

An initiative for preservation and research of Land Tortoises in Bulgaria

Two species of tortoises are naturally presented in the territory of Bulgaria – *Testudo graeca* (Spur-thighed tortoise) and *Testudo hermanni* (Spur-tailed tortoise)(Pic1). Both are endangered species, included in the Red List of (IUCN-2003). –*Testudo graeca* is in Vulnerable category and *Testudo hermanni* in Low risk category. The species are also included in the Bern Convention, ratified from Bulgaria on 25.01.1991 and came into force from 01.05.1991, Instruction 92/43 of EU from 21.05.1992 and CITES, ratified by the Bulgarian parliament in 1990, valid from April the 16th 1991. Both species are not included in the Bulgarian Red book from 1985. In project is their submission of the new edition of the National Red book. The tortoises are protected by the Bulgarian legislation by the Nature Protection Act and included in appendix II and III of The National Biological Diversity Conservation Strategy (valid from 09.08.2002).

The patchy range of spur-thighed tortoises *Testudo graeca*, covers part of three continents (Africa, Asia, Europe) and extends approximately 6500 km in an east-west direction from eastern Iran to the Moroccan Atlantic coast and about 1600 km in a north-south direction from the Danube Delta to the Libyan Cyrenaica Peninsula (Fritz et. all, 2007). The subspecies *T. graeca iberica* is found in most of Asian Turkey, Armenia, Georgia and Azerbaijan, European Turkey, Northern Greece, Bulgaria, Macedonia, and just into Romania and Serbia.

T. hermanni inhabits a patchy area with isolated ranges in continental Spain, France and Italy, and on Balearic Islands, Corsica, Sardinia and Sicily. In the eastern Mediterranean Hermann's tortoise is distributed over most Balkan Peninsula while in the western Mediterranean it is confined to areas with a Mediterranean climate. On the Balkan Peninsula it enters inland regions with more of continental climatic influence in Bosnia-Herzegovina, Serbia and Montenegro, the republic of Macedonia, Romania and Bulgaria. *Testudo hermanni hermanni* occupies the patchy western Mediterranean range and *Testudo hermanni boettgeri* occurs in the Balkans, including Bulgaria (Fritz et. all, 2006).

The first and only description of the distribution and relative abundance of tortoises in Bulgaria is found in Beshkov,1993 paper, originally published in Bulgaria in 1984 and later arranged and published in Chelonian Conservation and Biology in 1993. The survey was carried out during 1976-1979 and was based on standardized questionnaire spread in 3585 settlements (79.8% from the settlements in the country) and field survey in 111 settlement territories. Based on the analyzed data, a few maps were created, including the one which shows tortoises distribution and relative abundance (Fig.1).

In the southern part of Bulgaria (Eastern Rhodope mountains) are found the largest tortoise populations with highest density, which can be attributed mainly to the prevailing favorable natural conditions and low agricultural and industrial impact. Territories with relatively high tortoise densities are in the South-East part of the country - Sakar-Strandzha region, and in the South-West - Struma River region and its surrounding upland and mountain foothill (Beshkov, 1993).

T. hermanni is not found in the north-east part of Bulgaria, although it has been reported from this region in the past (Lepsi, 1927). *T. graeca* is not abundant in the north – west part of the country. The highest locations of *T. hermanni* have been reported from southwestern Bulgaria at altitudes up to 1400m. *T. graeca iberica* could be found up to 1300m. altitudes in the country (Beshkov, 1961), although it has been reported up to 2500-2700m in non European parts of its range (Gasc et al. 1997).

The largest specimens, found in Bulgaria, were reported by Beshkov, 1997 - *T.g. iberica* with SCL of 389mm. and weight 5.860kg. and *T. h. boettgeri* with SCL 357mm.

