

## A STUDY ON THE AMPHIBIANS (AMPHIBIA) AND REPTILES (REPTILIA) FROM THREE URBAN PROTECTED AREAS IN THE TOWN OF PLOVDIV (SOUTH BULGARIA)

*Ivelin A. Mollov*

*University of Plovdiv “Paisii Hilendarski”*

*Faculty of Biology, Department of Ecology and Environmental Conservation  
24 Tsar Assen Str., 4000 Plovdiv, Bulgaria*

*E-mail: mollov\_i@yahoo.com*

**Abstract:** The current paper reviews the species composition and distribution of 2 amphibian (*Bufo viridis*, *Hyla arborea*) and 7 reptile species (*Cyrtopodion kotschyi*, *Lacerta viridis*, *Lacerta trilineata*, *Podarcis taurica*, *Podarcis muralis*, *Ablepharus kitaibelii*, *Coronella austriaca*) inhabiting three protected territories in the town of Plovdiv. Some aspects of the species’ ecology are discussed in relation to the urban environment and the recorded amphibians and reptiles are categorized in ecological groups according to their level of synanthropy. Species’ zoogeographic characteristics, level of endemism, conservation significance and the basic conservation threats and problems in the studied protected territories are also discussed.

**Key words:** urban ecology, urban protected areas, zoogeography, conservation, amphibians, reptiles, Plovdiv, south Bulgaria

### INTRODUCTION

Many factors are known to influence considerably the animal populations inhabiting areas situated inside big cities. Among these factors the environmental diversity and the degree of conservation are worth mentioning, as well as the area size and the degree of isolation (MASSA & INGEGNOLI, 1999).

Most of these areas are small in size and quite isolated from other “green areas”. Because of these characteristics, they represent interesting case studies for the ecologists because they are fragmented portions of natural zones inside a very anthropogenically influenced territory (RUGIERO, 2004).

Within the town of Plovdiv there are several “green areas”. Besides the urban parks, which usually present a low conservation degree of the environment and are heavily visited by people, there are three areas which resemble natural sites more closely and because of that they were protected by the law. They are: nature landmark “Mladezki halm” (“The hill of youth”), situated on 36,2 ha of land; nature landmark “Halm na osvoboditelite” (“The hill of freedom”), situated on 22,0 ha and nature landmark “Danov halm” (“Danov’s hill”), situated on 5,3 ha. All three protected territories are declared with Order №ПД466 from 22.12.1995 by Ministry of Environment and Waters (MOEW), with the aim to protect the natural landscape and the unique geomorphological formations.

All three nature landmarks are situated in the center of the town (Fig. 1) and by origin they are syenite hills formed during the Paleogene. The predominating tree and shrub vegetation consist of *Celtis australis*, *Gleditschia triacantus*, *Robinia pseudoacacia*, *Crataegus monogyna*, *Paliurus spina-christi*, *Prunus spinosa* etc. (DIMITROV ET AL., 2002).

In the Bulgarian herpetological literature, there are a few announcements of localities of some species of amphibians and reptiles from the hills of Plovdiv (KOVACHEV, 1905; BURESH & TSONKOV, 1933; MÜLLER, 1940 and others), but so far there is no complete research on the batracho- and the herpetofauna of the hills.

The aim of the current paper is to explore the species composition and distribution of the amphibians and reptiles in the three protected territories in the town of Plovdiv; to give some data concerning their ecology and present their zoogeographical characteristics and conservation significance.

