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The Role of Local Governments in Conservation of Endemic Species: Case of Taurus Frog (Rana Holtzi)

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Abstract
All living and non-living things are encompassed by the environment. Local governments play important role in conservation of environment. It is the responsibility of local governments to ensure a safe and livable environment for all living things. However, some living species have come to the point of extinction as a result of some people's unconscious behaviors. One of these living species is the Taurus Frog living in Taurus Mountains in Niğde City of Turkey. This study emphasizes the role and importance of local governments in conservation of the Taurus Frog (Rana Holtzi), one of endemic species.

Keywords: Local governments, Taurus Frog, Conservation, Environment

Introduction

Although environmental problems are large in size, these problems occur in a certain place. For example, the negative effects of the accident in Chernobyl have spread over a very wide area. However the place where the pollution and danger come out is obvious. For this reason, environmental problems have local characteristics. Preventing these problems requires locally precautions. Local governments are close to local life, the source of problems and needs at the local level. Local governments are at the source of problems and they are responsible for resolving these problems. The most effective solution can be realized by local governments because they are the closest institutions to the source of the problems (Geray, 1998). In this study, it is aimed to reveal how local administrations shed light on an important environmental problem. Taurus Frog has come to the point of extinction due to unconscious behaviors of people. Taurus Frog has been protected under international agreements. Both Ulukışla sub-governorship and local governments have done important activities to keep Taurus Frog. Their efforts may be exemplary for local governments around the world.

General Characteristics of Taurus Frog (Rana Holtzi)

Frogs have a very interesting anatomy. They have highly specialized structures, such as a long, sticky tongue which they use to capture food. The anatomical structures of the bones in their upper and hind legs are also highly specialized for jumping and leaping.

They have other structures however, that appear useless. Their weak teeth is an example of this.Frogs breathe through their skin when underwater. Oxygen in the water can pass through their porous skin and go directly to the blood. They also have a pair of lungs that allow them to breathe when on land.Frogs have a closed circulatory system containing a three-chambered heart with two atria and one ventricle. A valve within the heart, called the spiral valve, directs the flow of blood to prevent oxygenated and de-oxygenated blood from mixing.

Frogs have a highly developed sense of hearing. They can detect high-pitched sounds with their ears and low-pitched sounds through their skin.They also have a highly developed sense of sight and smell. Frogs can detect predators and prey using their large eyes that protrude from their head. They use their keen sense of smell to detect chemical signals that help them identify potential food (Bailey, 2015). General characteristics of the Taurus Frogs can be examined under several headings:

