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## On the Amphibia and Reptilia Species of Murgul (Artvin)

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**Abstract:** During a two-years survey of amphibian and reptilian species and their habitats in Murgul, Artvin a total of 22 species were recorded. In the investigated species were, six tailless amphibians, two tailed amphibians, six lizards, and eight snakes. The habitats of *Vipera ammodytes transcaucasiana*, *Triturus vittatus ophryticus*, *Coluber najadum*, *Lacerta clarkorum*, and *Lacerta trilineata* are threatened by a dam being constructed between Borçka and Erenköy. Furthermore, it should be pointed out that some compliant species such as *Elaphia hohenackeri*, *Coronella austriaca*, *Rana macrocnemis* and *Anguis fragilis* are being threatened by local people.

**Key words:** Amphibia and Reptilia, systematics, population status

### Introduction

Murgul, which is a district of Artvin, is located at the East Black Sea region. It is surrounded by Yusufeli at southwest, Arhavi at northwest, Borçka at northeast, and Hopa at north (41° 11' N, 41° 43' E). Its altitude is between 360-1800 m. The area of Murgul is 406 km<sup>2</sup>, 50 % of which is forest, 45 % grass, rocky or stony and 5 % is agricultural area (Fig. 1). A considerable part of Murgul land is covered with steep mountains that are hard to pass. These mountains are divided into two sections by the Çoruh River Valley, which extends along Erenköy. One of them is Balıklı Mountain, which is located at the northwest, and the other is Alca Mountain located at the northwest of Murgul. Since the mountains ascend in a way not to permit the formation of wide valley, the valleys are scattered and steep. This characteristic property prevents the agricultural lands to extend in wide areas. So, there are no flat surfaces that may be called as planes. But very small lakes are often encountered at the Kabaca and Nitromax areas. Most of them are crater or set lakes formed at the bottom of narrow valleys.

These high mountain barriers produce a protected area which shows humid and drier inland habitats in the bordered area. Due to this reason, some amphibia and reptilia species of this region are originated from the East Anatolia Region, whereas others filter through the East Black Sea Region. That is why this region provides unique and ecotonal habitat which is excellent for many species of amphibians and reptiles.

Although a few studies belonging to Turkish and foreigner researchers have been done about amphibian and reptilian species in the West, Middle, and East Black Sea Region (Lantz, 1912; Steiner, 1968; Kretz, 1972; Darevsky and Eiselt, 1980; Atatür and Budak, 1982; Andren, 1978; Franzen, 1985; Eiselt and Darevsky, 1991; Billing *et al.*, 1991; Baran *et al.*, 1992, 1997; Kumlutaş *et al.*, 1998; Kutrup, 1999, 2000a, 2000b), only one of them informs about the herpeto fauna of the East Black Sea Region (Baran *et al.*, 1997). This study is only limited to the Çamlıhemşin area.

The aim of this study is to determine species belonging to amphibian and reptilian and examine their habitats and take baseline data on their population for their future management in Murgul.

### Materials and Methods

Total of 91 specimens (43 ♂♂ and 48 ♀♀) were caught during the study period between 01. 05. 1999 and 30. 09. 2000 from the study area (Fig. 1). The specimens were kept in the zoology laboratory in Department of Biology at Black Sea Technical University.

We utilized several methods to collect and evaluate the amphibian and reptilian species in Murgul. Since the area was not large, extensive field work on foot was conducted. Frog specimens living in the water were captured using net,

whereas brown frogs living under stones or on wet grass were caught by hand. Also some lizards which utilize burms along dirt roads as basking sites were caught by hand like in salamanders. Some lizards which are very active and difficult to catch such as green lizards were captured by shooting. Poisonous and unpoisonous snakes were captured by pressing the head with a stick and picked up by hand.

