

CONTRIBUTIONS TO COREOIDEA (HEMIPTERA: HETEROPTERA) FAUNA OF WESTERN BLACK SEA REGION

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ABSTRACT: The present study was carried out in various localities in the Western Black Sea Region between the years 2005 and 2007. A total of 25 species /subspecies from 15 genera and 4 families of the superfamily Coreoidea were determined. One of these species belong to Alydidae, 9 species to Coreidae, 13 species/subspecies to Rhopalidae and 2 species to Stenocephalidae. Ten species are reported as new records for the fauna of Western Black Sea Region. *Coriomeris scabricornis* Panzer, 1805, *Ceraleptus gracilicornis* (Herrich-Schäffer, 1835), *Rhopalus rufus* Schilling, 1829 and *Stictopleurus punctatonervosus* (Goeze, 1778) are rarely distributed species in Turkey.

KEY WORDS: Heteroptera, Coreoidea, fauna, Turkey, Western Black Sea Region

The superfamily Coreoidea (Hemiptera: Heteroptera) is represented in the Palaearctic Region with 462 species/subspecies within 125 genera belonging to 4 families (Alydidae, Coreidae, Stenocephalidae and Rhopalidae). All species are phytophags feeding on meristematic tissues and mature seeds of plants, and they sometimes cause damage in plant tissues through leading to a reduction in alive seed production (Dolling, 2006).

The Coreoidea fauna of Turkey includes 94 species/subspecies within 36 genera belonging to 4 families (Alydidae: 7 species in 4 genera, Coreidae: 48 species in 20 genera, Stenocephalidae: 7 species in 1 genus and Rhopalidae: 29 species in 11 genera) (Dolling, 2006; Önder et al., 2006; Dursun et al., 2010; Dursun, 2011; Fent & Kment, 2011; Dursun & Fent, 2015). The most important studies performed on the family in Turkey are Horváth (1883, 1901), Kiritshenko (1918, 1924), Fahringer (1922), Hoberlandt (1956), Seidenstücker (1957, 1958, 1960), Linnavuori (1965), Wagner (1966), Pehlivan (1981), Kiyak (1990a,b, 1993, 2000); Moulett (1995), Önder et al. (2006), Dursun (2009, 2011), Dursun & Fent (2009), Dursun et al. (2010) and Fent & Kment (2011).

The number of studies on Coreoidea fauna of Western Black Sea Region is rather limited. Linnavuori (1965) and Pehlivan (1981) reported two species, *Dicranocephalus agilis* and *D. albipes*, from the family Stenocephalidae from the region. Pehlivan (1981) also reported *Corizus hyoscyami* and Dursun & Fent (2015) reported *Myrmus miriformis* both from the Rhopalidae family from Kastamonu province. Küçükbasmacı & Kiyak (2015) recorded 21 species belonging to 3 families of Coreoidea in Ilgaz Mountains in Western Black Sea Region. Parlak (2017) reported the invasive species *Leptoglossus occidentalis* and its affects on forestry activities in Kastamonu and Zonguldak.

MATERIAL AND METHODS

The study material was collected from 45 different localities in Western Black Sea Region between the years 2005 and 2007 (Table 1., Fig. 1). The specimens

were collected on grass and from shrubs using insect nets. All specimens were prepared and identified using the relevant diagnostic keys of Pehlivan (1981), Stichel (1960), and Moulet (1995). The male specimens were kept in hot water to remove the parameres and aedeagus of male genitalia which were used for diagnosis of some species.

RESULTS AND DISCUSSION

Family ALYDIDAE Amyot & Serville, 1843

Camptopus lateralis (Germar, 1817)

Material: **Çankırı:** Ilgaz (Kırkpınar Plateau road), 1088m, 03.07.2007, 1♀; **Kastamonu:** Daday (Taşçılar Pond), 992m, 26.06.2007, 1♂; Yumurtacı Pond, 938m, 26.06.2007, 1♂; Pınarbaşı (Küre Mountains National Park -Valla Canyon road), 527m, 27.06.2007, 1♀.