- **Habitat of Taurus Frog (Rana Holtzi)**: Rana Holtzi (Taurus Frog), an endemic species, is included in the Anura team of the Amphibia class and is a member of the Ranidea (Water Frog) Family. Ranidae Family is the richest family in terms of species. It has spread all over the world. There is only one kind of Rana in our country. This breed is represented on the northern sides of Europe, America, or even a single species of Australia.Their pupils are horizontal, tongues are free and forked behind, forefingers are free. In our country, their ear canal is evident. There are internal sound cues in males' throat (Demirsoy, 2001). Taurus Frog is the smallest of the mountain frogs. The length of the male's 6cm, female's 7.5cm. The back legs are quite long, the skin is soft and flat, the vertebral strip is rarely seen. The ground color of the back parts is usually yellowish, gray green; There are spots ranging from blackish green to black and brown. The sides of the snow are pinkish, sometimes yellowish (Demirsoy, 2001). The only frog species on the earth that does not croak is the Taurus Frog (Arıbaş, 2009). Rana holtzi Werner (1898), a frog endemic to the Middle Taurus Mountain Range in southern Anatolia in Turkey (Guarıno & Erismis, 2008). Chiefly inhabits lake Karagöl (formerly Maden lake, 2500 m a.s.l.), lake Çiniligöl (2600 m a.s.l.) and lake Eğrigöl (2750 m a.s.l.) in the Bolkar mountains (Başkale et al. 2012). Karagöl is a small tectonic lake of about 450 × 175 m. The maximum depth is 12 m. The lake is surrounded by an alpine grassland, and is filled with melting snow (and possibly with groundwater from Lake Çinigöl, 2580 m a.s.l., situated 2 km from Lake Karagöl). The lake is covered with ice and snow during some 5–7 months each year. Melting snow water feeds this crater lake between April and June via a canal located at the eastern side of the lake. The southern side of the lake abuts a steep slope, while the other sides are covered with meadows. These meadows attract animals (invertebrates and vertebrates) that introduce nutrients to the lake (Miaud et al. 2007) and some springs near Eğrigöl Lake (Yıldız& Göçmen, 2012). Rana holtzi is exclusively observed at high montane lakes with grassy borders and slow-flowing creeks cre- ated by snow water. The frogs are also found in meadows, close to the water bodies in which they breed. The creeks are surrounded by dry prairies where domestic sheep graze (Başkale et al. 2012). This species inhabits high montane lakes with grassy borders and slow-flowing creeks created by snow water. The frogs are also found in meadows close to the water bodies in which they breed. The creeks are surrounded by prairies where domestic sheep graze. Pads formed by grass roots on the creek sides provide a suitable habitat under which the frogs spend the winter (Başkale et al. 2012).The Bolkar Mountains are located in the eastern part of the central Taurus Ranges, extending southwest and northeast for about 40-50 km width and 150 km length, a massif in southern Anatolia. Karagöl Lake (37° 24' 10.12" N, 34° 33' 28.36" E, 2588 m a.s.l.) is located in the Bolkar Mountains at the intersection of Maden village, Ulukışla, and Niğde province. It is a tectonic lake covering area approximately 60 ha, 430 m in length 80-160 m in with and 12 m at maximum depth. Karagöl Lake is supplied by snow melt and two springs, one is permanent and the others are temporary, and another spring may be connected to Çinigöl Lake in south east. Southwest coast of Lake is surrounded by high and steep rocks, that is why southwest side has poor vegetation and lake is often deeper. The other sides of the lake consist of flat and shallow areas and are covered with dense alpine vegetation. Çinigöl Lake (37° 23' 56.95" N, 34° 33' 15.00" E, 2673 m a.s.l.) is located on the southwest of Karagöl Lake and 85 m higher. Its length is 210 m and width ranges from 60-150 m. It is surrounded by high mountains; therefore, less sunlight reaches the surface of Çinigöl Lake. Çinigöl Lake does not have any vegetation except near 20 meter on the southwest side(Yıldız& Göçmen, 2012).
- **Feeding of Taurus Frog:**The Taurus frog lives an active short term due to the height of the region it lives in. During these periods, they feed on the insects living in the meadows that form the periphery of the lake. They can sometimes go away 30-40 m far from the water to find insects in the meadow in order to feed. Surveys around the lake revealed that more species of frogs were found in the areas where the plant species were well developed (Official Website of Ulukışla Sub-Governorship).
- **Behavior and Reproductivity of Taurus Frog:** The Taurus Frog, which has been active for about 4 months from the end of May to October, has to complete its reproduction biology.So in this 4 month period, it must mate and lay eggs (Official Website of Ulukışla Sub-Governorship).As a result, depending on the meteorological factors activity period goes on for 5-6 months.Activity period

began on 15th May and continued until 26th October for 5 months in the habitat of Taurus Frog.When it was cold in spring and autumn, Ranaholtzi individuals would be activated after sun light hit the lake surface and shores. They were found to bask just on the lakeshore. If it is rainy or there is high humidity, they travel about 50 m in land. But they were observed around wet grass near the spring on the northern west side of the lake every time. They stayed in the lake water during the nights. Juveniles got active later than adults in spring and hibernated earlier in autumn. Specimens were searched under the lake surface covered with ice and found that they hibernated under the stone in the lake water not out. When they were handed, all individuals had an urination reflex. In addition to playing dead and arching their back, another behavior was observed that when they were frightened they lower their body, turn out of their forelimb' palm and put it behind or on their Population dynamics, reproduction, and life history traits of Rana holtzi eye. Showing the red palm and looking strange with an enlarged head may be an attempt to frighten the enemy. This behavior known as unken reflex.Although Unken reflex was commonly observed in females, it was also done by males (Yıldız&Göçmen, 2012).