Roads were surveyed in different climatic conditions during a day. Because many species were secretive; rocks, logs, boards and other covers were turned to search for specimens such as common toads, ground snakes, brown frogs, etc. Streams, ponds, and small body of waters were checked for adult amphibians and larvae.

Some of the collected species were usually examined and then released where ever they captured. Locality data were recorded for all species encountered during the study. Some specimens were brought to laboratory to evaluate. Identification of the amphibian and reptilian specimens collected during the study period was made by using the current literature (Baran and Atatür, 1998).

### Results and Discussion

A total of 20 species, representing eight families, were recorded in survey area. The study area was represented by 6 frogs, 2 salamanders, 5 lizards, and 6 snakes. The species are given in Table 1.

Table 1: Amphibia and reptilia species collected from the study area

Common names	Species names	Male (♂)	Female (♀)
Common names	<i>Bufo bufo</i>	4	3
Green toad	<i>Bufo viridis</i>	18	24
Lake frog	<i>Rana ridibunda</i>	9	4
Agile frog	<i>Rana dalmatina</i>	3	2
Iranian long-legged frog	<i>Rana macrocnemis</i>	2	3
Common tree frog	<i>Hyla arborea</i>	6	5
Caucasian salamander	<i>Mertensiella caucasica</i>	4	6
Banded newt	<i>Triturus vittatus</i>	5	8
Giard lizard	<i>Lacerta derjugini</i>	6	2
Derjugin's lizard	<i>Laerta parvula</i>	12	16
Red-bellied lizard	<i>Lacerta rudis</i>	3	4
Spiny-tailed lizard	<i>Lacerta clarkorum</i>	5	7
Clarc's lizard	<i>Anguilla fragilis</i>	1	3
Slow worm	<i>Natrix natrix</i>	3	7
Grass snake	<i>Natrix tessellata</i>	1	2
Large whip snake	<i>Coluber jugularis</i>	-	2
Caspian snake	<i>Coluber caspius</i>	-	2
Dahl's whip snake	<i>Coluber najadum</i>	-	1
Smooth snake	<i>Coronella austriaca</i>	2	1
Caucasian snake	<i>Elaphe hohenackeri</i>	-	2
Nose horned viper	<i>Vipera a.</i>	1	1
	<i>tgranscaucasiana</i>		

**Common toad (*Bufo bufo*, Linnaeus, 1758):** In total, 7 specimens were captured. Only two specimens of common toad were encountered during the day hiding in burrows, and the others were found in the immediate of a stock pond just near houses at night as active to hunt for insects. All specimens had a ground colour of greenish-yellow or brown. The dark marking on the back encircled 1 or 3 warts. The dark warts begin behind the ears were extending to groin region. Dark brown coloration was seen at lower parts of the kidney-shaped gland called the paratoid. The belly was yellow or cream coloured and mottled with dark brown spots. One specimen showed difference in having dark spots under the head. Females were different from males in having lots of warts on the back, large paratoid gland and remarkable big body.

At first, Bodenheimer (1944); evaluated common toads of the Black Sea as nominant subspecies, *B. b. bufo*. Later, Eiselt (1965); published information about a common toad specimen caught from Meryemana (Trabzon) as *B. b. verrucosissimus*. Also, he described another specimen caught from Rize as *B. b. spinosus*. Currently, the subspecies status of common toad in Turkey has not been determined. That is why we prefer to evaluate our samples as *Bufo bufo*.

**Green toad (*Bufo viridis*):** Fourteen green toads (6 ♂♂ and 8 ♀♀) were found on sunny days. It was observed that this species preferred open areas such as grasslands with stones associated with water. In early May, after the heavy rains, at least 28 adults were observed in a breeding group around Nitramax (Fig.1). It is likely that green toads are usually surface active for only brief periods following rainstorm.

