008, 2♂, 1♀; Kocaeli, Bahçecik, between Servetiye and Kazandere, 40.62° N, 29.89° E, 984 m, 8.6.2008, 2♂, 1♀; Yalova, Esenköy, 40.63° N, 28.07° E, 176 m, 22.6.2008, 1♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 24.8.2008, 3♂,2♀; Kocaeli, Kartepe, between 1600-1500 m., 1.7.2009, 10♂,22♀.

Distribution:

North-west Anatolia. Distribution in Turkey: İstanbul, Kocaeli, Sakarya, Bolu, Kastamonu, Çankırı (Karabağ, 1958; Harz, 1969; Ünal, 1999, 2004a, 2004b, 2006).

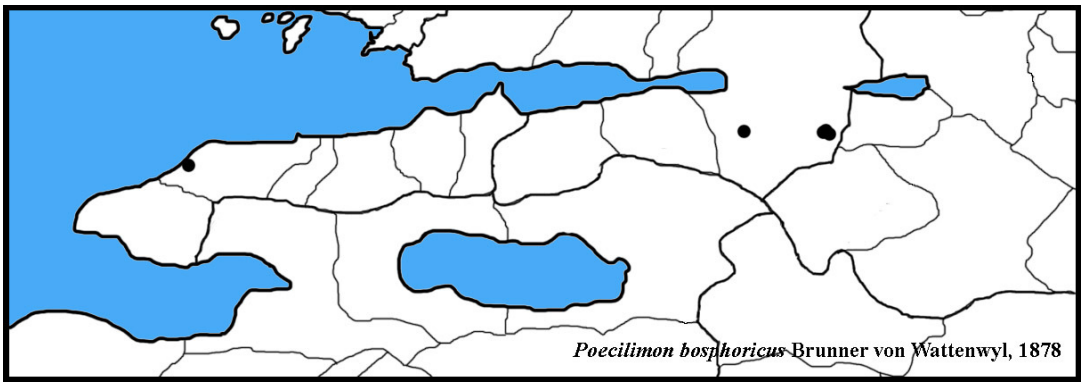

Figure 3.8. The sampling locations of *Poecilimon bosphoricus* Brunner von Wattenwyl, 1878 in Samanlı Mountains.

***Poecilimon kocaki* Ünal, 1999**

Poecilimon kocaki Ünal, 1999: Ünal, 2005, Transaction of American Entomological Society, 131(3+4): 442, İzmit, Bahçecik, Beşkayalar, 600 m, 7.7.2004, 1♂; Ayvalık Deresi, Ballıkayalar Tabiat Parkı, 250 m, 7.7.2004, 4♀; 15.6.2004, 1♀.

Distribution:

North-west Anatolia. Distribution in Turkey: Kocaeli, Sakarya (Ünal, 1999, 2004b).

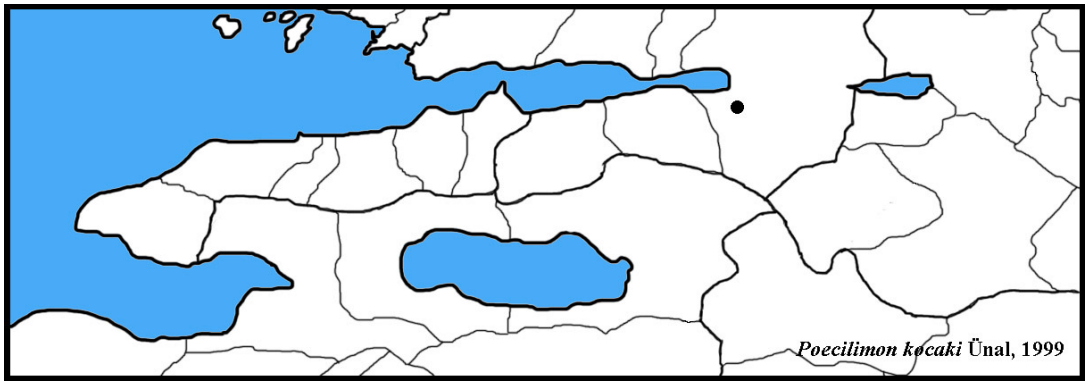

Figure 3.9. The sampling locations of *Poecilimon kocaki* Ünal, 1999 in Samanlı Mountains.

***Poecilimon kutahiensis* Werner, 1901**

Poecilimon kutahiensis Werner, 1901:Ünal, 1999, J. Orthoptera Res. No. 8, 244, Kocaeli, Karamürsel, 400 m., 8.8.1993, 1♂, 6♀, (M. Ünal).

Distribution:

North-west Anatolia. Distribution in Turkey: Kütahya, Bursa, Kocaeli, Eskişehir (Karabağ, 1958; Harz, 1969; Karabağ et al., 1980; Ünal, 1999, 2004a, 2004b).

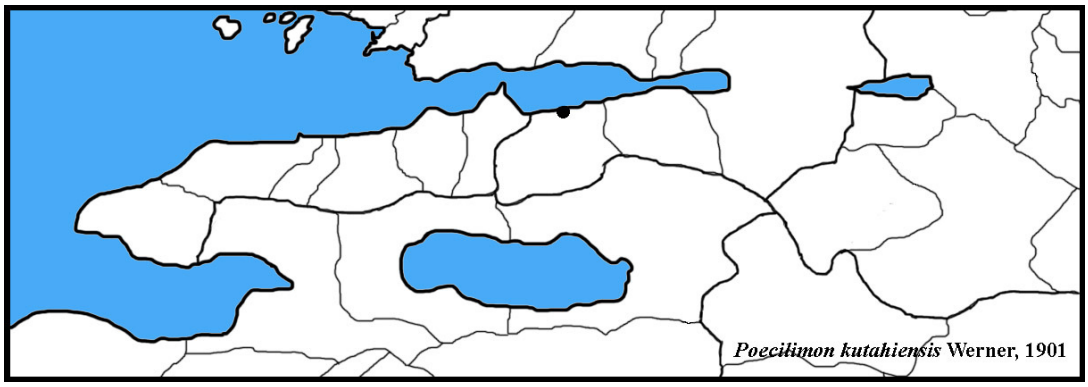

Figure 3.10. The sampling locations of *Poecilimon kutahiensis* Werner, 1901 in Samanlı Mountains.

***Poecilimon miramae* Ramme, 1933**

Poecilimon miramea Ramme, 1933: Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zool.,30, Yalova, 31.7.1910.

Poecilimon miramae Ramme 1933:Ünal, 1999, J. Orthoptera Res. No. 8, 244, Sakarya, 50 m., 24.4.1993, 5♂, 5♀, (M.Ünal).

Materrial Examined:

Kocaeli, Bahçecik, between Servetiye and Kazandere, 40.62° N, 29.89° E, 984 m, 8.6.2008, 1♂; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 24.8.2008, 1♂; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 22.8.2009, 1♂, 2♀; Kocaeli, Kartepeden decended form peak, 40.64° N, 30.10° E, 1500 m, 22.7.2009, 1♂, 1♀; Kocaeli, between Kartepe and Maşukiye, 40.64° N, 30.11° E, 1300 m, 22.7.2009, 4♀, Bursa. İznik, Gürmüzlü, 40.50802″ N, 29.77961″ E, 500 m, 23.7.2009, 2♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 10.8.2009, 4♂.

Distribution:

Balkans, Asia Minor. Distribution in Turkey: Tekirdağ, İstanbul, Kırklareli, Yalova, Sakarya, Bolu (Harz, 1969; Ünal, 1999, 2003b, 2004b).

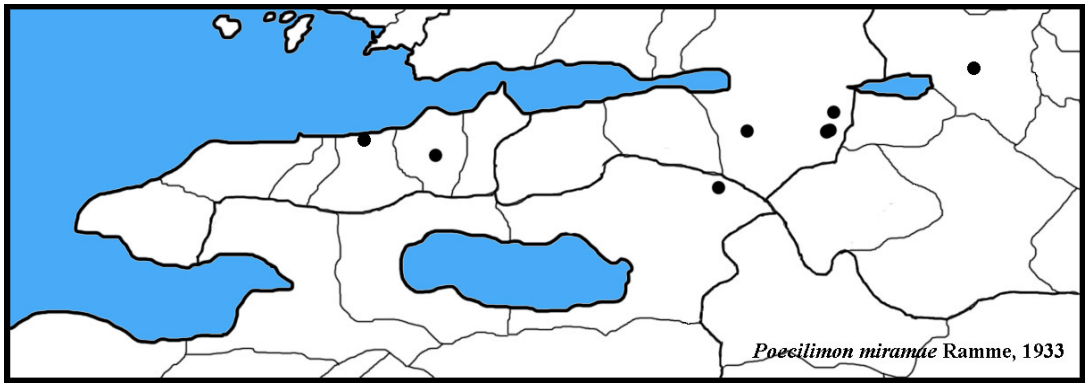

Figure 3.11. The sampling locations of *Poecilimon miramae* Ramme, 1933 in Samanlı Mountains.

***Poecilimon sureyanus* Uvarov, 1930**

Poecilimon sureyanus Uvarov, 1930: Karabağ, 1958, Orth. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 29, İzmit, 1♂, 6♀; Bursa, Gemlik. 22.6.1900, 1♂.

Poecilimon sureyanus Uvarov 1930: Ünal, 1999, ‚J. Orthop. Res. No. 8, 244, Sakarya, Pamukova, 110m., 25.4.1992, 1♂ (M. Ünal).

Distribution:

Asia Minor. Distribution in Turkey: Kocaeli, Bursa, Bilecik, Sakarya (Karabağ, 1958; Ünal, 1999, 2004a, 2004b).

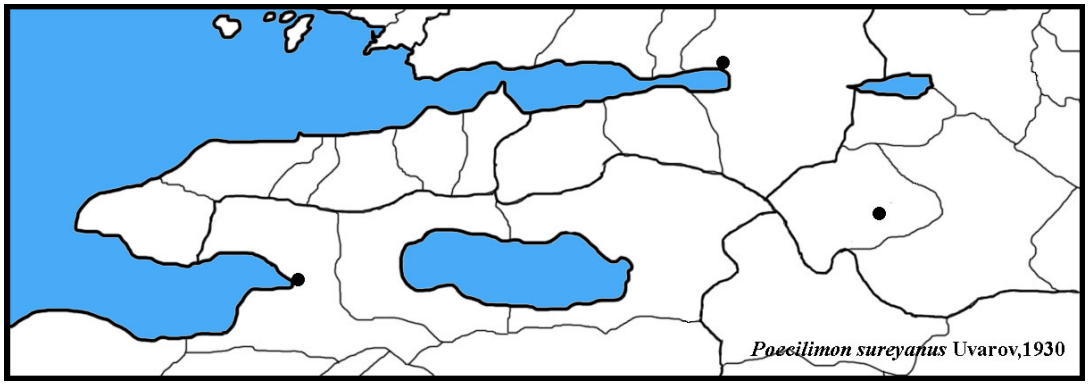

Figure 3.12. The sampling locations of *Poecilimon sureyanus* Uvarov,1930 in Samanlı Mountains.

***Poecilimon turciae* (Ramme, 1951)**

Poecilimon turciae Ramme, 1951: Ünal, 2005, Transaction of American Entomological Society Volume 131, Number 3+4: 441, Bursa, Armutlu, Elmakaya-Gözsu, 26.6.1959, 7♂, 2♀, (coll. E. Can) (NHML).

Poecilimon turciae (Ramme, 1951): Ünal, 1999, J. Orthop. Res. No. 8, 244, İzmit, Karamürsel, 400m., 8.8.1993, 1♂, (M. Ünal).

Material Examined:

Kocaeli, Karamürsel, Kızderbent Village, 235 m, 13.6.2007, 2♂, 4♀; Kocaeli, Karamürsel, Yalakdere, 40.61°N, 29.57° E, 160 m, 21.6.2008, 1♀; Yalova, Esenköy, 40.63° N, 28.07° E, 176 m, 22.6.2008, 1♂; Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380 m, 6.6.2009, 5♂,4♀; Kocaeli, Kartepe, between 1600-1500 m, 1.7.2009, 2♂, 3♀; Kocaeli, Karamürsel, Kızderbent Village, 40.55° N, 29.53° E, 265 m, 3.7.2009, 2♂, 6♀; Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355 m, 23.7.2009, 1♀.

Distribution:

North-west Anatolia. Distribution in Turkey: Bursa, İstanbul, Kocaeli (Karabağ, 1958; Karabağ et al., 1980; Ünal, 1999, 2004b,2006).

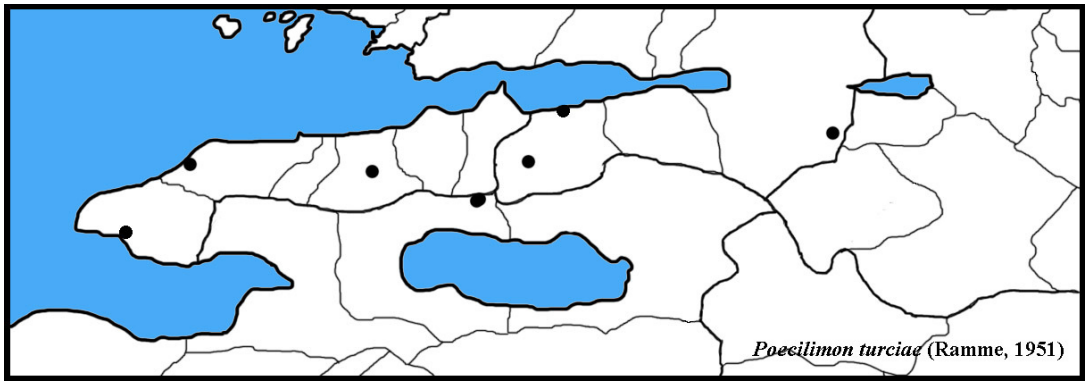

Figure 3.13. The sampling locations of *Poecilimon turciae* (Ramme, 1951) in Samanlı Mountains.

3.1.1.2. Subfamily: *CONOCEPHALINAE* Stal, 1874

Key to the Genus of *Conocephalinae*

1. First and second femora with big spine; fastigium elongate as cone and with a tubercle at base, first segment of antenna wider than scapus (Figure 5.27) ……..…….. ***Ruspolia***

-. First and second femora without big spine; fastigium not elongate as cone and without any tubercle at base, first segment of antenna narrower than scapus (Figure 5.26) ……...…… ***Conocephalus***

Genus: *Conocephalus* Thunberg, 1815

***Conocephalus (Xiphidion) fuscus* (Fabricius, 1793)**

Material Examined:

Bilecik, Çerkesli, Yeşilçimen village., 40.42670″ N, 29.90512″ E, 280 m,2♂, 1♀; Kocaeli,between Kocaeli and Acısu, 40.73085″ N, 30.06380″ E, 35 m, 26.9.2009, 1♂, 1♀; Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 27.9.2009, 1♀; Yalova, Çınarcık, Delmece upland, 40.56282″ N, 29.00714″ E, 712 m, 10.10.2009, 2♀.

Distribution:

North Africa, Middle and South Europe, Balkans, Anatolia, MiddleEast , Caucasia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Adıyaman, Amasya, Ankara, Antalya, Artvin, Bingöl, Bitlis, Bursa, Çorum, Diyarbakır, Elazığ, Erzurum, Eskişehir, Hakkari, Hatay, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Mardin, Nevşehir, Rize, Siirt, Şanlıurfa, Tekirdağ, Tunceli, Van (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Demirsoy, 1975; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997; Önder et al., 1999; Çıplak et al.., 1996; Sevgili and Çıplak, 2000).

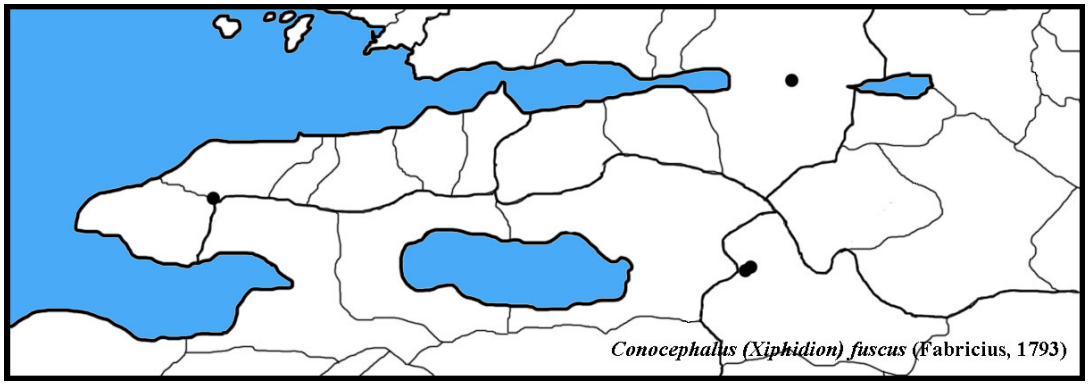

Figure 3.14. The sampling locations of *Conocephalus (Xiphidion) fuscus* (Fabricius, 1793) in Samanlı Mountains.

***Ruspolia nitidula* (Scopoli, 1796)**

Homorocoryphus nitidulus (Scopoli), 1786: Karabağ, 1958, Orth. Faun. Turkey, Um. 81, Zooloji 4: 42, Yalova, 31.7.1910, 1♀ (Fahringer) from Ebner, 1919.

Material Examined:

Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 17.9.2009, 1♂.

Distribution:

Africa, South Europe, Balkans, Anatolia, West Asia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Ankara, Artvin, Bursa, Hatay, İçel, İstanbul, Kastamonu, Kars, Kırklareli, Kocaeli, Rize, Samsun, Tekirdağ, Trabzon (Karabağ, 1958, 1964; Karabağ et al., 1971, 1974, 1980; Salman, 1978; Güneş, 1984; Naskrecki, 1991; Ünal, 1999; Önder et al., 1999).

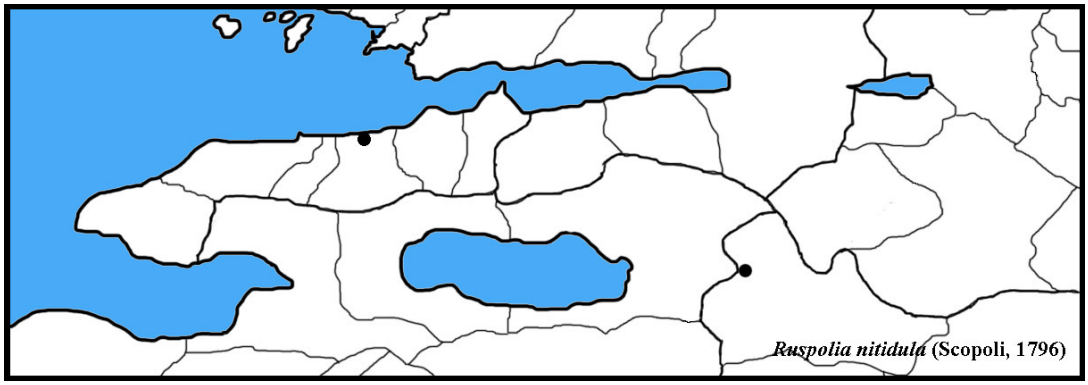

Figure 3.15. The sampling locations of *Ruspolia nitidula* (Scopoli, 1796) in Samanlı Mountains.

3.1.1.3. Subfamily: *SAGINAE* Stal, 1874

Genus: *Saga* Charpentier, 1825

Saga natoliae Serville, 1838

Material Examined:

Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380 m, 6.6.2009, 2♂ (nymph); Kocaeli, Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 285 m, 25.7.2009, 1♂; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 27.9.2009, 1♀.

Distribution:

Thrace, Balkans, Anatlia, Syria, Palestine. Distribution in Turkey: Aydın, İzmir, Balıkesir, İstanbul, Bursa, Manisa, Muğla, Hatay, Maraş, Dıyarbakır (Karabağ, 1958; Harz, 1969; Karabağ et al., 1971; Önder, 1999c).

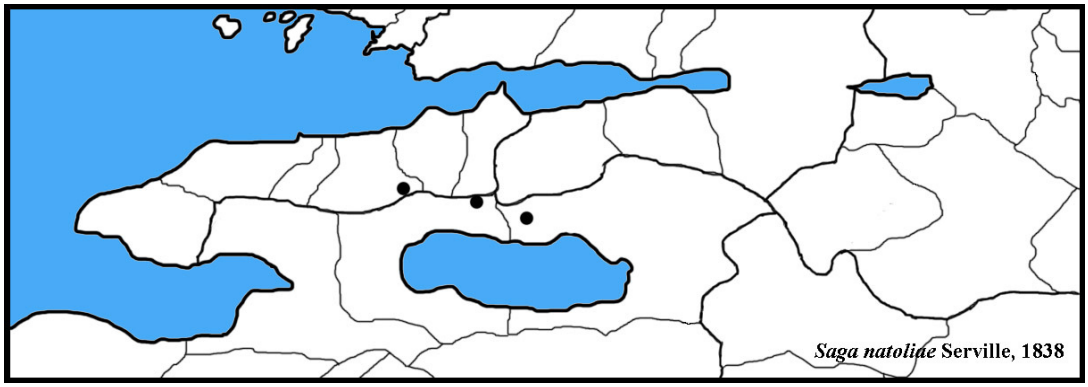

Figure 3.16. The sampling locations of *Saga natoliae* Serville, 1838 in Samanlı Mountains.

3.1.1.4. Subfamily: *TETTIGONIINAE* Krauss, 1902

Key to genus of *Tettigoniinae*

1. Fastigium ¼ times narrower than scapus (Figure 5.30.) ……. ***Tettigonia***

-. Fastigium as broad as or broader than scapus (Figure 5.28.) …….. 2

2. Post tibia with two equal length apical spurs ventrally ……..….. ***Rhacocleis***

-. Post tibia with four apical spurs ventrally (Figure 5.29.) ..…..…… 3

3. Fore tibia with 4 spines dorsally (Figure 5.19.) ...……...…… 4

-. Fore tibia with 1-3 spines dorsally ……...…….…….. 5

4. Pronotum dorsally straight in lateral view; median carina distinct (Figure 5.31.) …… ***Decticus***

-. Pronotum dorsally convex in lateral view, without median carina (Figure 5.32.) .... ……. ***Bucephaloptera***

5. Pronotum with median carina (Figure 5.33.) ...…….……..…… 6

-. Pronotum without median carina (Figure 5.35.) ……..… 8

6. Ovipositor short, almost twice as long as pronotum, strongly upcurved …… 7

Ovipositor long, 3 times longer than pronotum, almost straight …… ***Bolua***

7. Radial area of tegmina darkened with black spots; longitudinal veins light (Figure 5.34. - Figure 5.43.) ..…… ***Platycleis***

-. Radial area of tegmina unicolor without black spots; longitudinal veins not light ..……...…….……...…… ***Metrioptera***

8. Last abdominal tergit black ……..……... ***Eupholidoptera***

_. Last abdominal tergit concolour with the other tergite ……..…….. 9

9. Posterior margin of pronotum distinctly rounded (Figure 5.35.), pronorum cylindrical sulcus in front of the middle …….…..… ***Parapholidoptera***

-. Posterior margin of pronotum truncate, pronotum slightly to strongly flattened dorsally, sulcus in the middle or behind it (Figure 5.21.) ……...… ***Pholidoptera***

Genus: *Tettigonia* Linnaeus, 1758

Key to Species of *Tettigonia*

1. Cerci of the male reaching far beyond the styles, ovipositor at most reaching 1-2 mm beyond the tegmina; often shorter ...…… ***Tettigonia viridissima* Linnaeus, 1758**

-. Cerci of the male scarcely reaching beyond the styles, ovipositor reaching far beyond the tegmina; often shorter …… ***Tettigonia caudata* Charpentier, 1845**

***Tettigonia viridissima* Linnaeus, 1758**

Material Examined:

Kocaeli, Karamürsel, Kızderbent Village, 235 m, 13.6.2007, 6♂, 8♀; Yalova, Esenköy, 40.63° N, 28.07° E, 176 m, 22.6.2008, 1♀; Yalova, Altınova, between Soğuksu and Karadere, 40.65° N, 29.49° E, 32 m, 5.6.2009,1♀; Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380 m, 6.6.2009, 1♂; Kocaeli, Derbent, Acısu, 40.72877″ N, 30.07275″ E, 62 m, 1.7.2009, 1♂, 1♀; Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009, 1♀.

Distribution:

North Africa, Middle and South Europe, Balkans, Anatolia, MiddleEast , Caucasia, Palearctic Asia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Afyonkarahisar,Ankara, Antalya, Artvin, Aydın, Bingöl, Bolu, Bursa, Diyarbakır, Elazığ, Erzincan, Erzurum, Eskişehir, Giresun, Hatay, Hakkari, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Kırklareli, Konya, Malatya, Manisa, Mardin, Muğla, Nevşehir, Ordu, Sakarya, Samsun, Siirt, Sinop, Sivas, Tunceli (Karabağ, 1958; Karabağ et al., 1971, 1980; Demirsoy, 1975; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki and Ünal, 1995; Ünal, 1997; 1999; Önder et al., 1999).

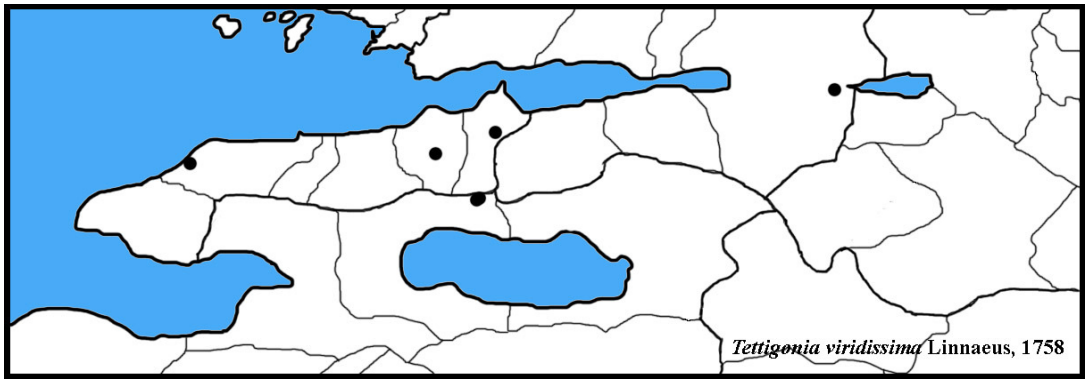

Figure 3.17. The sampling locations of *Tettigonia viridissima* Linnaeus, 1758 in Samanlı Mountains.

***Tettigonia caudata* Charpentier, 1845**

Material Examined:

Kocaeli, Karamürsel, Yalakdere, 40.61°N, 29.57° E, 160 m, 21.6.2008, 1♂.

Distribution:

Middle and East Europe, Balkans, Anatolia, Caucasia, MiddleEast , West Siberia, West Asia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Adıyaman, Ağrı, Ankara, Antalya, Artvin, Bingöl, Bursa, Diyarbakır, Edirne, Eskişehir, Elazığ, Erzurum, Hakkari, İzmir, Kırklareli, Malatya, Mardin, Niğde, Şanlıurfa, Tekirdağ, Van (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Demirsoy, 1975; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Naskrecki, 1991; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Sevgili and Çıplak, 2000).

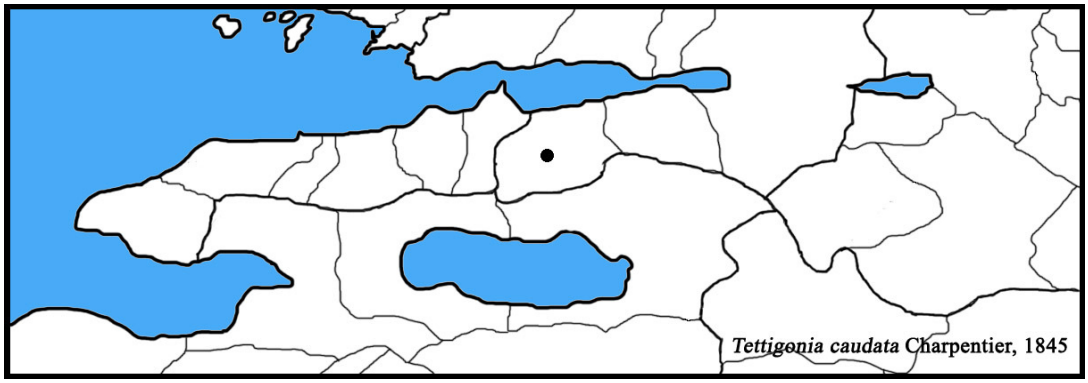

Figure 3.18. The sampling locations of *Tettigonia caudata* Charpentier, 1845 in Samanlı Mountains.

Genus: *Decticus* Serville, 1831

Key to Species of *Decticus*

1. Cerci of the male with an inner tooth about in the middle (Figure 5.45.), subgenital plate of the female with a narrow excision (Figure 5.46.), without conspicuous side sclerite ……..... ***Decticus verrucivorus*** **(Linnaeus, 1758)**

-. Cerci of the mele with a basal tooth (Figure 5.44.), subgenital plate roundly emarginated, with a conspicuous side sclerite (Figure 5.47.) ……..…….. …… ***Decticus albifrons*** **(Fabricius, 1775)**

Decticus verrucivorus **(Linnaeus, 1758)**

Decticus verrucivorus (Linnaeus 1758:431): Ünal, 1999, J. Orthop. Res. No. 8, 245, Bursa, Orhangazi, Sugören, 400 m, 1♂, 1♀ (M. Ünal).

Material Examined:

Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009, 1♂; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 3.7.2009, 1♂, 1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 24.7.2009, 1♀.

Distribution:

Scandinava, West Europe, Balkans, Anatolia, Caucasia, Middle Asia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Ankara, Ağrı, Antalya, Artvin, Aydın, Bursa, Edirne, Elazığ, Erzurum, Hakkari, İstanbul, İzmir, Kahramanmaraş, Kars, Kırklareli, Malatya, Sakarya, Sivas, Tekirdağ, Van (Karabağ, 1958; Karabağ et al., 1872, 1974, 1980; Demirsoy, 1975; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Naskrecki, 1991; Çıplak et al., 1996; Önder et al., 1999; Ünal, 1999).

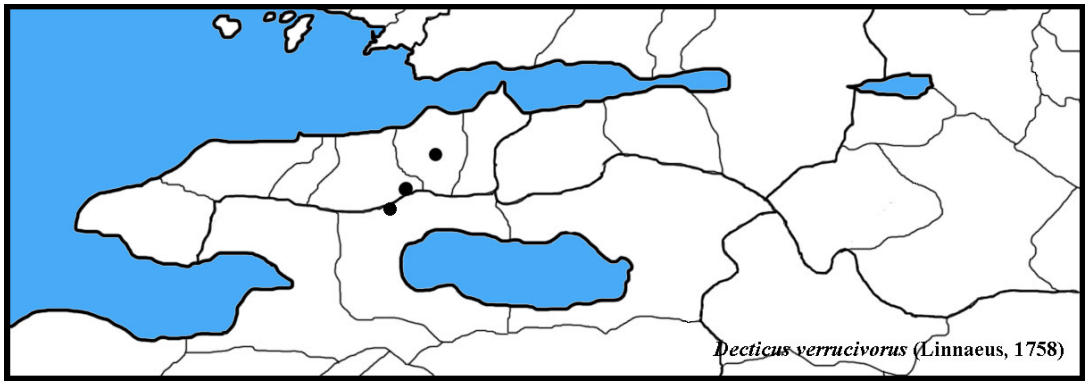

Figure 3.19. The sampling locations of *Decticus verrucivorus* (Linnaeus, 1758) in Samanlı Mountains.