Tortoises are natural food for some big daily birds on prey like: *Aquila chrysaetos* – Golden eagle, *Neophron percnopterus* – Egyptian vulture, *Gypaetus barbatus* - Lammergeier etc. Eggs and young specimens are predated also by *Martes spp.*, *Meles meles*. - Badger, *Vulpes vulpes* - Fox, *Corvus corax* - Raven etc. The natural character of the predation factor suggests that it has no significant impact of the tortoises density. Serious is however the situation in some regions where over the last couple of years the number of semi-wild and wild boars (*Sus scrofa*) and jackals (*Canis aureus*) is significantly increasing.

In recent decades tortoise's abundance in Bulgaria have suffered ubiquitous reduction. Although they were one of the most common reptiles in the near past, nowadays the picture is drastically changed. Decline in tortoises populations is due to a number of factors, mostly anthropogenic, which can be divided conditionally in two main groups.

The first group is connected with habitat distraction and alteration – destroying, fragmentation and deterioration of habitats, urbanization, intensive agriculture, clearance of broad leaved and low-raised forests that are turned into cultivated land and pastures, destruction connected with resort and infrastructure construction, deliberate fire of forests and fields in some regions of the country etc.

There are no specialized surveys on the territory of Bulgaria about the influence of the negative factors from the first group. Indirect idea about the negative consequences of some of them may be found from data about Greece. For example in the conducted by (Willemsen & Hailey, 2001) survey about effects of spraying with herbicides on population of *T. hermanni*, was estimated that survival rates of specimens 10 cm or larger were significantly lower in the affected areas, with extra mortality of about 34%. The effects of fire and habitat destruction in northern Greece on tortoises *T. hermanni* could cause from 5% up to 64% decrease of the population (Hailey, 2000).

In the second group are factors which have direct negative impact on land tortoises populations. They are illegal trade for human consumption, illegal pet-trade, trade for medical purposes etc. According to CITES trade data, a total of 1 991 236 live specimens of Testudo were traded globally between 1975 and 2004, of which until 1984 more than 95% of all live Testudinidae reported in international trade represented specimens of Testudo (Turkozian & Kiremit, 2006). In the past, about 80-100 ago, cheloniofagy was unknown or very rare event in Bulgaria (Beshkov, 1981). One of the first big waves of cheloniofagy was during and after the First World War (1912-1918), when many people included in their menus boiled or roasted tortoises. Collection of tortoises subsequently became especially intensive also during and after the Second World War (1941-44), when they were exported with large numbers abroad or sent to private restaurants in the interior of Bulgaria. Investigation on distribution of cheloniofagy in Bulgaria was conducted by Beshkov during the period 1976-1979 (Beshkov, 1993), which shows that tortoise collection for human consumption remains a negative factor in many regions and especially among the gypsy population.

There has been significantly increased investments in the resort construction in Bulgaria for the last 10-15 years. Under particular threat are the Black Sea Biogeographic Region and its habitats where irreversible damages to biodiversity are already caused by construction of new resort complexes, golf playgrounds,

hotels, and wind generators. Real-estate trade of private non used agriculture lands for building purposes of hotels, sports facilities, vacancy villages, bungalows and summer houses is leading to splitting, deterioration and urbanization of the costal habitats, where tortoises are still abundant. Apart from the direct destruction, the remaining tortoises are becoming victims of illegal trade and collection from tourists. The great number of tourist attractions in the nature, are often the cause of nests and eggs destruction. Only urgent measures for saving the remained habitats and survived tortoises from the territories which are to be partly or totally destroyed, could prevent from total extinction both kind of land tortoises in the Costal region.

From its behalf the huge investing interest significantly increases the pressure over the state and municipal authorities, the corruption risk is high and as a result is the practical absence of effective natural resources conservation actions.