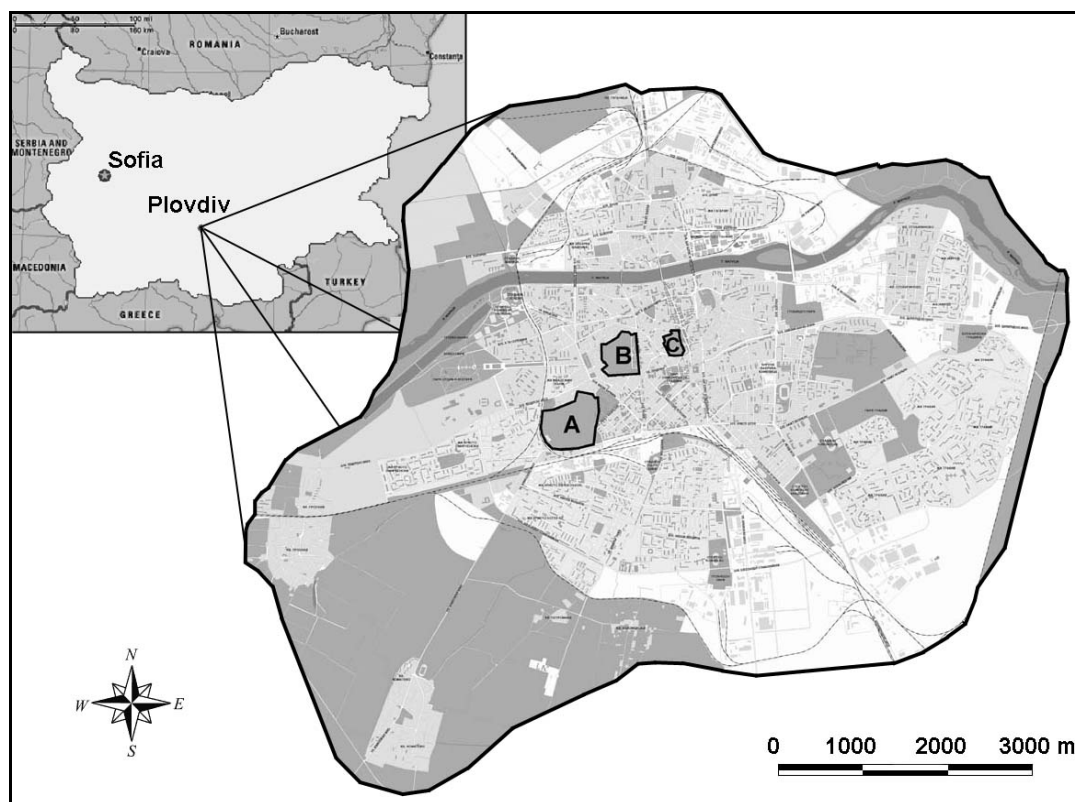
## MATERIAL AND METHODS

For the purposes of the present study a series of observations were carried out in the period of March-October 1999-2005 in various biotopes in the territory of NL “Mladezki halm”, NL “Halm na osvoboditelite” and NL “Danov halm” (Fig. 1).

The amphibians and reptiles were identified visually, using the field guides of BANNIKOV ET AL. (1977) and ARNOLD & OVENDEN (2002). In some of the cases, the observed animals were captured for more precise identification and then released on the exact same spot. Some of the specimens were identified by the sounds they make, their eggs or larvae and skin sheds. No animals were collected because of their conservation.

The following features are indicated for each recorded species: a valid common and Latin name (after ARNOLD & OVENDEN 2002); distribution in the studied territories; some ecological data in relation to the urban environment; abundance (in case of recording more than 20 specimens for the studied territory we considered this species as “abundant”; between 10 and 20 specimens – “common”; less than 10 specimens – “rare” and species recorded only with few specimens – “very rare”); level of endemism; zoogeographic characteristics; conservation status according to the contemporary Bulgarian and international conservation legislation (after NAUMOV & STANCHEV, 2006); concrete conservation problems and threats for the studied territories.

The works of BEŠKOV & BERON (1964), GRUEV & KUZMANOV (1999), GRUEV (2000, 2002) and UNDJIAN (2000) were used for the zoogeographic characterization of the studied species of amphibians and reptiles. The zoogeographic categories (complexes, elements, subelements) are after GRUEV & BECHEV (2000).



**Figure 1.** Location of the three studied urban protected areas within the town of Plovdiv.  
**Legend:** A – NL “Mladezki halm”, B – NL “Halm na osvoboditelite”, C – NL “Danov halm”

## RESULTS

In the studied three protected territories 2 species of amphibians and 7 species of reptiles were recorded, which represents 11,7% from the Bulgarian batrachofauna and 19,4% from the Bulgarian herpetofauna, respectively.

### *Species composition*

#### **1. Green toad - *Bufo viridis* Laurenti, 1768**

**Distribution:** NL “Mladezki halm” (Fig. 2), NL “Halm na osvoboditelite” (Fig.3), NL “Danov halm” (Fig. 4).

**Ecological data:** According to BESHKOV & NANEV (2002), the green toad (Fig.6c), prefers the urban territories where it is considerably more numerous. Our observations showed that this species is common in all three protected territories in the town of Plovdiv (Table 1). It inhabits the yards of the houses situated near the studied territories, where this species finds enough food and shelter. During the

reproduction period it enters the interior of the hills, where the frogs use small, often temporary water basins for the copulation and the laying of the eggs.

At NL “Mladezki halm” we observed copulation in two water basins in the south part of the hill – a temporary pond, which collects rainwater (Fig. 6a) and a shaft also collecting rainwater at 50 meters away from it. Copulations and laying of the eggs (Fig. 6b) were observed from 30.III.2002 to 02.IV.2002. One month later the water in both basins was evaporated and the eggs and the larvae were perished.