***Decticus albifrons* (Fabricius, 1775)**

Decticus albifrons (Fabricius), 1793: Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 76, Yalova; Bursa; İznik.

Decticus albifrons (Fabricius, 1775): Ünal, 2006, Transaction of American Entomological Society Volume 132, Number 1+2:160, Kocaeli, Karamürsel, 400m., 8.8.1993, 2♂ (M.Ünal) (AİBÜEM).

Decticus albifrons (Fabricius 1775): Ünal, 1999, J. Orthop. Res. No. 8,245, Bursa, Orhangazi, Güneyköy, 350m., 7.8.1993, 1♂, 2♀ (M. Ünal).

Material Examined:

Bursa, İznik-Orhangazi road, 40.48° N, 29.54° E, 90 m, 23.8.2008, 1♂; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 1♀; Bursa, İznik yolu Elbeyli ayrımı, 40.45° N, 29.71° E, 86 m, 30.8.2008, 1♂; Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 1♂; Yalova, Soğucak, 40.59876″ N, 29.27377″ E, 110 m, 1.9.2008, 1♂,1♀; Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009, 3♂, 1♀; Kocaeli, Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 285 m, 25.7.2009, 1♂; Yalova, Sugören, Höyüktepe, 40.57° N. 29.34° E, 661 m, 27.9.2009, 1♂; Yalova, Termal, 40.61320 N, 29.16155″ E, 220 m, 10.10.2009, 1♂.

Distribution:

North Africa, Canary Islands, South, Middle and East Europe, Balkans, Anatolia, Caucasia, MiddleEast , SouthWest Asia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Ağrı, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bursa, Çanakkale,

Diyarbakır, Edirne, Elazığ, Erzurum, Gaziantep, Hatay, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Manisa, Mardin, Samsun, Şanlıurfa, Tekirdağ, Zonguldak (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Demirsoy, 1975; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1999; 2001; Önder et al., 1999; Sevgili and Çıplak, 2000).

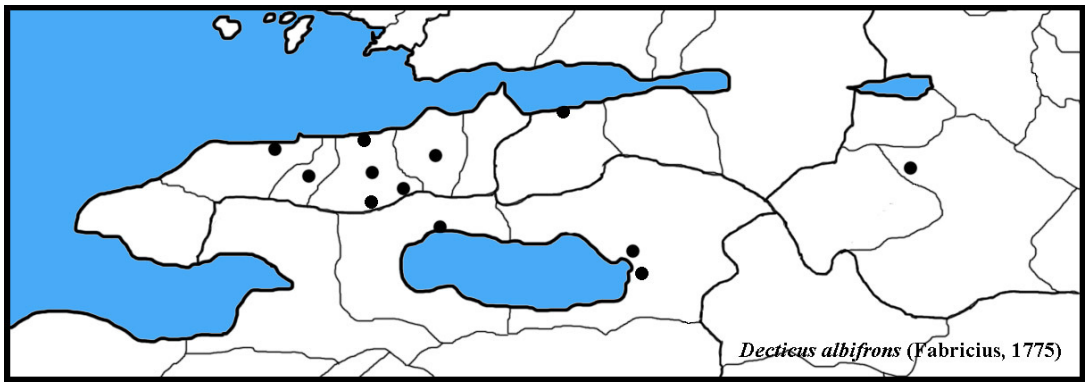

Figure 3.20. The sampling locations of *Decticus albifrons* (Fabricius, 1775) in Samanlı Mountains.

Genus: *Platycleis* Fieber, 1852 *s.l.*

Key to Subgenus of *Platycleis*

1. Radial field of tegmina mostly unicoloured, at most with uncertainly delimited dark spots, transverse veins not enclosed by light and not enclosed by light spots …….. ***(Sepiana)***

-. Tegmina, especially in the radial field, with distinct dark pots, transverse veins light ……. 2

2. Tegmina longer than abdomen (Figure 5.34.); the base of ovipositor cream color, remaining part darkbrawn-black color ……..…….. ***(Platycleis)***

-. Tegmina shorter than abdomen (Figure 5.43.); ovipositor light color, at most the tip of ovipositor dark ……..…… ***(Incertana)***

Subgenus: *Platycleis* Fieber, 1852 *s.str.*

Key to species of (*Platycleis*)

1. Cubitus outstandingly light coloured in its basal part, if not so conspicuous, than popstfemura 26 mm and more in length and titilator like Figure 5.42 …..……..…. 2

-. Cubitus not outstandingly light coloured in its basal part, if popstfemura 26 mm and more in length, than titilator not with coarse teeth (Figure 5.37); 7th tegmina like Figure 5.39. ....…….....

……..…… ***Platycleis (Platycleis) intermedia*** **(Serville, 1838)**

2. Titillators robust strongly toothed (Figure 5.42) ……...…...

……..... ***Platycleis (Platycleis) escalerai*** **Bolivar, 1899**

-. Titillators slender, weakly toothed (Figure 5.41); 7th tegmina like Figure 5.40. ……

…….... ***Platycleis (Platycleis) affinis*** **Fieber, 1853**

Platycleis (Platycleis) intermedia intermedia **(Serville, 1838)**

Platcleis (Platcleis) intermedia intermedia (Serville 1839): Ünal, 1999, J. Orthop. Res. No. 8,245, Bursa, Orhangazi, Sugören, 400m., 7.8.1993, 1♀; Bursa, İznik, 470m., 7.8.1993, 1♀ (M. Ünal).

Material Examined:

Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009, 2♂, 1♀; Bursa. İznik, close to Hacıosman Village, 40.58° N, 29.83° E, 935 m, 23.7.2009, 1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 24.7.2009, 1♀; Kocaeli, Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 285 m, 25.7.2009, 1♀; Bursa, İznik, between Hacıosman and Ayvazpınar, 40.61467″ N, 29.74994″ E, 850 m, 22.8.2009, 1♀.

Distribution:

Morocco, South Europe, Balkans, Anatolia, MiddleEast, Caucasia, West, East and Middle Asia (Zeuner, 1941; Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Afyonkarahisar, Ağrı, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bingöl, Bitlis, Burdur, Bursa, Çankırı, Denizli, Diyarbakır, Elazığ, Erzincan, Erzurum, Eskişehir, Gaziantep, Hatay, Hakkari, Isparta, İçel, İstanbul, İzmir, Kahramanmaraş, Karaman, Kars, Kastamonu, Kayseri, Kırklareli, Konya, Kütahya, Malatya, Manisa, Mardin, Muğla, Nevşehir, Niğde, Sakarya, Siirt, Sivas, Şanlıurfa, Tekirdağ, Tokat, Trabzon, Tunceli, Van, Zonguldak (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Demirsoy, 1975; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997; 1999; 2001; Sevgili and Çıplak, 2000; Çıplak et al., 2002; Önder et al., 1999).

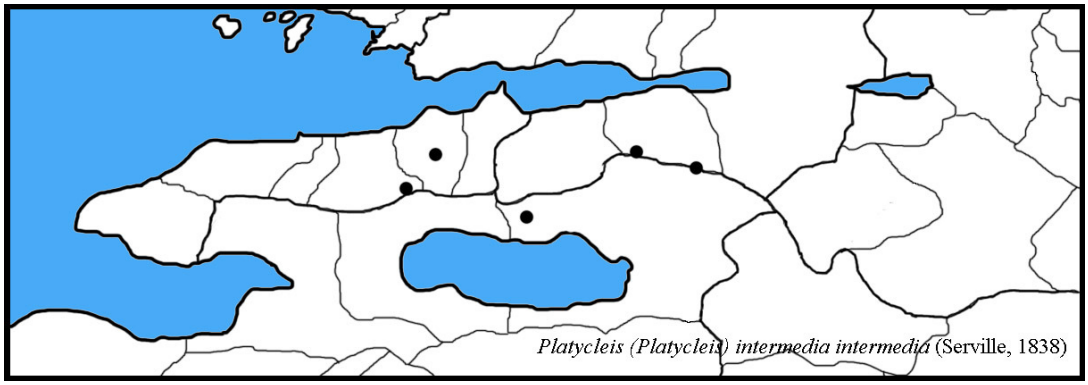

Figure 3.21. The sampling locations of *Platycleis (Platycleis) intermedia intermedia* (Serville, 1838) in Samanlı Mountains.

***Platycleis (Platycleis) affinis affinis* Fieber, 1853**

Material Examined:

Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008, 2♀; Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009, 1♂; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 3.7.2009, 1♂; Bursa. İznik, close to Hacıosman Village, 40.58° N, 29.83° E, 935 m, 23.7.2009, 1♂; Bursa, İznik, Sarıağıl, 40.56256″ N, 29.67435″ E, 590 m, 6.8.2009, 1♂, 1♀; Bursa, İznik, Osmaniye, 40.60796″ N, 29.70397″ E, 850 m, 6.8.2009, 1♂; Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 17.9.2009, 1♂, 1♀.

Distribution:

North Africa, South, Middle and East Europe, Balkans, Anatolia, MiddleEast, Caucasia (Zeuner, 1941; Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Afyonkarahisar, Ankara, Antalya, Balıkesir, Burdur, Bursa, Çankırı, Denizli, Erzincan, Eskişehir, Gaziantep, Isparta, İçel, İstanbul, İzmir, Kahramanmaraş,

Karaman, Kayseri, Kırıkkale, Konya, Kütahya, Malatya, Manisa, Nevşehir, Niğde, Sivas, Tekirdağ (Karabağ, 1958; Karabağ et al., 1980; Güneş, 1984; Naskrecki, 1991; Ünal, 1997; 1999; 2001; Önder., 1999; Sevgili and Çıplak, 2000; Çıplak et al., 1996; 2002).

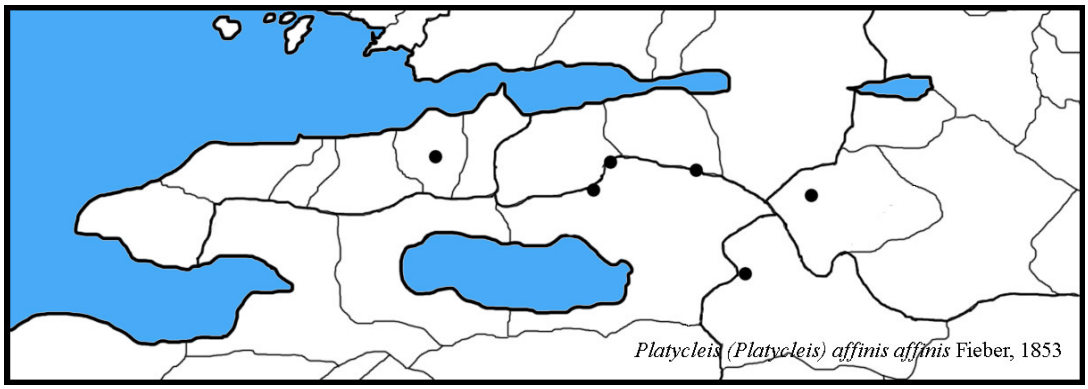

Figure 3.22. The sampling locations of *Platycleis (Platycleis) affinis affinis* Fieber, 1853 in Samanlı Mountains.

***Platycleis (Platycleis) escalerai escalerai* Bolivar, 1899**

Platycleis (Platycleis) escalerai Bolivar, 1899: Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 65, Yalova, 2♂ (Ş. Tunçak).

Platycleis (Platycleis) escalerai escalerai Bolivar 1899: Ünal, 1999, J. Orthop. Res. No. 8, 245, Bursa, Orhangazi, Sugören, 400m., 7.8.1993, 1♀ (M. Ünal).

Material Examined:

Kocaeli, Karamürsel, Çamdibi, 40.58° N, 29.54° E, 144m., 23.8.2008, 1♂.

Distribution:

North Africa, East Mediterranean Island, East Europe, Balkans, Anatolia, MiddleEast, Caucasia (Zeuner, 1941; Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Ağrı, Antalya, Ankara, Artvin, Bursa, Diyarbakır, Elazığ, Erzurum, Gaziantep, Hatay, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Kayseri, Kırklareli, Malatya, Manisa, Nevşehir, Şanlıurfa, Tekirdağ; Yalova (Karabağ, 1958; Karabağ et al., 1971, 1980; Demirsoy, 1975; Salman, 1978; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; 2002; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997; 1999; Önder et al., 1999; Sevgili and Çıplak, 2000).

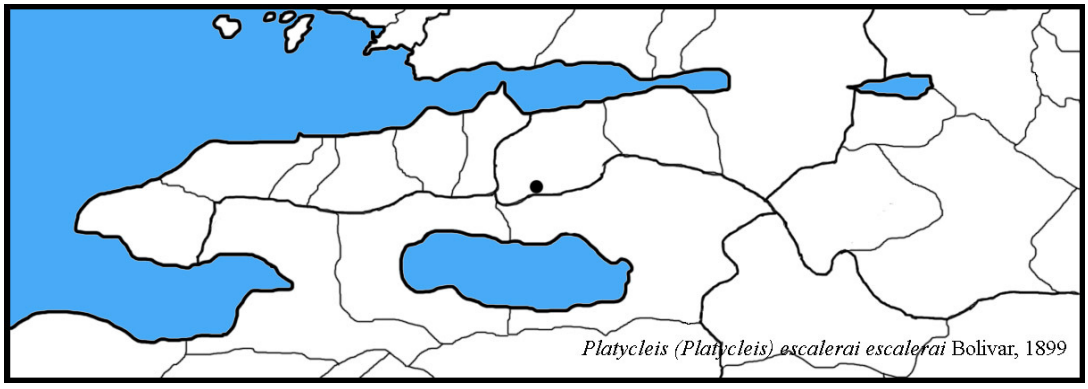

Figure 3.23. The sampling locations of *Platycleis (Platycleis) escalerai escalerai* Bolivar, 1899 in Samanlı Mountains.

Subgenus: *Incertana* Zeuner, 1941

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

Platycleis (Incertana) incerta (Brunner von Wattenwyl, 1882): Ünal, 2006, Transaction of American Entomological Society Volume 132, Number 1+2, 176, Yalova, 9.8.1962, 1♀ (leg. K. M. Guichard and D. H. Harvey) (NHM).

Platycleis incerta Brunner von Wattenwyl 1882: Ünal, 1999, J. Orthop. Res. No. 8,246, Yalova, Güneyköy, 350 m., 7.8.1993, 1♂; Bursa, İznik, 440 m, 7.8.1993, 1♂, 1♀; Kocaeli, Karamürsel, 400 m, 8.8.1993, 3♂, 3♀, 1 nymph.

Material Examined:

Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 6.6.2008, 1♂; Kocaeli, Derbent, 6.6.2008, 3♀; Kocaeli, Karamürsel, Çamdibi, 40.58° N, 29.54° E, 144 m, 23.8.2008, 2♀; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 2♂; Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355 m, 31.8.2008, 1♂; Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 2♀; Kocaeli, Kartepe, between 1600 m and 1500 m, 1.7.2009, 1♂; Kocaeli, Gölcük, Yazlık, 40.70° N, 29.86° E, 16 m, 23.7.2009, 1♂; Yalova. Altınova, Fevziye Village, Valide Under bridge, 40.60250″ N, 29.52918″ E, 96 m, 25.7.2009, 2♂, 1♀; Bursa, İznik, Sarıağıl, 40.56256″ N, 29.67435″ E, 590 m, 6.8.2009, 1♀; Bursa, İznik, Osmaniye, 40.60796″ N, 29.70397″ E, 850 m, 6.8.2009, 1♂; Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 17.9.2009, 1♀.

Distribution:

Balkans, Anatolia, Syria. Distribution in Turkey: İstanbul, Balıkesir, Konya, Aksaray, Düzce, Zonguldak, Bartın, Kırklareli, Bursa, Kocaeli, Sakarya, İzmir, Tekirdağ, Eskişehir, Adana, Manisa (Karabağ, 1958; Harz, 1969; Karabağ et al.: 1971, 1980; Ünal, 1999, 2006; Önder, 1999).

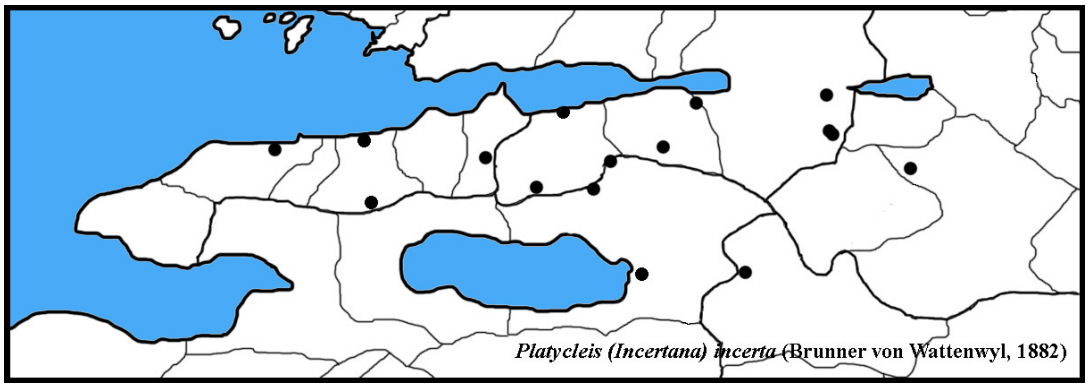

Figure 3.24. The sampling locations of *Platycleis (Incertana) incerta incerta* (Brunner von Wattenwyl, 1882) in Samanlı Mountains.

Subgenus: *Sepiana* Zeuner, 1941

***Platycleis (Sepiana) sepium* (Yersin, 1854)**

Sepiana sepium (Yersin 1854): Ünal, 1999, J. Orthopt. Res. No. 8,246, Kocaeli, Karamürsel, 400m., 8.8.1993, 1♂, 2♀ (M.Ünal).

Material Examined:

Yalova, Soğucak, 40.59876″ N, 29.27377″ E, 110 m, 1.9.2008, 1♂, 1♀, Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380 m, 24.7.2009, 2♀; Kocaeli,

Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 285 m, 25.7.2009, 1♂, 1♀.

Distribution:

Europe, Caucausu, Anatolia, Aegen İsland. Distribution in Turkey: İstanbul, Kocaeli, Düzce, İstanbul, Samsun, İzmir (Harz, 1969; Karabağ et al., 1980; Ünal, 1999, 2006).

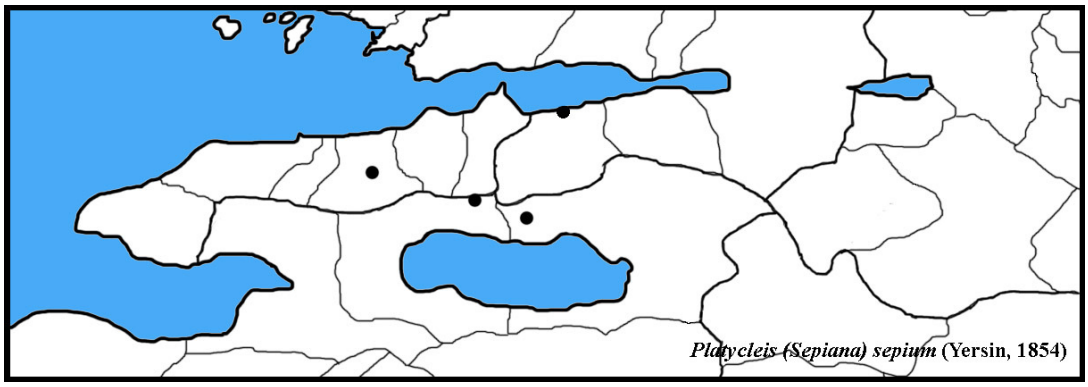

Figure 3.25. The sampling locations of *Platycleis (Sepiana) sepium* (Yersin, 1854) in Samanlı Mountains.

Genus: *Pholidoptera* Wasmael, 1838

***Pholidoptera griseoaptera* (De Geer, 1773)**

Material Examined:

Kocaeli, Bahçecik, between Servetiye and Kazandere, 40.62° N, 29.89° E, 984 m, 8.6.2008, 1♂, 1♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 24.8.2008, 3♂, 1♀; Kocaeli, Kartepeden decended form peak, 40.64° N, 30.10° E, 1500 m,

22.7.2009, 2♂; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 5.8.2009, 3♂, 2♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 16.9.2009, 1♂, 4♀;

Distribution:

Spain, England, Northern İtaly, Crinea, Caucausu and Transcaucacian, Balkans, Anatolia. Distribution in Turkey: Düzce, Bolu, Trabzon. (Ünal, 2006)

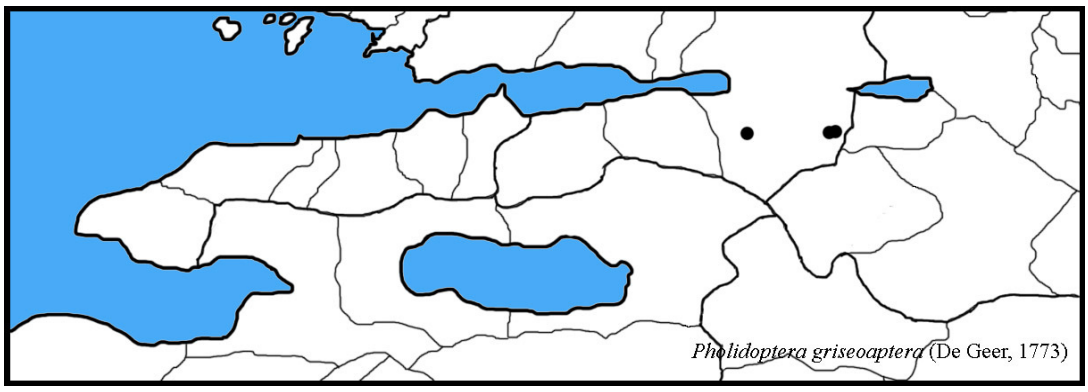

Figure 3.26. The sampling locations of *Pholidoptera griseoaptera* (De Geer, 1773) in Samanlı Mountains.

Genus: *Eupholidoptera* Maran, 1953

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

Eupholidoptera smyrnensis (Br.-W.), 1882: Karabağ, 1958, Orthoptera Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 56, Bursa, İznik.

Material Examined:

Kocaeli, Derbent, Acısu, 40.72877″ N, 30.07275″ E, 62 m, 1.7.2009, 3, 2♀; Yalova. Altınova, Fevziye Village, Valide Under bridge, 40.60250″ N, 29.52918″ E, 96 m, 25.7.2009, 1♂.

Distribution:

Aegen İsland, Greece, Anatolia, Balkans. Distribution in Turkey: İstanbul, Aydın, İzmir, Manisa, Bursa, Maraş (Karabağ, 1958; Karabağ et al., 1980; Ünal, 2006).

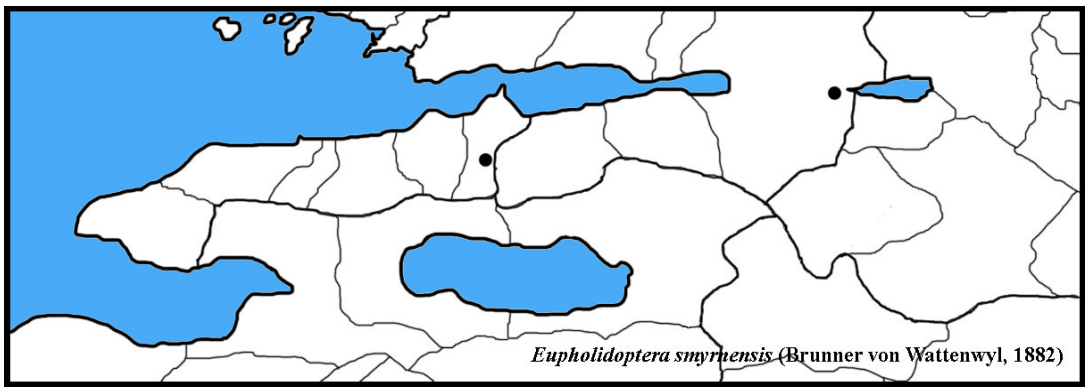

Figure 3.27. The sampling locations of *Eupholidoptera smyrnensis* (Brunner von Wattenwyl, 1882) in Samanlı Mountains.

Genus: *Parapholidoptera* Maran, 1953

***Parapholidoptera castaneoviridis* (Brunner von Wattenwyl, 1882)**

Material Examined:

Kocaeli, Derbent, Acısu, 40.72877″ N, 30.07275″ E, 62 m, 1.7.2009, 3♂, 2♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 3.7.2009, 4♂, 4♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 24.7.2009, 3♂, 4♀; Kocaeli,

Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 285 m, 25.7.2009, 2♂, 1♀; Yalova. Altınova, Fevziye village, Valide under bridge, 40.60250″ N, 29.52918″ E, 96 m, 25.7.2009, 2♂.

Distribution:

Balkans, Anatolia. Distribution in Turkey: Bursa, İzmir, Edirne, Manisa, Aydın (Karabağ et al., 1980; Ünal, 2006).

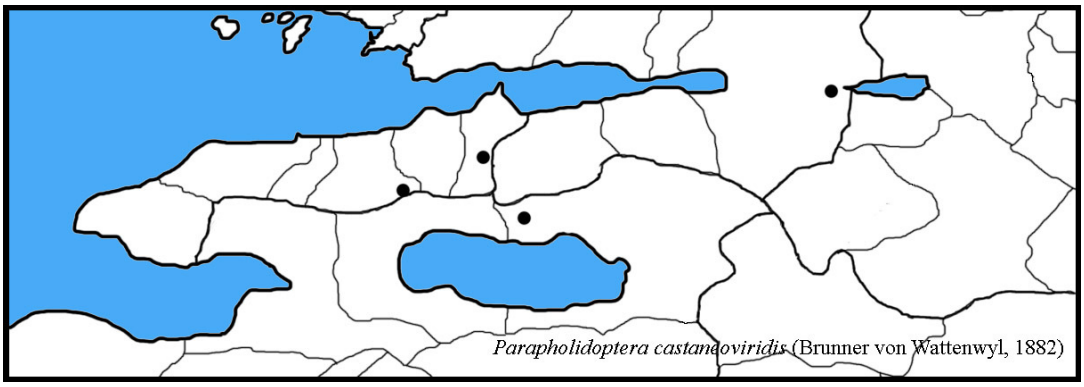

Figure 3.28. The sampling locations of *Parapholidoptera castaneoviridis* (Brunner von Wattenwyl, 1882) in Samanlı Mountains.

Genus: *Bolua* Ünal, 1999

***Bolua turkiyae* Ünal, 1999**

Material Examined:

Kocaeli, Bahçecik, between Servetiye and Kazandere, 40.62° N, 29.89° E, 984 m, 8.6.2008, 1♀ nymph; Bursa, İznik, Kızderbent, 40.56°N, 29.52° E, 236 m, 21.6.2008, 1♀ nymph.; Sakarya, Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m,

30.8.2008, 1♂; Yalova, Altınova, between Soğuksu and Karadere, 40.65° N, 29.49° E, 32 m, 5.6.2009, 1♂ nymph; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 22.8.2009, 1♂ nymph.; Bursa, İznik, Gürmüzlü, 40.50802″ N, 29.77961″ E, 500 m, 23.7.2009, 1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 24.7.2009, 1♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 9.10.2009, 1♂, 1♀.

Distribution:

North West Anatolia. Distribution in Turkey: Bolu, Düzce, Zonguldak, Karabük, Bilecik, Bursa, Kütahya (Ünal, 1999, 2006).

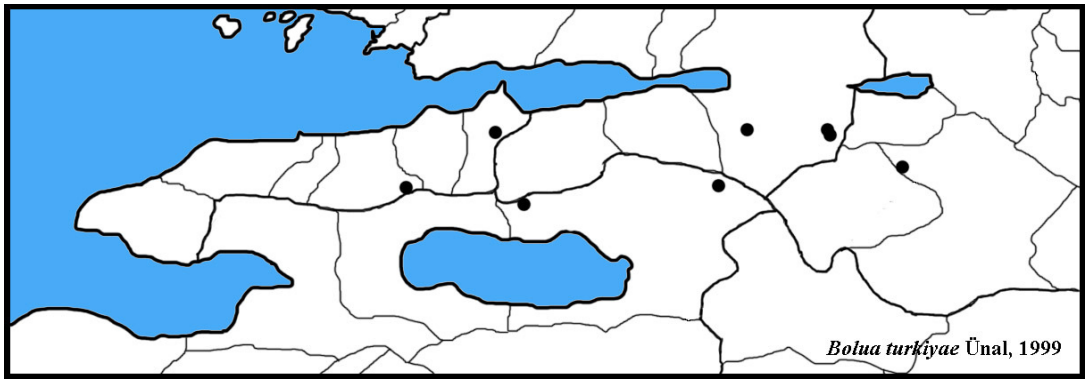

Figure 3.29. The sampling locations of *Bolua turkiyae* Ünal, 1999 in Samanlı Mountains.

***Genus: Metrioptera* Wesmael, 1838**

***Subgenus: Roeseliana* Zeuner, 1941**

***Metrioptera (Roeseliana) bispina* (Bolívar, 1899)**

Metrioptera (Roeseliana) bispina (Bolivar), 1899: Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 72, 1 ♀.

Maternial Examined:

Kocaeli, Karamürsel, Yalakdere, 40.61° N, 29.57° E, 160 m, 21.6.2008, 1 ♀.

Distribution:

SouthEast Balkans, Anatolia (Zeuner, 1941; Ramme, 1951; Harz, 1969). Distribution in Turkey: Ağrı, Ankara, Bursa, Diyarbakır, İstanbul, İzmir, Kahramanmaraş, Kayseri, Konya, Van (Karabağ, 1958; Karabağ et al., 1980; Salman, 1978; Güneş, 1984; Ünal, 1999).

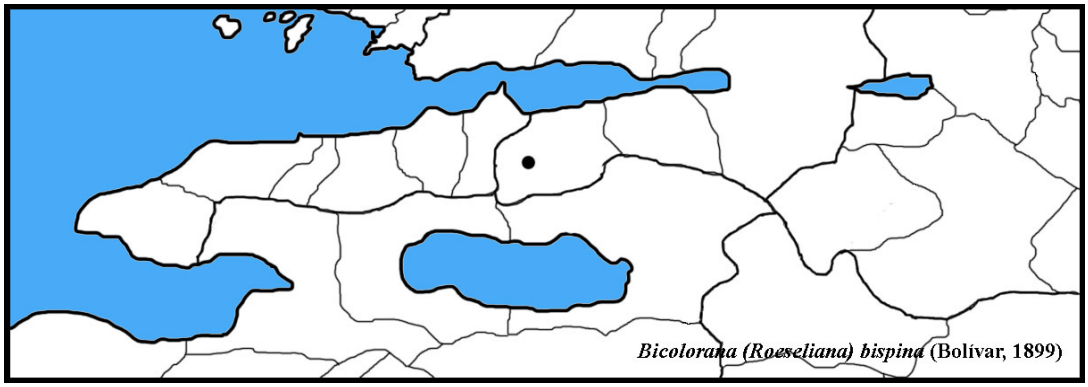

Figure 3.30. The sampling locations of *Metrioptera (Roeseliana) bispina* (Bolívar, 1899) in Samanlı Mountains.