- **Population Structure and Dynamics of Taurus Frog:** Daily Activities of Taurus frogchanged according to the seasons. Most of the individuals were observed in water and in shallow areas during the breeding season (the end of May and early June). Low temperature and wind inhibited activity of the frogs out of water. It was known that wind increases evaporation rate on skin thus cause dehydration and inhibit activity of amphibians. Most of the individuals were adults in this season. After the breeding season, water was at its maximum level and when the sun light hit the lake surface and its shores, Rana Holtzi individuals would be activated and generally they were found just on the lakeshores. They constituted large herds on the grass, they were observed only on wet grass formed by the spring water in the north-western side of the lake water during three years. Otherwise, Taurus frog was observed 50 m away from the lake only on the rainy days. Rana Holtzi hibernated under the meadow pad and repeated this expression in their subsequent but it was determined that they hibernated under the stone in the lake water not on land. It was previously reported that mountain frogs distributed in high mountains hibernate in lake water. Individuals of Taurus frog were found more (7-10/individuals m2) on grass and high vegetation areas than deeper ones and areas surrounded by high rocks (1-2/individuals m2). Taurus frog constitutes highly dense flocks. Their population decreased to 60-70% ratio. It was noticed that as the altitude increased the survival rate Population dynamics, reproduction, and life history traits of Rana holtzi and capture probability increased. However, in some studies it was reported that depending on the increase in the altitude, survival rate and capture probability decreased. It was determined that in Karagöl Lake Taurus frog population declined –0.084 ratio between 2007–2008 whereas it increased 0.316 and 0.232 between 2008-2009 and 2007-2009 years, respectively. As a result, population showed tendency to grow. Rainfall ratio was at its lowest level (504.3 mm) for the last 38 years in 2008, therefore it is clear that all amphibian population living in Anatolia was negatively affected (Yıldız&Göçmen, 2012).

Threats and Affecting Factors to Taurus Frog

The major problem affecting the Taurus frog is a carp species, Cyprinus carpio introduced to the lake in 1990. Carp is an omnivore species therefore it may feed on eggs, tadpoles or adults of the Taurus frog. A fisherman expressed that he witnessed a carp attacked an adult Taurus frog on the lakeshore. The Ministry of Environment and Forestry encouraged fishery and supported them but it was observed that some fishermen try to feed carps with bread. On the other hand, when they casted nets, they accidentally damaged egg clutches in the breeding season. Some fisherman expressed that they release juvenile fishes they collect from other lakes nearby and try to reproduce them. It must be the reason why only one Capoetta specimen was caught by the fishermen in Karagöl Lake. Karagöl Lake is a famous area known by mountaineers and local people. Many visitors traveling to and camp around Karagöl Lake has caused environmental pollution. It is clear that pollution will affect amphibian population over time. In addition, some mountaineers crushed frogs when climbing at the night. Another problem as stated above, aquatic larvae of Dytiscus marginalis and Coenagrion puella may feed on eggs and tadpoles and thus affecting the population. The last but

certainly not least problems, if precautions are not taken Poligonium amphibium will dry the lake up and cause the extinction of Taurus frog in the long run (Yıldız&Göçmen, 2012).

The species is endemic to a popular tourist area. A road has recently been completed at the site potentially increasing the number of visitors. It is reported to be declining through overcollection for scientific and possibly other purposes and the introduction of predatory fishes (including carp) into the lakes in the 1990s, has led to a significant decline in the population. The impact of local fisheries (including dynamite fishing) and overgrazing of surrounding meadows by goats on the species requires further information, but is presumed to be having a negative impact (Başkale et al. 2012).

