Original research

On the Herpetofauna of the Central Anatolian Province of Kırıkkale (Turkey) (Amphibia; Reptilia)

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Abstract: The aim of this study is to investigate the amphibian and reptile species of Kırıkkale province (central Anatolia, Turkey). For this purpose, 30 days of field studies were carried out between March 2016 and June 2017 at the study area. A total of 24 herptile species (four anurans, three cheloniens, seven lizard and ten snake species) were determined in Kırıkkale Province. Among the determined species, Emys orbicularis (Linnaeus, 1758) and Malpolon insignitus (Geoffroy De St-Hilaire, 1809) were recorded for the first time from Kırıkkale province.

Keywords: Herpetofauna, biodiversity, distribution, chorology, Kırıkkale


Introduction

Topographical, geological and climatic characteristics of Anatolia provide rich faunal and floral diversity to Turkey (Cihan and Tok, 2014; Ambarlı et al., 2016). which has abundant herpetofaunal biodiversity as well as other animal classes (IUCN, 2019). According to the published data 132 reptile and 33 amphibian species were reported from Turkey so far, and therefore has a rich potential almost as much as the whole European continent (Baran and Atatür, 1998; Sindaco et al., 2000; Sarıkaya et al., 2017; Göçmen et al., 2018; Yıldız et al., 2018). Besides published data, an oral presentation was delivered about the amphibians and reptilians of Kırıkkale province at the twelfth national ecology and Environment symposium Muğla University (Turkey) (İlhan and Tosunoğlu, 2015). They recorded 4 amphibian and 14 reptilian species from Kırıkkale province.

Kırıkkale is an important geographical location as it is a junction point of Central Anatolia, Black Sea and Eastern Anatolia. However, the studies on amphibian and reptile species from Kırıkkale province are very limited (İlhan and Tosunoğlu, 2015). Various researchers reported amphibians and reptiles that they were encountered in the border of Kırıkkale province during their general survey in Turkey without any detailed location information (Eiselt and Spitzenberger, 1967; Baran and Atatürk, 1986; Fritz and Freytag, 1993; Mulder 1995; Sindaco et al., 2000; Gözütok and Albayrak, 2009; Toyran and Albayrak, 2009; Bülbul and Kutrup, 2011; Çiçek et al., 2011; İnci et al., 2013; Özdemir et al., 2014). Therefore, it is aimed to determine an updated herpetofaunal inventory of Kırıkkale province in this study to contribute to the studies which aimed to reveal the herpetile diversity of Turkey.
province but did not give any locality information, collection or observation dates. So here we present the results of an intensive field study that was carried out at the study area and report 24 herptile species which of two are recorded for the first time from Kırıkkale province. Also, herpetological inventory of Kırıkkale province is updated with their distributions. Additionally, protection status and chorotype of the species were determined.

**Materials and Methods**

Field studies were carried out by operating at least two point in each of 30 grid units that 1/25000 scaled, covering the whole of the Kırıkkale province and field survey was completed 30 days between March 2016 and June 2017. Various habitat types such as wetlands, forests, steppes, mountains were selected to show comprehensive results about provincial herpetofauna. Before the field trips, all literature about herpetofauna of Kırıkkale province was searched and published localities were checked.

A total of 108 different localities whose altitudes were varied amongst 582-1521 m a.s.l. were surveyed within this project (Fig. 1). The coordinates of the observed herptile species’ localities were recorded via GPS device (Garmin Montana 650) as latitude and longitude in decimal degrees format and referenced to the World Geodetic System of 1984 (WGS84). They were deposited in The Noah's Ark Biodiversity Database (The Republic of Turkey, Ministry of Agriculture and Forestry, General Directorate of Nature Conservation and National Parks). The list of observation localities, dates, and altitudes are given in appendix.

Amphibians and reptiles were examined and identified by visual encounter surveys (VES) (Crump and Scott, 1994). Also, some of the specimens were subjected to detailed examination for species identification. Photographs of the specimens and their habitat were taken using digital camera (Nikon D80, Nikon D90) with lenses (90 mm Macro, 70-300 mm and 18-105 mm). After the detailed examination and photographing, the specimens were released natural habitats that they were collected.