Genus: *Rhacocleis* Fieber, 1853

***Rhacocleis germanica* (Herrich-Schäffer, 1840)**

Rhacocleis germanica (Herrich-Schäffer 1840) : Ünal, 1999, J. Orthop. Res. No. 8, 246

Materrial Examined:

Yalova, Güneyköy, 350 m, 7.8.1993, 3♂, 3♀.

Distribution:

Middle and South East Europe, Balkans, Anatolia. Distribution in Turkey: Edirne, Tekirdağ, Bursa, İstanbul, Kocaeli, Sakarya, Balıkesir, Aydın (Karabağ, 1958; Karabağ et al., 1971,1980; Ünal, 1999; Harz, 1969).

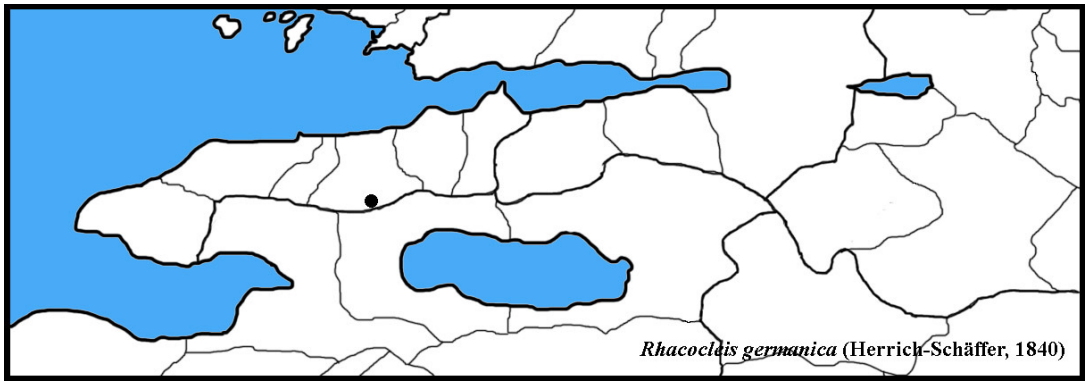

Figure 3.31. The sampling locations of *Rhacocleis germanica* (Herrich-Schäffer, 1840) in Samanlı Mountains.

Genus: *Bucephaloptera* Ebner, 1923

***Bucephaloptera bucephala* (Brunner von Wattenwyl, 1882)**

Bucephaloptera bucephala (Brunner von Wattenwyl 1882): Ünal, 1999,J. Orthop. Res. No. 8, 246, Kocaeli, Karamürsel, 400 m, 8.8.1993, 1♂, 1♀ (M. Ünal).

Material Examined:

Kocaeli, Karamürsel, Çamdibi, 40.58° N, 29.54° E, 144 m, 23.8.2008, 1♂; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 1♀; Yalova, Soğucak, 40.59876″ N, 29.27377″ E, 110 m, 1.9.2008, 1♀; Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009, 2♂, 4♀.

Distribution:

Balkans, Anatolia, West Asia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Afyonkarahisar, Antalya, Ankara, Artvin, Balıkesir, Bursa, Edirne, Elazığ,

Hatay, İçel, İstanbul, İzmir, Kırklareli, Kocaeli, Manisa, Samsun, Tekirdağ (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1999; Önder et al., 1999).

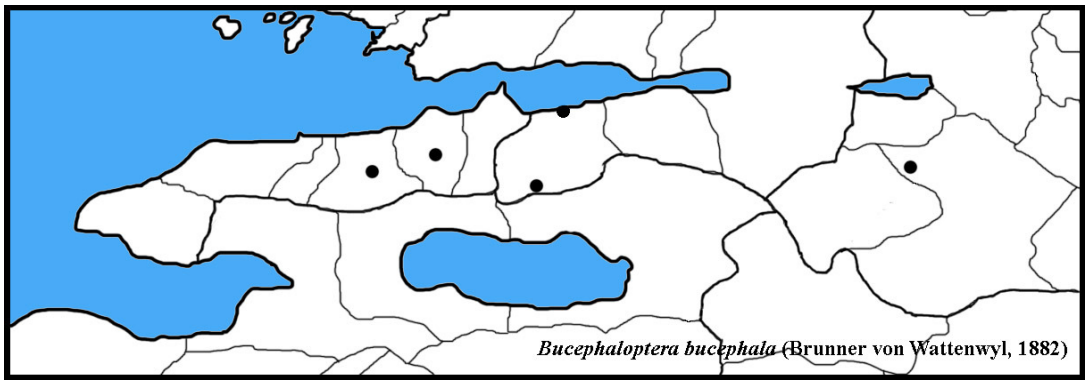

Figure 3.32. The sampling locations of *Bucephaloptera bucephala* (Brunner von Wattenwyl, 1882) in Samanlı Mountains.

3.1.2. Family: *GRYLLIDAE* Laicharting, 1781

Key to Subfamilies of *Gryllidae*

1. Head round, body cylindrical, postfemura with equal spines (Figure 5.50.) ……. 2

-. Head longish, body slender, posttibiae with fine spinules on the apical part dorsally, among them long spines (Figure 5.49.) ……... ***Oecanthinae***

2. Posttibiae with firm spines dorsally which are at most as long as diameter of tibiae (Figure 5.50.) …… ***Gryllinae***

-. Posttibiae with moveable spines the length of which is greater than the diameter of the tibiae (Figure 5.51.) ……..……..…… ***Nemobiinae***

3.1.2.1 Subfamily: *GRYLLINAE* Laicharting, 1781

Key to Genus of *Gryllinae*

1.Dorsal of head with longitudenal and tarnsvers bands or clepeo-frontal suture reach median ocellus or to body light brown ..…… ***Modicogryllus frontalis*** **(Feiber, 1845)**

-. Dorsal of head without bands ……..…….2

2. Body and femora finely and closely hirsute lusterless, if dark, then postfemora not reddish ventrally, apex of the ectoparamere not digitiform, endoparamere with a transverse parameral muscle apodema or internal anterior projection of the octoparamere much longer than the external anterior projection ….… ***Melanogryllus***

-. Body and postfemura without hair or hardly hirsute, shining, the apex of the ectoparamere digitiform endomere without a transverse parameral muscle apodeme ……...… ***Gryllus***

Genus: *Gryllus* Linnaeus, 1758

***Gryllus (Gryllus) campestris* Linnaeus, 1758**

Material Examined:

Yalova, Altınova, Karadere, 40.65532″ N, 29.49313″ E, 30 m, 27.9.2009, 1♂ nymph.

Distribution:

North Africa, Europe, Anatolia, MiddleEast (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Amasya, Ankara, Artvin, Bilecik, Çankırı, Eskişehir,

Elazığ, Erzurum, Erzincan, İzmir, Kahramanmaraş, Karabük, Kayseri, Kırıkkale, Kırşehir, Kırklareli, Konya, Kütahya, Malatya, Nevşehir, Niğde, Şanlıurfa, Tunceli (Karabağ, 1958; Karabağ et al.,1971; Demirsoy, 1975; Salman, 1978; Gümüşsuyu, 1980, 1981a, 1981b; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Ünal, 1999, 2001; Sevgili and Çıplak, 2000).

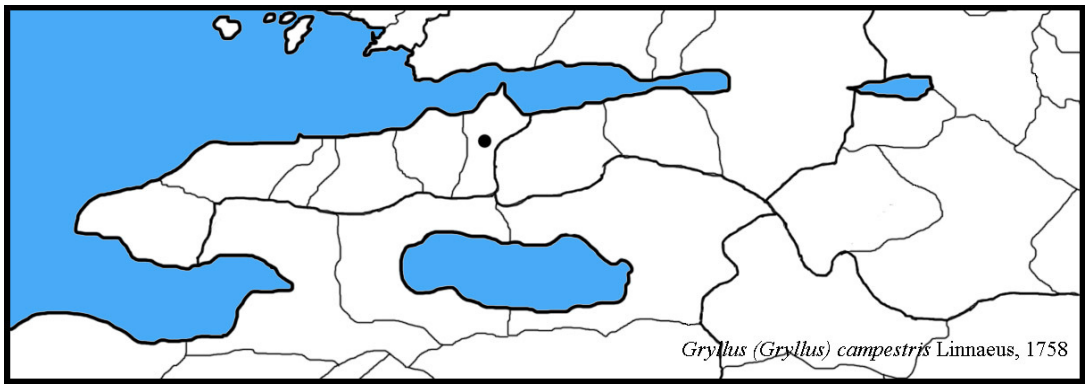

Figure 3.33. The sampling locations of *Gryllus (Gryllus) campestris* Linnaeus, 1758 in Samanlı Mountains.

Genus: *Melanogryllus* Chopard, 1961

***Melanogryllus desertus* (Pallas, 1771)**

Melanogryllus desertus (PALLAS), 1771: Gümüşsuyu, 1981, T.C. Tarım ve Orman Bakanlığı Zirai Mücadele ve Zirai Karantina Enstitüsü Müdürlüğü, Araştırma Eserleri No: 42, 29, Kocaeli, Karamürsel, 7.6.1976, 2♀.

Material Examined:

Kocaeli, Karamürsel, Kızderbent Village, 235 m, 13.6.2007, 3♂, 3♀; Kocaeli, Derbent, Acısu, 40.72877″ N, 30.07275″ E, 62 m, 1.7.2009, 1♂.

Distribution:

South, Middle and East Europe, Balkans, Anatolia, MiddleEast, Caucasia, Middle and West Asia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar, Ağrı, Aksaray, Amasya, Ankara, Antalya, Artvin, Balıkesir, Bartın, Bilecik, Bingöl, Bolu, Bursa, Çankırı, Çorum, Edirne, Elazığ, Erzincan, Erzurum, Diyarbakır, Hatay, Isparta, İstanbul, İzmir, Kahramanmaraş, Karabük, Karaman, Kars, Kastamonu, Kayseri, Kırşehir, Kırıkkale, Kırklareli, Kocaeli, Konya, Kütahya, Malatya, Manisa, Muş, Nevşehir, Niğde, Samsun, Sakarya, Sinop, Şanlıurfa, Tekirdağ, Tunceli (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Demirsoy, 1975; Salman, 1978; Gümüşsuyu, 1979, 1981a, 1981b; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997; Önder et al., 1999; Sevgili and Çıplak, 2000).

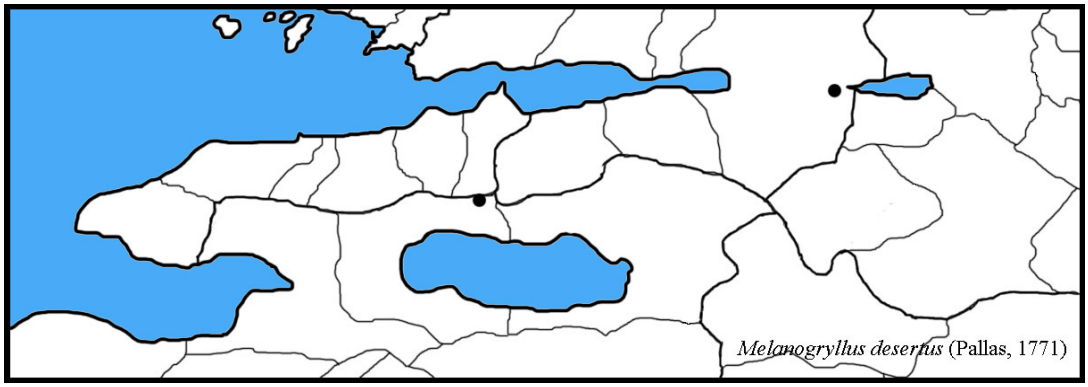

Figure 3.34. The sampling locations of *Melanogryllus desertus* (Pallas, 1771) in Samanlı Mountains.

Genus: *Modicogryllus* Chopard, 1961

***Modicogryllus frontalis* (Feiber, 1845)**

Material Examined:

Kocaeli, Karamürsel, Kızderbent village, 235 m, 13.6.2007, 5♀.

Distribution:

Middle and East Europe, Balkans, Anatolia, Caucasia, West Asia (Ramme, 1951; Harz, 1969). Türkiye'deki yayılış: Adana, Ağrı, Ankara, Antalya, Artvin, Giresun, Hatay, Kars, Nevşehir (Karabağ, 1858; Salman, 1978; Gümüşsuyu, 1980, 1981a; Güneş, 1984; Naskrecki and Ünal, 1995; Ünal, 1997, 2001, Önder et al., 1999).

3.1.2.2. Subfamily: *NEMOBIINAE* Saussure 1877

Genus: *Pteronemobius* Jacobson, 1904

***Pteronemobius (Pteronemobius) heydeni* (Walker, 1871)**

Pteronemobius concolor (WALKER), 1871: Gümüşsuyu, 1981, T.C. Tarım ve Orman Bakanlığı Zirai Mücadele ve Zirai Karantina Enstitüsü Müdürlüğü, Araştırma Eserleri No: 42, 61, Yalova, D. Ü. Ç., 28.8.1973, 6♂, 6♀.

Material Examined:

Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 27.9.2009, 1♂, 1♂ nymph.

Distribution:

South, Middle and East Europe, Balkans, Anatolia, MiddleEast, Caucasia, Middle and West Asia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar, Ağrı, Aksaray, Amasya, Ankara, Antalya, Artvin, Balıkesir, Bartın, Bilecik, Bingöl, Bolu, Bursa, Çankırı, Çorum, Edirne, Elazığ, Erzincan, Erzurum, Diyarbakır, Hatay, Isparta, İstanbul, İzmir, Kahramanmaraş, Karabük, Karaman, Kars, Kastamonu, Kayseri, Kırşehir, Kırıkkale, Kırklareli, Kocaeli, Konya, Kütahya, Malatya, Manisa, Muş, Nevşehir, Niğde, Samsun, Sakarya, Sinop, Şanlıurfa, Tekirdağ, Tunceli (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Demirsoy, 1975; Salman, 1978; Gümüşsuyu, 1979, 1981a, 1981b; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al.,

1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997; Önder et al., 1999; Sevgili and Çıplak, 2000).

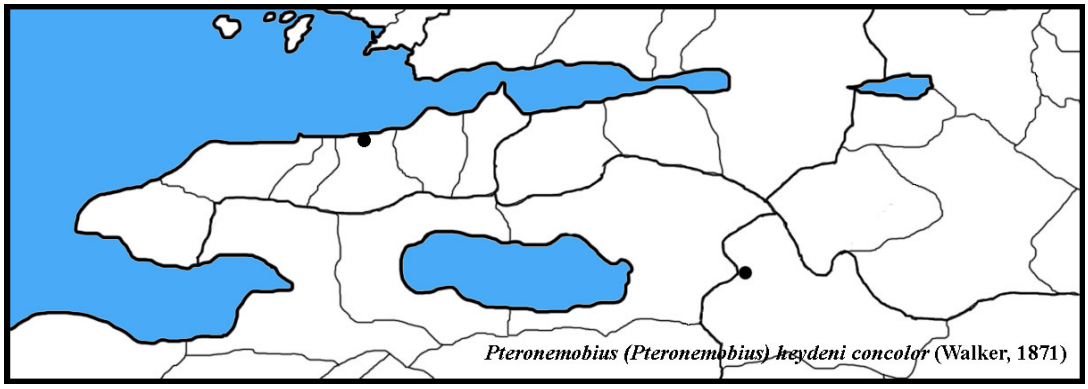

Figure 3.35. The sampling locations of *Pteronemobius (Pteronemobius) heydeni* (Walker, 1871) in Samanlı Mountains.

3.1.2.3. Subfamily: *OECANTHINAE* Blanchard 1845

Genus: *Oecanthus* Serville, 1831

Oecanthus pellucens pellucens (Scopoli, 1763)

Oecanthus pellucens (SCOPILI), 1763: Gümüşsuyu, 1981, T.C. Tarım ve Orman Bakanlığı Zirai Mücadele ve Zirai Karantina Enstitüsü Müdürlüğü, Araştırma Eserleri No: 42, 81, Kocaeli, Karamürsel, Yalakdere, 5.7.1977, 1♂; Yalova, 12.10.1976, 1♀ (İ. Gümüşsuyu).

Oecanthus pellucens (Scopoli, 1763): Ünal, 1999, J. Orthop. Res. No. 8, 247, Bursa, İznik, 470m., 7.8.1993, 1 nymph; Kocaeli, Karamürsel, 400m., 8.8.1993, 2♂, 2 nymph (M. Ünal).

Material Examined:

Bursa, İznik, Osmaniye, 40.60796″ N, 29.70397″ E, 850 m, 6.8.2009, 1♂; Kocaeli, Bahçecik, Servetiye, 40.64500″ N, 29.78088″ E, 511 m, 6.8.2009, 1♂, 1♀.

Distribution:

North Africa, Europe, Anatolia, MiddleEast, Caucasia, West Siberia, West Asia (Ramme, 1951; Harz, 1969). Distribution in Turkey: Adana, Afyonkarahisar, Ağrı, Antalya, Ankara, Antalya, Artvin, Aydın, Bursa, Çorum, Elazığ, Edirne, Eskişehir, Erzincan, Erzurum, Hakkari, Hatay, İçel, İstanbul, İzmir, Kastamonu, Kırklareli, Kocaeli, Malatya, Manisa, Mardin, Niğde, Sakarya, Tekirdağ, Van, Zonguldak (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Demirsoy, 1975; Salman, 1978; Gümüşsuyu, 1980, 1981a, 1981b; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Naskrecki, 1991; Naskrecki and Ünal, 1995; Çıplak et al., 1996; Önder et al., 1999; Ünal, 1999).

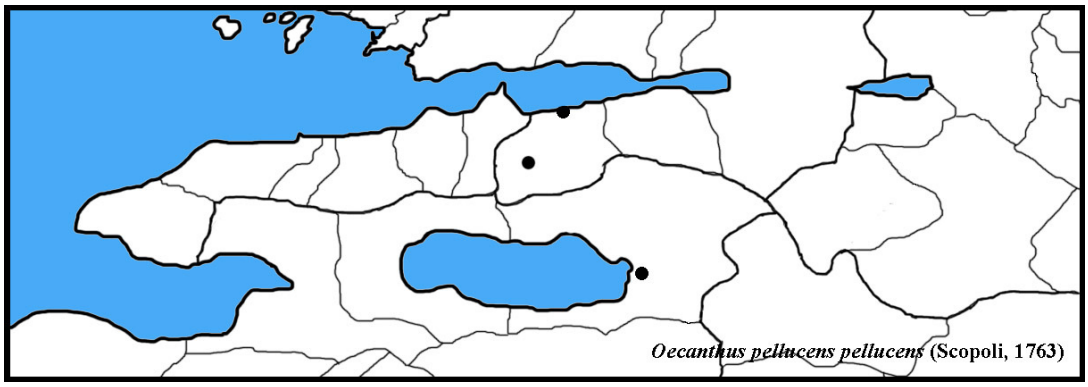

Figure 3.36. The sampling locations of *Oecanthus pellucens pellucens* (Scopoli, 1763) in Samanlı Mountains.

3.1.2.4. Subfamily: *GRYLLOTALPINAE* Leach 1815

Genus: *Gryllotalpa* Latreille, 1802

***Gryllotalpa gryllotalpa* (Linnaeus, 1758)**

Gryllotalpa gryllotalpa (Linnaeus), 1758: Karabağ, 1958, Ortho. Fauna of Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 92, Bursa, İznik.

Material Examined:

Kocaeli, Gölcük, 40.71390″ N, 29.91543″ E, 3 m, 2.7.2009, 4♀.

Distribution:

North Africa, Europe, Anatolia, MiddleEast, Caucasia, West Asya (Ramme 1951; Harz, 1969). Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar,Ağrı, Ankara, Antalya, Artvin, Aydın, Bursa, Çanakkale, Diyarbakır, Elazığ, Erzincan, Erzurum, İçel, İstanbul, İzmir, Kırklareli, Konya, Malatya, Manisa, Mardin, Nevşehir, Niğde, Sakarya, Siirt (Karabağ, 1958; Karabağ et al., 1972, 1980; Demirsoy, 1975; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Naskrecki 1991; Naskrecki and Ünal, 1995; Çıplak et al., 1996; Ünal, 1997; Önder et al., 1999).

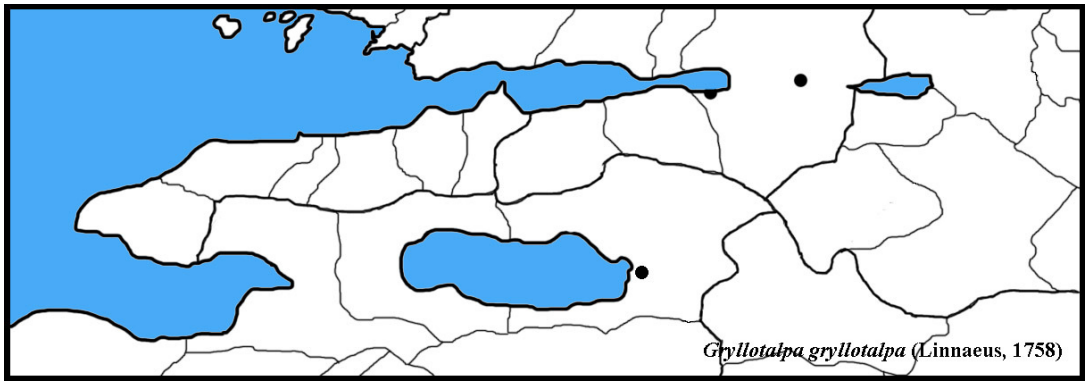

Figure 3.37. The sampling locations of *Gryllotalpa gryllotalpa* (Linnaeus, 1758) in Samanlı Mountains.

3.2. Suborder: *CAELIFERA* Ander, 1936

Key to Superfamilies of *Caelifera*

1. Fore tarsi with 3 segments (Figure 5.15.); Claws with arolia (Figure 5.86.) …….

…….....…...…..…….…….. ***Acridoidea***

-. Fore tarsi with 2 segments; Claws without arolia (Figure 5.48.) …… 2

2. Pronotum produced backwards along the top of the abdomen, reaching the tip of the abdomen (Figure 5.14.); Fore legs not modified into toothed digging instruments

……. ***Tetrigoidea***

-. Pronotum not produced backwards along the top of the abdomen, never reaching the tip of the abdomen (Figure 5.38.); Fore legs modified into toothed digging instruments (Figure 5.48.) ……..…… ***Tridactyloidea***

Superfamily: *TRIDACTYLOIDEA* Brullé 1835

3.2.1. Familiy: *TRIDACTYLIDEA* Brullé 1835

3.2.1.1. Subfamily: *TRIDACTYLINAE* Brullé 1835

Genus: *Xya* Latreille, 1809

***Xya variegata* Latreille, 1809**

Material Examined:

Yalova, Altınova, between Soğuksu and Karadere, 40.65° N, 29.49° E, 32 m, 5.6.2009, 4♂, 2♀; Yalova. Altınova, Fevziye Village, Valide Under bridge, 40.60250″ N, 29.52918″ E, 96 m, 3.7.2009, 1♀; Yalova, Altınova, Karadere, 40.65532″ N, 29.49313″ E, 30 m, 27.9.2009, 1♂, 1♀.

Distribution:

North Africa, Europe, Asia (Ramme, 1951; Harz, 1975; Günther, 1990). Distribution in Turkey: Ağrı, Ankara, Artvin, Balıkesir, Bilecik, Bolu, Bursa, Elazığ, Eskişehir, Hatay, İstanbul İzmir, Kırklareli, Konya, Malatya, Nevşehir, Trabzon (Karabağ, 1958; Karabağ et al.,1980; Weidner, 1969; Demirsoy, 1977; Salman, 1978; Gümüşsuyu, 1983; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Naskrecki and Ünal, 1995).

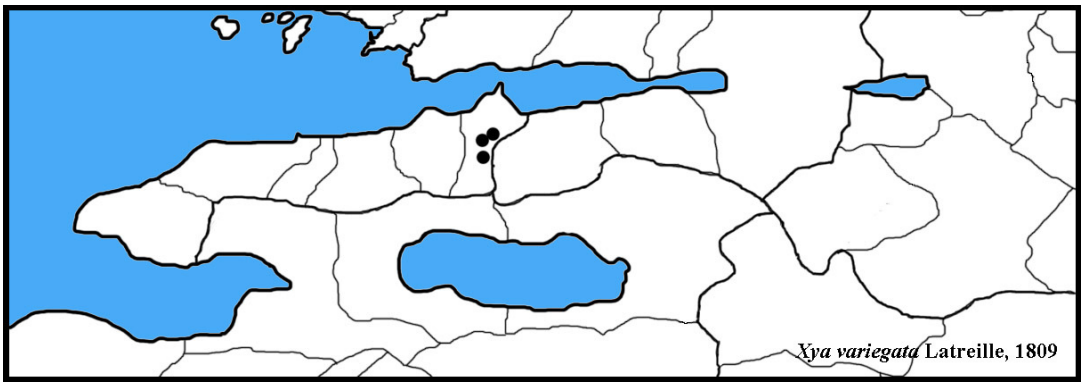

Figure 3.38. The sampling locations of *Xya variegata* Latreille, 1809 in Samanlı Mountains.

Superfamily: *TETRIGOIDEA* Serville 1838

3.2.2. Familiy: *TETRIGIDAE* Serville 1838

3.2.2.1. Subfamily: *TETRIGINAE* Serville 1838

Genus: *Paratettix* Bolívar, 1887

***Paratettix meridionalis* (Rambur, 1838)**

Material Examined:

Yalova, Altınova, between Soğuksu and Karadere, 40.65° N, 29.49° E, 32 m, 5.6.2009, 3♂, 4♀, 6 nymph; Yalova. Altınova, Fevziye Village, Valide Under bridge, 40.60250″ N, 29.52918″ E, 96 m, 25.7.2009, 2♂, 2♀; Yalova, Altınova, Karadere, 40.65532″ N, 29.49313″ E, 30 m, 27.9.2009, 2♂, 2♀.

Distribution:

Southern Europe, North Africa, Madagascar, Mediterranen Sea coast, Anatolia. Distribution in Turkey: İzmir, İstanbul ,Manisa, Aydın , Bursa, Ankara, Trabzon, Rize, Adana, Bolu, Afyan (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Demirsoy, 1977).

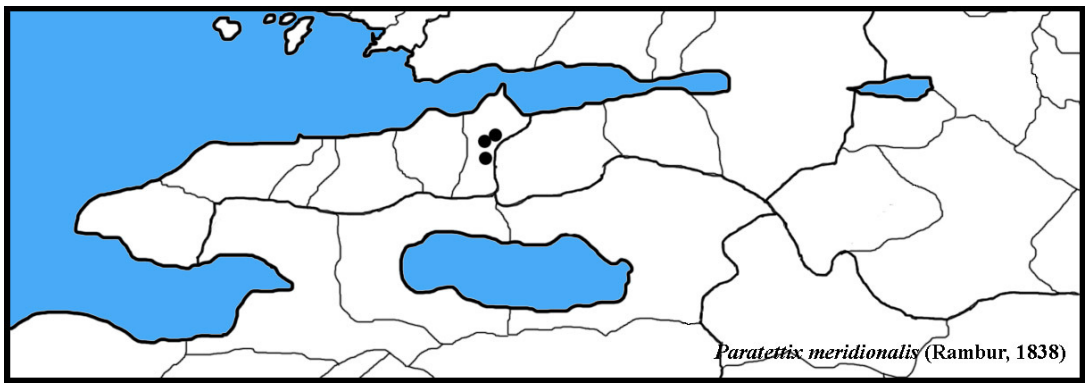

Figure 3.39. The sampling locations of *Paratettix meridionalis* (Rambur, 1838) in Samanlı Mountains.

Superfamily: *ACRIDOIDEA* MacLeay 1821

Key to families of *Acridoidea*

1.Dorsal lobe of hind femura longer than ventral lobe at the base (Figure 5.53.) …..... ……. ***Acrididae***

-. Dorsal lobe of hind femura equal or shorter than ventral lobe at the base (Figure 5.52.) ...……. ***Pamphagidae***

3.2.3. Familiy: *PAMPHAGIDAE* Burmeister 1840

3.2.3.1. Subfamily: *PAMPHAGINAE* Burmeister 1840

Key to Genera of *Pamphaginae*

1. Timpanum well developed, bigger than circle of stigmata ……

……... ***Paranocarodes*** **Bolívar, 1916**

-. Without timpanum, if residually have allways smallar than circle of stigmata

……..…… ***Paranocaracris*** **Mishchenko, 1951**

Genus: *Paranocarodes* Bolívar, 1916

***Paranocarodes straubei straubei* (Fieber, 1853)**

Material Examined:

Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 3.7.2009, 1♂, 1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 27.9.2009, 7 nymph.

Distribution:

Thracia, South of Bosphorus. Distribution in Turkey: İstanbul, Bursa, Çorum (Karabağ, 1958; Harz, 1969; Demirsoy, 1977)

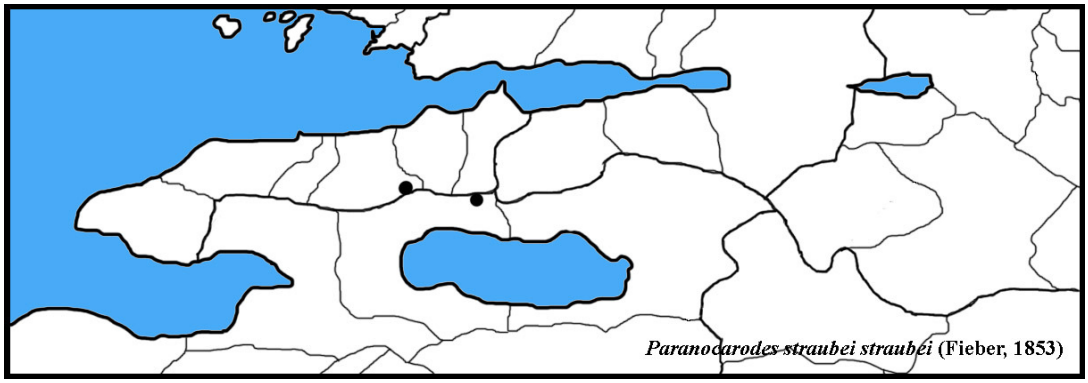

Figure 3.40. The sampling locations of *Paranocarodes straubei straubei* (Fieber, 1853) in Samanlı Mountains.

Genus: *Paranocaracris* Mishchenko, 1951

***Paranocaracris citripes* (Uvarov, 1949)**

Paranocaracris citripes citripes (Uvarov, 1949): Ünal, 1999, J. Orthop. Res. No. 8, 247, Sakarya, Pamukova, 110 m, 25.4.1992, 1♂ (M.Ünal).

Distribution:

Asia Minor. Distribution in Turkey: Sakarya, Konya, Muğla (Ünal, 1999).