Family COREIDAE Leach, 1815

Ceraleptus gracilicornis (Herrich-Schäffer, 1835)

Material: **Kastamonu:** Azdavay (between Azdavay and Küre 5th km, 827m), 29.06.2006, 1♀; **Sinop:** Erfelek, between Selbeyi and Erfelek (Çaykaşı Bridge), 137m, 27.08.2006, 1♀; Ayancık (between Ayancık and Boyabat), 1074m, 01.07.2007, 1♀.

Centrocoris spiniger (Fabricius, 1781)

Material: **Kastamonu:** Tosya (Dipsiz Lake), 1230m, 30.08.2006, 1♂; Daday (Yumurtacı Pond), 938m, 26.06.2007, 1♀; Pınarbaşı (Küre Mountains National Park -Valla Canyon road), 527m, 27.06.2007, 1♂; **Sinop:** Ayancık, 20m, 01.07.2007, 1♀.

Centrocoris variegatus Kolenati, 1845

Material: **Düzce:** Yiğilca (between Yiğilca and Alaplı), 486m, 13.07.2005, 1♀; Karakaş Village, 522m, 13.07.2005, 3♀♀, 2♂♂; **Sinop:** Ayancık, 20m, 01.07.2007, 1♀, 1♂.

Coreus marginatus (Linnaeus, 1758)

Material: **Bartın:** İnkum road, 0m 17.07.2005, 1♀; **Çankırı:** Ilgaz (between Ilgaz and Kastamonu 4th km), 942m, 27.06.2006, 1♂; **Kastamonu:** Azdavay (between Azdavay and Küre 5th km, 827m), 29.06.2006, 3♀♀, 1♂; Pınarbaşı (Küre Mountains National Park -Valla Canyon road), 527m, 27.06.2007, 3♀♀; Devrekani (between Devrekani and Çatalzeytin, 18th km), 1195m, 30.06.2007, 1♀; **Sinop:** Ayancık, 20m, 01.07.2007, 1♀, 2♂♂.

Coriomeris affinis (Herrich-Schaeffer, 1839)

Material: **Kastamonu:** Azdavay, 822m, 29.06.2007, 3♂♂; **Sinop:** Ayancık, 20m, 01.07.2007, 2♂♂.

Coriomeris denticulatus (Scopoli, 1763)

Material: **Bolu:** Abant Lake 1332m, 09.08.2007, 1♀; **Çankırı:** Ilgaz (Kırkpınar Plateau road), 1088m, 03.07.2007, 1♂; **Düzce:** Dipsiz Lake, 820m, 12.08.2007, 1♀, 2♂♂; **Karabük:** Eflani (Kadıköy Pond), 930m, 26.06.2007, 1♂; Eskipazar (between Budaklar and Hacıahmetler), 830m, 07.08.2007, 1♂; **Kastamonu:** Daday (9 km away Daday), 818m, 23.06.2006, 3♀♀; Azdavay, 822m, 29.06.2006, 2♂♂; between Azdavay and Küre, 5th km, 827m, 29.06.2006, 4♂♂; Hanönü (Aşağıçakırçay), 348m, 30.06.2006, 1♂; Taşköprü (Kıvrımçay), 515m, 25.08.2006, 1♂; Daday (Taşçılar Pond), 992m, 26.06.2007, 6♂♂; Yumurtacı Pond, 936m, 26.06.2007, 3♂♂; Pınarbaşı (Küre Mountains National Park -Valla

Canyon road), 527m, 27.06.2007, 4♂♂; Kerte Village-Kokurdan Plateau, 1029m, 28.06.2007, 1♀; Devrekani (Kulaksızlar Dam), 1104m, 29.06.2007, 1♂; between Devrekani and Çatalzeytin, 18th km, 1195m, 30.06.2007, 2♂♂; **Sinop:** Ayancık (Bakırlızıviye), 1289m, 30.06.2006, 1♂; between Selbeyi and Erfelek (Çaykaşı Bridge), 137m, 27.08.2006, 1♂; Ayancık, 20m, 01.07.2007, 2♂♂; between Ayancık and Boyabat, 1074m, 01.07.2007, 2♂♂.