At NL “Halm na osvoboditelite” we observed larvae in a non-functioning fountain, filled with rainwater, in the southwestern part of the hill. With the beginning of the warm months the water there was also evaporated and all larvae have perished. The no longer existing “Markovo Tepe” hill was situated very near to the hill at its south side. At this site there was a pitfall, also collecting rainwater, where we observed copulating green toads (probably specimens inhabiting the territory of NL “Halm na osvoboditelite”). Now the pitfall is destroyed and at this place there is a construction site. At the periphery of the north-east part of the hill there is a street with intense automobile traffic. During the breeding migrations of the green toad from the situated nearby houses to the interior of the hill it suffers considerable losses due to road mortality from vehicle collisions (MOLLOV, 2005-in press).

At NL “Danov halm” we were unable to determine the reproduction sites of the green toad, but we observed many alive specimens, as well as single dead ones (killed by automobile traffic) at the periphery of the hill.

**Zoogeography:** Euroasiatic Palearctic element, Siberian faunistic complex.

**Conservation status:** protected by the Biodiversity Act (Appendix III) from 2002; included in Appendix II of Bern Convention; included in Annex IV of Directive 92/43/EEC; included in Red List of Threatened Species of IUCN from 2006 in category “least concern”.

**Conservation problems and threats:** destruction of the suitable habitats and the sites for reproduction (drought, construction, pollution), killing of specimens by automobile traffic, and directly by humans (usually children).

## **2. Common Tree Frog - *Hyla arborea* (Linnaeus, 1758)**

**Distribution:** NL “Mladezki halm” (Fig. 2), NL “Halm na osvoboditelite” (Fig.3).

**Ecological data:** BESHKOV & NANEV (2002) announced that the tree frog isn't a rare species in the urbanized territories. We found this frog only in two of the studied protected territories and in both places with few specimens (Table 1). According to our observations the tree frog shows affinity to habitats with moderate humidity and predominating shrub and tree vegetation (which is abundant at the hills in Plovdiv). Breeding takes place in temporary still water basins. Some laid eggs were observed at NL “Mladezki halm” in a small temporary pond in the south side of the hill (Fig. 6a). The absence of this species from NL “Danov halm” can probably be explained with the fact that it is considerably smaller than the other two, with less suitable habitats and it is much more anthropogenized.

**Zoogeography:** Eurosiberian subelement, Euroasiatic Palearctic element, Siberian faunistic complex.

**Conservation status:** protected by the Biodiversity Act (Appendices II & III) from 2002; included in Appendix II of Bern Convention; included in Annex IV of Directive 92/43/EEC; included in Red List of Threatened Species of IUCN from 2006 in category “least concern”.

**Conservation problems and threats:** destruction of suitable habitats and reproduction sites.

### **3. Kotschy’s Gecko - *Cyrtopodion kotschyi* (Steindachner, 1870)**

**Distribution:** NL “Mladezki halm” (Fig. 2), NL “Halm na osvoboditelite” (Fig.3), NL “Danov halm” (Fig. 4).

**Ecological data:** This is the most abundant species recorded in all three protected areas (Table 1). A completely synanthropic species - inhabits exclusively human constructions. Even in the interior of the hills, geckos can be observed more often at constructions made by humans (ruins of old houses, supporting walls along the alleys, etc.) than on open rocks. On 28.VII.2003, at NL “Mladezki halm” we found a heaping of about ten gecko’s eggs in a big crack in one of the supporting walls along the alleys in the east part of the hill. Considering that one female can lay maximum of two eggs, such a big gathering of eggs is an undeniable proof that geckos not only temporary inhabit human constructions, but they use them during the reproduction period as well.

BESHKOV & NANEV (2002) announced that geckos can be observed during the day, but they are active mostly at night. Our observations showed that the geckos at the hills of Plovdiv are very active during most of the daytime, especially early in the morning and late afternoon. We have also recorded variability in the coloration. It varies from light, ashy-gray to very dark brownish (almost black) color, in correspondence to the light and the temperature. The geckos from shady places are lighter in color (Fig. 7a) and those from more sunny places are with darker coloration (Fig. 7b).

**Endemism:** The subspecies *C. k. rumelicus* (Müller, 1940) is distributed in Plovdiv (BESHKOV & NANEV, 2002) and it is endemic taxa for Bulgaria.