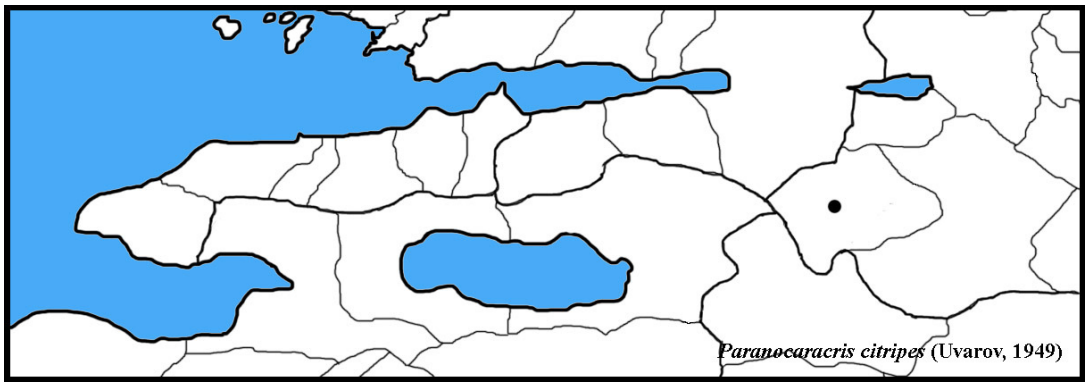

Figure 3.41. The sampling locations of *Paranocaracris citripes* (Uvarov, 1949) in Samanlı Mountains.

3.2.4. Family: *ACRIDIDAE* MacLeay 1821

Key to the subfamilies of *Acrididae*

1. Prosternum with projecting process, collar like, without a small tubercle or a wart like protuberance; post tibia with an apical spine on the outside dorsally …...…….. 4

-. Prosternum without strongly projecting process, not collar like, with at least a small tubercle or a wart like protuberance (Figure 5.54.); post tibia without an apical spine on the outside dors ……..……..……..…. 2

2. Body not conspicuous elongate, not as in fig. Figure 5.56. …..……..... 3

-. Body conspicuous elongate, about as fig Figure 5.56. ..…… ***Acridinae***

3. The mostly vertical frons forms with the vertex a right angle (Figure 5.57.), if the frons slopes obliquely downwards and forms with the vertex an acute angle, then the radialis not sharpened for stridulation and in the medial area of the tegmen an intercalate which in male is mostly denticulated or granulated; and the ventral ridge on the inside of the medial area of the postfemora without stridulatory pegs ……...

…….... ***Oedipodinae***

-. The oblique downwardly sloping frons forms with the vertex an acute angle (Figure 5.58.), more seldom an obtuse angle; radius of the tegmen sharpened for stridulation, if there is an intercalate in the medial area, then it is weak and irregular and in male not denticulated or granulated; the vertal ridge of the medial area on the inside of the postfemure with stridulation pegs .....……..……. ***Gomphocerinae***

4. Post tibia with spin on eachside dorsally (Figure 5.55.), ……..…… 5

-. Post tibia with spurs only inside dorsally 6

5. Tegmina reduced, not reach middle of abdomen (Figure 5.60.), ……...

…….. ***Catantopinae*** **Brunner von Wattenwyl 1893**

-. Tegmina well devoloped ……..…...… ***Tropidopolinae*** **Jacobson 1905**

6. Mesosternal lobes longer than its width (Figure 5.59.), ……....

……... ***Cyrtacanthacridinae*** **Kirby, W.F. 1902**

-. Mesosternal lobes as long as its width or wider (Figure 5.97.) ….……..... 7

7. Hind femur short and broad (Figure 5.62.); male cercus large, plate like, bifurcate at apex (Figure 5.63.) ……. ***Calliptaminae*** **Uvarov, 1922**

-. Hind femur long and narrow(Figure 5.61.); male cercus simple, distinctly downcurved at apex, not bifurcate at apex ..... ***Eyprepocnemidinae*** **Uvarov, 1921**

3.2.4.1. Subfamily: *CYRTACANTHACRIDINAE* Kirby, 1910

Genus: *Anacridium* Uvarov, 1923

***Anacridium aegyptium* (Linnaeus, 1764)**

Anacridium aegyptium (Linnaeus, 1764): Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 989, Bursa, İznik.

Material Examined:

Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 1♂,2♀;Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355 m, 23.7.2009, 1 nymph; Bilecek, Osmaneli, Kaynarca, 40.41597″ N, 29.81676″ E, 200 m, 17.9.2009, 1♂; Bursa, close to İznik, 40.42320″ N, 29.74190″ E, 100 m, 25.10.2009, 1♂;

Distribution:

North and East Africa, South and East Europe, Balkans, Anatolia, MiddleEast , Caucasia, West and Middle Asia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkey: Adana, Adıyaman, Antalya, Ankara, Artvin, Aydın, Balıkesir, Bursa, Çanakkale, Denizli, Diyarbakır, Elazığ, Gaziantep, Hatay, Isparta, İçel, İstanbul, İzmir, Kahramanmaraş, Konya, Malatya, Manisa, Mardin, Muğla, Samsun, Sinop, Şanlıurfa, Zonguldak (Karabağ 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Naskrecki and Ünal, 1995; Çıplak et al., 1996; Ünal, 1997, 1999; Önder et al., 1999; Sevgili and Çıplak, 2000).

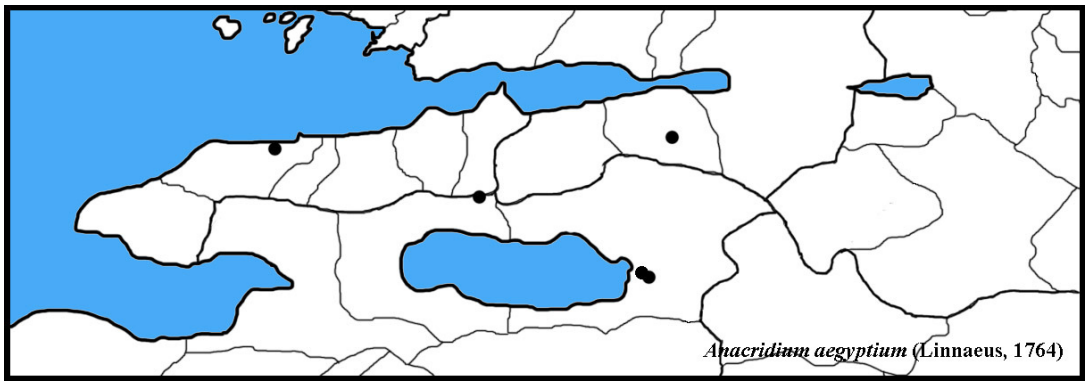

Figure 3.42. The sampling locations of *Anacridium aegyptium* (Linnaeus, 1764) in Samanlı Mountains.

3.2.4.2. Subfamily: *EYPREPOCNEMIDINAE* Uvarov, 1921.

Genus: *Eyprepocnemis* Fieber, 1853

Eyprepocnemis plorans plorans (Charpentier, 1825)

Material Examined:

Bursa, İznik-Orhangazi road, 40.48° N, 29.54° E, 90 m, 23.8.2008, 1♀; Yalova, Çiftlik, 40.68799″ N, 29.44007″ E, 10 m, 9.10.2009, 4♂, 1♀.

Distribution:

South and East Spain, South İtaly, Greece, South West Russia, West Asia, Anatolia. Distribution in Turkey: Kars , Yalova, Bursa, Elazığ, Tunceli, Dıyarbakır, İstanbul, Muğla, Denizli, Burdur, Antalya, Adana, Hatay, Maraş, Urfa, Ankara, Artvin (Karabağ, 1958, Demirsoy, 1975).

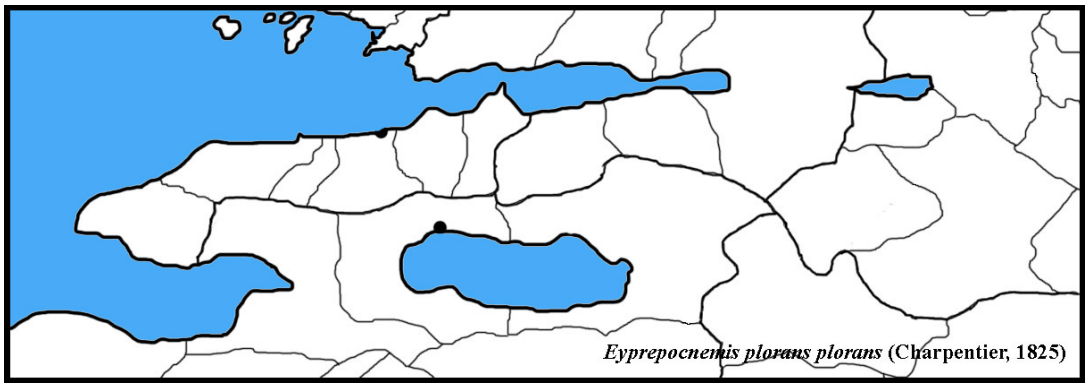

Figure 3.43. The sampling locations of *Eyprepocnemis plorans plorans* (Charpentier, 1825) in Samanlı Mountains.

3.2.4.3. Subfamily: *CALLIPTAMINAE* Uvarov, 1922

Key to Genera of *Calliptaminae*

1. Tegmina well developed ……... ***Calliptamus* Serville, 1831**

-. Tegmina reduced ……..……...……. ***Paracaloptenus* Bolívar, 1876**

Genus: *Calliptamus* Serville, 1831

Key to male of the species of *Calliptamus*

1. Penis valves short (Figure 5.65.) ……....…… 2

-. Penis valves distinctly long and recurved as Figure 5.64. …..……..……..

……..…… ***Calliptamus italicus* (Linnaeus, 1758)**

2. The inner spot of postfemura shows at least some trace of orange at its margin on the on the posterior end; penis valves as Figure 5.63. …..…….....

…… ***Calliptamus barbarus* (Costa, 1836)**

-. The posterior end of the inner spot of postfemura without a trace of orange; penis valves as Figure 5.65. ...……..…….. ***Calliptamus tenuicercis*** **Tarbinsky, 1930**

***Calliptamus italicus italicus (*Linnaeus, 1758)**

Callitamus italicus italicus (Linnaeus), 1758: Karabağ, 1958, Orthop. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 101

Material Eamined;

Kocaeli, Karşıyaka, 40.69° N, 29.93° E, 190 m, 24.8.2008, 2♂; Sakarya, Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m, 30.8.2008, 1♀; Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008, 1♂, 8♀; Kocaeli, Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 230 m, 17.9.2009, 2♂, 2♀.

Distribution:

South Europe, Balkans, Anatolia, MiddleEast , Caucasia, Middle and West Asia (Ramme, 1951; Bei-Bienko, 1951; Jago, 1963; Harz, 1975). Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar, Ağrı, Amasya, Ankara, Antalya, Balıkesir, Bilecik, Bitlis, Bolu, Bursa, Çanakkale, Çankırı, Çorum, Diyarbakır, Edirne, Eskişehir, Elazığ, Erzurum, Hakkari, İçel, İstanbul, İzmir, Kahramanmaraş, Kastamonu, Kayseri, Kırklareli, Kocaeli, Malatya, Muğla, Muş, Niğde, Ordu, Samsun, Sinop, Şanlıurfa, Tekirdağ, Tokat, Trabzon, Tunceli, Van, Yozgat, Zonguldak (Maran, 1951; Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Jago 1963; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984, Erman

and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki, 1991; Önder et al., 1999; Sevgili and Çıplak, 2000).

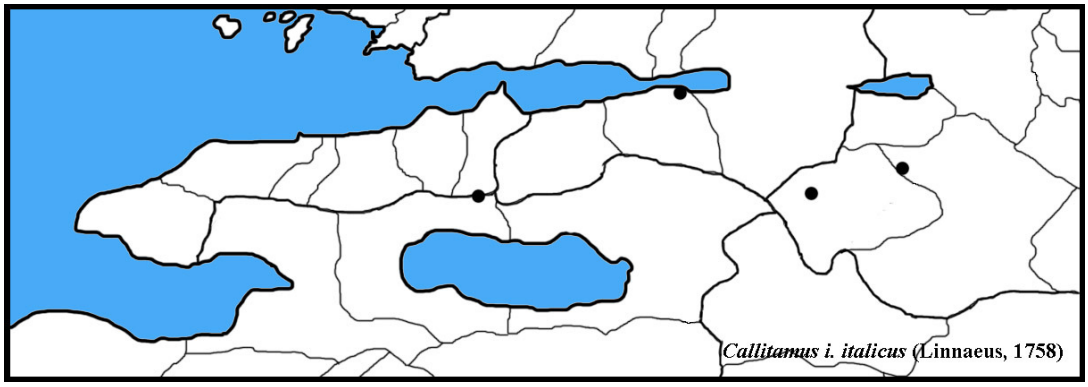

Figure 3.44. The sampling locations of *Calliptamus italicus italicus (*Linnaeus, 1758) in Samanlı Mountains.

***Calliptamus barbarus barbarus* (Costa, 1836)**

Calliptamus barbarus (Costa 1836): Ünal, 1999, J. Orthop. Res. No. 8,247, Bursa, Orhangazi, Sugören, 400m., 7.8.1993, 1♂, 1♀; Yalova, Güneyköy, 350m., 7.8.1993, 1♂; Bursa, İznik, 470m., 7.8.1993, 6♂, 7♀; Kocaeli, Çayırköy, 125m., 8.8.1993, 5♂, 2♀; Karamürsel, 400m., 8.8.1993, 6♂, 5♀ (M. Ünal).

Material Examined:

Kocaeli, Acısu, 40.71416″ N, 30.13438″ E, 44 m, 21.8.2009, 1♂, 2♀; Kocaeli, Karamürsel, between Karapınar and İhsaniye, 40.65942″ N, 29.60513″ E, 402 m, 23.8.2008, 2♂, 7♀; Kocaeli, Karamürsel, Çamdibi, 40.58° N, 29.54° E, 144 m, 23.8.2008, 2♂, 2♀; Bursa, İznik-Orhangazi road, 40.48° N, 29.54° E, 90 m, 23.8.2008, 1♀; Kocaeli, Karşıyaka, 40.69° N, 29.93° E, 190 m, 24.8.2008, 16♂, 7♀;

Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008, 7♂, 1♀; Kocaeli, Bahçecik, İrşadiye, 40.64499″ N, 29.80507″ E, 500 m, 31.8.2008, 4♂, 5♀; Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355 m, 31.8.2008,3♀; Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 1♂, 1♀; Yalova, Armutlu, Mecidiye, 40.5194′ N, 28.8894′ E, 400 m, 1.9.2008, 1♂, 5♀; Yalova, Soğucak, 40.59876″ N, 29.27377″ E, 110 m, 1.9.2008, 1♀; Kocaeli, Gölcük, Şevkatiye K., 40.64508″ N, 29.78090″ E, 500 m, 22.8.2009, 4♂, 5♀; Yalova, Çınarcık, Karlık upland, 40.58099″ N, 28.99035″ E, 850 m, 10.10.2009,1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 27.9.2009, 5♂, 5♀;

Distribution:

North Europe, South Europe, Balkans, Anatolia, MiddleEast, Caucasia, Middle and SouthWest Asia (Ramme, 1951; Bei-Bienko, 1951; Jago, 1963; Harz, 1975). Distribution in Turkey: Adana, Afyonkarahisar, Ağrı, Amasya, Ankara, Antalya, Artvin, Aydın Balıkesir, Bitlis, Bolu, Burdur, Bursa, Çanakkale, Çorum, Denizli, Diyarbakır, Edirne, Eskişehir, Elazığ, Erzurum, Gaziantep, Hatay, Isparta, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Kastamonu, Kayseri, Kırklareli, Kocaeli, Konya, Malatya, Manisa, Muğla, Muş, Nevşehir, Niğde, Rize, Samsun, Sivas, Şanlıurfa, Tekirdağ, Tokati Tunceli (Maran, 1951; Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Jago, 1963; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak at al Demirsoy, 1991; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997, 1999, 2001; Önder et al., 1999; Sevgili and Çıplak, 2000).

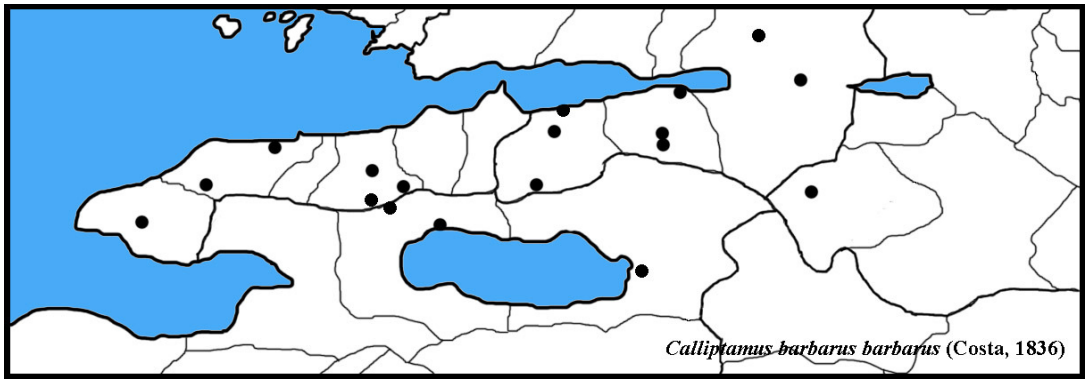

Figure 3.45. The sampling locations of *Calliptamus barbarus barbarus* (Costa, 1836) in Samanlı Mountains.

***Calliptamus tenuicercis* Tarbinsky, 1930**

Material Examined:

Bursa, İznik, between Elbeyli and Gürmüzlü, 40.49° N, 29.75° E, 406 m, 30.8.2008, 4♂, 1♀; Bursa, İznik, Boyalıca K., 40.49649″ N, 29.5640″ E, 280 m, 25.7.2009, 2♂; Sakarya, Pamukova, Bakacak, 40.52580″ N, 30.06798E, 630 m, 5.8.2009, 2♂, 1♀.

Distribution:

Anatolia, MiddleEast, Caucasia, SouthWest Asia (Ramme, 1951; Bei-Bienko, 1951; Jago, 1963; Harz, 1975). Distribution in Turkey: Adana, Afyonkarahisar, Ağrı, Amasya, Ankara, Antalya, Artvin, Bingöl, Bitlis, Burdur, Bursa, Çanakkale, Çankırı, Çorum, Diyarbakır, Denizli, Elazığ, Eskişehir, Hatay, Gaziantep, Isparta, İçel, İstanbul, İzmir, Kars, Kayseri, Konya, Kütahya, Malatya, Manisa, Mardin, Muş, Nevşehir, Niğde, Siirt, Şanlıurfa, Tokat, Tunceli, Yozgat (Maran, 1951; Karabağ, 1958; Karabağ et al., 1974, Jago, 1963; Weidner, 1969; Demirsoy, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1990; Çıplak et

al., 1996; Naskrecki and Ünal, 1995; Ünal, 1997, 1999, 2001; Önder et al., 1999; Sevgili and Çıplak, 2000).

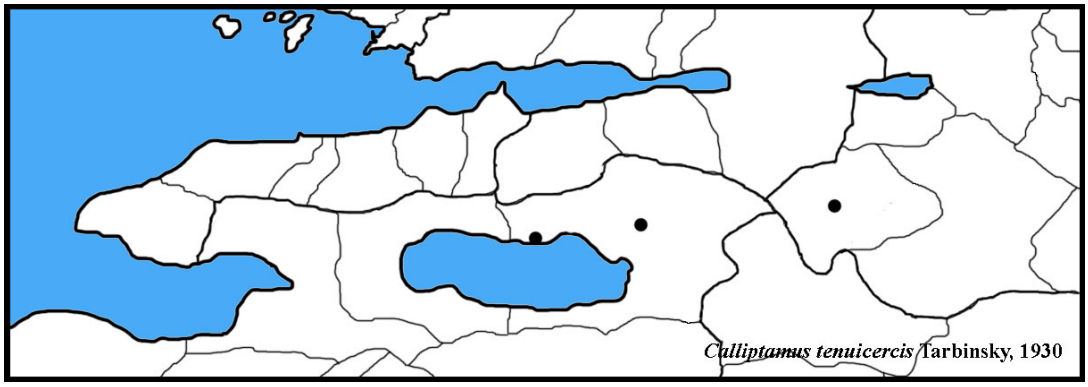

Figure 3.46. The sampling locations of *Calliptamus tenuicercis* Tarbinsky, 1930 in Samanlı Mountains.

Genus: *Paracaloptenus* Bolívar, 1876

***Paracaloptenus caloptenoides* (Brunner von Wattenwyl, 1861)**

Paracaloptenus caloptenoides (Brunner von Wattenwyl), 1861): Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 100, Yalova.

Material Examined:

Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 24.7.2009, 1♂, 1♀; Yalova, Çınarcık, Delmece upland, 40.56282″ N, 29.00714″ E, 712 m, 10.10.2009, 2♂, 2♀.

Distribution: East and south Europe, West Asia, Tracia, Balkans, Asia Minor. Distribution in Turkey: Edirne, İstanbul, Balıkesir, Kırklareli, Bursa, Kocaeli, Manisa (Karabağ, 1958; Harz, 1975).

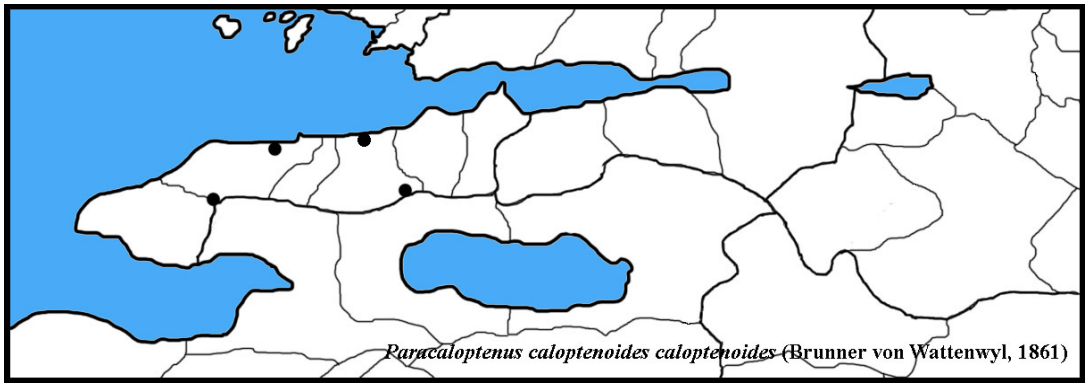

Figure 3.47. The sampling locations of *Paracaloptenus caloptenoides* (Brunner von Wattenwyl, 1861) in Samanlı Mountains.

3.2.4.4. Subfamily: *ACRIDINAE* MacLeay 1821

Genus: *Acrida* Linnaeus, 1758

Acrida ungarica (Herbst, 1786)

Material Examined:

Kocaeli, Karamürsel, between Karapınar and İhsaniye, 40.65942″ N, 29.60513″ E, 402 m, 23.8.2008, 1♂,4♀; Bursa, İznik-Orhangazi road, 40.48° N, 29.54° E, 90 m, 23.8.2008, 3♀; Kocaeli, Karşıyaka, 40.69° N, 29.93° E, 190 m, 24.8.2008, 6♂,3♀; Sakarya, Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m, 30.8.2008, 3♂; Bursa, İznik, between Elbeyli and Gürmüzlü, 40.49° N, 29.75° E, 406 m, 30.8.2008, 1♀;

Kocaeli, Bahçecik, İrşadiye, 40.64499″ N, 29.80507″ E, 500 m., 31.8.2008, 1♂, 3♀; Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355 m, 31.8.2008, 2♂, 2♀; Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 2♂, 2♀; Yalova, Armutlu, Mecidiye, 40.5194′ N, 28.8894′ E, 400 m, 1.9.2008, 2♂, 2♀; Yalova, Soğucak, 40.59876″ N, 29.27377″ E, 110 m, 1.9.2008, 2♂, 3♀; Kocaeli, Acısu, 40.71416″ N, 30.13438″ E, 44 m, 21.8.2009, 2♂, 2♀; Kocaeli, Gölcük, Şevkatiye K., 40.64508″ N, 29.78090″ E, 500 m, 22.8.2009, 1♂, 1♀; Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 17.9.2009, 1♂; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 27.9.2009, 1♀; Kocaeli, Derbent, Acısu, 40.72877″ N, 30.07275″ E, 62 m, 9.10.2009, 1♀; Yalova, Çiftlik, 40.68799″ N, 29.44007″ E, 10 m, 9.10.2009, 2♂.

Distribution:

South East Europe, Balkans. Distribution in Turkey: West Anatolia, Caucasia (Harz, 1975)

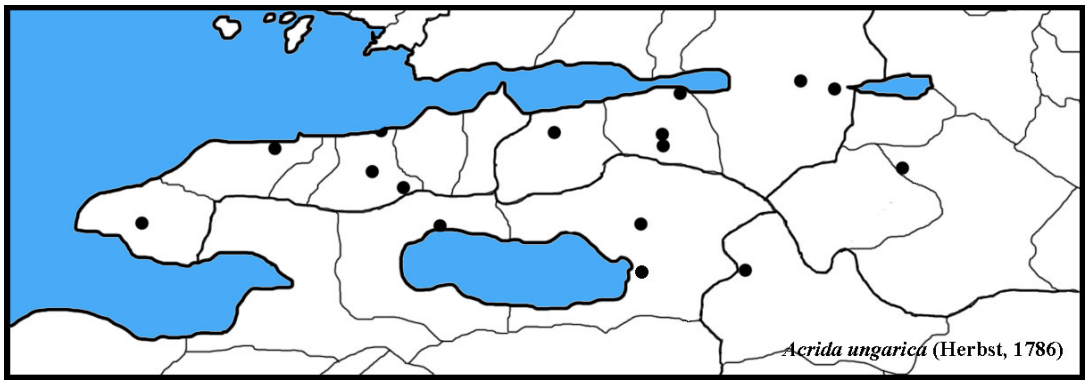

Figure 3.48. The sampling locations of *Acrida ungarica* (Herbst, 1786) in Samanlı Mountains.

3.2.4.5. Subfamily: *TROPIDOPOLINAE* Jacobson 1905

Genus: *Tropidopola* Stål, 1873

Tropidopola graeca graeca Uvarov, 1926

Material Examined:

Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 17.9.2009, 2♂, 1♀, 11 nymph; Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 27.9.2009, 2♂, 1♀.

Distribution:

Egypt, İtaly. Distribution in Turkey: Adana, Antalya, Gaziantap, Hatay, Diyarbakır, İzmir, Kayseri, Maraş (Karabağ, 1958; Demirsoy, 1977; Önder et al., 1999).

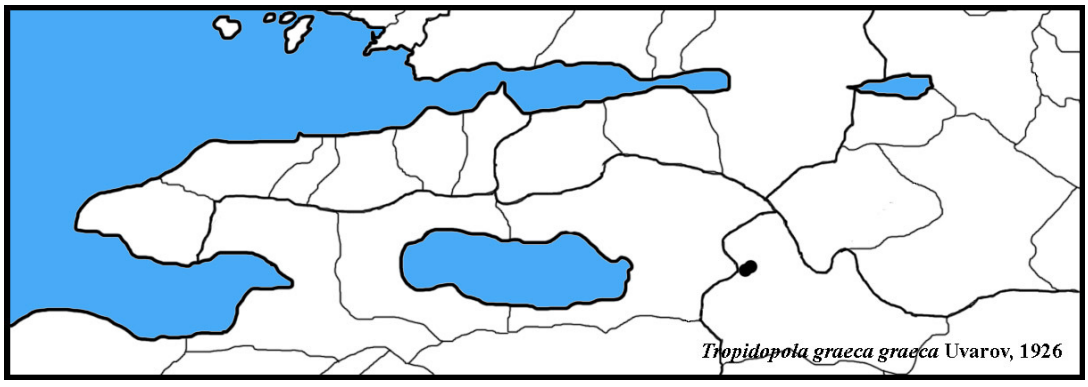

Figure 3.49. The sampling locations of *Tropidopola graeca graeca* Uvarov, 1926 in Samanlı Mountains.

3.2.4.6. Subfamily: *CATANTOPINAE* Brunner von Wattenwyl 1893

Genus: *Pezotettix* Burmeister, 1840

Key to male of the species of *Pezotettix*

1. Cerci strongly flattened laterally, seen in profile widened apically (Figure 5.67.) ……..…….…… ***Pezottettix anatolica* Uvarov, 1934**

- Cerci slightly flattened laterally, seen in profile conical (Figure 5.66.) …… ……... ***Pezotettix giornae* (Rossi, 1794)**

***Pezottettix anatolica* Uvarov, 1934**

Pezottettix anatolica Uvarov, 1934: Ünal, 1999, J. Orthop. Res. No. 8, 247, Kocaeli, Karamürsel, 400m., 8.8.1993, 7♂, 4♀; Kocaeli, Karamürsel, 150m., 8.8.1993, 1♀ (M. Ünal).

Material Examined:

Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 1♂; Yalova, Armutlu, Mecidiye, 40.5194′ N, 28.8894′ E, 400 m, 1.9.2008, 1♂; Yalova, Soğucak, 40.59876″ N, 29.27377″ E, 110 m, 1.9.2008, 1♂; Kocaeli, Gölcük, Şevkatiye K., 40.64508″ N, 29.78090″ E, 500 m, 22.8.2009, 1♂; Kocaeli, Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 230 m, 17.9.2009, 3♂, 2♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 27.9.2009, 1♂, 2♀.

Distribution:

West Turkey. Distribution in Turkey: Bursa, Kocaeli, Burdur, Isparta, Antalya, Hatay, İzmir, Muğla, Zonguldak, Ankara, Aydın (Karabağ, 1958, Harz, 1975).

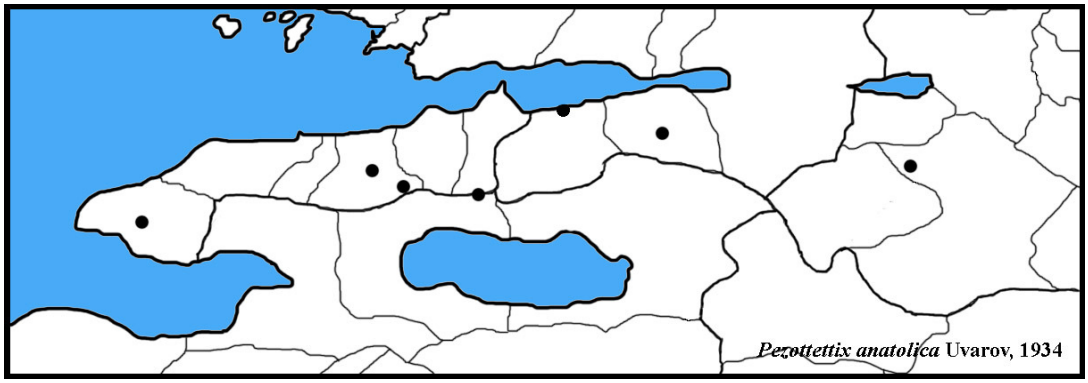

Figure 3.50. The sampling locations of *Pezottettix anatolica* Uvarov, 1934 in Samanlı Mountains.

***Pezotettix giornae* (Rossi, 1794)**

Pezotettix giornae (Rossi), 1794: Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 96, Yalova.

Pezotettix giornae (Rossi, 1794): Ünal, 1999, J. Orthop. Res. No. 8,247, Bursa, Orhangazi, Sugören, 400m., 7.8.1993, 1♂; Kocaeli, Çayırköy, 125m., 8.8.1993, 2♂, 1♀; Kocaeli, Karamürsel, 400m., 8.8.1993, 2♀.