Unfortunately, no matter that both species of land tortoises are with the highest protection by the Bulgarian legislation, until now official authorities haven't provided conditions for organized, specific actions for their preservation, stabilization and scientific research. All the measures are reduced to sparse isolated actions for sanctioning the offenders, mainly during border control, when illegally carried specimen are being confiscated or seized. After the confiscation there is no effective organization for further expert action. On another side, regardless of that on Bulgarian territory are still existing some of the relatively most stable populations from the whole range of abundance of both species, until now there is lack of profound and on a large scale surveys over their ecology and biology. As a result, the negative tendencies in regards to tortoises conservation are on going and in a number of regions of Bulgaria where tortoises were present in the past, now they are whether extinct, or their catastrophic decline in numbers, continues.

As a result of the understanding for the necessity of urgent and adequate measures, in 2001 a group with non official character for Conservation of Reptiles and Amphibians in Bulgaria (CRABG) was founded. Participants on voluntarily basis in the group are members of the Bulgarian Herpetological Society (BHS), scientists zoologists from the Bulgarian Academy of Science (BAS), representatives of some Regional Inspections of Environment and Waters (RIEW), NGOs and a number of naturalists and enthusiasts from the country. Since 2002, I am also a member of the group. CRABG has annual meetings on which are discussed previous activities, specific problems and further actions. The required minimum finances for the meetings are kindly provided from NGO Bulgarian Society for the Protection of Birds (BSPB) - Plovdiv. Main result of the CRABG work is the preparation of National Action Plan for Protection of Land Tortoises in Bulgaria, which has been submitted to and approved by the Ministry of Environment and Water Resources in 2005. However there has been no financial support from the Ministry until now, with no indications for providing such in the near future. As a result, the plan remains only on paper.

Led from my lifetime lasting passion and interest for tortoises, inspired from the group's work and in the context of the Plan, in 2002, investing my own finances, I have tried to create a sanctuary and specialized ex-situ center for land tortoises. Main goals applied in the idea of the center are: research over ecology and biology of both species, restoration and stabilization of the populations on the territory of Eastern Balkan Range through reintroduction program of young (captive bred) and confiscated specimens, rescuing specimens from territories which are to be destroyed from human activities, medical treatment of sick and injured specimens, popularization of the necessity of protection of tortoises and their habitats.

The center is situated in private property in Banya village, Bourgas district, in the easterly part of Eminska Mountain, approximately 8 kilometers of cape Emine. The location is favorable for this purposes,

because it is in a territory, where both kind of land tortoises are naturally presented. It is located on a south slope on 180m. elevation in the outskirts of the village, which makes it naturally isolated from human presence, but well protected from wild and domestic animals (Pic.2).

The region of Eminska Mountain is with territory of 80 000 Ha with borders: to the south and to the east – Black Sea, to the west and north – main motor way Bourgas-Varna. It is characterized with hill-mountain relief, relatively low and flat mountain edges, cut through deep ravines. Inclined terrains are prevalent - 46%, with 150-200m above the sea level. The area lies within the Black Sea coastal climatic zone with an average annual precipitation of 550-600 mm. and an average annual temperature of 12 degrees C. Vegetation consists of mixed broadleaved forests featuring cerris oak, elm, ash, oak, hornbeam, etc. The region is very favorable from an ecological perspective. There are no mineral resources nor industry, the human population density is low, and the region still remains undisturbed by resort construction (Ivanchev,2007, in print).

Still undisturbed from destructive human activities, the region is one of the last spots of wild nature in the Bulgarian costal area, in fact a natural sanctuary for many wild life. Due to the diversity of bird species, the region is an official Ornithological Important Site. Besides land tortoises, on the territory is presented the European Pond turtle (*Emys orbicularis*) and many other reptile and amphibian species, in result of which it was suggested for Herpetological Important Site and included in the Bulgarian part of the European network for protected sites NATURA 2000, in both – Bird directive and Habitat directive. Unfortunately, due to the strong investors pressure, members of the parliament, district governors, and mayors carried out active campaign against the ecological net work and still the future of the area is unclear.