**Zoogeography:** Eastsubmediterranean subelement, Submediterranean element, European faunistic complex.

**Conservation status:** protected by the Biodiversity Act (Appendix III); included in Appendix II of Bern Convention; included in Annex IV of Directive 92/43/EEC.

**Conservation problems and threats:** destruction of suitable habitats in means of various kinds of modern construction, as well as the demolishing of old houses; capture and killing of some specimens by humans.

### **4. Stripe Lizard - *Lacerta trilineata* Bedriaga, 1886**

**Distribution:** NL “Mladezki halm” (Fig. 2).

**Ecological data:** In the protected territories the stripe lizard was registered only at NL “Mladezki halm” with only few specimens (Table 1). It mainly inhabits dry

and sunny slopes and uses as a shelter the space underneath rocks, the roots of shrub vegetation etc. It seems that the environmental conditions at the hills of Plovdiv are not very suitable for the stripe lizard, because we recorded it with considerably greater abundance from other parts of the town (MOLLOV – unpublished data).

**Endemism:** Sub endemic taxa for the Balkan Peninsula.

**Zoogeography:** Eastsubmediterranean subelement, Submediterranean element, European faunistic complex.

**Conservation status:** included in Appendix II of Bern Convention; included in Annex IV of Directive 92/43/EEC; included in Red List of Threatened Species of IUCN from 2006 in category “least concern”.

**Conservation problems and threats:** destruction of suitable habitats, fires.

### 5. Eastern Green Lizard - *Lacerta viridis* (Laurenti, 1768)

**Distribution:** NL “Mladezki halm” (Fig. 2), NL “Halm na osvoboditelite” (Fig.3).

**Ecological data:** The green lizard is more numerous than the stripe lizard (*Lacerta trilineata*) at NL “Mladezki halm”, but its total number from the two hills is quite low (Table 1). It inhabits sunny places, with thick shrub vegetation and open forests etc. Excellent climber. According to our observations the green lizard prefers wetter habitats, which are scarce at the hills of Plovdiv and that is why like the stripe lizard, it is much more numerous in other parts of the town (MOLLOV – unpublished data).

**Endemism:** The subspecies *L. v. meridionalis* Cyrén, 1933, which inhabits Plovdiv as well (BESHKOV & NANEV, 2002), is sub endemic for the Balkan Peninsula.

**Zoogeography:** Submediterranean element, European faunistic complex.

**Conservation status:** included in Appendix II of Bern Convention; included in Annex IV of Directive 92/43/EEC; included in Red List of Threatened Species of IUCN from 2006 in category “least concern”.

**Conservation problems and threats:** destruction of suitable habitats, fires.

### 6. Balkan Wall Lizard - *Podarcis taurica* Pallas, 1811

**Distribution:** NL “Mladezki halm” (Fig. 2), NL “Halm na osvoboditelite” (Fig.3).

**Ecological data:** The Balkan wall lizard is the most numerous lacertid lizard recorded at the hills of Plovdiv. It is especially numerous at the NL “Mladezki halm” (Table 1). It seems that *Podarcis taurica* is much more adapted to conditions at the studied hills than the other lacertid lizards. It inhabits open hilly and plain terrains, covered mainly with herbaceous and xerophilous shrub vegetation.

**Zoogeography:** Pontosubmediterranean Steppe subelement, Steppe element, Euroasiatic faunistic complex.

**Conservation status:** included in Appendix II of Bern Convention; included in Annex IV of Directive 92/43/EEC; included in Red List of Threatened Species of IUCN from 2006 in category “least concern”.

**Conservation problems and threats:** destruction of suitable habitats, fires.

### **7. Common Wall Lizard - *Podarcis muralis* (Laurenti, 1768)**

**Distribution:** NL “Mladezki halm” (Fig. 2), NL “Halm na osvoboditelite” (Fig.3).

**Ecological data:** This species is a typical petrophile – inhabits exclusively rocks and stone terrains. In the protected territories we discovered only few specimens on the rocky slopes at two of the hills in Plovdiv (Table 1). It appears that the locality of the wall lizard in Plovdiv is isolated, but it has preserved itself due to the existence of semi natural, habitat suitable for this species, at these hills.

**Zoogeography:** Submediterranean element, European faunistic complex.

**Conservation status:** included in Appendix II of Bern Convention; included in Annex IV of Directive 92/43/EEC; included in Red List of Threatened Species of IUCN from 2006 in category “least concern”.