Rana Holtzi, prefer living in non-vegetated areas and of medium depth in Maden Lake, where their eggs can be predated by the common carp, Cyprinus carpio, which has been introduced into this lake. However, overgrazing of surrounding meadows by goats in recent years has dramatically diminished its distribution areas (Guarıno & Erismis, 2008).Rana holtzi has been on the IUCN red list of Threatened Species and categorized as an endangered (EN) species since 1996. restricted geographic distribution and de - clining population size resulted in this frog's classification as Critically endangered (Cr) in the iuCn red list in 2008. The species is also listed on ap - pendix ii of the Berne Convention and is protected by national legislation (Başkale et al. 2012).It does not occur in any protected areas. The species is listed on Appendix II of the Bern Convention and is protected by national legislation. The Council of Europe recommended that the introduction of salmonid or other predator fish to the species habitat was strictly forbidden; and that there was a need to carry out a field survey of the species in the whole Taurus Mountains range. Local public awareness programmes have been initiated. Captive breeding might be necessary in the future if threats continue (Başkale et al. 2012).

Declines of amphibian populations have been reported from many countries all around the world, especially in the last decade. Population size and demographic information concerning the frog populations in Turkey are still lacking. It was estimated the population size of Maden Lake Taurus frogs to be between 725 and 1432. This species was abundant in the late 1960s, but its numbers declined as much as 70% towards the late 1990s. In the absence of long-term monitoring studies, no solid trends in the population size can be determined. The Taurus Frogs showed the most dramatic decline during the previous 3 yeras. In the light of the previously reported evidence the introduction of the common carp, Cyprinus carpio, may be responsible for the decline in the Rana Holtzi population at this site. The effects of fish introduction on native frogs have already been documented in several studies.As mentioned previously, the Taurus Frog has been categorized as an Endangered (EN) species on the IUCN Red List. It is facing a very high risk of decline, and long-term monitoring studies must be planned. Thus, if the trends in the population size of Rana Holtzi continue to decline, it should be categorized as a Critically Endangered (CR) species on the IUCN Red List rather than merely on EN(Kaya et al. 2005).The protection of the Taurus Frog should be through more effective solutions, not just international treaties and laws.In this regard, the efforts of the Ulukışla district sub-governorship to raise public awareness are of great importance.

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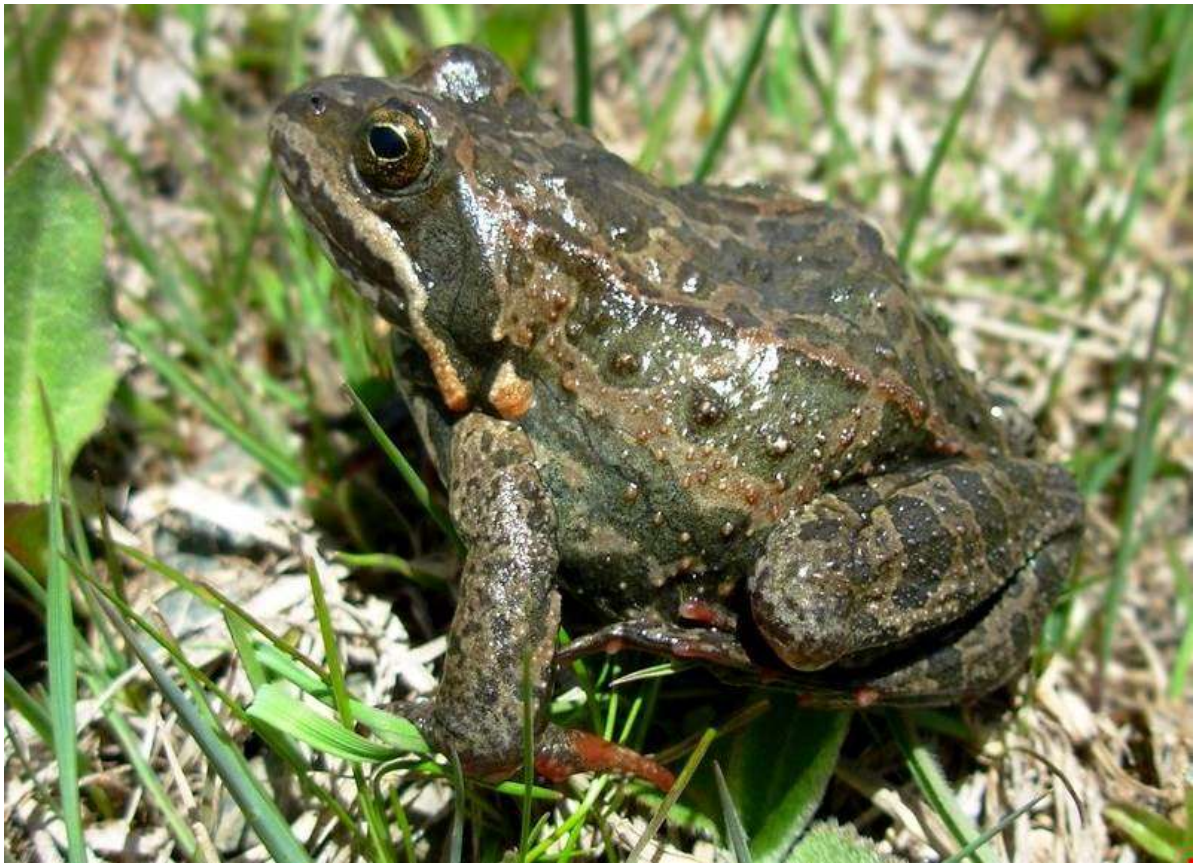