In the eastern part of the region is situated the Irakli protected area (43.2 Ha), (Fig.2), inhabited from both species of land tortoises. The area was officially declared as protected in 1994 with an order of the Ministry of Environment. Its aim is protection of typical costal habitats of rare and endangered plant species like *Panacratum moritimum*, *Stachys marimima*, *Enphorbia peplis*, *Lactnea tatarica* etc. Its territory is a nesting site of various numbers of rare birds. Irakli is under the disposition, protection and special care of the ecological NGO – Green Patrols. On its territory are absolutely forbidden construction work, disclosure of stone-pits and other activities which disturb the natural character of the landscape, import of alien animal and plant species, cutting trees, picking up flowers, herbs or other plants, hunting, disturbing birds and animals, pasture of domestic cattle, camping and burning fires, entry of vehicles, pollution of any kind etc. Unfortunately many of the protected areas and reserves mostly in the Bulgarian costal area, are protected only on paper. In reality they are subject to destruction by the powerful of the day, often with non official support from the authorities responsible for their protection. The real attendance of eco organization in the Irakli area is a guarantee for its future protection and for carrying successful long term conservation measures, especially concerning land tortoises.

On the territory of the center are created enclosures for separation of different species, males from females and for other occasions when separation is necessary, with provided natural and artificial hiding spots. There is enough living space with natural food in conditions very close to the wild (Pic.3). During the active season (April-November) extra food is added regularly (Pic.4). On a daily basis fresh water, observation and special treatment, when necessary, is provided. In such created conditions, the practice proves that on the territory of the center tortoises are reproducing and overwintering, which is main indicator for normal and successful functioning.

Hatching takes place either in natural nests or in artificial incubators under different temperature ranges, providing specimens from both sexes (Pic.5). Housing conditions of hatchlings, two, three and more years old individuals are close to the natural (Pic.6), but with adequate protection cushions – small enclosures covered with safety nets against predator attacks (Pic.7). Captive bred individuals are being reintroduced back in to the wild around their third year – when they reach the size, when sex determination is possible and survival chances are increased.

Suitable indoors facility is used for controlled hibernation of young and not well fitted specimens, which need regularly check of their condition. During the active season the same facility is used for keeping young and sick tortoises overnight, during unfavorable weather, for medical treatment and for any other occasions when required.

The natural characteristics of the area and the provided conditions in the center are favorable for carrying out various studies over the biology and ecology of both species. Of significant importance is the combination of observations over wild populations and specimens in enclosure which is part of the natural habitat.

All the tortoises are being marked according to the field techniques described by (Stubbs et al., 1984), than the main data about each specimen is being stored in a data base. Until 2006 results in observations over the wild population in the region are achieved in: sex ratio, territorial behavior, daily and annual activity, reproducing, terms of nesting and nesting sites, incubation and hatching, growth rate, behavior of hatchlings, unusual behavior, unusual morphology, limiting factors, ethnical research, habitats, negative impact of fires etc. Some of the results have been described in (Ivanchev, 2007). Long term observations on the population in Eminska Mountain are the first of its kind in Bulgaria. The results might be not only of scientific value, but also contribute for creating more successful strategies for future tortoise conservation in Bulgaria.

The systematization and visualization of collected data is achieved on the basis of a GIS technology using MapInfo software. The database contains georeferenced data for every one of the marked specimen from the Eminska Mountain wild population - species, sex, sizes, approximate age, weight, distinguishing marks. Subsequently in view of the possibility the area to become a part of Natura 2000 network, in collaboration with other specialists the GIS was enlarged and new layers of specialized information added – topography, vegetation, geomorphology, geology, etc.

Main source of specimens for reintroduction, are captive bred, confiscated by the official authorities, voluntarily brought or rescued tortoises.

Since 2003 in the center were hatched more than 200 tortoises from both species. During 2006, the first 74 *T. hermanni* and 37 *T. graeca* captive bred young specimens, were released in to the Irakli protected area (Pic.8).