Material Examined:

Kocaeli, Karşıyaka, 40.69° N, 29.93° E, 190 m, 24.8.2008, 3♂, 3♀; Sakarya, Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m, 30.8.2008, 1♀; Bursa, İznik yolu Elbeyli ayrımı, 40.45° N, 29.71° E, 86 m, 30.8.2008, 3♂, 5♀; Kocaeli, Bahçecik, İrşadiye,

40.64499″ N, 29.80507″ E, 500 m, 31.8.2008, 1♂, 2♀; Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355 m, 31.8.2008, 4♂, 4♀; Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 3♀; Yalova, Armutlu, Mecidiye, 40.5194′ N, 28.8894′ E, 400 m, 1.9.2008, 2♀; Yalova, Soğucak, 40.59876″ N, 29.27377″ E, 110 m, 1.9.2008, 1♂, 1♀; Kocaeli, Gölcük, Şevkatiye K., 40.64508″ N, 29.78090″ E, 500 m, 22.8.2009, 2♂, 2♀; between Kocaeli and Acısu,40.73135″ N, 30.06178″ E, 40 m, 16.9.2009, 1♂, 1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661m., 27.9.2009, 1♂, 2♀; Yalova, Çiftlik, 40.68799″ N, 29.44007″ E, 10 m., 9.10.2009, 2♂, 2♀.

Distribution:

Middle, East and South Europe, North Caucasus, North Africa, Turkey. Distribution in Turkey: İstanbul , Bursa, Bolu, Taurus, Zonguldak, Sinop, Samsun (Karabağ, 1958, Harz, 1975)

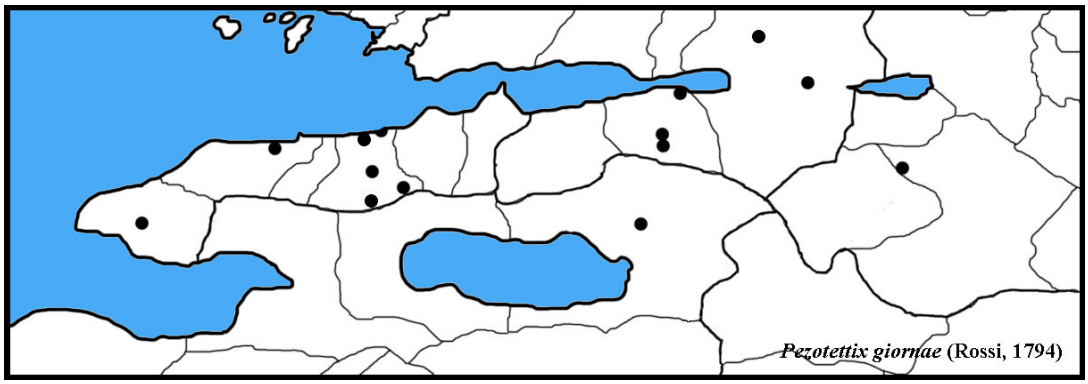

Figure 3.51. The sampling locations of *Pezotettix giornae* (Rossi, 1794) in Samanlı Mountains.

3.2.4.7. Subfamily: *GOMPHOCERINAE* Fieber, 1852

Key to genera of *Gomphocerinae*

1. Foveolae narrow, without the surrounding carinulae about 2,5-3 times as long as wide; side keels of the pronotum never forming an x-shaped pattern …… 2

-. Foveolae broad, without the surrounding carinulae about 1,3-1,5 times, seldom 2 times as long as wide; the side keels of the pronotum often forming a light, x-shaped pattern (Figure 5.68.) ..…….…… ***Dociostaurus***

2. Precostal-area widened basally, if not, then a weak intercalata in the madian- area, or cubital-area as wide as median-area (Figure 5.77.) …….…….. 4

-. Precostal area of the tegmen not widened (Figure 5.69.) ……...…..…….. 3

3. Median-area of the tegmen in male not widened (Figure 5.69.); 10^{th} tergum and epiproct in male seldom midified; side keels of the pronotum angularly incurved to almost straight; dorsal valve of the ovipositor not toothed, ventral valve at most with roundly projecting hump basally on the outsid; ventral valve of the penis longer than the dorsal one, sometimes much more longer ……... ***Omocestus***

-. Median-area of the tegmen in male widened; 10^{th} tergum and epiproct in male often modified; side keels of the pronotum slightlu curved; ovipositor with toothed dorsal- and ventral valve; valve of the penis ofequal length ..……..…. ***Stenobothrus***

4. Inner claw of the middle and hind tarsi longer than the outer one , in the forwards directed fore tarsi the outer claw is longer than the inner one; pleurae rugosely – punctuate to rugose; male subgenical plate acutely-conical (Figure 5.70.) ……

……....…….…… ***Euchorthippus***

-. Claws of equal length on the inside and outside of each leg; pleurae smooth; male subgenital plate conical or bluntly conical (Figure 5.71.) …… ***Chorthippus***

Genus: *Dociostaurus* Fieber, 1853

***Dociostaurus (Notostaurus) anatolicus* (Krauss, 1896)**

Material Examined:

Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009, 1♀; 230 m, 17.9.2009,

Kocaeli, Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 230 m, 17.9.2009,1♀.

Distribution:

Balkans, Anatolia, Middleast, Caucasia, West Asia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975; Soltani, 1978). Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar, Ağrı, Amasya, Ankara, Antalya, Artvin, Balıkesir, Bingöl, Bitlis, Bursa, Çanakkale, Çorum, Diyarbakır, Elazığ, Erzurum, Eskişehir, Hatay, Isparta, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Kastamonu, Kayseri, Kırklareli, Konya, Kütahya, Malatya, Manisa, Mardin, Muş, Nevşehir, Niğde, Siirt, Şanlıurfa, Tokat, Tunceli, Yozgat (Karabağ, 1858; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki and Ünal, 1995; Ünal 1997, 1999, 2001; Önder et al., 1999; Sevgil and Çıplak, 2000).

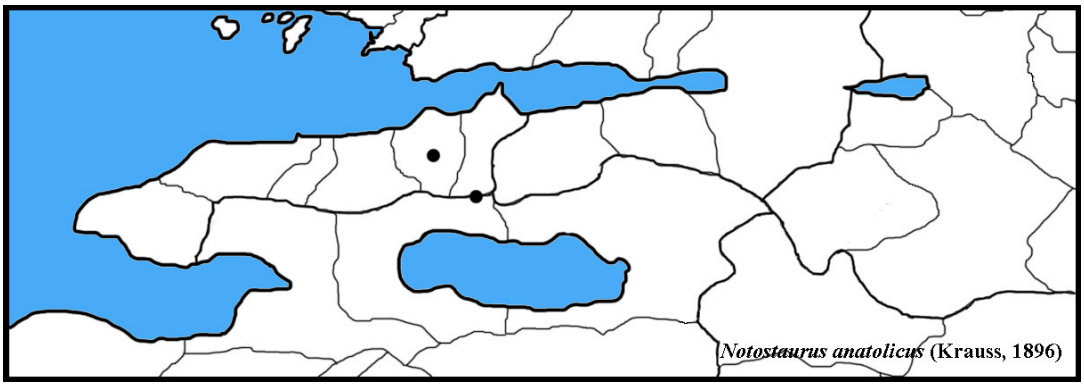

Figure 3.52. The sampling locations of *Dociostaurus (Notostaurus) anatolicus* (Krauss, 1896) in Samanlı Mountains.

Genus: *Stenobothrus* Fischer, 1853

***Stenobothrus lineatus lineatus* (Panzer, 1796)**

Stenobothrus (Stenobothrus) lineatus (Panzer 1796) :Ünal, 1999, J. Orthop. Res. No. 8,248, Kocaeli, Karamürsel, 150m., 8.8.1993, 1♀.

Distribution:

Europe, Balkans, Caucasia, Middle and North Asia, Anatolia. Distribution in Turkey: Ankara, Çankırı (Karabağ, 1958; Harz, 1969)

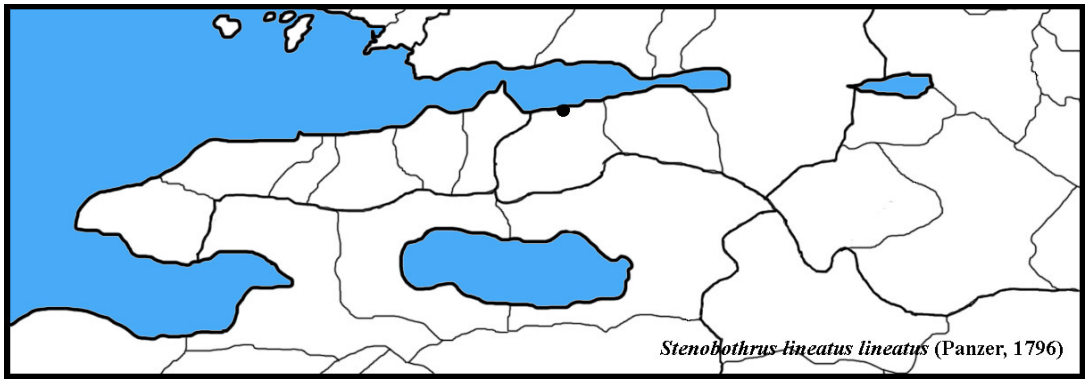

Figure 3.53. The sampling locations of *Stenobothrus lineatus lineatus* (Panzer, 1796) in Samanlı Mountains.

Genus: *Omocestus* Bolívar, 1878

Key to species of Omocestus

1. Ratio least width of vertex: length of eyes about as 1:2-2,5, fastigium mostly without median carinula at the apex; epiproct not dark bordered …….. ..…….…… ***Omocestus (Omocestus) rufipes* (Zetterstedt, 1821)**

-. Ratio least width of vertex: length of eyes about as 1:1,5, fastigium with median carinula apically; epiproct dark bordered ……. ……... ***Omocestus (Omocestus) viridulus* (Linnaeus, 1758)**

***Omocestus (Omocestus) rufipes* (Zetterstedt, 1821)**

Omocestus (Omocestus) rufipes (Zetterstedt 1821):Ünal, 1999, Notes on Orthoptera of Western Turkey, with Description of a New Genus and Four New Species, J. Orthoptera Res. No. 8,249, Bursa, İznik, 470 m, 7.8.1993, 1♀; Kocaeli, Çayırköy, 125 m, 8.8.1993, 1♂: Kocaeli, Karamürsel, 400 m, 8.8.1993, 1♂ (M. Ünal).

Material Examined:

Sakarya, Sapanca, 36 m, 12.6.2007, 2♂,♀ (M.Ünal, A. Erden); Kocaeli, Kartepe, 1290 m, 12.6.2007 (M.Ünal, A. Erden), 1♀; Kocaeli, Karamürsel, Kızderbent Village, 235 m, 13.6.2007, 6♂; Sakarya, Sapanca, close to Fevziye Village, 6.6.2008, 1♂; Kocaeli, Derbent, 6.6.2008, 1♂; Sakarya, city center, 7.6.2008, 1♀; Kocaeli, Bahçecik, Servetiye, 40.63° N, 29.90° E, 741 m, 8.6.2008, 3♂, 2♀; Kocaeli, Karamürsel, Yalakdere, 40.61°N, 29.57° E, 160 m, 21.6.2008, 2♂, 1♀; Bursa, İznik, Kızderbent, 40.56°N, 29.52° E, 236 m, 21.6.2008, 1♂; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 1♂; Sakarya, Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m, 30.8.2008, 5♂, 2♀, Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008, 2♂, 1♀; Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355 m, 31.8.2008, 3♂,1♀; Kocaeli, Derbent, Acısu, 40.72877″ N, 30.07275″ E, 62 m, 1.7.2009, 1♂,3♀; Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009, 1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 3.7.2009, 1♀; Kocaeli, Gölcük, Şevkatiye K., 40.64508″ N, 29.78090″ E, 500 m, 22.8.2009,1♂, 1♀; Bursa. İznik, Gürmüzlü, 40.50802″ N,29.77961″ E, 500 m, 22.8.2009, 2♂; between Kocaeli and Acısu,40.73135″ N,30.06178″ E, 40 m, 16.9.2009, 1♂, 1♀; Kocaeli, Karamürsel, Kızderbent Village, 40.54370″ N, 29.52252″ E, 230 m, 17.9.2009, 1♂.

Distribution:

NorthWest Africa, Europe Balkans, Anatolia, North Caucasia, South Siberia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkey: Adana, Aydın, Bolu, Bursa, İstanbul, İzmir, Kırklareli, Kocaeli, Sakarya, Samsun, Sinop,

Tekidağ (Karabağ, 1958; Weidner, 1969; Demirsoy, 1977; Güneş, 1984; Naskrecki, 1991; Ünal, 1999; Önder et al., 1999).

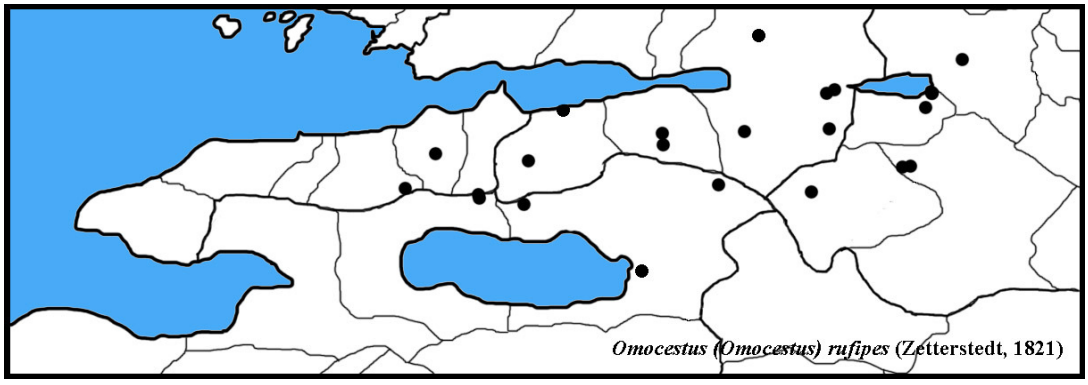

Figure 3.54. The sampling locations of *Omocestus (Omocestus) rufipes* (Zetterstedt, 1821) in Samanlı Mountains.

***Omocestus (Omocestus) viridulus* (Linnaeus, 1758)**

Omocestus viridulus (Linnaeus), 1758: Karabağ, 1958, Orthop. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 143, Yalova, 25.7.1930.

Distribution:

Europe, Transcaucasia, North and Middle Asia, Anatolia. Distribution in Turkey: Edirne, İstanbul, Burdut, Antalya, Kastamonu, Sinop, Samsun, Bursa, Aydın, Adana, İzmir, Tekirdağ, Bilecik (Karabağ, 1958; Harz, 1975; Katabağ et al., 1971, 1974; Demirsoy, 1977).

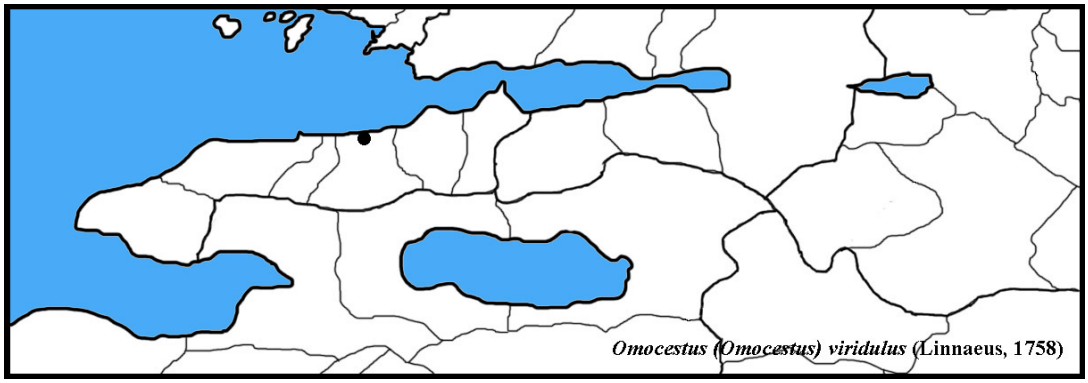

Figure 3.55. The sampling locations of *Omocestus (Omocestus) viridulus* (Linnaeus, 1758) in Samanlı Mountains.

Genus: *Chorthippus* Fieber, 1852 *s.l.*

Key to Subgenus of *Chorthippus*

1. Lateral carina of pronotum concave (Figure 5.73) …… ***(Glyptobothrus)***

-. Lateral carina of pronotum parallel or slightly concave or after prozona slightly separate (Figure 5.72) …..…… ***(Chothippus)***

Subgenus: *(Chothippus)* Fieber, 1852 *s.str.*

Key to the species subgenus (*Chorthippus)*

1. Tegmina reaching or surpassing the hind knee 2

-. Tegmina as a rule do not reach the hind knees, if they reach or surpass them, then the hind knees are black...***Chorthippus (Chorthippus) parallelus* (Zetterstedt, 1821)**

2. Apical part of the subgenital plate broadly conical, with rounded apex; cerci about twice as long as broad at the base; tegmen about 3,5 times as long as the apical narrowing, this is about 1/5 narrower at the point of the meeting of costal and

subcostal than the tegmen in the middle (Figure 5.74.) ……..... …….. ***Chorthippus (Chorthippus) dichrous*** **(Eversmann, 1859)**

-. Apicsl part of sungenital plate conical; cerci about 3 times as lon as broad at the base; tegmen 3 times as long as the apical narrowing, this 1/5-1/7 narrower at the point of meeting of costal and suncostal than tegmen in the middle (Figure 5.75.) ... ...……...…… ***Chorthippus (Chorthippus) loratus*** **(Fisher-Waldheim, 1846)**

Chorthippus (Chorthippus) dichrous **(Eversmann, 1859)**

Chorthippus dorsatus dichrous (Eversmann), 1859: Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 153, Bursa, İznik.

Chorthippus (Chorthippus) dichrous (Eversmann 1859): Ünal, 1999, J. Orthop. Res. No. 8,249, Kocaeli, Karamürsel, 150m., 8.8.1993, 1♂, 5 nymph.

Material Examined:

Sakarya, Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m, 30.8.2008, 1♀; Kocaeli, Derbent, Acısu, 40.72877″ N, 30.07275″ E, 62 m, 9.10.2009 ,1♂.

Distribution:

Middle Europe, Balkans, Anatolia, Caucasia, West and Middle Asia, West Siberia (Bei-Bienko, 1951; Harz, 1975). Distribution in Turkey: Afyonkarahisar, Ağrı, Ankara, Artvin, Aydın, Balıkesir, Bingöl, Bitlis, Bolu, Burdur, Bursa, Çankırı, Denizli, Elazığ, Erzincan, Erzurum, Eskişehir, Isparta, İzmir, Kahramanmaraş, Kars, Kastamonu, Kayseri, Kırklareli, Kocaeli, Konya, Kütahya, Malatya, Muş, Nevşehir,

Niğde, Sinop, Sivas, Şanlıurfa, Tekirdağ, Tunceli, Van, Yozgat (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Ünal, 1997, 1999, 2001; Önder et al., 1999; Sevgili and Çıplak, 2000).

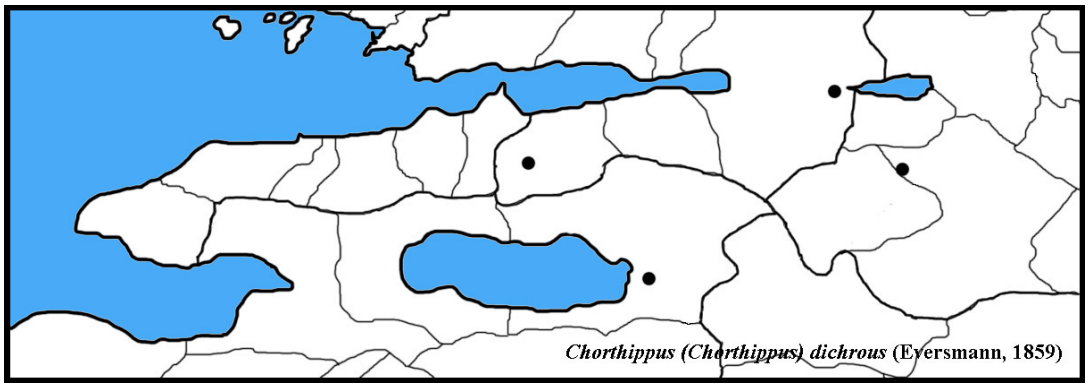

Figure 3.56. The sampling locations of *Chorthippus (Chorthippus) dichrous* (Eversmann, 1859) in Samanlı Mountains.

***Chorthippus (Chorthippus) loratus* (Fisher-Waldheim, 1846)**

Chorthippus loratus (Fisher-Waldheim), 1846: Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 152, Yalova.

Chorthippus (Chorthippus) loratus (Fischer de Waldheim,1846): Ünal, 1999, J. Orthop. Res. No. 8,249, Bursa, Orhangazi, Sugören, 400m., 7.8.1993, 1♂, 1♀.

Material Examined:

Kocaeli, Karamürsel, Çamdibi, 40.58° N, 29.54° E, 144 m, 23.8.2008, 2♂, 5♀; Kocaeli, Karşıyaka, 40.69° N, 29.93° E, 190 m, 24.8.2008, 4♂, 2♀; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 5♂, 4♀; Sakarya, Pamukova,

Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008, 1♂; Bursa, between İznik and Elbeyli, 40.45° N, 29.71° E, 86 m, 30.8.2008, 3♂, 1♀; Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355 m, 31.8.2008, 2♂, 3♀; Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 2♂, 4♀; Yalova, Soğucak, 40.59876″ N, 29.27377″ E, 110 m, 1.9.2008, 1♂, 2♀; Bursa. İznik, close to Hacıosman Village, 40.60° N, 29.80° E, 1000 m, 23.7.2009, 1♂; Bursa, İznik, Sarıağıl, 40.56256″ N, 29.67435″ E, 590 m, 6.8.2009, 1♀; Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 17.9.2009, 3♂, 1♀

Distribution:

Middle Europe, Balkans, Anatolia, MiddleEast , Caucasia, West Asia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar, Amasya, Ankara, Balıkesir, Bingöl, Bitlis, Bolu, Burdur, Bursa, Çankırı, Çorum, Diyarbakır, Edirne, Elazığ, Eskişehir, Gaziantep, İstanbul, İzmir, Kastamonu, Kaysari, Kırklareli, Kocaeli Manisa, Muş, Nevşehir, Niğde, Rize, Samsun, Siirt, Sinop, Şanlıurfa, Tekirdağ, Tunceli, Van (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1977; Güneş, 1984; Erman and Salman, 1990; Çıplak et al., 1996; Ünal, 1997, 1999; Önder et al., 1999; Sevgili and Çıplak, 2000).

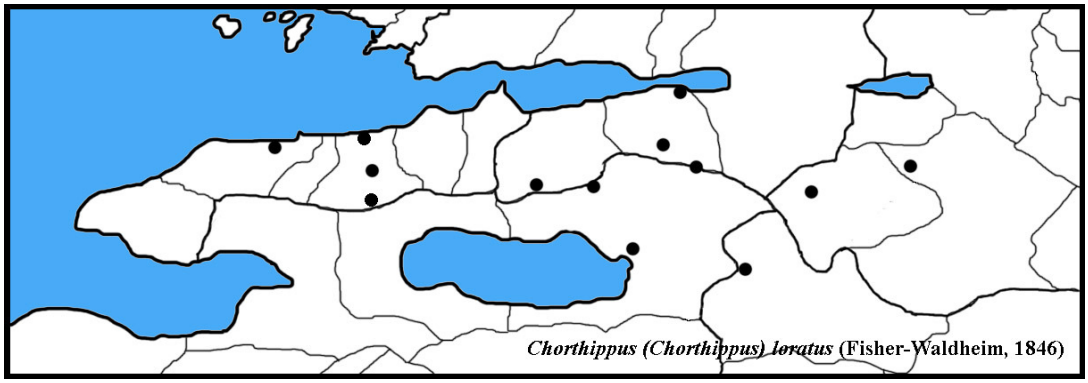

Figure 3.57. The sampling locations of *Chorthippus (Chorthippus) loratus* (Fisher-Waldheim, 1846) in Samanlı Mountains.

***Chorthippus (Chorthippus) parallelus parallelus* (Zetterstedt, 1821)**

Chorthippus (Chorthippus) parallelus parallelus (Zetterstedt 1821): Ünal, 1999, J. Orthoptera Res. No. 8,249, Kocaeli, Karamürsel, 400m., 8.8.1993, 4♂, 1♀.

Material Examined:

Sakarya, Sapanca, 36 m, 12.6.2007 (M.Ünal, A. Erden), 11♂, 4♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 6.6.2008, 4♂, 4♀; Kocaeli, Derbent, 6.6.2008,2♂,1♀; Kocaeli, Derbent, Acısu, 40.72877″ N, 30.07275″ E, 62 m, 1.7.2009, 1♂, 3♀.

Distribution:

Europe, Anatolia, Caucasia, NorthWest Asia, Siberia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkey: Ağrı, Ankara, Artvin, Balıkesir, Bolu, Bursa, Çanakkale, Çankırı, Edirne, Elazığ, Erzurum, Eskişehir, Isparta, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Kırklareli, Kocaeli, Konya, Kütahya, Malatya, Manisa,

Muş, Nevşehir, Niğde, Sakarya, Tunceli, Van (Karabağ, 1858; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984, Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Ünal, 1997, 2001; Önder et al., 1999).

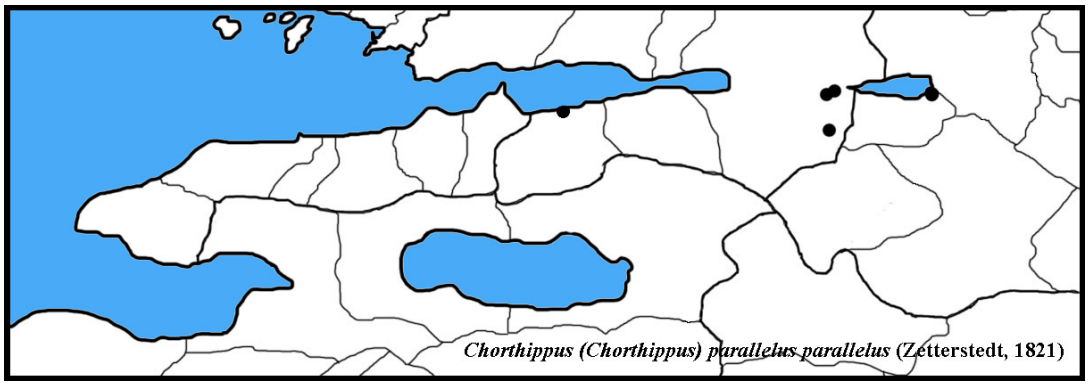

Figure 3.58. The sampling locations of *Chorthippus (Chorthippus) parallelus parallelus* (Zetterstedt, 1821) in Samanlı Mountains.

Subgenus: *Glyptobothrus* Chopard, 1951

Key to the species subgenus *Glyptobothrus*

1. Median-area of tegmen not conspicuously widened (Figure 5.77.) ..…….…… 2

-. Median-area of the tegmen conspicuously widened (Figure 5.76.)……

……..…... ***Chorthippus(Glyptobothrus) apricarius* (Linnaeus, 1758)**

2. Opening of the tympanal organ hemisphere or elips ……...……..

……. ***Chorthippus (Glyptobothrus) macrocerus* (Fischer de Waldheim, 1846)**

-. Opening of the tympanal organ groove like …… 3

3. Sulkus located front of pronotum ……..…….

…….. ***Chorthippus (Glyptobothrus) bornhalmi* Harz, 1971**

-. Sulkus located back of pronotum …….

……..... ***Chorthippus (Glyptobothrus) biguttulus euhedickei*** **Helversen, 1989**

Chorthippus(Glyptobothrus) apricarius **(Linnaeus, 1758)**

Material Examined:

Kocaeli, Kartepeden decended form peak, 40.64° N, 30.10° E, 1500 m, 22.7.2009, 11♂, 17♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602m., 22.7.2009, 8♂, 13♀; Kocaeli, between Kartepe and Maşukiye, 40.64° N, 30.11° E, 1300 m, 22.7.2009, 2♂, 4♀; Bursa. İznik, close to Hacıosman Village, 40.60° N, 29.80° E, 1000 m, 23.7.2009, 1♂; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602m., 24.8.2008, 7♂, 14♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602m., 5.8.2009, 6♂, 15♀; Bursa, İznik, Sarıağıl, 40.56256″ N, 29.67435″ E, 590m., 6.8.2009, 4 ♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602m., 21.8.2009, 3♂, 3♀; Kocaeli, Acısu, 40.71416″ N, 30.13438″ E, 44m., 21.8.2009, 1♂; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602m., 16.9.2009, 3♂, 1♀; Kocaeli, Kartepe, 40.64191″ N,30.09987″ E, 1602m., 9.10.2009, 3♂. Distribution:

Distribution:

Europe, Anatolia, Caucasia, Siberia, West, East and Middle Asia (Harz, 1975).

Distribution in Turkey: Bolu, Bursa, Çankırı, Elazığ, Erzurum, Erzincan, Ordu (Karabağ, 1958; Demirsoy, 1977; Önder et al., 1999; Ünal, 1999).

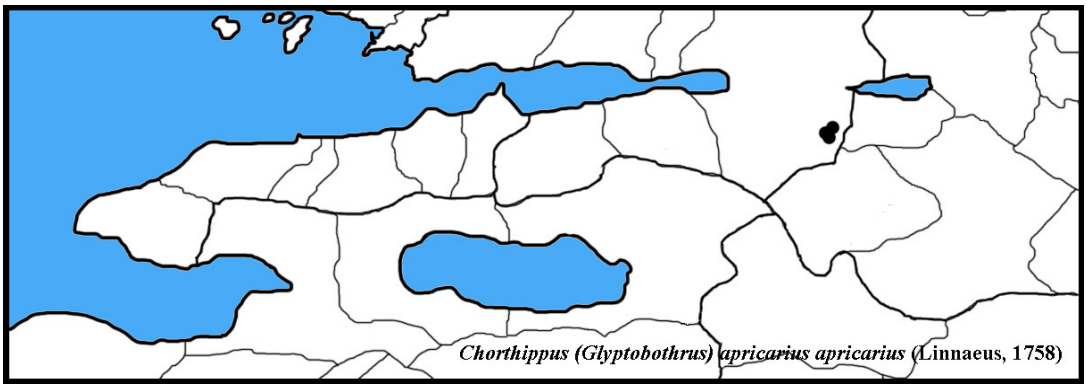

Figure 3.59. The sampling locations of *Chorthippus apricarius* (Linnaeus, 1758) in Samanlı Mountains.

***Chorthippus (Glyptobothrus) bornhalmi* Harz, 1971**

Chorthippus brunneus brunneus (Thunberg), 1815: Karabağ, 1958, Orthop. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 149, Bursa, İzmit. 17.6.1914.

Chorthippus (Glyptobothrus) brunneus brunneus (Thunberg, 1815): Ünal, 1999, J. Orthop. Res. No. 8, 250, Kocaeli, Karamürsel, 400 m, 8.8.1993, 1♂, 1♀; Bursa, Orhangazi, Sugören, 400 m, 7.8.1993, 2♂, 3♀; Bursa, İznik. 470 m, 7.8.1993, 1♀.