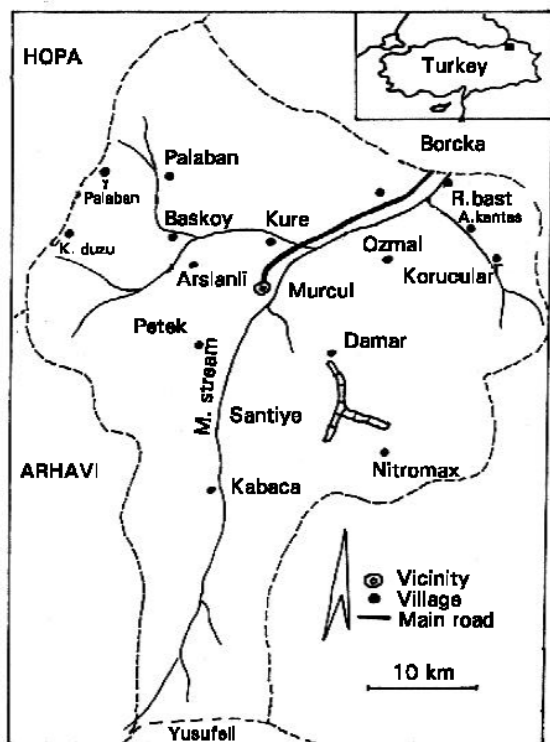


Fig. 1: The study area

The ground colour was usually light green and mottled with many dark spots. It had 3 warts within each dark spots on the

dorsal and outside of each hand. Six sickle-shaped blotches were extending along the forehands. Also, there were five dark yellow lines on the each chine. The belly was dirty yellow with small dark spots. Males were different from females in having small body and lots of dark spots on the body.

As stated before (Eiselt and Darevsky, 1991; Baran and Atatür, 1998), except the Hatay population, others were belong to nominant subspecies of *B. viridis*. So, we preferred to evaluate our species as *B. v. viridis*.

**Water frog (*Rana ridibunda*):** Water frogs have been introduced in numerous locations. They were found not only in natural ponds but also in the canals near the roads. Breeding behaviour was observed on 26 May. Unfortunately we did not observe any water frog in the stream which was extending from Damar to Erenköy due to Murgul copper factory. It was seen that many water frogs utilize a small quantity of water pond to lay. Most of them were died because of the drying of small water in late August. In fact, this species is very common and abundant in Turkey compared to other *Rana* species. But, we found that it was not very common in this region. Pollution of the streams with copper will be gone to effect the water frog populations in future time.

Body coloration ranged from green to brown. Vertebral line which was seen in some *R. ridibunda* populations was not observed. According to earlier studies (Eiselt, 1965; Baran and Atatür, 1998), our specimens belong to nominant subspecies.

**Agile frog (*Rana dalmatina*):** This species was very rarely encountered in the study area according to the whole Black Sea Region. Four specimens were captured from Erenköy on 18 June. These were inhabited in moist, deciduous forest with many dry leaves. We observed one adult male inhabiting near the road at Kabaca on rainy days in late August. No breeding behaviour was seen during the survey. All specimens were observed under 1000 m altitude.

The general colour of back was olive or brown and weakly spotted. All of the species had the long hind limb and heel extending to snout tip. The belly was pink or cream and unspotted.

**Long legged frog (*Rana macrocnemis*):** Five samples were encountered during the study period. Three of them were observed on moist grassland after a rain on the small plateau of Kabaca (altitude of 1800m) on 5 July. The others were found under stones at Nitromax on a sunny day. It was seen that this species lived mainly near permanent water, which is surrounded by shrubby vegetation. These frogs were appeared from the beginning of May to late September depending on weather and altitude.

Dorsal coloration was light brown with abundant dark spots. Light mid-dorsal line was appeared on two specimens. When the hind leg was stretched along the body, the tibia-tarsal ankle was exceeding to the tip of the snout for all specimens. The belly was pinkish or orange-red. The thorax was spotted and these spots were extending to the chest.