**Conservation problems and threats:** destruction of rocks and the collection of stone material.

### **8. Snake-eyed Skink - *Ablepharus kitaibelii* Bibron et Bory, 1833**

**Distribution:** NL “Mladezki halm” (Fig. 2).

**Ecological data:** Very rare species recorded with only 2 specimens for the entire period of the study (Table 1). The snake-eyed skink prefers dry and sunny sites with herbaceous and rare, xerophilous shrub vegetation. BESHKOV & NANEV (2002) announced that at danger this lizard closes its legs next to its body and with fast snake-like movements it goes to the nearest shelter. We observed exactly the same behavior on 31.III.2003 and 02.V.2003 at NL “Mladezki halm”, where due to our presence the lizards quickly disappeared in cracks in the rocks.

**Endemism:** In Bulgaria the subspecies *A. k. stepaneki* Fuhn, 1970 (BESHKOV & NANEV, 2002) is distributed, which is endemic for the Balkan Peninsula.

**Zoogeography:** Eastsubmediterranean subelement, Submediterranean element, European faunistic complex.

**Conservation status:** protected by the Biodiversity Act (Appendix III) from 2002; included in Appendix II of Bern Convention; included in Annex IV of Directive 92/43/EEC; included in Red List of Threatened Species of IUCN from 2006 in category “least concern”.

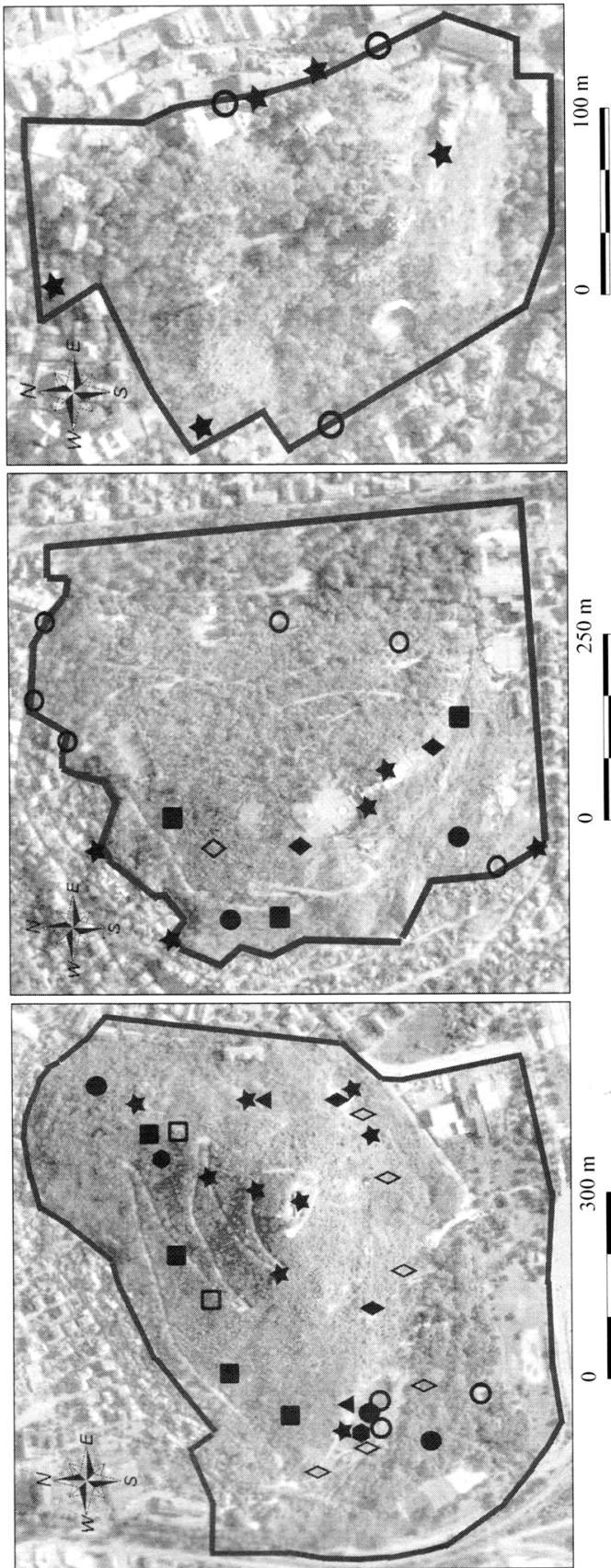
**Conservation problems and threats:** insufficient data.

### **9. Smooth Snake - *Coronella austriaca* Laurenti, 1768**

**Distribution:** NL “Mladezki halm” (Fig. 2).

**Ecological data:** Due to the fact that we recorded this species only by two skin sheds and we don't have observation on live specimens, the data concerning the species' ecology is scarce. But judging by the place where the skin sheds were found, it appears that the smooth snake, which prefers forest sites, with the presence of rocky patches in the periphery of slopes etc. (BESHKOV & NANEV, 2002), had found suitable conditions at this hill, where there is abundance of shelters and good food base.