The observed species were grouped into chorotypes categories according to Vigna Taglianti et al. (1999). The habitats, where amphibians and reptiles were collected,
were categorized into 8 groups according to the following EUNIS habitat types (EUNIS 2018): C1 – Surface standing waters; C2 – Surface running waters; E1 – Dry grasslands; G1 – Broadleaved deciduous woodland; H3 – Inland cliffs, rock pavements and outcrops; I1 – Arable land and market gardens; J1 – Buildings of cities, towns and villages; and J3 – Extractive industrial sites. Additionally, the conservation status of the amphibians and reptiles was pointed out according to the International Union for Conservation of Nature (IUCN), The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and The Convention on the Conservation of European Wildlife and Natural Habitats (BERN Convention).

**Results**

Although 22 herptile species records were found by literature search, only 17 of them were observed during present study; four frogs [Families: Bufonidae (2) and Ranidae (2)], three turtles [Families: Emydidae (1), Geomydidae (1) and Testudinidae (1)], seven lizards [Families: Agamidae (1), Geckonidae (1), Scincidae (2) and Lacertidae (3)] and ten snakes [Families: Colubridae (8) Typhlopidae (1) and Viperidae (1)]. Despite the intensive field survey, we could not be able to encounter (Bufo bufo, Stellagama stellio, Mediodactylus kotschyi, Lacerta trilineata, Dolichophis jugularis, Platyceps najadum, and Montivipera xanthina) that were reported from the study area with previous studies. Species list with their observed locality numbers, conservation status, and related published references are given in Table 1. There is no endemic species distributed in Kırıkkale province. According to the published data, *Emys orbicularis* (Linnaeus, 1758) and *Malpolon insignitus* (Geoffroy De St-Hilaire, 1809) are new records for Kirikkale province (Fig. 2).