***Coriomeris hirticornis* (Fabricius, 1794)**

Material: **Çankırı:** Ilgaz (Kırkpınar Plateau road), 1088m, 03.07.2007, 1♂; **Düzce:** Gürcüçiftliği, 177m, 12.07.2005, 1♂; **Karabük:** Eflani (Kadıköy Pond), 930m, 26.06.2007, 1♂; Eskipazar (Büyükayalar), 854m, 07.08.2007, 2♂♂; **Kastamonu:** Daday (Yumurtacı Pond), 938m, 26.06.2007, 1♂.

***Coriomeris scabricornis* (Panzer, 1805)**

Material: **Sinop:** Ayancık (between Ayancık and Boyabat), 1074m, 01.07.2007, 1♀.

***Syromastus rhombeus* (Linnaeus, 1767)**

Material: **Kastamonu:** Daday (Yumurtacı Pond), 938m, 26.06.2007, 1♀; **Sinop:** Ayancık (between Ayancık and Boyabat), 1074m, 01.07.2007, 2♀♀.

Family RMOPALIDAE Amyot & Serville, 1843

***Brachycarenum tigrinus* (Schilling, 1829)**

Material: **Karabük:** Eskipazar (between Budaklar and Hacıahmetler), 830m, 07.08.2007, 1♂; **Kastamonu:** Daday (Yumurtacı Pond), 938m, 26.06.2007, 1♀, 1♂; central province, 850m, 29.06.2007, 1♂.

***Chorosoma schillingi* (Schummel, 1829)**

Material: **Sinop:** Ayancık (between Ayancık and Boyabat), 1074m, 01.07.2007, 1♀.

***Corizus hyoscyami hyoscyami* (Linnaeus, 1758)**

Material: **Bolu:** Abant Lake, 1332m, 09.08.2007, 1♀, 1♂; between Abant Lake and Akçaalan Village, 946m, 09.08.2007, 1♂; **Çankırı:** Çerkeş, 1248m, 03.07.2007, 1♂; Ilgaz (between Ilgaz and Kastamonu, 4th km), 942m, 21.08.2006, 1♂; Kırkpınar Plateau road, 1088m, 03.07.2007, 1♂; Kırkpınar Plateau road, 1613m, 03.07.2007, 1♀, 1♂; **Karabük:** Eskipazar (between Budaklar and Hacıahmetler), 830m, 07.08.2007, 1♂; Sarıkadılar, 796m, 07.08.2007, 1♂; **Kastamonu:** Azdavay (between Azdavay and Küre, 5th km, 827m, 29.06.2006, 1♀; Devrekani (Kulaksızlar Dam), 1104m, 29.06.2007, 1♀, 1♂; Pınarbaşı (Küre Mountains National Park -Valla Canyon road), 527m, 27.06.2007, 1♀; Kerte Village-Kokurdan Plateau, 28.06.2007, 1029m, 1♀, 1♂; Seydiler (Kepez Village), 1118m, 30.06.2007, 1♀; **Sinop:** Durağan (Dağdelen), 223m, 29.08.2006, 1♂; Saraydüzü (Yaylacılı Village), 231m, 30.08.2006, 1♀; Ayancık (between Ayancık and Boyabat), 1074m, 01.07.2007, 1♂.

***Liorhyssus hyalinus* (Fabricius, 1794)**

Material: **Düzce:** Aydınpınar (between Aydınpınar and Düzce), 137m, 11.08.2007, 1♂; **Kastamonu:** Devrekani (Kulaksızlar Dam), 1104m, 29.06.2007, 1♀; **Sinop:** Koçak, 340m, 02.07.2007, 2♂♂.

***Macevethus corsicus corsicus* Signoret, 1862**

Material: **Kastamonu:** Daday (Yumurtacı Pond), 938m, 26.06.2007, 2♀♀; Tosya (Dipsiz Lake), 1230m, 30.08.2006, 1♀.