Material Examined:

Kocaeli, Kartepe, 1290 m, 12.6.2007 (M.Ünal, A. Erden), 11♂, 12♀; Sakarya, Sapanca,Fevziye Village, 40.66° N, 30.29° E, 6.6.2008, 1♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 6.6.2008, 2♂, 3♀; Kocaeli, Kartepe, decended form peak 5th km, 6.6.2008, 2♂, 4♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 24.8.2008, 1♂, 1♀; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 1♀; Sakarya, Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m,

30.8.2008, 1♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 3.6.2009, 12♂, 12♀; Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380 m, 6.6.2009, 2♂; Bursa. İznik, Çandarlı, 40.56° N, 29.85° E, 816 m, 6.6.2009, 2♂, 1♀;

Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 3.7.2009, 1♀; Bursa. İznik, close to Hacıosman Village, 40.60° N, 29.80° E, 1000 m, 23.7.2009, 2♀; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 21.8.2009, 1♂, 2♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 27.9.2009, 1♂; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 9.10.2009, 2♂; Yalova, Çınarcık, Karlık upland, 40.58099″ N, 28.99035″ E, 850 m, 10.10.2009, 2♂, 1♀; Bursa, close to İznik, 40.42320″ N, 29.74190″ E, 100 m, 25.10.2009. 2♀.

Distribution:

North Africa, Europe, Anatolia, MiddleEast , Caucasia, West, East and Middle Asia, Siberia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar, Ağrı, Amasya, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bingöl, Bitlis, Bolu, Burdur, Bursa, Çankırı, Denizli, Diyarbakır, Edirne, Elazığ, Eskişehir, Giresun, Hatay, Isparta, İstanbul, İzmir, Kahramanmaraş, Kastamonu, Kırklareli, Kocaeli, Konya Malatya, Manisa, Mardin, Muğla, Nevşehir, Niğde, Ordu, Rize, Samsun, Sinop, Şanlıurfa, Tokat, Tunceli, Yozgat (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1977; Salman 1978; Güneş, 1984; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997, 1999, 2001, 2002; Önder et al., 1999; Sevgili and Çıplak, 2000).

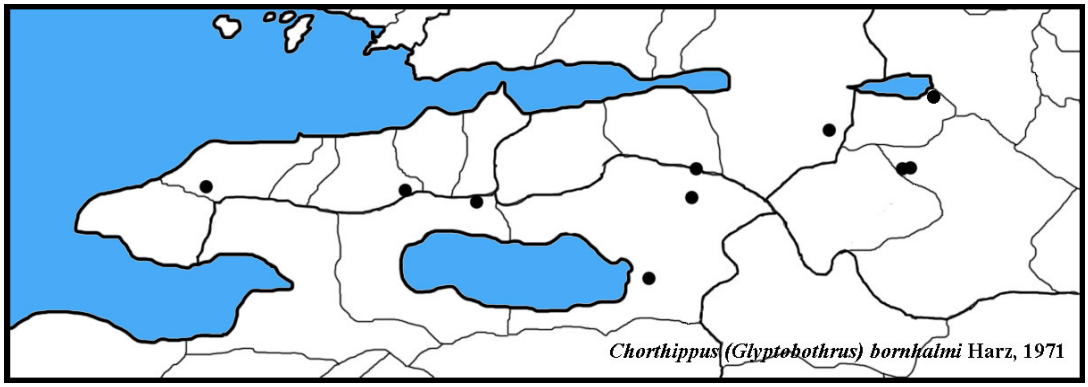

Figure 3.60. The sampling locations of *Chorthippus (Glyptobothrus) bornhalmi* in Samanlı Mountains.

***Chorthippus (Glyptobothrus) biguttulus euhedickei* Helversen, 1989**

Material Examined:

Bursa. İznik, close to Hacıosman Village, 40.60° N, 29.80° E, 1000m., 23.7.2009, 2♂.

Distribution: Balkans, North-West Anatolia. Distribution in Turkey:

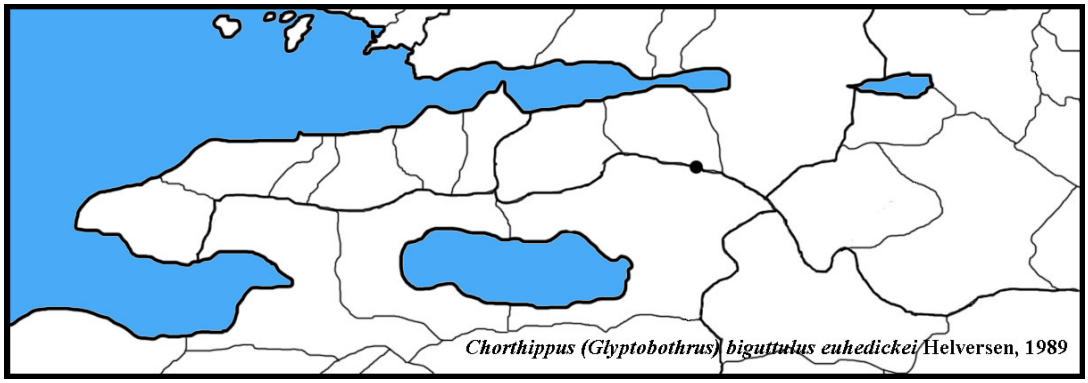

Figure 3.61. The sampling locations of *Chorthippus (Glyptobothrus) biguttulus euhedickei* Helversen, 1989 in Samanlı Mountains.

***Chorthippus (Glyptobothrus) macrocerus macrocerus* (Fischer de Waldheim, 1846)**

Chorthippus (Glyptobothrus) macrocerus macrocerus (Fischer de Waldheim 1846): Ünal, 1999, J. Orthop. Res. No. 8,250, Kocaeli, Karamürsel, 400m., 8.8.1993, 7♂, 3♀.

Material Examined:

Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602m., 9.10.2009, 2♂; Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808m., 30.8.2008, 2♀; Kocaeli, Bahçecik, İrşadiye, 40.64477″ N, 29.80507″ E, 355m., 31.8.2008, 1♀; Bursa, İznik, close to Hacıosman Village, 40.60° N, 29.80° E, 1000m., 23.7.2009, 1♂; Bursa, İznik, close to Hacıosman Village, 40.58° N, 29.83° E, 935m., 23.7.2009, 1♂, 1♀; Bursa, İznik, Sarıağıl, 40.56256″ N, 29.67435″ E, 590m., 6.8.2009, 2♂, 2♀; Bursa, İznik, Sarıağıl, 40.56256″ N, 29.67435″ E, 590m., 6.8.2009, 2♂.

Distribution:

Turkey, İraq, North İran, Anatolia. Distribution in Turkey: Bursa, Kocaeli, Sakarya, Hatay, Tokat, Van, Bolu, Rize, Kars, Erzurum, Ağrı, Artvin (Karabağ, 1958; Harz, 1075).

Figure 3.62. The sampling locations of *Chorthippus (Glyptobothrus) macrocerus macrocerus* (Fischer de Waldheim, 1846) in Samanlı Mountains.

Genus: *Euchorthippus* Tarbinsky, 1926

***Euchorthippus declivus* (Brisout de Barneville, 1848)**

Material Examined:

Bursa, İznik, Kızderbent, 40.56°N, 29.52° E, 236 m, 21.6.2008, 2♂; Kocaeli, Karşıyaka, 40.69° N,29.93° E, 190 m, 24.8.2008, 1♂.

Distribution:

Europe, East Asia, Balkans (Harz, 1975). Distribution in Turkey: New for Turkey.

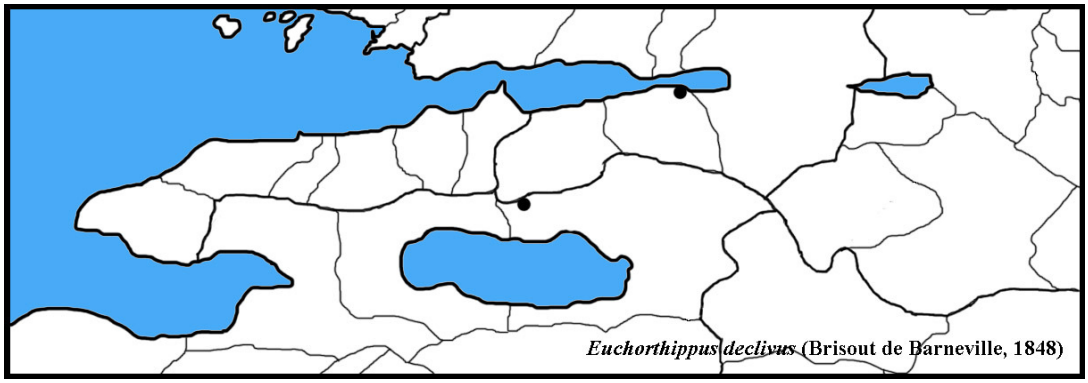

Figure 3.63. The sampling locations of *Euchorthippus declivus* (Brisout de Barneville, 1848) in Samanlı Mountains.

3.2.4.8. Subfamily: *OEDIPODINAE* Walker, 1871

Key to the genera of *Oedipodinae*

1. Vertex forming with the frons an acute angle (Figure 5.78.) ..…….....… 5

-. Vertex forming with the frons a right – or – if the vertex sloped towards the apex- an obtuse angle (Figure 5.79.) ……...…….……... 2

2. Upper carina of the postfemur not abruptly excised in the middle (Figure 5.53.) …….. 3

-. Upper caarina of the postfemur abruptly excised about the middle (Figure 5.80.) … ……..…….. ***Oedipoda***

3. Mostly slender specimens; the head – especially in male-rises above the pronotum (Figure 5.57.); median keel of the pronotum indistinct or absent in the pro- and mesozona, if distinct along the whole length, then the hind margin is broadly rounded, if distinct in the pro- and mesozona, then the side carinae of the impressed vertex turn into the frontal ridge; alae colourless or soft bluish, yellowish or pink, if there is a dark band, it contrasts hardly with the colours …….. ***Acrotylus***

-. Mostly sturdy specimens; the head rise not or weakly above the pronotum (Figure 5.82.); median keel of the pronotum distinct along the whole length; aloe mostly strongly blue, red or yellow contrasting with a dark band ……..…... 4

4. Median keel of pronotum with 1-3 notches, pronotum without an x-shaped light mark (Figure 5.81.) ……. ***Locusta***

-. Median keel of the the pronotum without notch (if postfemura slightly denticulate dorsally compare with Locusta), with x-shaped light mark on the pronotum (Figure 5.82.) ..…… ***Oedaleus***

5. Pronotum with at least distict side keels in the prozona (Figure 5.83.) …….. 6

-. Pronotum without side keels (Figure 5.84.) ..... ***Aiolopus***

6. Antenna at least partly more flattened and widened dorsoventrally; ovipositor short; length of the eyes in male 1:2-2.25; postfemura 4-4.5 times as long as high ….. ……..…… ***Duroniella***

-. Antenna filiform, weakly and regularly flattenend dorsoventrally; ovipositor longer; length of the eyes in male 1:1,5- 1.74. Postfemora 5 times as long as high … …… ***Paracinema***

Genus: *Paracinema* Fischer, 1853

***Paracinema tricolor bisignata* (Charpentier, 1825)**

Paracinema tricolor bisignata (Charpentier, 1825): Karabağ, 1958,The Orthotera Fauna of Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 130, Yalova.

Material Examined:

between Kocaeli and Acısu,40.73135″ N, 30.06178″ E, 40 m, 16.9.2009, 1♂; between Kocaeli and Acısu, 40.73085″ N, 30.06380″ E, 35 m, 26.9.2009, 1♂, 1♂.

Distribution:

NorthWest Africa, South and SouthWest Europe, Balkans, Anatolia, Caucasia, MiddleEast (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkeyı: Adana, Ankara, Bursa, Çorum, Edirne, Elazığ, Eskişehir, Isparta, İstanbul, Kırklareli, Kocaeli, Konya, Niğde, Samsun, Tekirdağ (Karabağ, 1958 Karabağ et al., 1971, 1980; Weidner, 1969; Demirsoy, 1977; Güneş, 1984; Erman and Salman, 1990; Önder et al., 1999).

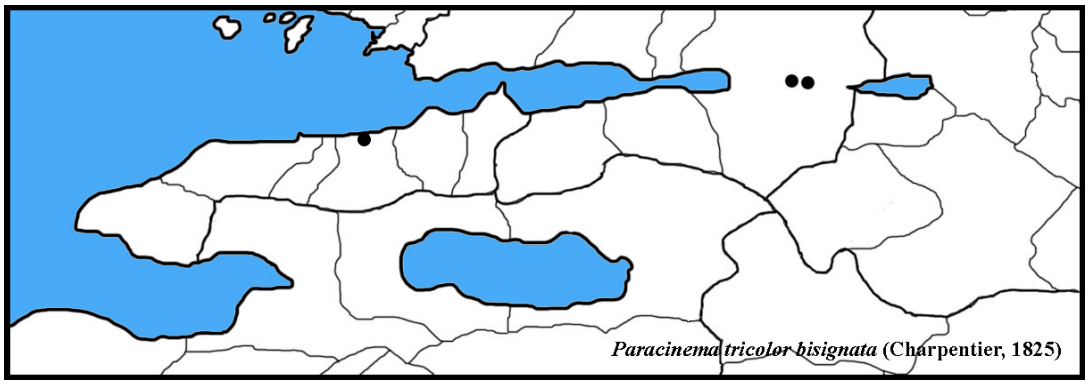

Figure 3.64. The sampling locations of *Paracinema tricolor bisignata* (Charpentier, 1825) in Samanlı Mountains.

Genus: *Duroniella* Bolívar, 1908

***Duroniella fracta* (Krauss, 1890)**

Material Examined:

Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380 m, 6.6.2009, 4♀.

Distribution:

Güneydoğu Avrupa, Balkanlar, Anadolu, Ortadoğu (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Türkiye'deki yayılış: Adana, Ankara, Bursa, Diyarbakır, Gaziantep, Hatay, İçel, İzmir, Kahramanmaraş, Sakarya (Karabağ 1958; Karabağ et al., 1971; Weidner, 1969; Demirsoy 1977; Güneş, 1984; Naskrecki and Ünal, 1995; Ünal, 1997, 1999; Önder et al., 1999).

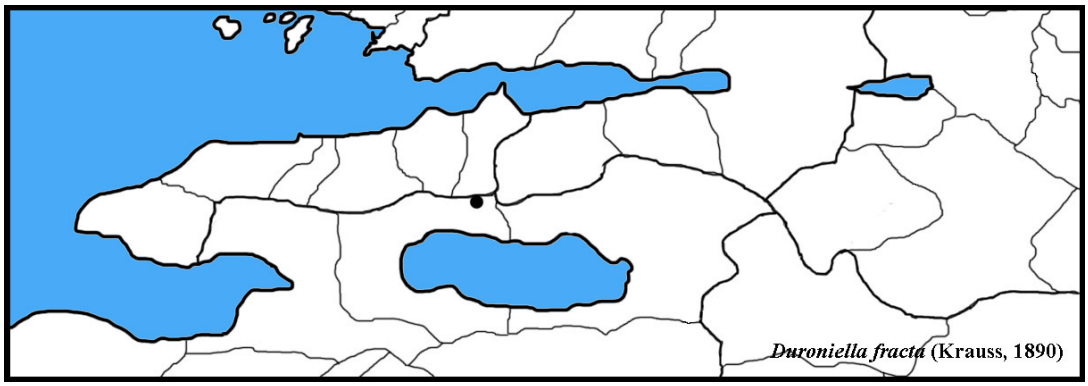

Figure 3.65. The sampling locations of *Duroniella fracta* (Krauss, 1890) in Samanlı Mountains.

Genus: *Aiolopus* Fieber, 1853

Key to the species of Aiolopus

1.Postfemura at most 3.5 times as long as high, about as high as the width of tegmen (Figure 5.85.) ...……...…… ***Aiolopus strepens*** **(Latreille, 1804)**

- Postfamura clearly 4 times as long as high, their height is less than the width of tegmina (Figure 5.86.) ……..……...… ***Aiolopus thalassinus*** **(Fabricius, 1781)**

Aiolopus thalassinus **(Fabricius, 1781)**

Material Examined:

Kocaeli, Karamürsel, Yalakdere, 40.61°N, 29.57° E, 160 m, 21.6.2008, 1♂; Kocaeli, Bahçecik, 40.66°N, 29.91° E, 209 m, 2.7.2009, 2♂; Yalova, Çiftlik, 40.68799″ N, 29.44007″ E, 10 m, 9.10.2009, 1♂; Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 17.9.2009, 1♂; Kocaeli, Kartepe, 40.64191″ N, 30.09987″ E, 1602 m, 9.10.2009, 2♂; Yalova, Termal, 40.61320″ N, 29.16155″ E, 220 m, 10.10.2009, 1♀; Yalova, Çınarcık, Delmece upland, 40.56282″ N, 29.00714″ E, 712m., 10.10.2009, 1♂, 6♀, 2 nymph.

Distribution:

Africa, South, Middle and East Europe, Anatolia, MiddleEast , Peninsula of Arabia, Caucasia, Middle, West and South Asia (Ramme, 1951; Bei-Bienko, 1951; Hollis, 1968; Harz, 1975). Distribution in Turkey: Adana, Ağrı, Adıyaman, Ankara, Antalya, Aydın, Artvin, Balıkesir, Bingöl, Bursa, Çankırı, Çorum, Diyarbakır, Edirne, Elazığ, Erzurum, Eskşehir, Gaziantep, Hatay, İçel, İstanbul, İzmir,

Kahramanmaraş, Kars, Kayseri, Kırklareli, Konya, Manisa, Muğla, Muş, Nevşehir, Niğde, Samsun, Siirt, Tekirdağ, Tunceli (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997).

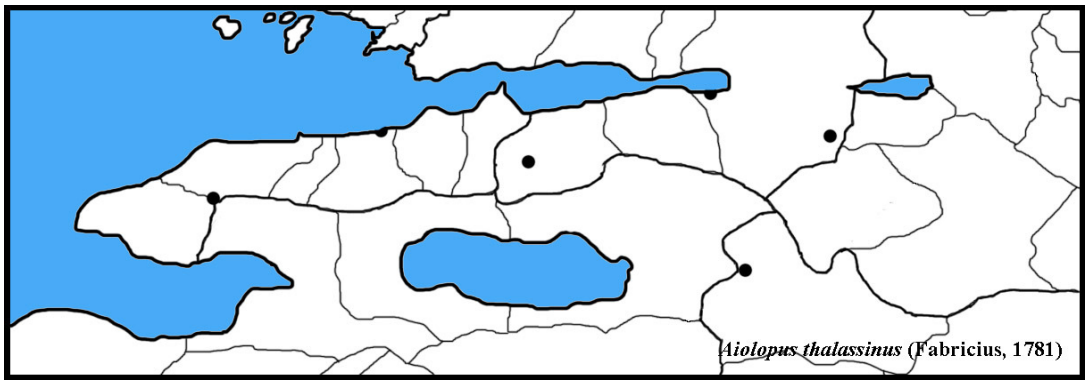

Figure 3.66. The sampling locations of *Aiolopus thalassinus* (Fabricius, 1781) in Samanlı Mountains.

***Aiolopus strepens* (Latreille, 1804)**

Material Examined:

Kocaeli, Karamürsel, Kızderbent Village, 235 m, 13.6.2007, 1♀; Kocaeli, Karamürsel, Çamdibi, 40.58° N, 29.54° E, 144 m, 23.8.2008, 1♂; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 5♂, 4♀; Sakarya, Geyve, Melekşeoruç, 40.59° N, 30.23° E, 714 m, 30.8.2008, 4♀; Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008, 1♂; Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 2♀; Yalova, Armutlu, Mecidiye, 40.5194′ N, 28.8894′ E, 400 m, 1.9.2008, 2♂; Kocaeli, Bahçecik, 40.66°N, 29.91° E, 209 m, 2.7.2009, 1♀; Kocaeli, Gölcük, Şevkatiye K., 40.64508″ N, 29.78090″ E, 500 m, 22.8.2009, 1♂,

1♀; Bursa. İznik, Gürmüzlü, 40.50802″ N, 29.77961″ E, 500 m, 22.8.2009, 2♂, 1♀; between Kocaeli and Acısu,40.73135″ N, 30.06178″ E, 40 m, 16.9.2009, 1♀; Bilecik, Çerkesli, Yeşilçimen village, 40.42670″ N, 29.90512″ E, 280 m, 17.9.2009, 3♂, 1♀; Yalova, Altınova, Karadere, 40.65532″ N, 29.49313″ E, 30 m, 27.9.2009, 1♂, 2♀; Yalova, Çiftlik, 40.68799″ N, 29.44007″ E, 10 m, 9.10.2009,1♂;Yalova, Çınarcık, Karlık upland, 40.58099″ N, 28.99035″ E, 850 m, 10.10.2009, 1♀.

Distribution:

North Africa, South and Middle Europe, Balkans, Anatolia, MiddleEast , Caucasia, West and Middle Asia (Ramme, 1951; Bei-Bienko, 1951; Hollis, 1968; Harz, 1975). Distribution in Turkey: Adana, Ağrı, Afyonkarahisar,Amasya, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bingöl, Burdur, Bursa, Çanakkale, Çankırı, Denizli, Elazığ, Eskişehir, Hatay, Isparta, İçel, İstanbul, İzmir, Kars, Kırklareli Konya, Kocaeli, Malatya, Manisa, Muğla, Nevşehir, Niğde, Samsun, Sinop, Şanlıurfa, Tekirdağ, Tokat (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997; Sevgili and Çıplak, 2000).

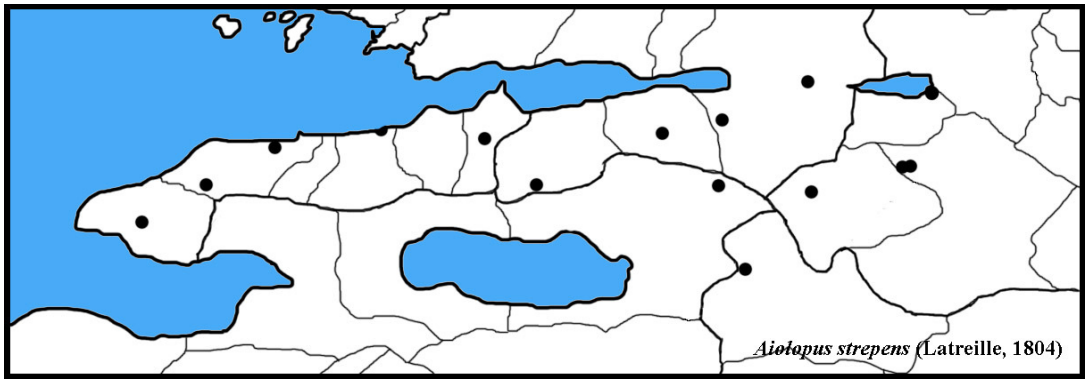

Figure 3.67. The sampling locations of *Aiolopus strepens* (Latreille, 1804) in Samanlı Mountains.

Genus: *Locusta* Linnaeus, 1758

***Locusta migratoria* Linnaeus, 1758**

Material Examined:

Yalova, Çınarcık, Delmece upland, 40.56282″ N, 29.00714″ E, 712 m, 10.10.2009, 1♂.

Distribution:

Europe, Anatolia, Caucasia, Middle and West Asia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkeyı: Adana, Ankara, Antalya, Artvin, Aydın, Balıkesir, Burdur, Bursa, Çankırı, Diyarbakır, Elazığ, Erzincan, Hatay, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Konya, Kütahya, Manisa, Mardin, Muğla, Niğde, Samsun, Sinop, Şanlıurfa (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Naskrecki and Ünal, 1995; Ünal, 1999, 2001; Önder et al. 1999; Sevgili and Çıplak, 2000).

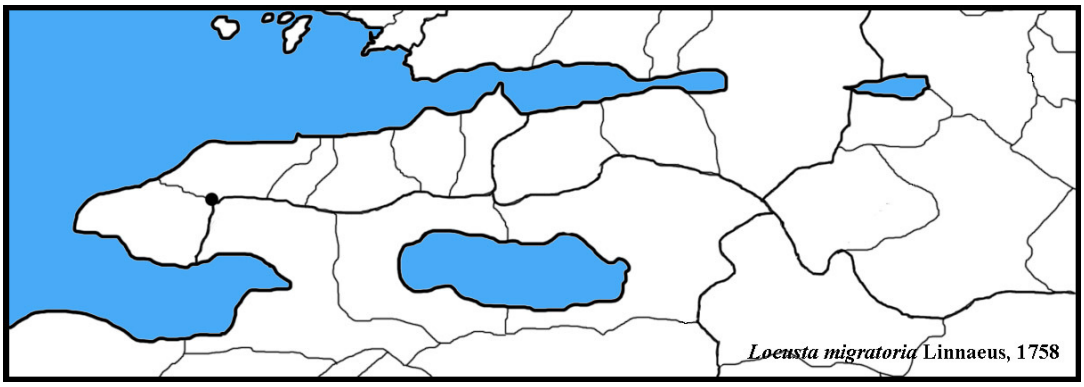

Figure 3.68. The sampling locations of *Locusta migratoria* Linnaeus, 1758 in Samanlı Mountains.

Genus: *Oedaleus* Fieber, 1853

***Oedaleus decorus* (Germar, 1826)**

Material Examined:

Yalova, Altınova, Dereköy, 40.66° N, 29.55° E, 336 m, 3.7.2009, 1♀; Bursa. İznik, close to Hacıosman Village, 40.60° N, 29.80° E, 1000 m, 23.7.2009, 3♂, 3♀.

Distribution:

North Africa, South and Middle Europe, Balkans, Anatolia, MiddleEast, Caucasia, Middle, East and West Asia, Siberia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar, Ağrı, Amasya, Ankara, Antalya, Artvin, Balıkesir, Bilecik, Bitlis, Bursa, Çanakkale, Çankırı, Çorum, Denizli Edirne, Elazığ, Erzincan, Erzurum, Eskişehir, Hatay, İçel, İstanbul, İzmir, Kahramanmaraş, Kars, Kayseri, Kırklareli, Konyai Kütahya, Malatya, Manisa, Muğla, Muş, Nevşehir, Niğde, Samsun, Şanlıurfa, Tekirdağ, Tokat, Tunceli, Van,

Zonguldak (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997, 1999; Önder et al. 1999).

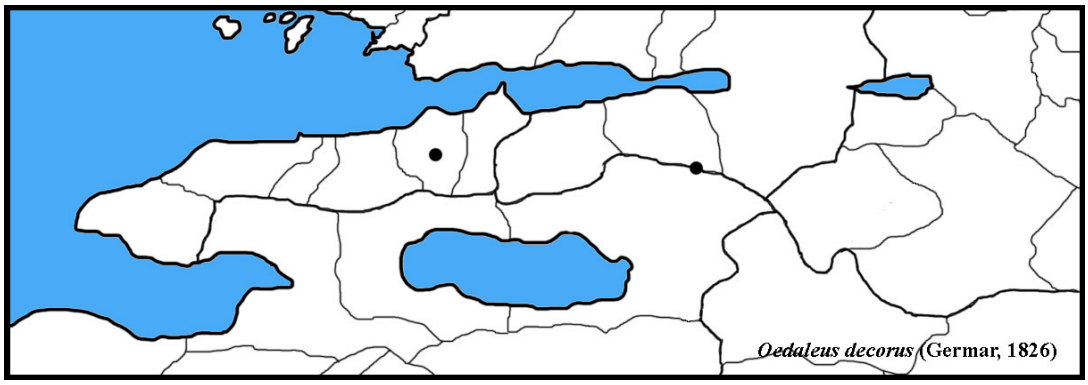

Figure 3.69. The sampling locations of *Oedaleus decorus* (Germar, 1826) in Samanlı Mountains.

Genus: *Oedipoda* Latreille, 1829

Key to the species for *Oedipoda*

1. Hind wings red, reddish or blue yellow ……..…… 2

-. Hind wings yellow……...……..……..……. ***Oedipoda aurea* Uvarov, 1923**

2. Hind wings blue ……..……..……. ***Oedipoda caerulescens* (Linnaeus, 1758)**

-. Hind wings red, reddish ……...…… 3

3. Dark band of hind wing reaching to posterior margin; hind wing reddish-orange ….……...…… ***Oedipoda germanica* (Latreille, 1804)**

-. Dark band of hind wing not reaching to posterior margin; hind wing red ……..... ……..…… ***Oedipoda miniata* (Pallas, 1771)**

***Oedipoda caerulescens caerulescens* (Linnaeus, 1758)**

Oedipoda caerulescens (Linnaeus 1758): Ünal, 1999, J. Orthop. Res. No. 8,250, Bursa, Orhangazi, Sugören, 400 m, 7.8.1993, 1♀; Bursa, İznik, 470 m, 7.8.1993, 5♂, 5♀; Kocaeli, Çayırköy, 125 m, 8.8.1993, 1♂, 2♀; Kocaeli, Karamürsel, 400 m, 1♂, 1♀.

Material Examined:

Kocaeli, Karamürsel, between Karapınar and İhsaniye, 40.65942″ N, 29.60513″ E, 402 m, 23.8.2008,1♂; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 3♂, 1♀; Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008, 2♀; Bursa, İznik, between Elbeyli and Gürmüzlü, 40.49° N, 29.75° E, 406 m, 30.8.2008, 4♂, 1♀; Kocaeli, Bahçecik, İrşadiye, 40.64499″ N, 29.80507″ E, 500 m, 31.8.2008, 2♀; Yalova, Armutlu, Mecidiye, 40.5194′ N, 28.8894′ E, 400 m, 1.9.2008, 1♀; Bursa. İznik, close to Hacıosman Village, 40.58° N, 29.83° E, 935 m, 23.7.2009, 1♂, 1♀;Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 24.7.2009, 2♂, 3♀; Bursa. İznik, Hacıosman, 40.58000″ N, 29.81917″ E, 1000 m, 22.8.2009, 1♂, 1♀; Yalova, Sugören, Höyüktepe, 40.57° N, 29.34° E, 661 m, 27.9.2009, 1♂, 1♀; Yalova, Çınarcık, Karlık upland, 40.58099″ N, 28.99035″ E, 850 m, 10.10.2009, 2♂, 1♀.

Distribution:

North Africa, Europe, Anatolia, MiddleEast, Caucasia, Middle, West and SouthWest Asia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkey: Adana, Afyonkarahisar, Ağrı, Amasya, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bilecik,

Bingöl, Bitlis, Bolu, Burdur, Bursa, Çanakkale, Çankırı, Çorum, Denizli, Diyarbakır, Edirne, Elazığ, Erzurum, Gaziantep, Hatay, İçel, İstanbul, İzmir, Kars, Kastamonu, Kayseri, Kırklareli, Kocaeli, Konya, Kütahya, Malatya, Mardin, Muğla, Muş, Nevşehir, Niğde, Sakarya, Samsun, Sivas, Tekirdağ, Tokat, Trabzon, Tunceli, Yozgat, Zonguldak (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997, 1999, 2001; Önder et al. 1999).