![Figure 2. Selected amphibians and reptiles captured in Kırıkkale: A – Rana macrocnemis, B – Bufo bufo, C – Ablepharus kitaibellii, D – Malpolon insignitus, E – Xerotyplops vermicularis, F – Natrix tessellata (Photographs were taken by B. AKMAN and M. ÇAKMAK).](image-url)
<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>bern</th>
<th>IUCN</th>
<th>CITES</th>
<th>Chorotypes</th>
<th>EUNIS</th>
<th>Record Localities (in this survey)</th>
<th>References/Literatur</th>
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<tbody>
<tr>
<td>Ranidae</td>
<td><em>Pelophylax ridibundus</em> (Pallas, 1771)</td>
<td>III</td>
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<td>-</td>
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<td>C1; C2; E1; H3; I1; J1</td>
<td>1, 2, 5, 6, 7, 8, 10, 13, 14, 15, 16, 17, 18, 23, 24, 25, 26, 27, 28, 29, 34, 35, 36, 41, 42, 43, 44, 45, 50, 51, 53, 54, 58, 59, 62, 63, 64, 65, 69, 72, 73, 74, 76, 78, 80, 81, 85, 86, 87, 89, 91, 92, 93, 94, 95, 97, 99, 101, 102, 104, 105, 106, 107, 108</td>
<td>Bülbül &amp; Kutrup, 2011; İnci et al., 2013; İlhan &amp; Tosunağlu, 2015;</td>
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<td></td>
<td><em>Rana macrocnemis</em> Boulenger, 1885</td>
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<td>-</td>
<td>SW-Asiatic</td>
<td>C2; E1; H3; I1</td>
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<td><em>Bufo bufo</em> (Linnaeus, 1758)</td>
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<td>-</td>
<td>European</td>
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<td>İlhan &amp; Tosunağlu, 2015;</td>
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<td>Testudinidae</td>
<td><em>Testudo graeca</em> Linnaeus, 1758</td>
<td>II</td>
<td>VU</td>
<td>II</td>
<td>Turano-Mediterranean</td>
<td>E1; G1; H3; I1; J1</td>
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<td>İnci et al., 2013; Mulder 1995; İlhan &amp; Tosunağlu, 2015;</td>
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<td><em>Mauremys caspica</em> (Gmelin, 1774)</td>
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<td>NE</td>
<td>II</td>
<td>Turano-Mediterranean</td>
<td>C1; C2; E1; H3; I1</td>
<td>1, 5, 7, 10, 18, 34, 41, 43, 44, 54, 55, 69, 86, 94, 95, 97, 99, 102, 107, 108</td>
<td>Fritz &amp; Freytag,1993; İnci et al., 2013; Sindaco et al., 2000; Eiselt &amp; Spitzenerberger, 1967; İlhan &amp; Tosunağlu, 2015;</td>
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<td>Emydidae</td>
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<td>NT</td>
<td>II</td>
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<td>C1; C2; E1; I1</td>
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<td>Agamidae</td>
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<td>LC</td>
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<td>E-Mediterranean</td>
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<td>İlhan &amp; Tosunağlu, 2015;</td>
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<td>Geckonidae</td>
<td><em>Mediodactylus kotschyi</em> (Steindachner, 1870)</td>
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<td>LC</td>
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<td>E-Mediterranean</td>
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<td>İlhan &amp; Tosunağlu, 2015;</td>
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<td><em>Ablepharus kitaibelii</em> Bibron &amp; Bory St-Vincent, 1833</td>
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<td>LC</td>
<td>-</td>
<td>E. Mediterranean</td>
<td>E1; G1; H3; I1</td>
<td>6, 17, 31, 46, 55, 62, 64, 66, 67</td>
<td>İlhan &amp; Tosunağlu, 2015; Mulder 1995; Sindaco et al., 2000; İlhan &amp; Tosunağlu, 2015;</td>
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<td><em>Heremites auratus</em> (Linnaeus, 1758)</td>
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<td>-</td>
<td>SW-Asiatic</td>
<td>E1; G1; H3; I1; J1</td>
<td>12, 25, 38, 50, 51, 54, 55, 74, 87, 88, 96,</td>
<td>Sindaco et al., 2000; İlhan &amp; Tosunağlu, 2015;</td>
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<td>Lacertidae</td>
<td><em>Lacerta media</em> Lantz &amp; Cyrên, 1920</td>
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<td>LC</td>
<td>-</td>
<td>SW-Asiatic</td>
<td>E1; G1; H3; I1</td>
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<td>İnci et al., 2013; Sindaco et al., 2000; Toyran &amp; Albayrak, 2009; İlhan &amp; Tosunağlu, 2015;</td>
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<td><em>Lacerta trilineata</em> Bedriaga, 1886</td>
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<td>LC</td>
<td>E-Mediterranean</td>
<td>Mulder 1995; İlhan &amp; Tosunuğlu, 2015;</td>
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<td><em>Ophisops elegans</em> Ménétries, 1832</td>
<td>II</td>
<td>LC</td>
<td>E. Mediterranean</td>
<td>Mulder 1995; Sindaco et al., 2000; İlhan &amp; Tosunuğlu, 2015;</td>
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<td><em>Dolichophis jugularis</em> Linnaeus, 1758</td>
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<td>LC</td>
<td>SW-Asiatic</td>
<td>İlhan &amp; Tosunuğlu, 2015;</td>
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<td><em>Dolichophis caspius</em> Gmelin, 1789</td>
<td>III</td>
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<td>Gözütok &amp; Albayrak, 2009; Sindaco et al., 2000; Toyran &amp; Albayrak, 2009;</td>
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<td><em>Eirenis modestus</em> Martin, 1838</td>
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<td>LC</td>
<td>SW-Asiatic</td>
<td>Sindaco et al., 2000;</td>
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<td><em>Elaphe sauromates</em> (Pallas, 1811)</td>
<td>II</td>
<td>LC</td>
<td>Turano-Europeo-Mediterranean</td>
<td>Sindaco et al., 2000;</td>
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<td><em>Malpolon insignitus</em> (Geoffroy Saint-Hilaire, 1827)</td>
<td>III</td>
<td>LC</td>
<td>Mediterranean</td>
<td>This Study</td>
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<td><em>Natrix tessellata</em> Laurenti, 1768</td>
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<td>Centralasiatic</td>
<td>İlhan &amp; Tosunuğlu, 2015;</td>
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<tr>
<td><em>Natrix natrix</em> (Linnaeus, 1758)</td>
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<td>LC</td>
<td>Centralasiatic-Europeo-Mediterranean</td>
<td>Gözütok &amp; Albayrak, 2009; İnci et al., 2013; Sindaco et al., 2000; İlhan &amp; Tosunuğlu, 2015;</td>
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<td><em>Platyceps najadum</em> (Eichwald, 1831)</td>
<td>III</td>
<td>LC</td>
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<td>İlhan &amp; Tosunuğlu, 2015;</td>
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<td><em>Xeropholops vermicularis</em> (Merrem, 1820)</td>
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<td>İlhan &amp; Tosunuğlu, 2015;</td>
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<td><em>Montivipera xanthina</em> (Gray, 1849)</td>
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<td>LC</td>
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<td>İlhan &amp; Tosunuğlu, 2015;</td>
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The species of amphibians and reptiles in Kırıkkale province were grouped into 8 chorotype categories (Fig. 3, Table 1). E-Mediterranean (25%) is the dominant category which is represented by 6 species. SW-Asiatic and Turano-Mediterranean chorotype (21%) are represented by 5 species each, Turano-Europeo-Mediterranean chorotype (13%) is represented by 3 species, and Centralasiatic, Centralasiatic-European, Centralasiatic-Europeo-Mediterranean, European and Mediterranean chorotype (4%) is by 1 species.