**Zoogeography:** Mid European element, European faunistic complex.



**Figure 2.** Distribution of the encountered species of amphibians and reptiles at NL "Mladezki halm".

**Figure 3.** Distribution of the encountered species of amphibians and reptiles at NL "Halm na osvoboditelite".

**Figure 4.** Distribution of the encountered species of amphibians and reptiles at NL "Danov halm".

**Legend:** ○ – *Bufo viridis*; ● – *Hyla arborea*; ★ – *Cyrtopodion kotschy*;  
 □ – *Lacerta trilineata*; ■ – *Lacerta viridis*; ◇ – *Podarcis taurica*;  
 ◆ – *Podarcis muralis*; ◐ – *Ablepharus kitaibelii*; ▲ – *Coronella austriaca*



**Conservation status:** protected by the Biodiversity Act (Appendix III) from 2002; included in Appendix II of Bern Convention; included in Annex IV of Directive 92/43/EEC.

**Conservation problems and threats:** insufficient data.

## DISCUSSION

From all recorded species of amphibians and reptiles in the three protected territories, four species had been announced in the past by literary data - *Lacerta viridis* – “Mladezki halm in Plovdiv” (BURESH & TSONKOV, 1933); *Lacerta trilineata* – “At the hills of Plovdiv” (BURESH & TSONKOV, 1933); *Podarcis muralis* – “...at the hills of Plovdiv...” (KOVACHEV, 1905; BURESH & TSONKOV, 1933); *Cyrtopodion kotschy* – “Mladezki halm in Plovdiv” (BURESH & TSONKOV, 1933), “from Plovdiv (Halm na osvoboditelite)” (MÜLLER, 1940). Four others – *Bufo viridis*, *Hyla arborea*, *Podarcis taurica* and *Coronella austriaca* are announced for the town of Plovdiv in general (KOVACHEV, 1905, 1912; CYRÉN, 1941; BURESH & TSONKOV, 1933, 1934, 1942; ANGELOV, 1960; ANGELOV & KALCHEV, 1961; DONEV, 1984), but they are announced for the hills of Plovdiv in the current study. The presence of the snake-eyed skink (*Ablepharus kitaibelii*) in the town of Plovdiv at NL “Mladezki halm” is announced here for the first time.

**Table 1.** Abundance of the amphibians and reptiles registered in each of the three protected territories.

	NL “Mladezki halm”	NL “Halm na osvoboditelite”	NL “Danov halm”
<i>Bufo viridis</i>	abundant	abundant	common
<i>Hyla arborea</i>	rare	rare	-
<i>Cyrtopodion kotschy</i>	abundant	common	common
<i>Lacerta trilineata</i>	very rare	-	-
<i>Lacerta viridis</i>	rare	rare	-
<i>Podarcis taurica</i>	common	rare	-
<i>Podarcis muralis</i>	very rare	very rare	-
<i>Ablepharus kitaibelii</i>	very rare	-	-
<i>Coronella austriaca</i>	very rare	-	-

The species composition and distribution of the amphibians and reptiles in the three studied territories, in our opinion is formed due to several factors – the size, the specific environmental conditions, and the level of anthropogenic influence of each protected territory.

According to KLAUSNITZER (1990), many of the urban habitats are highly isolated one from another by roads and buildings, which enable us to study them as islands and the theoretical concepts of the island biogeography can be applied to them. According to the same author, the number of species inhabiting these “islands” correlates with the size of the “island”.

During the current study we established dependence between the size of each protected territory, the level of anthropogenic influence and the number of the inhabiting amphibians and reptiles (with the decrease of the size and the increase of the anthropogenic influence, the number of species decreases) (Table 2).

**Table 2.** *Dependence between the size of the three protected territories, their level of anthropogenic influence and the registered number of species.*

	NL “Mladezki halm”	NL “Halm na osvoboditelite”	NL “Danov halm”
Level of anthropogenic influence	low	moderate	strong
Size (ha)	36,2	22,0	5,3
Number of species	9	6	2
Mean number of species per 1 ha	0,25	0,27	0,38

In the conditions of the urban environment, some species suffer a process of synanthropization, i.e. adaptations and new mechanisms of regulation at population level to the new environment are formed (VERSHININ, 1987). According to the classification given by KLAUSNITZER (1990), there are four ecological groups of animals in subordination to their level of synanthropy: **hemerophobes** – species, which avoid urban environment; **hemerodiaphores** – species, which existence doesn't depend on the anthropogenic transformation of the landscape; **hemerophiles** – species, which prefer habitats made by humans and **synanthropes** – species, which are directly connected with habitats made by man and their existence depend on the human activity. Based on their abundance (Table 1) as well as our observations during the current study the encountered amphibians and reptiles were categorized in the above mentioned four ecological groups of animals (Table 3).