***Rhopalus conspersus* (Fieber, 1837)**

Material: **Karabük:** Eskipazar (Büyükayalar), 845m, 07.08.2007, 1♀, 1♂; **Sinop:** Ayancık (between Ayancık and Boyabat), 1074m, 01.07.2007, 1♀.

***Rhopalus maculatus* (Fieber, 1836)**

Material: **Düzce:** Central province, 156m, 11.07.2005, 1♀; Cevizli Village (Efteni Pond), 137m, 11.08.2007, 1♂; **Karabük:** Eskipazar (Büyükayalar), 845m, 07.08.2007, 1♀, 1♂.

***Rhopalus parumpunctatus* Schilling, 1829**

Material: **Bolu:** Between Abant Lake and Akçaalan Village, 946m, 09.08.2007, 1♀, 1♂; Yedigöller and Bolu road, 753m, 10.08.2007, 1♂; between Gerece and Kızılcahamam, Avşar Plataeu, 15th km, 1337m, 08.08.2007, 1♀; **Çankırı:** Kurşunlu, 1179m, 03.07.2007, 1♀; Ilgaz (between Ilgaz and Kastamonu 4th km), 942m, 21.08.2006, 1♀; Kırkpınar Plataeu road, 1613m, 03.07.2007, 3♂♂; **Düzce:** Central province, 156m, 11.07.2005, 1♀; Akçakoca (Dadalı Village), 59m, 12.07.2005, 1♂; Yiğilca (Karakas Village), 522m, 13.07.2005, 4♀♀, 2♂♂; **Kastamonu:** Azdavay, 843m, 29.06.2006, 7♀♀, 3♂♂; between Azdavay and Küre, 5th km, 827m, 29.06.2006, 2♀♀, 3♂♂; Daday (Taşçılar Pond), 992m, 26.06.2007, 3♀♀; Pınarbaşı (Küre Mountains National Park -Valla Canyon road), 527m, 27.06.2007, 3♀♀, 1♂; **Sinop:** Ayancık (between Ayancık and Boyabat), 1074m, 01.07.2007, 1♀, 3♂♂; Akgöl, 1024m, 02.07.2007, 1♀.

***Rhopalus rufus* Schilling, 1829**

Material: **Kastamonu:** Daday (Taşçılar Pond), 992m, 26.06.2007, 3♀♀, 1♂; **Sinop:** Ayancık, 20m, 01.07.2007, 1♀.

***Rhopalus subrufus* (Gmelin, 1788)**

Material: **Bolu:** Between Abant Lake and Akçaalan Village, 946m, 09.08.2007, 1♀; Yedigöller and Bolu road, 753m, 10.08.2007, 2♀♀; **Düzce:** Central province, 156m, 11.07.2005, 1♀, ♂; Yiğilca (Karakas Village), 522m, 13.07.2005, 1♀; between Aydınpınar and Düzce, 137m, 11.08.2007, 2♂♂; Cevizli Village (Efteni Pond), 137m, 11.08.2007, 2♂♂; **Karabük:** Eskipazar (Büyükayalar), 845m, 07.08.2007, 2♀♀, 8♂♂; **Kastamonu:** Azdavay (between Azdavay and Küre, 5th km), 827m, 29.06.2006, 1♀, 1♂; Hanönü (Aşağıçakırçay), 348m, 30.06.2006, 1♀; Daday (Taşçılar Pond), 992m, 26.06.2007, 1♂; **Sinop:** Ayancık (Bakırlıziyeye), 1289m, 30.06.2006, 1♀; Ayancık, 20m, 01.07.2007, 1♀; between Ayancık and Boyabat, 1074m, 01.07.2007, 2♀♀.