The habitats of amphibians and reptiles observed in this study are categorized into 8 groups according to the EUNIS level two habitat types (EUNIS 2018) (Fig. 4), E1 – Dry grasslands habitat type was preferred by all species. This is followed by I1 – Arable land and market gardens (14 species); H3 – Inland cliffs, rock pavements and outcrops (13 species); G1 – Broadleaved deciduous woodland (8 species); C2 – Surface running waters (6 species); J1 – Buildings of cities, towns and villages (5 species); C1 – Surface standing waters (3 species); and J3 – Extractive industrial sites (1 species), respectively. Pelophylax ridibundus was observed in 7 of the 8 considered EUNIS habitat types, Bufotes variabilis, Mauremys caspica, Ophisops elegans and Lacerta trilineata (Mulder, 1995), Dolichophis caspius (Gözütok and Albayrak, 2009; Toyran and Albayrak, 2009), and Pelophylax ridibundus (Bülbül and Kutrup, 2011) were recorded from Kırıkkale province.

Mulder (1995) reported Lacerta trilineata, which we could not encounter it at the study area, from Karaağıl (Behirek dag), Kırıkkale province. Some green lizard specimens were collected from Sarıkızlı (Locality 6) and Sarıkayalar (Locality 85) in this study and they have examined in detail. Ventral scales of Sarıkayalar and Sarıkızlı specimens were counted six which is characteristics for Lacerta media. Therefore, it is concluded that L. trilineata and L. media are found sympatrically under the studied area.

Ilhan and Tosunoğlu (2015) presented that Bufo bufo, Stellagama stellio, Mediodactylus kotschyi, Lacerta trilineata, Dolichophis jugularis, Platycps najadam, and Montivipera xanthina distributed on the studied area. The distribution range of these species except Dolichophis jugularis are near the research area. Therefore, it is an expected result to be observed in these species in Kırıkkale province. But, D. jugularis did not reported north of central Anatolia up to now (Zinner 1972; Sindaco et al. 2000). It is difficult to identify juvenile individuals of the species belonging to Dolichophis genus and they didn’t give any information about size or gender of their specimens. For this reason, D. jugularis record needs confirmation.
According to the occurrence frequency, *P. ridibundus* was the most common amphibian species in Kırıkkale province based on observed locality numbers. However, *B. variabilis* also occur in many areas. *O. elegans* was the most found species which was followed by *T. greaca*.

It was determined that 4 amphibian and 20 reptile species correspond to 12.12% of Turkey amphibian fauna and 15.15% of the reptile fauna, respectively. With many studies in recent years, amphibian and reptile fauna have been reported from the provinces of Turkey as follows; 55 herptiles from Adana (Sarıkaya et al. 2017) 24 from Karabük (Kumlutaş et al. 2017), 23 from Tunceli (Avcı et al. 2018), 23 from Bartın (Çakmak et al. 2017), 35 from Ağrı (Yıldız et al. 2018), 36 from Bitlis (Akman et al. 2018) and 25 from Kütahya (Erişmiş, 2017). In addition, 15 reptile species were reported from Amasya (Şahin and Afsar, 2018).

In this study, a total of 24 amphibian and reptile species were determined when the results of the field study and the literature records were combined. *Emys orbicularis* (Linnaeus, 1758) and *Malpolon insignitus* (Geoffroy De St-Hilaire, 1809) are the new records for Kırıkkale province.