The taxonomic situation with brown frogs of the Caucasus has been for long time confusing. It was claimed that there were two forms of brown frogs, *R. macrocnemis* and *R. camerani* in Caucasus (Baran, 1998). We evaluated our samples as *R. macrocnemis*.

**Common tree frog (*Hyla arborea*):** This species was very common at lower altitudes when compared with high altitudes. Most of specimens were caught under dry leaves in forest area from the beginning of May to late September. The single female specimen was encountered in small water

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which had abundant vegetation to shelter immediately adjacent to the forest at Korucular on 23 May. It likely seemed that she was pregnant. Because there was not any egg observed in this locality. Only two specimens were found under stones at open area on 6 June at the Kabaca and Nitromax locality. One of them was showing a difference with dark coloration and swollen skin such as a balloon. Our specimens show typically morphological characteristics of *H. a. arborea* in having the projecting part of lateral line which is utilized in subspecies status of this species.

**Caucasian salamander (*Mertensiella caucasica*):** Two adults and seven larvae were encountered in the pond near the stream at Taşköprü locality on 12 June. Six adults and four larvae were seen inhabited near the stream where rushing water was running over the open area at Kabaca plateau (1800 m.) on 26 August. Also two adult specimens were found under a stone 14 m away from water at the same site in early November. It was seen that this species preferred to inhabit in high aquatic and rushing water which produced high oxygen. This explains, why this species occur only at the belt of the East Black Sea Mountains.

The species were only encountered after May due to snow and they were inactive until October in this region. No breeding behaviour was observed during the survey. According to Yılmaz (1989); the distribution of Caucasian salamander ranges from Kemal (Ordu) to Hopa. Up to day, numerous localities belong to this species were reported from Trabzon, Giresun and Rize (Baran *et al.*, 1997; Kumlutaş *et al.*, 1998). But only a few larva were reported from Hopa and Savaşat (Artvin) (Franzen, 1985).

**Banded newt (*Triturus vittatus*):** In late April, 8 aquatic banded newt were observed in the water with high vegetation near the road in Erenköy. This locality had 200 m. altitude. Then, in late May only two females were seen at the same place. On the other hand, numerous species encountered at Nitromax were almost aquatic form in late May. This indicating that mating and breeding behaviour of the specimens at high altitudes take place almost one month later than the ones at low altitudes. Only three samples were seen under stones at the same place in early June. But, in mid June no specimens were seen in water. In October, two specimens sheltered under the stone were observed 500 m away from water at Kabaca plateau.

The maximum body length of our specimens were 10.70 cm. (♂♂) and 10.20 cm. (♀♀), and of dorsal fin was 1.80 cm. Our specimens were showing the characteristics of *T. v. ophryticus*. As stated before (Yılmaz, 1989), this subspecies was very common along the coast of the Black Sea Region from Bursa to Rize. But there is no report for this subspecies from Artvin except Lantz's (1912). But we have not enough information about its locality.

**Giant green lizard (*Lacerta trilineata*):** Five adult and three young specimens were captured on dry, steep or vegetated hillsides of Erenköy, Taşköprü, Korucular and Basköy in late May. Two adult specimens (> >) were also captured in the hazelnut gardens near the vicinity of Erenköy on 14 July, while they were basking on dry grass at 10.25 in the morning. This species was highly active and secretive, so it was difficult to see them between short plants like *Pteridium aquilium*, *Brassia sp.* One male specimen was found under a stone after light rain on 21 September and this shows that green salamanders were inactive until late September. All specimens were encountered at low habitats (180-650 m altitude).

Although this green lizard is widespread in Turkey, there hasn't been any report from Middle and East Black Sea region

until now. This is the first record for this region. Up to now, 10 subspecies belonging to this species were described in Turkey. But the validity of these subspecies has to be still discussed (Kutrup, 2000b). In recent years, there is a trend to define new species. Our specimens were rather similar to *L. f. media* according to morphological characters and coloration. But our materials were different in having no blue stains on the sides of the body.