***Stictopleurus abutilon* (Rossi, 1790)**

Material: **Bolu:** Between Abant Lake and Akçaalan Village, 946m, 09.08.2007, 1♀; **Çankırı:** Kurşunlu, 1179m, 03.07.2007, 2♂♂; Ilgaz (Kırkpınar Plataeu road), 1088m, 03.07.2007, 1♀; **Düzce:** Yiğilca (between Yiğilca and Alaplı), 486m, 13.07.2005, 1♀; Dipsiz Lake, 820m, 12.08.2007, 1♀; **Karabük:** Eskipazar (between Budaklar and Hacıahmetler), 830m, 07.08.2007, 4♀♀, 2♂♂; Büyükayalar, 845m, 07.08.2007, 1♀, 1♂; **Kastamonu:** Devrekani (Kulaksızlar Dam), 1104m, 29.06.2007, 1♂.

***Stictopleurus pictus* (Fieber, 1861)**

Material: **Bolu:** Between Gerece and Kızılcahamam, Avşar Plataeu 15th km, 1337m, 08.08.2007, 1♂; **Kastamonu:** Devrekani (Kulaksızlar Dam), 1104m, 29.06.2007, 1♂.

***Stictopleurus punctatonervosus* (Goeze, 1778)**

Material: **Bartın:** İnkum road, 0m 17.07.2005, 2♀♀; **Çankırı:** Ilgaz (between Ilgaz and Kastamonu, 4th km), 942m, 21.08.2006, 2♀♀, 3♂♂; Kırkpınar Plataeu road, 1088m,

03.07.2007, 1♀; **Düzce:** Central province, 156m, 11.07.2005, 1♀; Akçakoca (Dadalı Village), 59m, 12.07.2005, 1♂; Yiğilca (Karakaş Village), 522m, 13.07.2005, 2♀♀; between Aydınpınar and Düzce, 137m, 11.08.2007, 6♀♀, 13♂♂; Cevizli Village (Efteni Pond), 137m, 11.08.2007, 2♀♀; **Karabük:** Eskipazar (between Budaklar and Hacıahmetler), 830m, 07.08.2007, 1♀; **Kastamonu:** Devrekani (Kulaksızlar Dam), 1104m, 29.06.2007, 1♂; between Devrekani and Çatalzeytin, 18th km, 1195m, 30.06.2007, 1♀; Pınarbaşı (Küre Mountains National Park - Valla Canyon road), 527m, 27.06.2007, 1♂; **Sinop:** Ayancık (Bakırlıazıviye), 1289m, 30.06.2006, 3♀♀.

Family STENOCEPHALIDAE Dallas, 1852

Dicronocephalaus agilis (Scopoli, 1763)

Material: **Düzce:** Central province, 156m, 11.07.2005, 2 ♀♀; **Karabük:** Eskipazar (Büyükayalar), 854m, 07.08.2007, 1♀.

Dicronocephalaus albipes (Fabricius, 1781)

Material: **Bolu:** Between Gerede and Kızılcahamam, Avşar Plateau 15th km, 1337m, 08.08.2007, 3♀♀, 7♂♂; **Düzce:** Central province, 156m, 11.07.2005, 1♀; Gürcüçiftliği, 177m, 12.07.2005, 1♀; Yiğilca (Karakaş Village), 522m, 13.07.2005, 1♂; **Karabük:** Eflani (Kadıköy Pond), 930m, 26.06.2007, 2♀♀, 1♂; Eskipazar (Adiller Village), 1392m, 07.08.2007, 1♀; **Kastamonu:** Azdavay (between Azdavay and Küre, 5th km), 827m, 29.06.2006, 1♀, 2♂♂; Daday (Taşçılar Pond), 992m, 26.06.2007, 1♀, 1♂; Pınarbaşı (Küre Mountains National Park -Valla Canyon road), 527m, 27.06.2007, 1♀; Devrekani (Kulaksızlar Dam), 1104m, 29.06.2007, 4♀♀, 4♂♂; **Sinop:** Ayancık (between Hacıyakası and Köşeyakası Village), 25.08.2006, 240m, 1♀, 1♂; Durağan (Dağdelen), 223m, 29.08.2006, 2♂♂; between Ayancık and Boyabat, 1074m, 01.07.2007, 1♀, 2♂♂; Akgöl, 1024m, 02.07.2007, 2♀♀, 2♂♂.