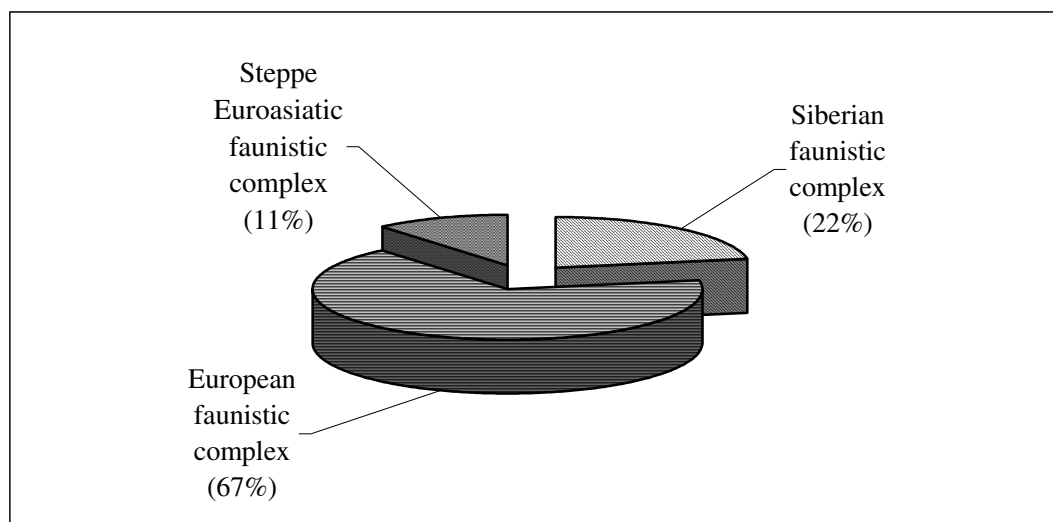
**Table 3.** *Ecological groups of amphibians and reptiles, established in the three studied protected territories, according to their level of synanthropy.*

Level of synanthropy	Species
emerophobes	<i>Podarcis muralis</i> ; <i>Coronella austriaca</i> ; <i>Ablepharus kitaibelii</i>
Hemerodiaphores	<i>Hyla arborea</i> ; <i>Lacerta viridis</i> ; <i>Lacerta trilineata</i> ; <i>Podarcis taurica</i>
Hemerophiles	<i>Bufo viridis</i>
Synanthropes	<i>Cyrtopodion kotschy</i>

From biogeographic point of view, all three protected territories in the town of Plovdiv belong to the Mid Bulgarian biogeographic region (GRUEV & KUZMANOV, 1999). The batracho- and the herpetofauna showed homogeneity in its zoogeographic characteristics, consisting three faunistic complexes: Siberian

complex (Euroasiatic Palaearctic element) – 2 species; European complex (Mid European element – 1 species; Submediterranean element – 5 species); Steppe Euroasiatic complex (Steppe element) – 1 species (Figure 5, Table 4).

Both amphibian species belong to the Siberian faunistic complex (Euroasiatic Palaearctic element). Most of the reptiles belong to the European faunistic complex with distinct predomination of taxa belonging to the Submediterranean element, followed by the Mid European element. Exception shows only *Podarcis taurica*, which is a Steppe element, belonging to the Steppe Euroasiatic faunistic complex.



**Figure 5.** Zoogeographic structure of the batracho- and the herpetofauna in all studied protected territories.

The level of endemism of the registered amphibians and reptiles is low. From the amphibians there are no endemic taxa and from the reptiles one taxon (*Cyrtopodion kotschy rumelicus*) is endemic for Bulgaria, one (*Ablepharus kitaibelii stepaneki*) is endemic for the Balkan Peninsula and two taxa (*Lacerta trilineata* and *Lacerta viridis meridionalis*) are sub endemics for the Balkan Peninsula.