Figure 1: Taurus Frog (Rana holtzi)
(Source: Official Website of Ulukışla Sub-Governorship)

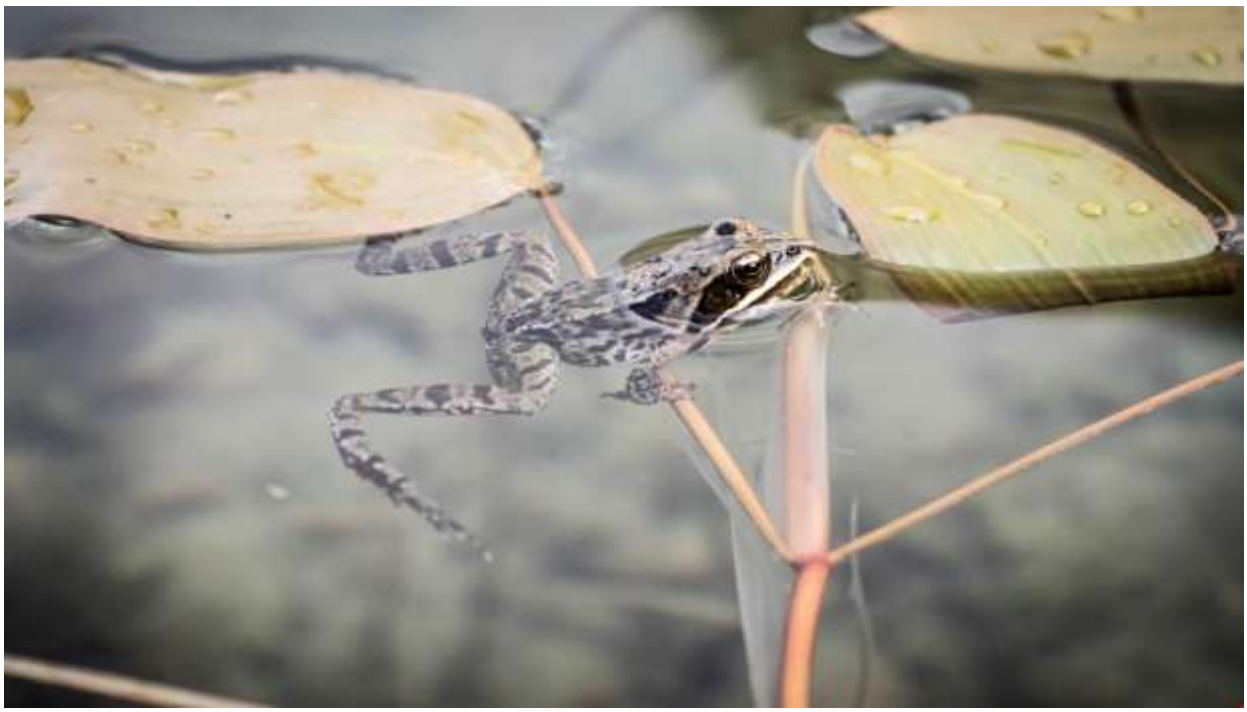

Figure 2: Taurus Frog (Rana holtzi)
(Source: Official Website of Ulukışla Sub-Governorship)

The Role of Ulukışla Sub-Governorship and Local Governments in Protection of Taurus Frog

To keep the Taurus frogs in a safe environment, local people should be made aware of the protection of Taurus frogs first. Local governments have great responsibilities and duties as the closest units to the people in this regard. In order to realize this, Ulukışla sub- governorship has accomplished very important activities.