As a result of the field studies carried out in 7 provinces (Bartın, Bolu, Çankırı, Düzce, Karabük, Kastamonu and Sinop) from 2005 to 2007, a total of 25 species belonging to 4 families of Coreoidea were identified and 10 species of them were recorded for the first time in Western Black Sea Region. Five species (*Coriomeris affinis*, *Coriomeris denticulatus*, *Coriomeris scabricornis*, *Centrocoris variegatus* and *Centrocoris spiniger*) of the Coreidae family and 5 species (*Brachycarenum tigrinus*, *Macevethus corsicus corsicus*, *Rhopalus subrufus*, *Stictopleurus abutilon* and *Stictopleurus punctatonevrosus*) of the Rhopalidae family are new records for the fauna of Western Black Sea Region. *Coriomeris scabricornis*, *Ceraleptus gracilicornis*, *Macevethus corsicus corsicus*, *Rhopalus rufus* and *Stictopleurus punctatonevrosus* are rarely distributed species and known from a few localities in Turkey. *Camptopus lateralis* (Alydidae) and two species of Stenocephalidae family were reported previously from Bolu and Kastamonu in Western Black Sea Region (Pehlivan, 1981; Önder et al., 2006; Küçükbasmacı & Kıyak, 2015).

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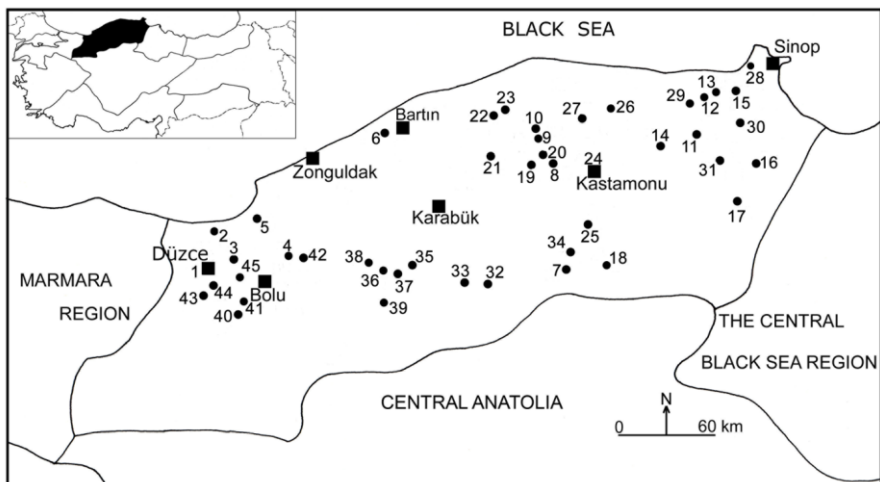


Figure 1. Collecting localities in Western Black Sea Region.

Table 1. The localities, coordinates, altitudes and dates where the material were collected in Western Black Sea Region.