Great number of tortoises, after being confiscated, seized, or voluntarily brought, are being released in inappropriate time of the year and in inappropriate habitats, often in poor physical condition. In many occasions this will certainly lead to their death. Unfortunately the official authorities in Bulgaria which are responsible for such activities have no specially trained staff. One of the goals of the center is to contribute to solve this problem. Physical, health determination and treatment when necessary, is included in the main

activities of the center. Since 2002, a couple of dozens tortoises go through the center each year and almost all of them were safeguarded back in to the wild. If the source or the region where the specimen has been taken from the wild, remains unknown, it is being released in a preliminarily chosen area with steady protection status, and where tortoise populations need restoration or stabilization.

Since 2006, during the active season April-October, I have started operation in Eminska Mountain, for rescuing tortoises from sites which are to be destroyed from resort construction. After marking, examination and input of information in the data base, they were released in Irakli protected area. For example only from the region of Sunny Beach, 25 *T. hermanni* and 6 *T. graeca* were relocated. In collaboration with Green Patrols NGO during 2006 joint actions have started for reintroducing and relocating specimens and their long term monitoring in Irakli protected area (Pic.9).

Before releasing back to the wild, a lot of tortoises need adequate medical treatment. Injuries, poor health condition, overworming etc. are most common and in regards with wrong housing conditions. When a specimen is severely damaged, or in life threat if released immediately, it is being kept temporary for prolonged treatment, or permanently and included in the captive breeding program, if its state permits so and will not affect the health of the offspring (Pic.10).

Due to its activities, the center is collecting interest from the public, which makes it often visited from various kind of people. An improvised lectures over subjects in regards with tortoises conservation and biology are presented, which are accompanied with photo and video materials. Most successful they are among children (Pic.11), who allways get special attention, as the future nature preservation most important factor. Explanation work in any possible occasion, pasting posters, giving educational materials etc. has already gathered some attention from the regional community.

CONCLUSION

The region of Eminska Mountain is quite suitable for various studies and actions in regards of tortoises research and conservation. The results may be used as a base for long term scientific programs and to accompany and supplement the actions for preservation of both species in the rest of the country. Priority conservation measures have to be performed in territories with stable future status of protection.

The activities of the ex-situ center are unfortunately the only one of its kind in Bulgaria. In 2005, from the Bulgarian Herpetological Society behalf, an official note was submitted to the Environmental Ministry with a claim for legalization and official support of the center, as specialized center for land tortoises. There was detailed explanation and argumentation of the necessity of founding such a center. It was pointed that such place already exists and proves to be successfully functioning, but to gain official character needs the states permission and support. Unfortunately, the answer from the Ministry was negative with no serious argumentation why. All the performed activities of the center until now, are result of only one persons effort, and its future existence remains uncertain. The balance-sheet of the work conducted until now, is not in favor of the Bulgarian scientific community, nor the official authorities, which both remain in great debt to land tortoises.

As a further attempt to continue my efforts in favor of land tortoises and eventually find another way, independent from the indifference Bulgarian authorities, in April 2007 I founded the first NGO in Bulgaria, which is dedicated and specialized in tortoise and turtles conservation. - "Gea Chelonia Foundation". By

doing that, my goals are to attract international attention from similar organizations, to introduce their experience in my country, in order to bring tortoise conservation measures to an adequate level. Together with those who love chelonians and are dedicated to save and explore the wild populations of one of the earth's most endangered species.

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Text under the figures

Fig. 1: Distribution of tortoises in Bulgaria, based on (Beshkov, 1993).

1- no tortoises in high mountainous plateaus; **2-** small isolated populations up to 15-30 years ago; **3-** tortoises completely extirpated; **4-** low tortoise densities; **5-** moderate tortoise densities; **6-** relatively undisturbed tortoise populations; **7-** high tortoise densities; **8-** altitude above 1200m .

Fig. 2: Map of Irakli protected area, part of the developed GIS.