**Artvin (Derjugini's) lizard (*Lacerta derjugini*):** Totally, 12 specimens were encountered during study period. It was observed that this lizard preferred to inhabit on the stones or in rocky areas, where they can have enough sunshine in the forest. It was seen that these lizards were active between June and September at high altitudes of Yukarı Balaban and Kavgadüzü. We did not see any specimen at lower habitats. We had trouble to see and catch this lizard because of its small body and high secretiveness.

The ground colour was light brown with dark spots. A fairly dark line was extending from the eye to the tip of tail. This was the distinguishing characters for this species. Males were different from females in having blue spots on lateral area. Currently, it was informed that two subspecies belong to this lizard inhabited in Artvin and Ardahan (*L. d. derjugini*), in Trabzon and Rize (*L. d. barani*) in Turkey (Baran, 1977). Since we have no information about these subspecies, we preferred to evaluate our specimens as *L. derjugini*.

**Georgia (Red bellied) lizard (*Lacerta parvula*):** When we compared Georgia lizard with *L. derjugini*, this small lizard was frequently common one. They were seen under stones, dry leaves or grass land habitats near roads, in almost everywhere of Murgul. Although they were very active, there was not seen any secretive behaviour. The activation period was extending from early May to late September.

The ground colour was usually brown, and dark small spots were scattered on the whole body. All specimens had bright red belly.

This lizard which is distributed only in the East Black Sea Region and East Anatolia has two subspecies; *L. p. parvula* and *L. p. adjarica* (Darevsky and Eiselt, 1980). Our specimens are different from *L. p. adjarica* which is reported from Çamlıhemşin (Baran *et al.*, 1997) in having more dorsal scales (54-65 instead of 45-60), supraocular granules (10-13 instead of 8-11) and high body length (55.7 instead of 51.10). So, we prefer to evaluate our samples as *L. p. parvula*.

**Trabzon (Spiny) lizard (*Lacerta rudis*):** This species, which was seen on stones and rocks along the roads, near houses or in forest, was very common in the study area when compared with other lizards. We took only seven species to examine and the others were released at the capture side after being examined. They were very active and it was difficult to catch them on sunny days. The time after heavy rains was the most suitable time to catch this species. This was the first lizard seen in this region and its activity begins in early April and extend to late October.

The scales on tibia had obviously keel and they were larger than the dorsal scales. Also dark brown line with light spots was extending from ear to hind leg. It was claimed that two subspecies, *L. r. rudis* and *L. r. bischoffi*, belong to this lizards were inhabited in the East Black Sea Region (Eiselt and Darevsky, 1991). These subspecies' status has been still discussing. We believed that more detailed studies have to be done to distinguish the subspecies of this lizard.

**Clark lizard (*Lacerta clarkorum*):** This lizard was moderately common in the north region at Damar, Nitromax and Kabaca

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locality and preferred moist soil, step and rocky habitats along the sides of small streams. It was seen that it shared the same habitat with *L. rudis*. Twelve specimens (7 ♀♀ and 5 ♂♂) were captured between early May and late August. This species was less active and secretive when it was compared with *L. rudis*.

This species was different from *L. rudis* in having wide head with dark spotted, small scales that contain less keel on tibia and obvious white spots extending along upper sides of the body. Also all specimens had orange belly and this coloration was obvious in females.

Two isolated populations were discovered in north east of Turkey. The first one extends just over the Soviet border near Batumi to the east of Hopa and the other isolated population was reported from Yusufkemali (Giresun) (Andren, 1978). This study shows that the distribution area of this taxon is extending to the middle of Artvin where it has dry habitat.