Loc. No	Locality	Altitude (m)	Coordinate	Date
1	Düzce (Central province)	156m	40°48'N31°10'E	11.07.2005
2	Düzce (Akçakoca-Dadalı Village)	59m	41°03'N31°11'E	12.07.2005
3	Düzce (Gürücüiftliği)	177m	40°53'N31°13'E	12.07.2005
4	Düzce (Yığılca-Karakaş Village)	522m	40°58'N31°34'E	13.07.2005
5	Düzce (between Yığılca and Alaph)	486m	40°00'N31°25'E	13.07.2005
6	Bartın (between Bartın and İnkum)	Sea level	41°39'N32°15'E	17.07.2005
7	Çankırı (between Ilgaz and Kastamonu 4 th km)	942m	40°54'N31°37'E	27.06.2006
8	Kastamonu (9 km away Daday)	818m	41°28'N33°35'E	23.06.2006
9	Kastamonu (Azdavay)	843m	41°35'N32°18'E	29.06.2006
10	Kastamonu (between Azdavay and Küre 5 th km)	827m	41°39'N33°21'E	29.06.2006
11	Kastamonu (Hanönü-Aşağıcakırçay)	384m	41°37'N34°22'E	30.06.2006
12	Sinop (between Ayancık and Bakırlıziyavi Village)	1289m	41°47'N34°39'E	30.06.2006
13	Sinop (Ayancık between Hacıyakası and Köşeyakası Village)	240m	41°49'N34°37'E	25.08.2006
14	Kastamonu (Taşköprü- Kıvrıncay)	515m	41°35'N34°19'E	25.08.2006
15	Sinop (between Selbeyi and Erfelek- Çaykaşı Bridge)	137m	41°53'N34°55'E	27.08.2006
16	Sinop (Durağan-Dağdelen Village)	223m	41°25'N34°57'E	29.08.2006
17	Sinop (Saraydüzü-Yaylacılı Village)	231m	41°15'N34°52'E	30.08.2006
18	Kastamonu (Tosya-Dipsiz Lake)	1230m	41°05'N34°02'E	30.08.2006
19	Kastamonu (Daday-Taşçılar Pond)	992m	41°28'N33°23'E	26.06.2007
20	Kastamonu (Daday-Yumurtacı Pond)	938m	41°28'N33°26'E	26.06.2007
21	Karabük (Eflani-Kadıköy Pond)	930m	41°27'N32°59'E	26.06.2007
22	Kastamonu (Küre Mountains National Park -Valla Canyon road)	527m	41°41'N33°05'E	27.06.2007
23	Kastamonu (Kerte Village-Kokurdan Plateau)	1029m	41°43'N33°07'E	28.06.2007
24	Kastamonu (Central province)	850m	41°21'N33°46'E	29.06.2007
25	Kastamonu (Devrekani-Kulaksızlar Dam)	1104m	41°38'N33°54'E	29.06.2007
26	Kastamonu (between Devrekani and Çatalzeytin 18 th km)	1195m	41°42'N33°58'E	30.06.2007
27	Kastamonu (Seydiler-Kepez Village)	1118m	41°41'N33°47'E	30.06.2007
28	Sinop (Ayancık)	20m	41°56'N34°41'E	01.07.2007
29	Sinop (between Ayancık and Boyabat)	1074m	41°43'N34°38'E	01.07.2007
30	Sinop (Akgöl)	1024m	41°41'N34°35'E	02.07.2007
31	Sinop (Boyabat-Koçak)	340m	41°36'N34°38'E	02.07.2007
32	Çankırı (Kırşunlu)	1179m	40°50'N33°13'E	03.07.2007
33	Çankırı (Çerkeş)	1166m	40°48'N32°55'E	03.07.2007
34	Çankırı (Ilgaz-Kırkpınar Plateau road)	1088m	40°59'N33°41'E	03.07.2007
35	Karabük(Eskipazar-Büyükyayalar Village)	854m	40°55'N32°28'E	07.08.2007
36	Karabük (Eskipazar-between Budaklar and Hacıahmetler)	830m	40°55'N32°29'E	07.08.2007
37	Karabük (Eskipazar-Adiller Village)	1392m	40°54'N32°23'E	07.08.2007
38	Karabük (Eskipazar-SarıkadılarVillage)	796m	40°56'N32°16'E	07.08.2007
39	Bolu (between Gerede and Kızılcahamam, Avşar Plateau 15 th km)	1337m	40°39'N32°21'E	08.08.2007
40	Bolu (Abant Lake)	1332m	40°36'N31°16'E	09.08.2007
41	Bolu (between Abant Lake and Akcaalan Village)	946m	40°39'N31°23'E	09.08.2007
42	Bolu-(Yedigöller- Bolu road)	753m	40°56'N31°44'E	10.08.2007
43	Düzce (Cevizli Village-Efteni Lake)	137m	40°46'N31°07'E	11.08.2007
44	Düzce (between Aydınpınar and Düzce)	259m	40°45'N31°06'E	11.08.2007
45	Düzce (Dipsiz Lake)	820m	40°44'N31°21'E	12.08.2007