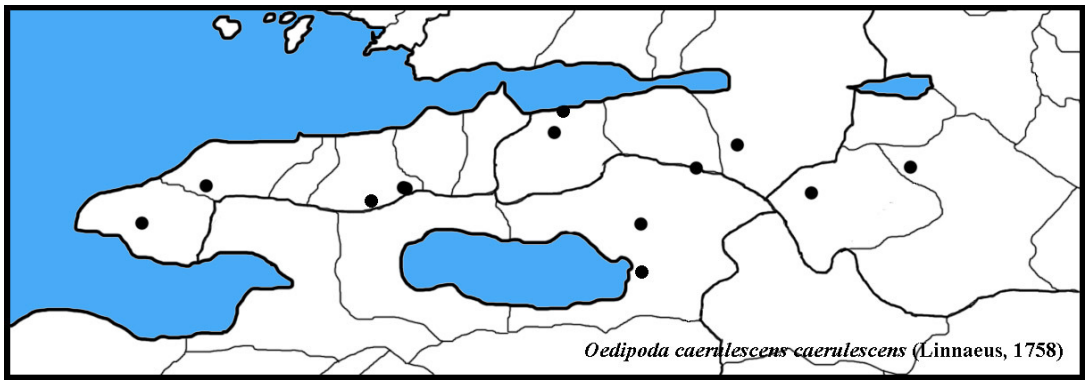

Figure 3.70. The sampling locations of *Oedipoda caerulescens caerulescens* (Linnaeus, 1758) in Samanlı Mountains.

***Oedipoda aurea* Uvarov, 1923**

Oedipoda aurea Uvarov 1923:Ünal, 1999, J. Orthop. Res. No. 8,250, Bursa, İznik, 470 m, 7.8.1993, 1♀ (M.Ünal).

Material Examined:

Bursa, İznik, between Elbeyli and Gürmüzlü, 40.49° N, 29.75° E, 406 m, 30.8.2008, 4♂.

Distribution:

Anatolia, West MiddleEast (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975. Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar, Ağrı, Amasya, Ankara, Antalya, Balıkesir, Bingöl, Bilecik, Bursa, Denizli, Diyarbakır, Elazığ, Erzurum, Erzincan, Hatay, Isparta, İçel, İzmir, Kahramanmaraş, Konya, Kütahya, Malatya, Manisa, Mardin, Muş, Niğde, Siirt, Şanlıurfa, Tunceli (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplaket al., 1996; Naskrecki and Ünal, 1995; Ünal, 1999, 2001; Sevgili and Çıplak, 2000).

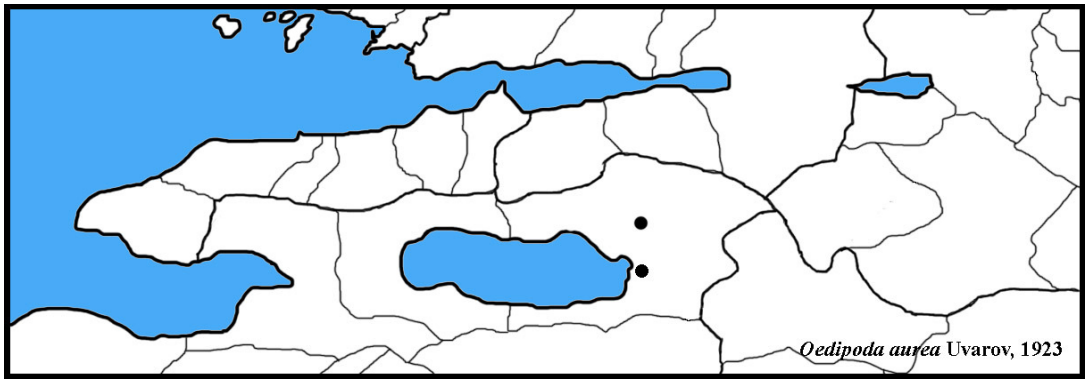

Figure 3.71. The sampling locations of *Oedipoda aurea* Uvarov, 1923 in Samanlı Mountains.

***Oedipoda miniata miniata* (Pallas, 1771)**

Oedipoda miniata miniata (Palas), 1771: Karabağ, 1958, Ortho. Fauna Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 164, Yalova, 31.8.1910

Material Examined:

Bursa. İznik, 40.42285″ N, 29.74226″ E, 120 m, 27.9.2009, 1♂, 1♀; Bursa, close to İznik, 40.42320″ N, 29.74190″ E, 100 m, 25.10.2009, 2♂.

Distribution:

North Africa, Mediterranean Countris, East Europe, Anatolia, Middle East, Peninsula of Arabia, Caucasia, West and Middle Asia, SouthWest Siberia (Ramme, 1951; Bei-Bienko, 1951; Harz, 1975). Distribution in Turkey: Adana, Adıyaman, Afyonkarahisar, Ağrı, Amasya, Ankara, Antalya, Artvin, Aydın, Balıkesir, Bilecik, Bingöl, Bitlis, Burdur, Bursa, Çanakkale, Çankırı, Çorum, Denizli, Diyarbakır, Edirne, Elazığ, Erzincan, Erzurum, Eskişehir, Gaziantep, Hakkari, Hatay, İçel, İstanbul, İzmir, Kars, Kahramanmaraş, Kırklareli, Kocaeli Konya, Kütahya, Malatya, Manisa, Mardin, Muğla, Muş, Nevşehir, Niğde, Sakarya, Samsun, Siirt, Sinop, Şanlıurfa, Tekirdağ, Tokat, Tunceli, Van, Yozgat, Zonguldak (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997, 1999, 2001; Önder et al. 1999; Sevgili and Çıplak, 2000).

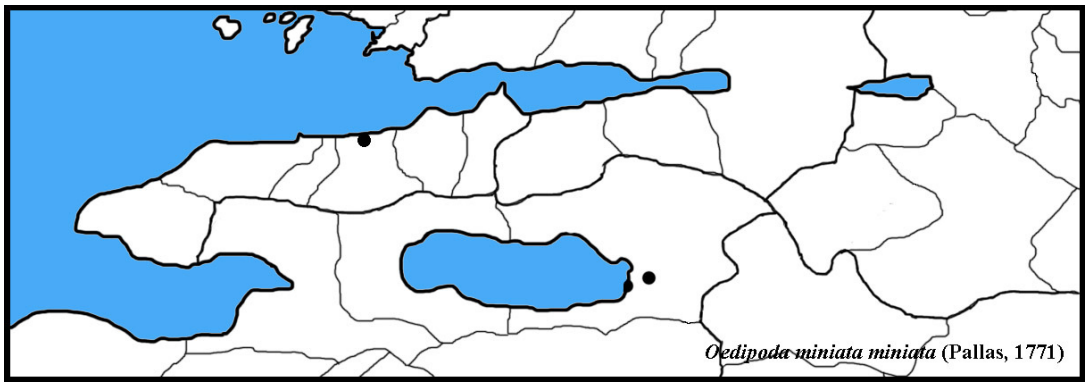

Figure 3.72. The sampling locations of *Oedipoda miniata miniata* (Pallas, 1771) in Samanlı Mountains.

***Oedipoda germanica germanica* (Latreille, 1804)**

Material Examined:

Bursa, Orhangazi, Mahmudiye, 40.53° N, 29.44° E, 380 m, 24.7.2009, 3♂, 2♀.

Distribution:

Europe, Trascaucausia, West Caucausia, Anatolia. Distribution in Turkey: Ankara, Bursa, Bolu, İstanbul (Karabağ,1958; Harz, 1969; Karabağ et al., 1971; Ünal, 1999).

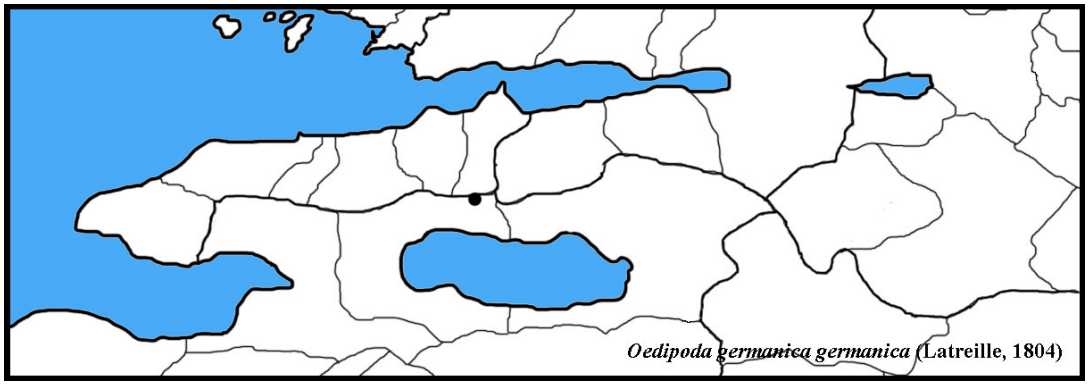

Figure 3.73. The sampling locations of *Oedipoda germanica germanica* (Latreille, 1804) in Samanlı Mountains.

Genus: *Acrotylus* Fieber, 1853

Key to species of *Acrotylus*

1. Hind wing with dark band …….. 2

-. Hind wing without dark band …..…….. ***Acrotylus longipes* (Charentier, 1845)**

2. Arolium hardly 1/3 as long as the claws, narrow (Figure 5.87.); antennae mostly somewhat thickened apically, surpassing the paranota by ½ to 1/3 of their length, in female at most by the half of the length of the paranota, longest segments as long as widw to 1,5 times as long as wide; if the dark band of the alae broad, then it is clearly separated from the hind margin; hide margin of the pronotum roundly obtuse angled ……. ***Acrotylus insubricus* (Scopoli, 1788)**

-. Arolium broader , in male up to half the length of the claws (Figure 5.88.); antennae slender, in male and female surpassing the paranota by the length of them, longest segment 2-3 times as long as wide; the dark band of the alae is broad and nearer the hind margin; hind margin of the pronotum rounded ……. ……. ***Acrotylus patruelis* (Herric-Schaffer, 1838)**

***Acrotylus insubricus* (Scopoli, 1788)**

Material Examined:

Kocaeli, Karamürsel, between Karapınar and İhsaniye, 40.65942″ N, 29.60513″ E, 402 m, 23.8.2008, 1♂; Sakarya, Geyve, Melekşeoruç, 40.56° N, 30.24° E, 268 m, 30.8.2008, 3♂, 1♀; Bursa, İznik, between Elbeyli and Gürmüzlü, 40.49° N, 29.75° E, 406 m, 30.8.2008, 2♂; Yalova, Armutlu, Mecidiye, 40.5194′ N, 28.8894′ E, 400 m, 1.9.2008, 1♂, 1♀.

Distribution:

East Europe, Balkans, Anatolia, MiddleEast, Caucasia, SouthWest Asia (Ramme, 1951; Bei-Bienko 1951; Harz, 1975). Distribution in Turkeyı: Adana, Afyonkarahisar, Amasya, Ankara, Antalya, Artvin, Bakıkesir, Bilecik, Bingöl, Bursa, Çanakkale, Çankırı, Çorum, Diyarbakır, Edirne, Elazığ, Erzincan, Erzurum, Eskişehir, Gaziantep, Hatay, Isparta, İçel, İstanbul, İzmir, Kahramanmaraş, Kastamonu, Kars, Kayseri, Kırklareli, Konya, Kütahya, Malatya, Manisa, Mardin, Muş, Nevşehir, Niğde, Sakarya, Samsun, Siirt, Sinop, Şanlıurfa, Tekirdağ, Tokat, Trabzon, Tunceli, Van (Karabağ, 1958; Karabağ et al., 1971, 1974, 1980; Weidner, 1969; Demirsoy, 1975, 1977; Salman, 1978; Güneş, 1984; Erman and Salman, 1990; Çıplak and Demirsoy, 1991; Çıplak et al., 1996; Naskrecki, 1991; Naskrecki and Ünal, 1995; Ünal, 1997, 1999, 2001; Önder et al. 1999; Sevgili and Çıplak, 2000).

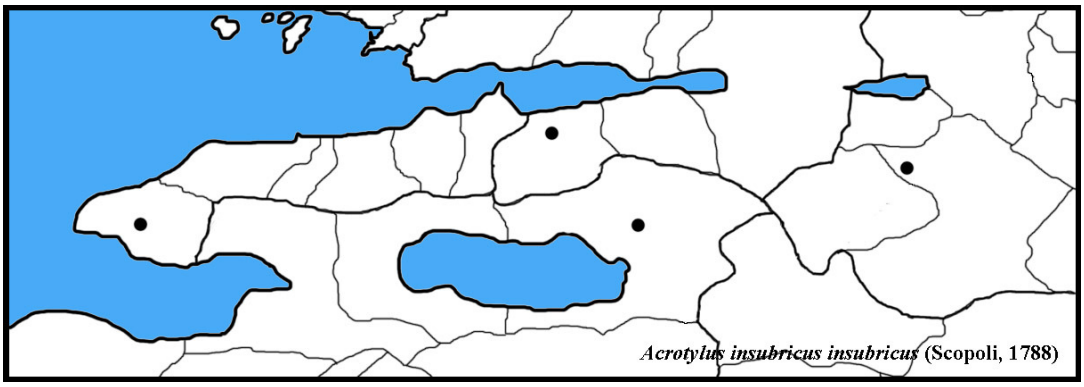

Figure 3.74. The sampling locations of *Acrotylus insubricus* (Scopoli, 1788) in Samanlı Mountains.

***Acrotylus patruelis* (Herrich-Schaffer, 1838)**

Material Examined:

Kocaeli, Karamürsel, Yalakdere, 40.61°N, 29.57° E, 160 m, 21.6.2008, 1♀; Bursa, İznik-Orhangazi road, 40.48° N, 29.54° E, 90 m, 23.8.2008, 1♀; Sakarya, Pamukova, Çilekli, 40.53° N, 30.058″ E, 808 m, 30.8.2008, 1♀; Yalova, Çınarcık, 40.64621″ N, 29.04407″ E, 45 m, 1.9.2008, 1♀; Bilecek, Osmaneli, Kaynarca, 40.41597″ N, 29.81676″ E, 200 m, 17.9.2009, 2♂.

Distribution:

West, East South Europe, Balkans, Caucasia, Anatolia, Africa, West Asia, Mediterranean İslands. Distribution in Turkey: Antalya, İzmir, Bursa, İstanbul, Adana, Maraş, Manisa, Muğla, Hatay, Artvin (Karabağ, 1958; Harz, 1969; Karabağ, 1974; Demirsoy, 1977; Önder et al., 1999).

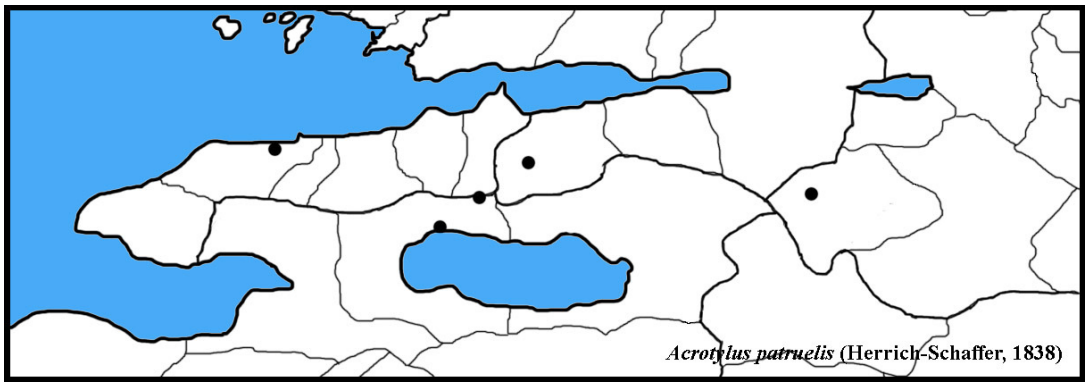

Figure 3.75. The sampling locations of *Acrotylus patruelis* (Herrich-Schaffer, 1838) in Samanlı Mountains.

***Acrotylus longipes* (Charentier, 1845)**

Acrotylus longipes longipes (Charentier, 1845): Karabağ, 1958,The Orthotera Fauna of Turkey, Ankara Üniversitesi Fen Fakültesi Yayınları Um. 81 –Zooloji 4, 167, Bursa.

Distribution:

East, East-South Europe, North Africa, Anatolia. (Harz, 1975). Distribution in Turkey: Antalya, Aydın, Balıkesir, Bursa, İstsnbul, Samsun (Karabağ, 1958; Demirsoy, 1977; Karabağ et al., 1980; Önder et al., 1999).

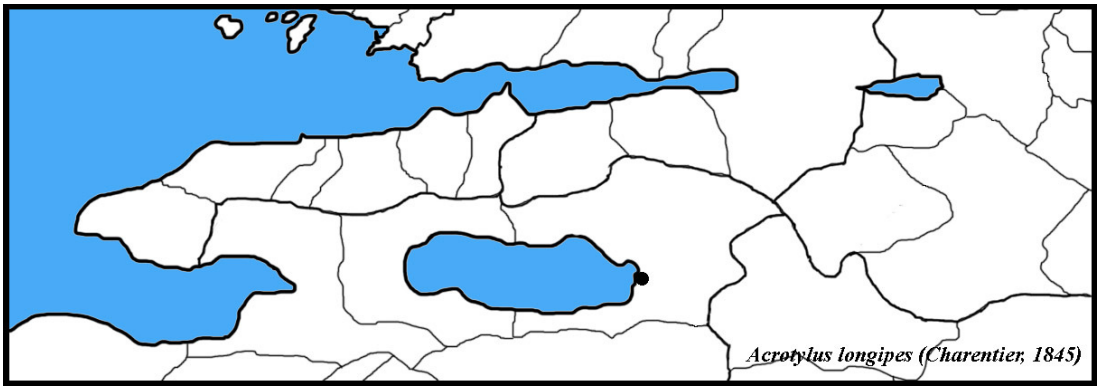

Figure 3.76. The sampling locations of *Acrotylus longipes* (Charentier, 1845) in Samanlı Mountains.

CHAPTER IV

4. DISCUSSION

In this study, a total of 933 specimens that belong to 7 families, 15 subfamilies, 53 genera, and 75 species have been collected from the Samanlı Mountain district. Thirty one of these species are new to the area, and *Euchorthippus declivus* (Brisout de Barneville, 1848) is recorded in Turkey for the first time.

That as low as 933 specimens could be collected from the area is mainly due to the presence of either dense forests, or high human impact. The high density of human settlement, and the large extent of the agricultural use of the land especially on the South rim of the mountains not only severely constrains the natural habitats of animals but also introduces chemical contaminants like pesticides that threatens their life.

Of the species that have been identified in the area, *Bolua turkiyae* Ünal, 1999, *Poecilimon kutahiensis* Werner, 1901 and *Euchorthippus declivus* (Brisout de Barneville, 1848) belong to the western Black Sea region, central Anatolian and European faunas, respectively (Fig. 4.1). The presence of the three species in the Samanlı Mountain district suggest it to be a transition area for the three faunas.

Figure 4.1. Distribution of *Bolua turkiyae*, *Poecilimon kutahiensis* and *Euchorthippus declivus*.

Tropidopola graeca graeca Uvarov, 1926 is a species that lives in high temperature environment. It has previously been reported to exist in warm areas like İzmir and Hatay in Turkey (Karabağ, 1958). Samanlı Mountain district is the northern-most area that this species has ever been documented. Although Acısu lowland and Delmece highland have habitats similar to those of the area that this *Tropidopola graeca graeca* Uvarov, 1926 was collected from Yeşilçimen village, their cooler climate due to being located on the North side seems not to permit the habitation of the species. This observation emphasizes the difference in the habitats of the North and South sides of Samanlı Mountains.

Gryllotalpa gryllotalpa (Linnaeus, 1758), this species is estimated to be wide-spread in the area because of its ability to exist in orchards due to being adapted to

living in manure. However, it failed to be collected in large numbers due to the practical difficulties of entering such areas.

Acrida bicolor (Thunberg, 1815) was documented in study area (Bursa, İznik) by Karabağ (1958). However, any *Acrida bicolor* (Thunberg, 1815) samples could not found in this study. On the other hand, *Acrida ungarica* (Herbst, 1786) which has not been reported on the Samanlı Mountains has been collected in large number. In this study, it is understood that most of *Acrida ungarica* (Herbst, 1786) collected from west Anatolia had been recorded as *Acrida bicolor* (Thunberg, 1815).

The following endemic species have been found: *Poecilimon bidens* Retowski, 1889, *Poecilimon bosphoricus* Brunner von Wattenwyl, 1878, *Poecilimon kocaki* Ünal, 1999, *Poecilimon kutahiensis* Werner, 1901, *Poecilimon sureyanus* Uvarov,1930, *Poecilimon turciae* (Ramme, 1951), *Bolua turkiyae* Ünal, 1999, *Paranocaracris citripes* (Uvarov, 1949).

Newly documented species from the study area are *Acrometopa servillea* (Brullé, 1832), *Poecilimon bidens* Retowski, 1889, *Poecilimon bosphoricus* Brunner von Wattenwyl, 1878, *Conocephalus (Xiphidion) fuscus* (Fabricius, 1793), *Saga natoliae* Serville, 1838, *Tettigonia viridissima* Linnaeus, 1758, *Tettigonia caudata* Charpentier, 1845, *Platycleis (Platycleis) affinis affinis* Fieber, 1853, *Pholidoptera griseoaptera* (De Geer, 1773), *Parapholidoptera castaneoviridis* (Brunner von Wattenwyl, 1882), *Bolua turkiyae* Ünal, 1999, *Gryllus (Gryllus) campestris* Linnaeus, 1758, *Modicogryllus frontalis* (Feiber, 1845),

Xya variegata Latreille, 1809, *Paratettix meridionalis* (Rambur, 1838), *Paranocarodes straubei straubei* (Fieber, 1853), *Eyprepocnemis plorans plorans* (Charpentier, 1825), *Calliptamus tenuicercis* Tarbinsky, 1930, *Acrida ungarica* (Herbst, 1786), *Tropidopola graeca graeca* Uvarov, 1926, *Dociostaurus (Notostaurus) anatolicus* (Krauss, 1896), *Chorthippus (Glyptobothrus) biguttulus euhedickei* Helversen, 1989, *Euchorthippus declivus* (Brisout de Barneville, 1848), *Duroniella fracta* (Krauss, 1890), *Aiolopus thalassinus* (Fabricius, 1781), *Aiolopus strepens* (Latreille, 1804), *Locusta migratoria* Linnaeus, 1758, *Oedaleus decorus* (Germar, 1826), *Oedipoda germanica germanica* (Latreille, 1804), *Acrotylus insubricus* (Scopoli, 1788) and *Acrotylus patruelis* (Herrich-Schaffer, 1838),

It was difficult to collect specimens of the family *Gryllidae* Laicharting, 1781 because of their prefer to live at night mostly. The diurnal species of this family were also difficult to collect due to their inhabitation in dense and high grassy areas.

Phenologically, the number of determined species belong to suborders *Ensifera* and *Caelifera* are given in the table 4.1.

	June	**July**	**August**	**September**	**October**
Suborder: *ENSIFERA*	14	22	15	10	3
Suborder: *CAELIFERA*	10	17	17	21	13
Order: *ORTHOPTERA*	24	39	32	31	16

Table 4.1. Phenology of *Ensifera* and *Caelifera*.

In Turkey, *Ensifera* species develop to be adults mostly between May and August whereas most of *Caelifera* species do not reach adulthood before June and

the both suborders can be separated relatively using the phenology (Ünal, 1997, 2004). The results of the present study support this opinion.

Adult species mostly collected in July, August and September months. Most of *Ensifera* species were found in July and most of *Caelifera* species were found in September. In my observations during field study, the climate was oscillated between years. Therefore distributions of species were shifted on years month by month. At the first and second years of the field study climate were too hot, most of grass turns green to yellow in first days of July. Most of species were reached to adulthood at the first part of summer. At the last year of the field study climate was too rainy, so that vegetation during the summer were green, came to that the species which seen first part of summer survived during summer. For example *Isophya rectipennis* Brunner von Wattenwyl, 1878, *Poecilimon miramea* Ramme, 1933 (for 500 m.). This is another result that phenology of the species are strongly related to annual climatic changes. See table 5.1 and table 5.2 for the phenology of all species determined in the study area.

At the and of this study, Orthoptera fauna of Samanlı Mountains has been determined, similarity of fauna of Samanlı Mountains with surrounding area has been appeared, and study proved that the region is a bridge between Europe and Anatolia.

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CHAPTER V

5. APPENDIX

Table 5.1. Phenology of *ENSIFERA* Chopart, 1920

Species	June	July	August	September	October
Tylopsis lilifolia (Fabricius, 1793)	0	0	1	0	0
Acrometopa servillea (Brullé, 1832)	0	1	0	0	0
Isophya amplipennis Brunner von Wattenwyl, 1878	1	1	1	0	0
Isophya pavelii Brunner von Wattenwyl, 1878	0	0	0	0	0
Isophya rectipennis Brunner von Wattenwyl, 1878	1	1	0	0	0
Poecilimon anatolicus Ramme, 1933	0	0	1	0	0
Poecilimon bidens Retowski, 1889	1	1	0	0	0
Poecilimon bosphoricus Brunner von Wattenwyl, 1878	1	1	1	0	0
Poecilimon kocaki Ünal, 1999	1	1	0	0	0
Poecilimon kutahiensis Werner, 1901	0	0	1	0	0
Poecilimon miramae Ramme, 1933	1	1	1	0	0
Poecilimon sureyanus Uvarov,1930	1	0	0	0	0
Poecilimon turciae (Ramme, 1951)	1	1	0	0	0
Conocephalus (Xiphidion) fuscus (Fabricius, 1793)	0	0	0	1	1
Ruspolia nitidula (Scopoli, 1796)	0	0	0	1	0
Saga natoliae Serville, 1838	0	1	0	1	0
Tettigonia viridissima Linnaeus, 1758	1	1	0	0	0
Tettigonia caudata Charpentier, 1845	1	0	0	0	0
Decticus verrucivorus (Linnaeus, 1758)	0	1	0	0	0
Decticus albifrons (Fabricius, 1775)	0	1	1	1	1
Platycleis (Platycleis) intermedia intermedia (Serville, 1838)	0	1	1	0	0
Platycleis (Platycleis) affinis affinis Fieber, 1853	0	1	1	1	0
Platycleis (Platycleis) escalerai escalerai Bolivar, 1899	0	0	1	0	0
Platycleis (Incertana) i.incerta (Brunner von Wattenwyl, 1882)	0	1	1	1	0
Platycleis (Sepiana) sepium (Yersin, 1854)	0	1	0	1	0

Pholidoptera griseoaptera (De Geer, 1773)	1	1	1	1	0
Eupholidoptera smyrnensis (Brunner von Wattenwyl, 1882)	0	1	0	0	0
Parapholidoptera castaneoviridis (Brunner von Wattenwyl, 1882)	0	1	0	0	0
Bolua turkiyae Ünal, 1999	1	1	1	0	1
Metrioptera (Roeseliana) bispina (Bolívar, 1899)	1	0	0	0	0
Rhacocleis germanica (Herrich-Schäffer, 1840)	0	0	1	0	0
Bucephaloptera bucephala (Brunner von Wattenwyl, 1882)	0	1	1	1	0
Gryllus (Gryllus) campestris Linnaeus, 1758	0	0	0	0	0
Melanogryllus desertus (Pallas, 1771)	1	1	0	0	0
Medicogryllus frontalis (Feiber, 1845)	1	0	0	0	0
Pteronemobius (Pteronemobius) heydeni (Walker, 1871)	0	0	0	1	0
Oecanthus pellucens pellucens (Scopoli, 1763)	0	0	1	0	0
Gryllotalpa gryllotalpa (Linnaeus, 1758)	0	1	0	0	0
Suborder: *ENSIFERA* Chopart, 1920	14	22	15	10	3

Table 5.2. Phenology of *CAELIFERA* Ander, 1936

Species	June	July	August	September	October
Xya variegata Latreille, 1809	1	1	0	1	0
Paratettix meridionalis (Rambur, 1838)	1	1	0	1	0
Paranocarodes straubei straubei (Fieber, 1853)	0	1	0	0	0
Paranocaracris citripes (Uvarov, 1949)	0	0	0	0	0
Anacridium aegyptium (Linnaeus, 1764)	0	1	0	1	1
Eyprepocnemis plorans plorans (Charpentier, 1825)	0	0	1	0	1
Calliptamus italicus (Linnaeus, 1758)	0	0	1	1	0
Calliptamus barbarus (Costa, 1836)	0	0	1	1	1
Calliptamus tenuicercis Tarbinsky, 1930	0	1	1	0	0
Paracaloptenus caloptenoides (Brunner von Wattenwyl, 1861)	0	1	0	1	1
Tropidopola graeca graeca Uvarov, 1926	0	0	0	1	0
Acrida ungarica (Herbst, 1786)	0	0	1	1	1
Pezottettix anatolica Uvarov, 1934	0	0	1	1	0
Pezotettix giornae (Rossi, 1794)	0	0	1	1	1
Dociostaurus (Notostaurus) anatolicus (Krauss, 1896)	0	1	0	1	0
Stenobothrus lineatus lineatus (Panzer, 1796)	0	0	0	0	0
Omocestus (Omocestus) rufipes (Zetterstedt, 1821)	1	1	1	1	0
Omocestus (Omocestus) viridulus (Linnaeus, 1758)	0	0	0	0	0
Chorthippus (Chorthippus) dichrous (Eversmann, 1859)	0	0	1	0	1
Chorthippus (Chorthippus) loratus (Fisher-Waldheim, 1846)	0	1	1	1	0
Chorthippus (Chorthippus) p.parallelus (Zetterstedt, 1821)	1	1	0	0	0
Chorthippus (Glyptobothrus) bornhalmi Harz, 1971	1	1	1	1	1
Chorthippus (Gly.) biguttulus euhedickei Helversen, 1989	0	1	0	0	0
Euchorthippus declivus (Brisout de Barneville, 1848)	1	0	1	0	0
Paracinema tricolor bisignata (Charpentier, 1825)	0	0	0	1	0
Duroniella fracta (Krauss, 1890)	1	0	0	0	0
Aiolopus strepens (Latreille, 1804)	1	1	1	1	1
Aiolopus thalassinus (Fabricius, 1781)	1	1	0	1	1
Locusta migratoria Linnaeus, 1758	0	0	0	0	1
Oedaleus decorus (Germar, 1826)	0	1	0	0	0
Oedipoda caerulescens caerulescens (Linnaeus, 1758)	0	1	1	1	1
Oedipoda aurea Uvarov, 1923	0	0	1	0	0
Oedipoda germanica germanica (Latreille, 1804)	0	1	0	0	0
Oedipoda miniata miniata (Pallas, 1771)	0	0	0	1	1
Acrotylus insubricus (Scopoli, 1788)	0	0	1	1	0
Acrotylus patruelis (Herrich-Schaffer, 1838)	1	0	1	1	0
Suborder: *CAELIFERA* Ander, 1936	10	17	17	21	13

Some Photographs of Locations

Figure 5.1. Photograph of 82nd Location

Figure 5.2. Photograph of 53rd Location

Figure 5.3. Photograph of 78th Location

Figure 5.4. Photograph of 36th Location

Figure 5.5. Photograph of 79th Location

Figure 5.6. Photograph of 7th Location

Figure 5.7. Photograph of 75th Location

Figure 5.8. Photograph of 47th Location

Figure 5.9. Photograph of 46th Location

Figure 5.10. Photograph of 19th Location

Figure 5.11. Photograph of 34th Location

Figure 5.12. Photograph of 45th Location

Photograph of the caracters of Orthoptera species in Keys

Figure 5.13. Lateral view of *Conocephalus (Xiphidion) fuscus* (Fabricius, 1793)

Figure 5.14. Lateral view of *Paratettix meridionalis* (Rambur, 1838)

Figure 5.15. Fore tarsus of *Melanogryllus desertus* (Pallas, 1771) (left)

Figure 5.16. Fore tarsus of *Isophya rectipennis* Brunner von Wattenwyl, 1878

Figure 5.17. Fore leg of *Gryllotalpa gryllotalpa* (Linnaeus, 1758)

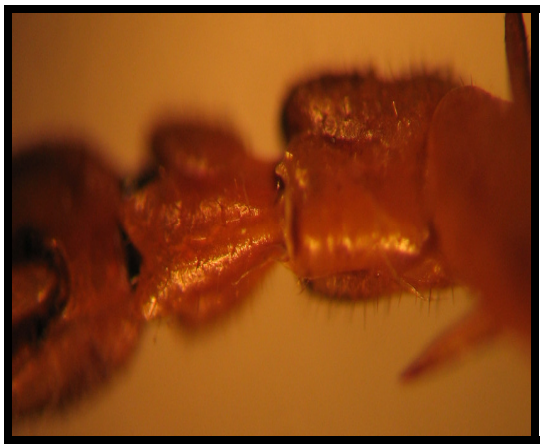

Figure 5.18. Fore tarsi of *Tettigonia caudata* Charpentier, 1845

Figure 5.19. Fore tibia of *Decticus albifrons* (Fabricius, 1775)

Figure 5.20. Fore coxa of *Tylopsis lilifolia* (Fabricius, 1793)

Figure 5.21. Cerci of *Isophya rectipennis* Brunner von Wattenwyl, 1878

Figure 5.22. Pronotum of *Isophya amplipennis* Brunner von Wattenwyl, 1878

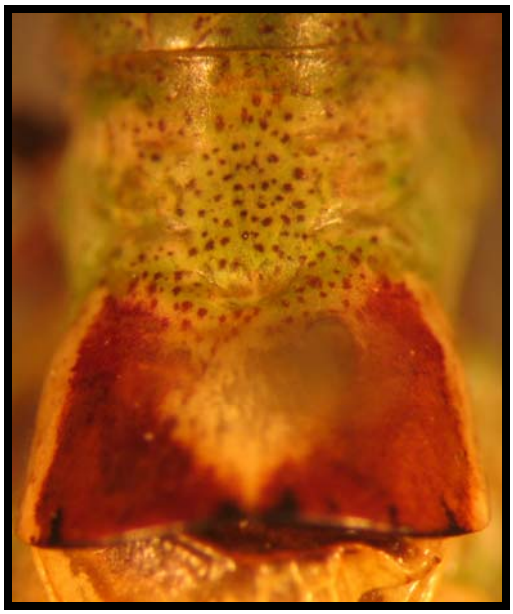

Figure 5.23. Pronotum of *Poecilimon bidens* Retowski, 1889

Figure 5.24. Ovipositor of *Isophya amplipennis* Brunner von Wattenwyl, 1878

Figure 5.25. Ovipositor of *Poecilimon turciae* (Ramme, 1951.