**Blind worm lizard (*Anguis fragilis*):** Three adult species (1 ♂♂ and 2 ♀♀) were found under stones along the road adjacent to water between May and August. Two of them were showing mating behaviour under a big stone on 24 May in Erenköy. The other female was found in a place which had short grassland and many stones on 15 July at Zansul. Because of being killed by local people, this lizard was very scarce in this region. It seemed that this factor is negatively effecting this compliant lizard population. Also its habitat of basking on roads are being threatened by the building of new roads. We preferred to evaluate our specimens as *A. f. colchicus* which was reported from Çamlıhemşin (Baran *et al.*, 1997).

**Grass snake (*Natrix natrix*):** Grass snakes were moderately common in our research area. Eight adults (6 ♀♀ and 2 ♂♂) and 2 subadults were encountered from Köprübaşı, Küre, and Zansul. It was seen that this lizard inhabited near water which has good vegetation cover at ground level. Also two adult specimens were found on an open grassland area for basking near a road at Kabaca on 13 September. Grass snakes were mostly active on warm days in late May through late September due to sunshine.

The body was green with black spots on back and sides. Yellowish colour was extending around the neck, and it was known as Ringed snake due to this character. The European snake was the most common from the Middle Europe to the Middle Asia. Our specimens were belonging to *N. n. perca* which lives in Turkey (Baran and Atatür, 1998).

**Diced snake (*Natrix tessellata*):** This snake was less abundant than the grass snake. The single adult female was captured under a stone, adjacent to water from the Küre locality on 24 June. Two specimens (1 ♂♂ and 1 ♀♀) were found in an area which has short grass and big stones near a stream while basking in the Özmal locality on 28 August. Their active period was similar to grass snakes. No specimen was caught over 800 m altitude, and this snake mostly preferred to live on the rocks at the sides of stream.

Four dark spots were extending along the body and the neck was consisting of dark blotch shaped-V. Light pink colour was seen on the sides of belly.

Our specimens are belonging to nominant subspecies, *N. t. tessellata*, which is reported from our region before (Baran *et al.*, 1992).

**Large whip snake (*Coluber jugularis*):** Only two young specimens were encountered during the survey period. One of them was captured on an open pasture area near groups of trees and bushes at the Akante locality on 27 May and the other was captured under a stone associated with an old

building on a rainy day at Özmar in August.

These young species were showing typical characteristics of *C. jugularis* as reported before (Baran and Atatür, 1998). The longest snake of Europe has a wide distribution from Balkans via the Middle East and Caucasian to Central Asia. But there is no report for this species from East Black Sea Region until this time. We evaluate our specimen as nominant subspecies.

**Caspian snake (*Coluber caspius*):** One Caspian snake (♀♀) was captured in an open area with short grass, adjacent to water canal from Korucular in the morning at 10.20 on 3 June. Another female inhabited near a stone was captured at the Erenköy locality in late August. Both of them were strong and very attack. The longest female had 165 mm total length. Dorsal pattern was consisting of dark green, and the middle area of dorsal scales had obviously clear area than the other parts. No dark spot was seen on dorsal and the belly was yellow with no spot.

There is a trend to evaluate this snake as a subspecies of *C. jugularis*. But we prefer to accept our materials as *C. caspius* as Baran did. Until this time, this lizard was mostly reported from the other regions except the East Black Sea Region in Turkey.

**Dahl's Whip snake (*Coluber najadum*):** Only one female was captured in a stony and sunny slope area which was situated between Erenköy and Murgul on 18 August. This stony and dry habitat was very near to the habitat of *V. a. transcaucasiana*. Since this slender and long snake was very fast, active and secretive, we had trouble to catch it.

The tail length was more than 1/3 of total length. The anterior part of body was green-blue and this colour was extending to almost 1/3 of total length. The other part of body was brown-red. Four big blotches, surrounded by white area and getting smaller towards posterior, were extending along the side of the neck. Also two big, but not combined, blotches were seen behind the head. The belly had yellow colour and no spots were seen.