Habitat destruction is one of the most important factors that threatens herptile species which depends on various parameters like agriculture, pollution etc. Therefore, it is very important to inform the local people to prevent the habitat destruction and give awareness to them about conservation of wild animals. Some studies like presentation should be done to gain common sense for local people, especially about vulnerable species like *Emys orbicularis* which is more susceptible to habitat loss.

**Acknowledgments.** This study was conducted within the framework of the National Biodiversity Inventory and Monitoring Project coordinated by the Republic of Turkey Ministry of Agriculture and Forestry General Directorate of Nature Conservation and National Parks. The author wish to thank to directory and the staff of the Kırıkkale Ministry of Agriculture and Forestry Department for their help in the field study. I also would like to thank Mr. Eren GERMEÇ for his help in preparing the map.

**References**


**Appendix**

1: Yeşilî (Sulakıryut, 578 m, 20.03.2016); 2: Kıyıhalilince (Sulakıryut, 570 m, 20.03.2016); 3: Ayvathi (Sulakıryut, 782 m, 23.06.2016); 4: Danaci (Sulakıryut, 736 m, 17.03.2016); 5: Esenpınar (Sulakıryut, 946 m, 17.03.2016); 6: Sarıkızlı (Sulakıryut, 1026 m, 17.03.2016); 7: Sulakıryut (Sulakıryut, 781 m, 20.03.2016); 8: Yeşilyazıcı (Sulakıryut, 712 m, 23.06.2016); 9: Sarımbe (Sulakıryut, 647 m, 20.03.2016); 10: Çayoba (Sulakıryut, 596 m, 23.06.2016); 11: Akkuyu (Sulakıryut, 927 m, 24.06.2016); 12: Korукöy (Sulakıryut, 864 m, 24.06.2016); 13: Ortköy (Sulakıryut, 893 m, 27.09.2016); 14: Merkez (Sulakıryut, 859 m, 18.03.2016); 15: Ağayı (Sulakıryut, 868 m, 17.03.2016); 16: Sarıkızlı (Sulakıryut, 1064 m, 17.03.2016); 17: Alıseylı (Sulakıryut, 1205 m, 17.03.2016); 18: Karaköse (Delice, 595 m, 17.03.2016); 19: Şahçalı (Delice, 705 m, 26.09.2016); 20: Koçubaba (Delice, 1279 m, 25.06.2016); 21: Kalekısa (Sulakıryut, 1028 m, 25.06.2016); 22: Çevirmili (Sulakıryut, 1036 m, 25.06.2016); 23: Kazmaca (Merkez, 982 m, 24.06.2016); 24: Kazmaca (Merkez, 1099 m, 24.06.2016); 25: Kazmaca (Merkez, 1067 m, 24.06.2016); 26: Hıdırşah (Balsıye, 1020 m, 25.06.2016); 27: Kösedaruk (Balsıye, 1048 m, 20.03.2016); 28: Selamı (Balsıye, 1156 m, 25.06.2016); 29: Yukarakarakı (Balsıye, 1142 m, 25.06.2016); 30: Elmali (Delice, 1156 m, 25.06.2016); 31: Büyükşafar (Delice, 1121 m, 25.06.2016); 32: Doğanören (Delice, 914 m, 26.06.2016); 33: Kurtoğu (Delice, 672 m, 17.03.2016); 34: Eviyali (Delice, 614 m, 17.03.2016); 35: Akboğaz (Delice, 690 m, 26.06.2016); 36: Sanyaka (Delice, 728 m, 20.05.2016); 37: Sarıkızlı (Delice, 1004 m, 20.05.2016); 38: Balıka (Delice, 862 m, 20.05.2016); 39: Ağıltı (Delice, 722 m, 26.06.2016); 40: Merkez (Delice, 823 m, 18.03.2016); 41: Cerikli (Delice, 651 m, 20.05.2016); 42: Tatılcak (Delice, 668 m, 20.05.2016); 43: Onakboğaz (Delice, 722 m, 20.04.2016); 44: Halılı (Delice, 700 m, 22.05.2016); 45: Halılı (Delice, 842 m, 22.05.2016); 46: Herelik (Delice, 803 m, 22.05.2016); 47: Büyükşah (Delice, 983 m, 22.05.2016); 48: Yeşilı (Balsıye, 920 m, 21.05.2016); 49: Merkez (Balsıye, 969 m, 18.03.2016); 50: Ağıkakavak (Balsıye, 888 m, 21.05.2016); 51: Ulası (Merkez, 383 m, 19.05.2016); 52: Merkez (Yahşihan, 920 m, 21.05.2016); 53: Merkez (Yahşihan, 670 m, 18.03.2016); 54: İrmak (Yahşihan, 667 m, 19.03.2016); 55: Kılçıl (Yahşihan, 727 m, 19.03.2016); 56: Hitarköy (Yahşihan, 808 m, 19.03.2016); 57: Bedesten (Yahşihan, 1149 m, 18.05.2016); 58: Bedesten (Yahşihan, 889 m, 18.05.2016); 59: Merkez (Yahşihan, 678 m, 18.03.2016); 60: Merkez (Balsıye, 684 m, 18.03.2016); 61: Ahili (Merkez, 857 m, 23.04.2016); 62: Ahili (Merkez, 933 m, 23.04.2016); 63: Dağevi (Keskin, 1027 m, 19.05.2016); 64: Gazibeyli (Keskin, 1566 m, 16.03.2016); 65: 1205 m, 17.03.2016); 66: Kavlak (Keskin, 927 m, 20.03.2016); 67: Mehmetbeyobası (Balsıye, 1235 m, 21.05.2016); 68: Eroğlu (Keskin, 1162 m, 21.05.2016); 69: Çakal (Keskin, 1202 m, 21.05.2016); 70: X. 2016);
21.05.2016); 70: Ceritmüminli (Keskin, 1005 m, 16.03.2016); 71: 
Ceritmüminli (Keskin, 1034 m, 16.03.2016); 72: Kurşunkaya (Keskin, 
1018 m, 23.04.2016); 73: Esmalıbudak (Keskin, 908 m, 23.04.2016); 
74: Karaahmetli (Bahşi, 764 m, 18.03.2016); 75: Karaahmetli 
(Bahşi, 980 m, 18.03.2016); 76: Esatmüminli (Keskin, 916 m, 
23.04.2016); 77: Hacilara (Merkez, 693 m, 18.03.2016); 78: Hasandede 
(Bahşi, 862 m, 16.03.2016); 79: Bahçeci (Bahşi, 687 m, 18.03.2016); 
80: Bahçeci (Bahşi, 884 m, 18.03.2016); 81: Çamlıca (Bahşi, 1055 
m, 18.05.2016); 82: Küreboğazi (Bahşi, 1075 m, 18.05.2016); 83: 
Sarıkayalar (Bahşi, 1169 m, 21.04.2016); 84: Sarıkayalar (Bahşi, 
1220 m, 21.04.2016); 85: Sarıkayalar (Bahşi, 942 m, 21.04.2016); 86: 
Karakeçili (Karakeçili, 952 m, 21.08.2016); 87: Köprüköy (Keskin, 
748 m, 18.03.2016); 88: Tilkili (Çelebi, 1121 m, 27.06.2016); 89: 
Karabucak (Çelebi, 809 m, 22.04.2016); 90: Akkoşan (Karakeçili, 847 
m, 18.03.2016); 91: Akçeyeníyapan (Çelebi, 898 m, 22.04.2016); 92: 
Halldede (Çelebi, 957 m, 22.04.2016); 93: Merkez (Çelebi, 1212 m, 
18.03.2016); 94: Çiftevi (Çelebi, 970 m, 18.03.2016); 95: Aşağıseyh 
(Keskin, 934 m, 20.08.2016); 96: Müsellim (Keskin, 1223 m, 
22.04.2016); 97: Ceritkale (Keskin, 971 m, 18.03.2016); 98: Gülkonak 
(Keskin, 1158 m, 20.08.2016); 99: Yeniyapan (Keskin, 921 m, 
18.03.2016); 100: Üçkuyu (Keskin, 1046 m, 16.03.2016); 101: Baraklı 
(Keskin, 1075 m, 20.05.2016); 102: Kavurgalı (Keskin, 1075 m, 
20.04.2016); 103: Beşler (Keskin, 928 m, 20.04.2016); 104: Kasınağa 
(Keskin, 1001 m, 20.04.2016); 105: Efendiköy (Keskin, 822 m, 
20.04.2016); 106: Ceritobası (Keskin, 842 m, 20.04.2016); 107: 
Hacıömersolaklısı (Keskin, 867 m, 20.04.2016); 108: Çamurbatmaz 
(Keskin, 755 m, 20.04.2016).