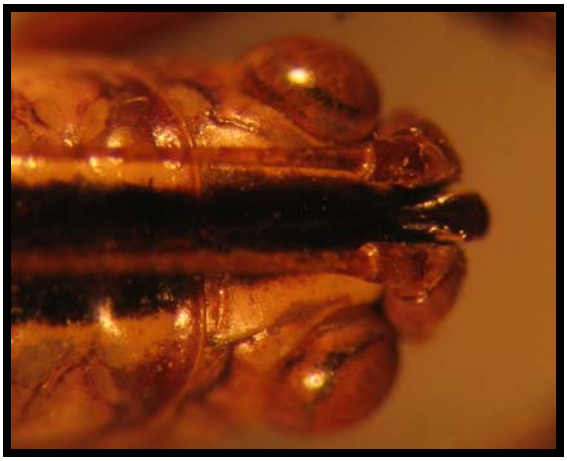

Figure 5.26. Dorsal view of head of *Conocephalus (Xiphidion) fuscus* (Fabricius, 1793)

Figure 5.27. Dorsal view of head of *Ruspolia nitidula* (Scopoli, 1796)

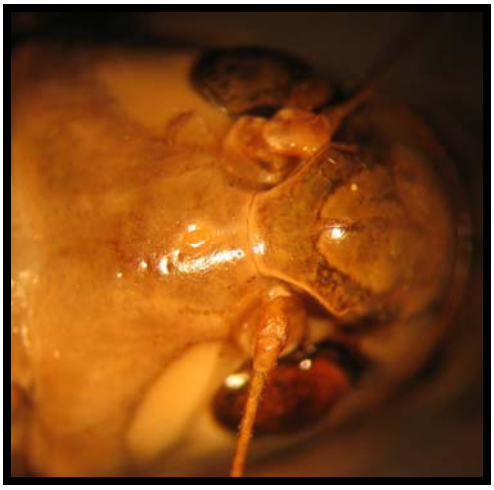

Figure 5.28. Frontal view of head of *Decticus albifrons* (Fabricius, 1775

Figure 5.29. Posttibia spurs of *Decticus albifrons* (Fabricius, 1775)

Figure 5.30. Frontal view of head of *Tettigonia viridissima* Linnaeus, 1758

Figure 5.31. Lateral view of pronotum of *Decticus albifrons* (Fabricius, 1775)

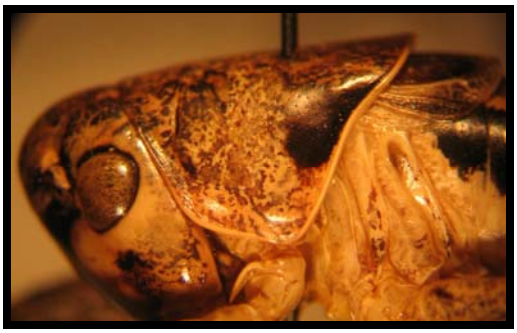

Figure 5.32. Dorsal view of pronotum of *Bucephaloptera bucephala* (Brunner von Wattenwyl, 1882)

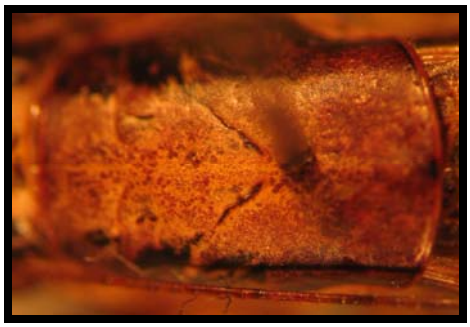

Figure 5.33. Dorsal view of pronotum of Photograph of *Bolua turkiyae* Ünal, 1999

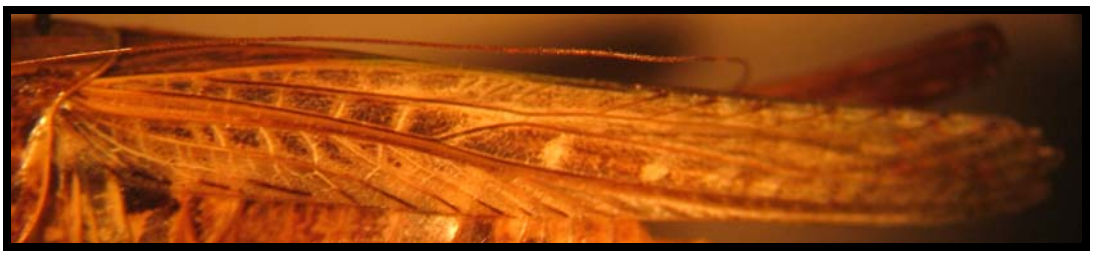

Figure 5.34. Tegmina of *Platycleis (Platycleis) affinis* Fieber, 1853

Figure 5.35. Dorsal view of pronotum of *Parapholidoptera castaneoviridis* (Brunner von Wattenwyl, 1882)

Figure 5.36. Titilator of *Parapholidoptera castaneoviridis* (Brunner von Wattenwyl, 1882)

Figure 5.37. Titilator of *Platycleis (Platycleis) intermedia* (Serville, 1838)

Figure 5.38. Lateral view of *Xya variegata* Latreille, 1809

Figure 5.39. 7th Tegmina of *Platycleis (Platycleis) intermedia* (Serville, 1838)

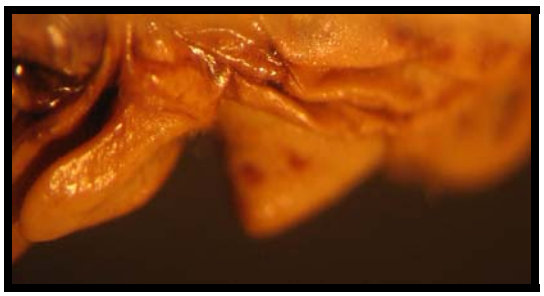

Figure 5.40. 7th Tegmina of *Platycleis (Platycleis) affinis* Fieber, 1853

Figure 5.41. Titilator of *Platycleis (Platycleis) affinis* Fieber, 1853

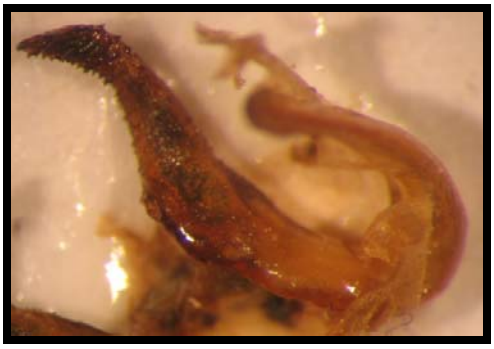

Figure 5.42. Titilator of *Platycleis (Platycleis) escalerai Bolivar, 1899*

Figure 5.43. Tegmina of *Platycleis (Incertana) incerta* (Brunner von Wattenwyl, 1882)

Figure 5.44. Cercus of *Decticus albifrons* (Fabricius, 1775)

Figure 5.45. Cerci of *Decticus verrucivorus* (Linnaeus, 1758)

Figure 5.46. Subgenital plate of *Decticus verrucivorus* (Linnaeus, 1758)

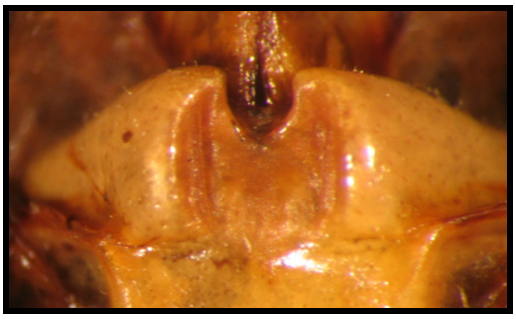

Figure 5.47. Subgenital plate of *Decticus albifrons* (Fabricius, 1775)

Figure 5.48. Fore tibia of *Xya variegata* Latreille, 1809

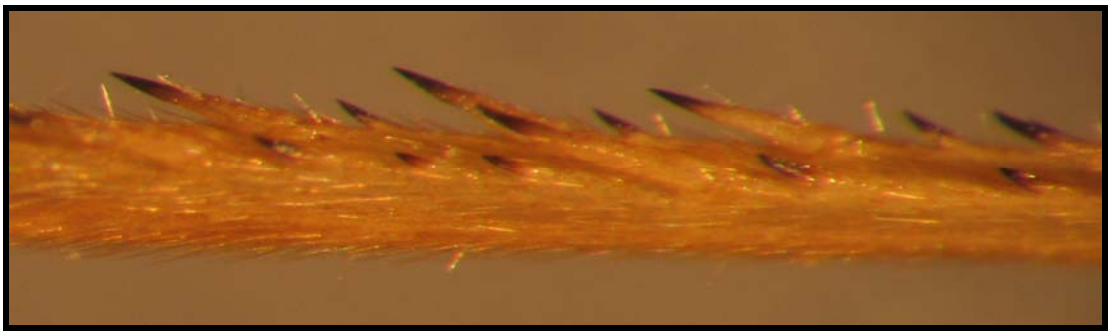

Figure 5.49. Post tibia of Oecanthus pellucens pellucens (Scopoli, 1763)

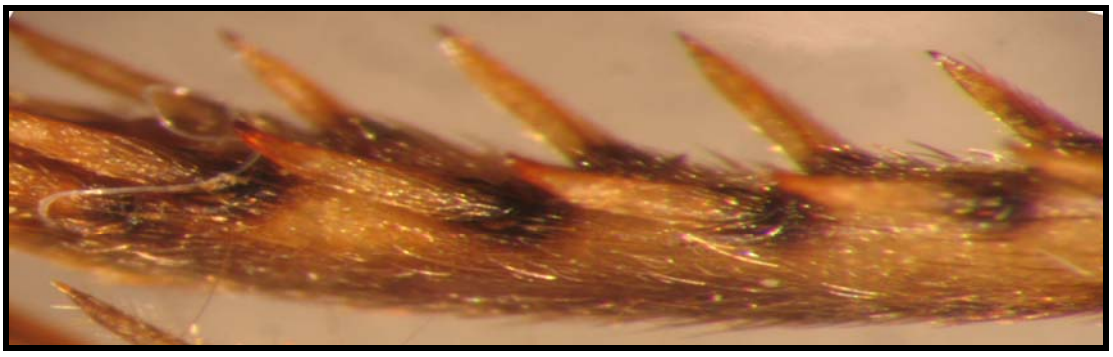

Figure 5.50. Post tibia of *Modicogryllus frontalis* (Feiber, 1845)

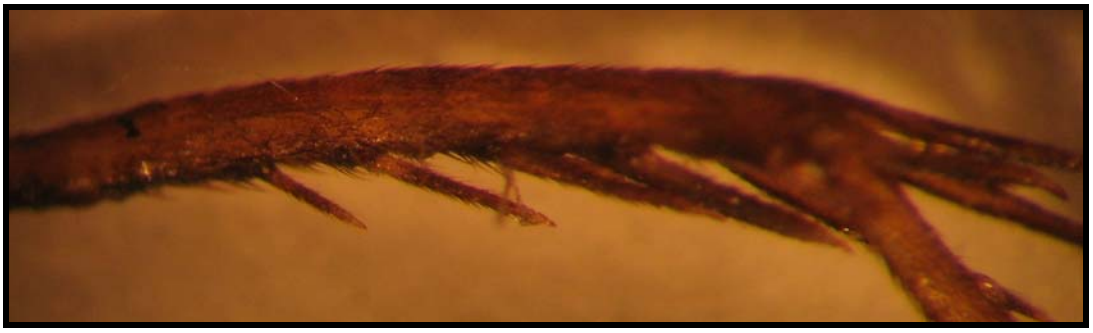

Figure 5.51. Post tibia of *Pteronemobius (Pteronemobius) heydeni* (Walker, 1871)

Figure 5.52. Post femur of *Paranocarodes straubei straubei* (Fieber, 1853)

Figure 5.53. Post femur of *Locusta migratoria* Linnaeus, 1758 post femur

Figure 5.54. View of prosternum *Pezotettix* giornae (Rossi, 1794) from below

Figure 5.55. Post tibia of *Pezotettix giornae* (Rossi, 1794) from below

Figure 5.56. Lateral view of *Acrida ungarica* (Herbst, 1786)

Figure 5.57. Lateral view of head of *Acrotylus insubricus* (Scopoli, 1788)

Figure 5.58. Lateral view of head of *Euchorthippus declivus* (Brisout de Barneville, 1848)

Figure 5.59. View of sternum *Anacridium aegyptium* (Linnaeus, 1764) from below

Figure 5.60. Tegmina of *Paracaloptenus caloptenoides* (Brunner von Wattenwyl, 1861)

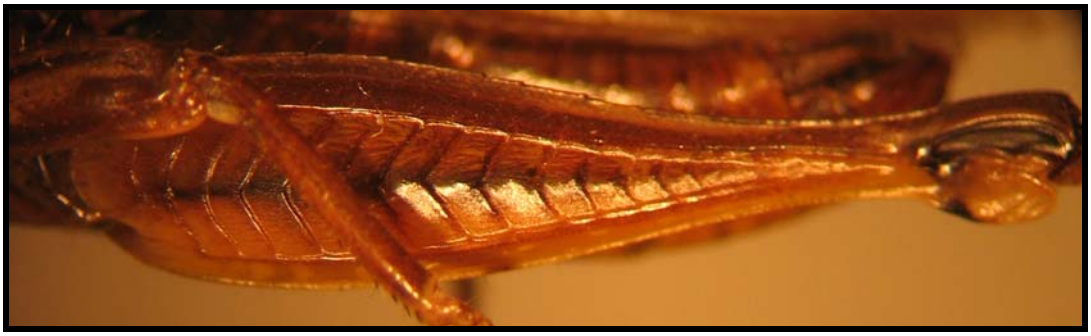

Figure 5.61. Lateral view of postfemur of *Eyprepocnemis plorans* (Charpentier, 1825)

Figure 5.62. Lateral view of postfemur of *Calliptamus barbarus* (Costa, 1836)

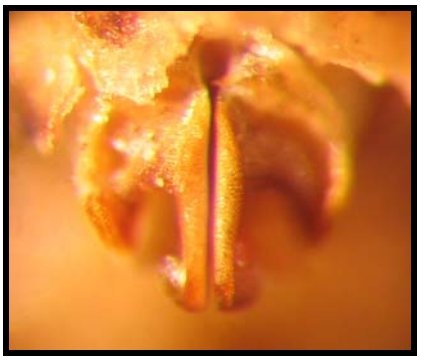

Figure 5.63. Titilator valves of *Calliptamus barbarus* (Costa, 1836)

Figure 5.64. Lateral view of titilator of *Calliptamus italicus* (Linnaeus, 1758)

Figure 5.65. Calliptamus tenuicercis Tarbinsky, 1930 titilator karşıdan

Figure 5.66. Lateral view of cercus of *Pezotettix giornae* (Rossi, 1794)

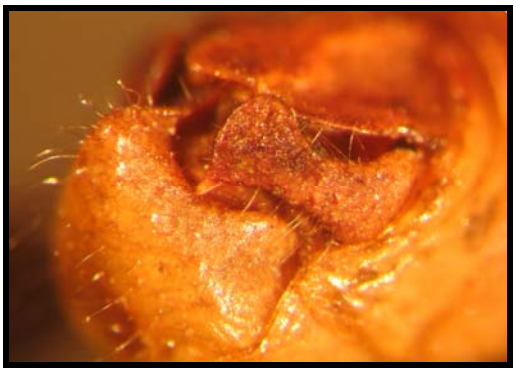

Figure 5.67. Lateral view of cercus of *Pezottettix anatolica* Uvarov, 1934

Figure 5.68. Dorsal view of pronotum of *Dociostaurus (Notostaurus) anatolicus* (Krauss, 1896)

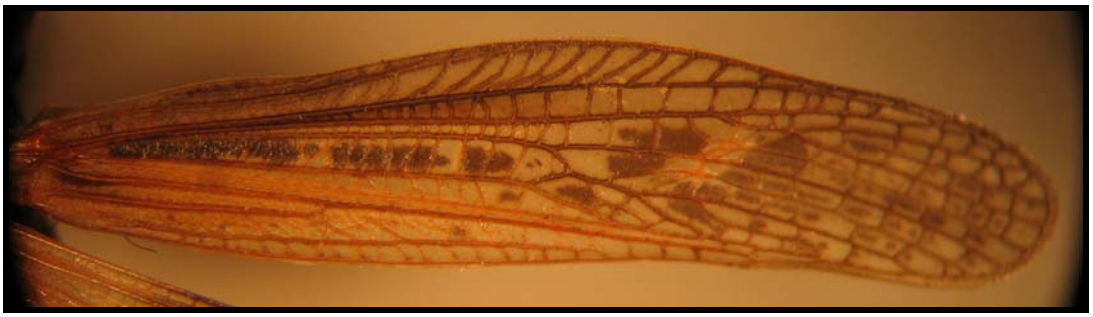

Figure 5.69. Tegmina of *Omocestus (Omocestus) rufipes* (Zetterstedt, 1821)

Figure 5.70. Lateral view of subgenital plate of *Euchorthippus declivus* (Brisout de Barneville, 1848)

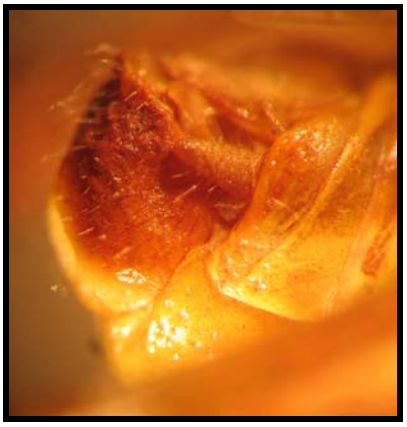

Figure 5.71. Lateral view of subgenital plate of *Chorthippus (Chorthippus) parallelus parallelus* (Zetterstedt, 1821)

Figure 5.72. Dorsal view of pronotum of *Chorthippus (Chorthippus) parallelus parallelus* (Zetterstedt, 1821)

Figure 5.73. Dorsal view of pronotum of *Chorthippus (Glyptobothrus) apricarius* (Linnaeus, 1758)

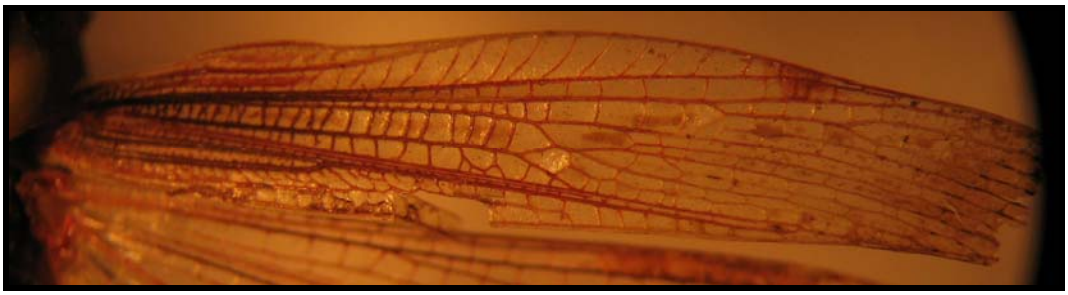

Figure 5.74. Tegmina of *Chorthippus (Chorthippus) dichrous* (Eversmann, 1859)

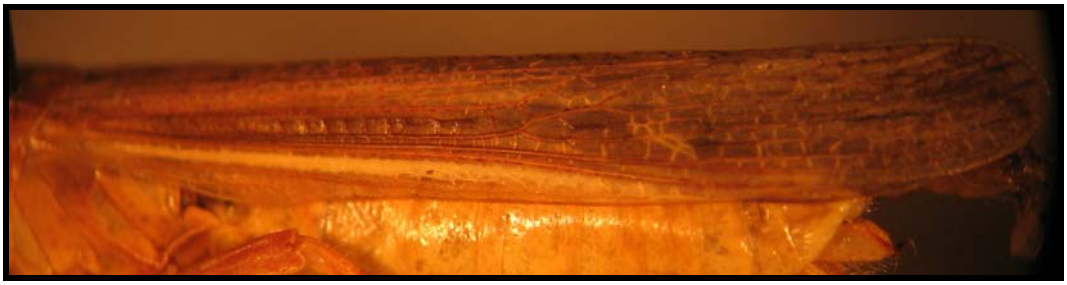

Figure 5.75. Tegmina of *Chorthippus (Chorthippus) loratus* (Fisher-Waldheim, 1846)

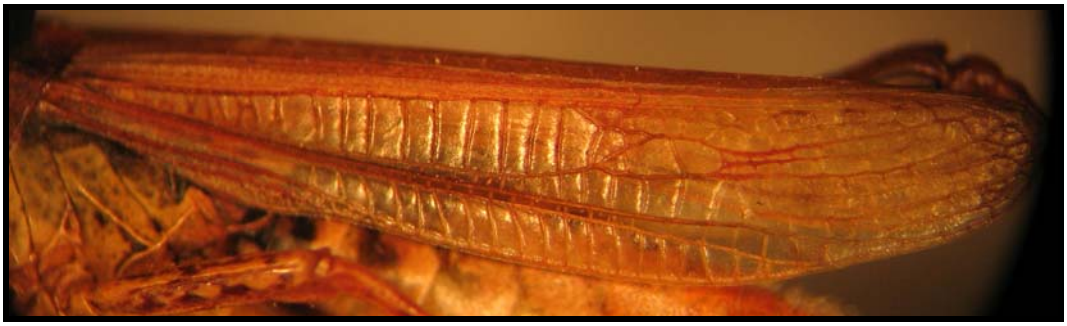

Figure 5.76. Tegmina of *Chorthippus (Glyptobothrus) apricarius* (Linnaeus, 1758)

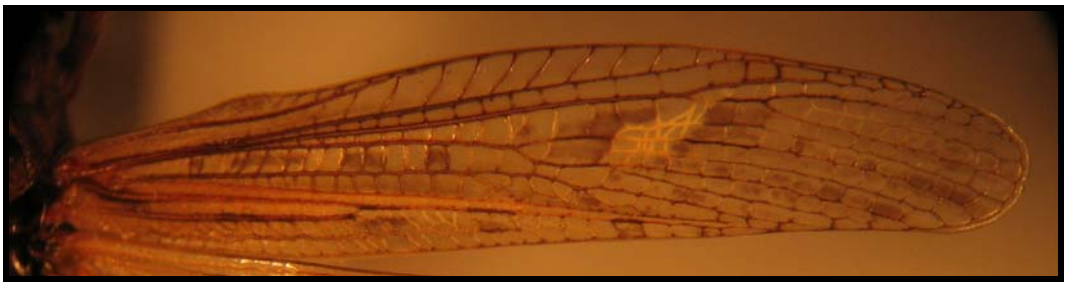

Figure 5.77. Tegmina of *Chorthippus (Glyptobothrus) bornhalmi* Harz, 1971

Figure 5.78. Lateral view of head and pronotum of *Paracinema tricolor bisignata* (Charpentier, 1825)

Figure 5.79. Lateral view of head and pronotum of *Oedipoda caerulescens caerulescens* (Linnaeus, 1758)

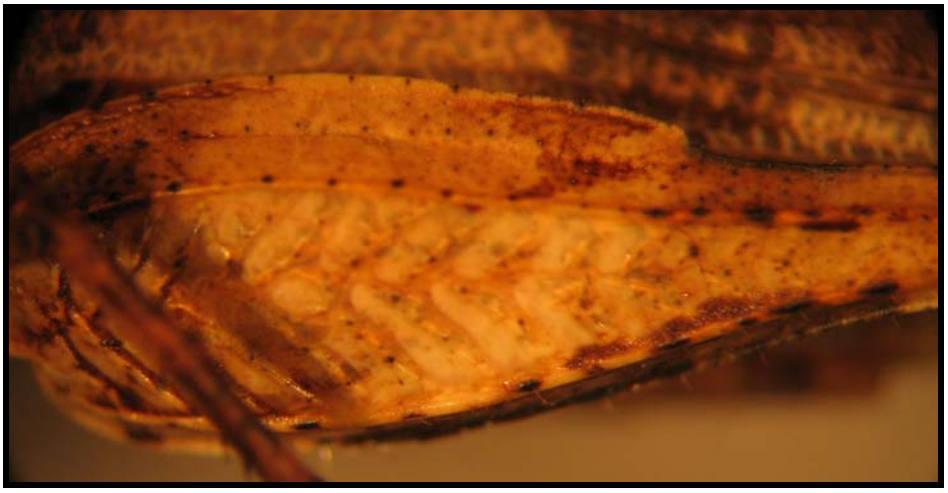

Figure 5.80. Lateral view of postfemur of *Oedipoda miniata miniata* (Pallas, 1771)

Figure 5.81. Lateral view of pronotum of *Locusta migratoria* Linnaeus, 1758

Figure 5.82. Lateral view of pronotum of *Oedaleus decorus* (Germar, 1826)

Figure 5.83. Dorsal view of pronotum of *Paracinema tricolor bisignata* (Charpentier, 1825)

Figure 5.84. Dorsal view of pronotum of *Aiolopus strepens* (Latreille, 1804)

Figure 5.85. Lateral view of postfemur of *Aiolopus strepens* (Latreille, 1804)

Figure 5.86. Lateral view of postfemur of *Aiolopus thalassinus* (Fabricius, 1781)

Figure 5.87. Foretibial calaw and arolium of *Acrotylus insubricus* (Scopoli, 1788)

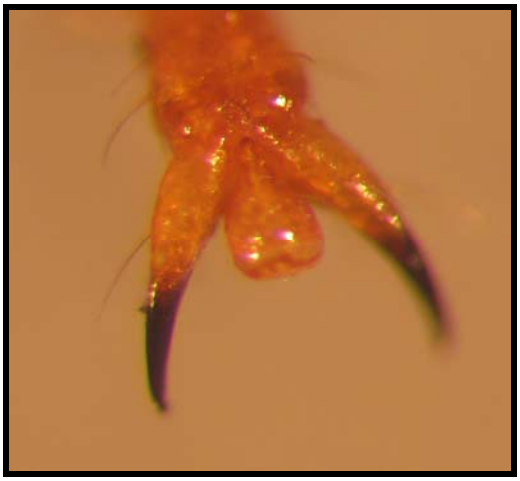

Figure 5.88. Foretibial calaw and arolium of *Acrotylus patruelis* (Herrich-Schaffer, 1838)

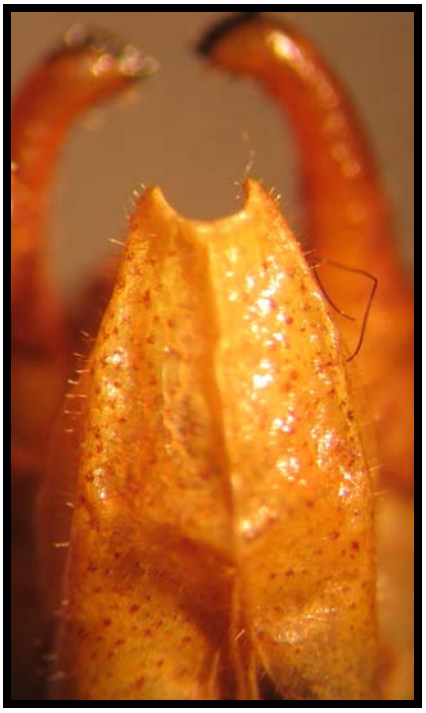

Figure 5.89. Posterior view of subgenital plate of *Poecilimon bosphoricus* Brunner von Wattenwyl, 1878

Figure 5.90. Posterior view of subgenital plate of *Decticus albifrons* (Fabricius, 1775)

Figure 5.91. Fore tibia of *Tettigonia caudata* Charpentier, 1845

Figure 5.92. Cerci of *Poecilimon miramae* Ramme, 1933

Figure 5.93. Cerci of *Poecilimon turciae* (Ramme, 1951)

Figure 5.94. Cerci of *Poecilimon bosphoricus* Brunner von Wattenwyl, 1878

Figure 5.95. Posterior view of subgenital plate of *Poecilimon turciae* (Ramme, 1951)

Figure 5.96. Cerci of *Poecilimon bidens* Retowski, 1889

Figure 5.97. View of sternum of *Calliptamus barbarus* (Costa, 1836)