There are two reports for this snake from Trabzon and Ardanuç (Artvin) (Baran, 1977). It was reported that this snake was mostly distributed in the East Anatolia and South East Anatolia. Although our specimens were similar to nominant subspecies with white belly, we prefer to evaluate our specimens as *C. najadum*.

**Smooth snake (*Coronella austriaca*):** The slender and not secretive snake was very common almost everywhere in Murgul. Only three specimens were taken to examine later. This snake was encountered in an area adjacent to a building, on short grassland while basking and on the dry leaves in forest. On 28 August, we caught a couple while mating in the woodland habitat in forest, and this indicated that mating activity was extending to late August.

There is no difference in terms of coloration and morphology between our samples and the preview literatures of this snake. This species was mostly reported from the West and Middle Anatolia (Baran *et al.*, 1992). Currently, Baran *et al.* (1997); reported this snake from Çalıhemşin (Rize). With this study, it was shown that the distribution of this species was extending towards Murgul.

**Hohenecker's snake (*Elaphe hoheneckeri*):** Only two females were observed in Cubula (Erenköy) locality in late June. It was seen that it prefers dry habitats with abundant bushes on the slopes of streams like as *V. a. transcaucasiana*. This snake was appeared to be less common in this area and its population is being threatened primarily by killing. Also their isolated habitat which is situated between Borçka and Murgul

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will be threatened with the dam which has been constructing at this place since 1999.

As stated before there are two subspecies belonging to this species in Turkey. Our specimens were showing similarities with nominant subspecies which was reported from Amasya, Vakfikebir and Siirt (Baran and Atatür, 1998) in having a clear line extending from posterior end of parietal area to the tip of tail. It was newly reported for this region.

**Transcaucasian horned viper ( *Vipera ammodytes transcaucasiana* ):** Two adult (1 ♂♂ and 1 ♀♀ ) specimens were encountered on dry, sunny and stony habitat with many bushes on 25 May at 10.45 from Cubula (Erenköy). Also three young specimens were seen at the same locality on 26 June and these were examined and released at the same site. This snake was not secretive but very aggressive. It was not common and its population was being threatened by the new dam and the local people.

This viper was different from other subspecies with fairly upturned horn and partial fragmentation. It was reported from Borçka (Billing *et al.*, 1991), Perşembe (Kumlutaş *et al.*, 1998), Sivas ( Baran *et al.*, 1992) and Erenköy (Kutrup, 1999).

It was concluded that the reptile species were quite abundant and widespread, compared with amphibian species in this area. Especially *Rana dalmatina* was very rare. The natural habitats of *V. a. transcaucasiana*, *T. v. ophryticus*, *L. trilineata* and *V. pontica* are being threatened by the new Dam which is constructed between Borçka and Erenköy. Also some compliant reptile and amphibian species such as *E. hohenackeri*, *C. australica*, *Rana macrocnemis* and *A. fragilis* are being threatened by local people.

Neither the species nor its habitats is protected in this region. One of the best way to get people to aware of the reptile and amphibian populations in their environment is to educate them with school field trips. Also, pet collecting for scientific purpose are a danger for small and endemic populations. In this purpose, after the examining some species that has rarely distribution were released at the capture site.

Another purpose of this study was to determine the south border of *V. kaznakovi*. With this intent we have made many trips to Yukarı Balaban adjacent to Hopa. But no specimen belong to this viper was seen. Also we did not encountered *Pelodytes caucasicus*, reported from Trabzon and Çamlıhemşin (Rize) (Baran *et al.*, 1997). In addition any suitable habitat for this frog was not seen in this region. As stated before its suitable habitats were placed on the northern slopes of the East Black Sea mountains.

Unfortunately, any alive samples belonging to *Vipera pontica* were not found during study period. But a sample which has a heavy damage on its head was found on a steep mountain slope in Erenköy. It was difficult to determine its systematics. But it was very similar to *V. pontica* in terms of its coloration.

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