Taurus Frog Conservation and Survival Seminar was organized in Ulukışla by Ulukışla sub- governorship. A seminar on the Taurus Frog (Rana Holtzi), an endemic species, was organized for village headmen (muhtar) and localsin Darboğaz Village of Ulukışla District of Niğde in February, 2016. This important and meaningful activitywas organized with the cooperation of Nigde Provincial Gendarmerie Command and Ulukışla Vocational School under the leadership of Ulukışla sub-governorship.In thepresentation made by a lecturer at Environmental Cleaning and Inspection Department of Ulukışla Vocational School,extensive information on Taurus Frogs was given.This presentation supported by the visual materials. Habitat, biological features, reproduction and anatomy of the Taurus Frog (Rana Holtzi) were introduced to the participants.It was emphasized that this species was protected by the international The Berne Convention on the Conservation of European Wildlife and Natural Habitats.At the end of the seminar, Ulukışla District Governor emphasized what can be done for the protection and survival of Taurus Frogs.Later, informative seminars were held elsewhere as well in Ulukışla. Today, 156 Gendarmerie Emergency Hot Line serves to protect this frog species.When the people of the village see those who harm the living area of the Taurus Frog, they firstly contact 156 Gendarmerie Emergency Hot Line (Haberler.com, 2016).Ulukışla district governor held a meeting about the new measures for protecting the frogs. Garrison Command, District Police Chief, Darboğaz and Maden VillagesHeadmen, authorities of relevant institutions and the environmentalists participated in the meeting.The public was informed about deterrent punishments for those who damage frogs.The participation of village headmen in the seminars and meetings is of great importance for the protection of theTaurus Frog because villages as local government units are the habitat of this species. Village headmen understood that they were responsible for raising awareness of the local people on this subject.Seminars were very useful for protecting frogs.Under the influence of the seminars,both judicial and administrative proceedings were initiated.

Conclusion

Ecological succession is the abrupt changes in the condition of the environment to which organism needs to adapt in order to survive. Some of these changes are fast and vicious that cause vast extinction of diverse organism in the biosphere. These drastic changes are the cause why some plants and animals suffer great loss in number and might end up to extinction of the whole specie. Some of these drastic changes are natural phenomenon such as: earthquakes, volcanic eruptions, landslide and cave-ins, floods, pollution. These natural changes are somewhat out-of-control by people and mostly brought about by disastrous natural calamities in the biosphere. A natural calamity such as volcanic eruption can wipe-out plant and animal population in an area, an ecological succession slowly takes place until finally the dilapidated area is brought back to life. People do have control over the changes in the biosphere which are brought about by their activities (Agudo, 2016). Nowadays, technological and other improvements make the life easier for customers while they consume the environmental resources irreversibly. Social, political and individual pressures about shortage of unsubstituted resources make the topic of environment more sensitive and more important (İnce, 2014: 201). At this point local governments have great duties and responsibilities. Local governments are confronted with the challenge of managing the environment, ensuring public health and meeting their obligation to administer state/territory legislation with finite resources. While state and federal governments also hold responsibility to ensure the health and wellbeing of the population, it is often local government that directly delivers the services that protect the community from issues such as contamination of food, water or land, or inadequate waste disposal. As the tier of government closest to the community, local government is also often directly scrutinised and held to account (Environmental Health Standing Committee, 2012).As seen in the case of Ulukışla District of Niğde in Turkey, local governments have undertaken great responsibilities in preventing an important environmental problem.Local governments in Ulukışla District, especially those who have been supported by the Ulukışla Sub-Governorship and other organizations, have taken important measures to raise public awareness.Thus, one of the endangered species, the Taurus Frog has been protected and necessary legal arrangements have been made in this context. Conservation of biodiversity can only be achieved by taking such measures.

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