**Table 4.** Zoogeographic structure of the amphibians and reptiles in each of the studied protected territories.

	NL “Mladezki halm”	NL “Halm na osvoboditelite”	NL “Danov halm”
Number of species	9	6	2
Siberian complex	2	2	1
European complex	6	3	1
Steppe Euroasiatic complex	1	1	-

In conclusion, the three studied nature landmarks protect 28,57% of all amphibian species and 58,33% of all reptile species inhabiting the town of Plovdiv (MOLLOV – unpublished data). In our opinion this is quite satisfactory considering the category of the protected areas – nature landmark. According to the Bulgarian law,

this is the category of protected territories with least conservation significance. We recommend more extensive future studies on the herpetofauna as well as other animal groups and the flora and of the three urban protected areas to be conducted. We also suggest a future re-categorization of the three studied areas into “protected areas”.

## CONCLUSIONS

1. In the three protected territories 2 species of amphibians and 7 species of reptiles were recorded. The registered amphibians represent 28,57% from all amphibian species inhabiting the town of Plovdiv and 11,7% from the Bulgarian batrachofauna. The recorded reptiles represent 58,33% of all reptile species inhabiting the town of Plovdiv and 19,4% from the Bulgarian herpetofauna. Five species (*Bufo viridis*, *Hyla arborea*, *Podarcis taurica*, *Coronella austriaca* and *Ablepharus kitaibelii*) are announced for the first time for the studied territories.

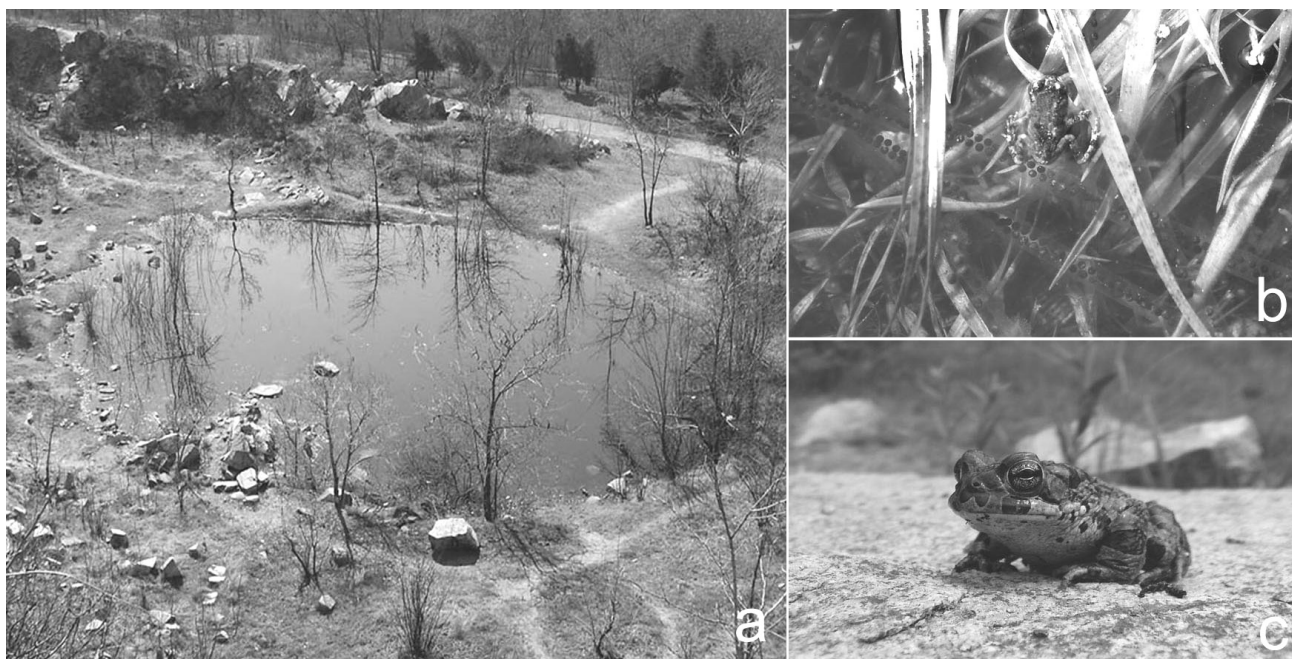
2. With the decrease of the size of each studied territory and the increase of the anthropogenic influence, the number of the observed species decreases.

3. For the first time the found amphibians and reptiles have been categorized in ecological groups according to their level of synanthropy. One species (*Cyrtopodion kotschy*) is synanthropic, one species (*Bufo viridis*) is hemerophilic, four species (*Hyla arborea*, *Lacerta trilineata*, *Lacerta viridis*, *Podarcis taurica*) are hemerodiaforic, and three species (*Podarcis muralis*, *Ablepharus kitaibelii*, *Coronella austriaca*) – hemerophobic.

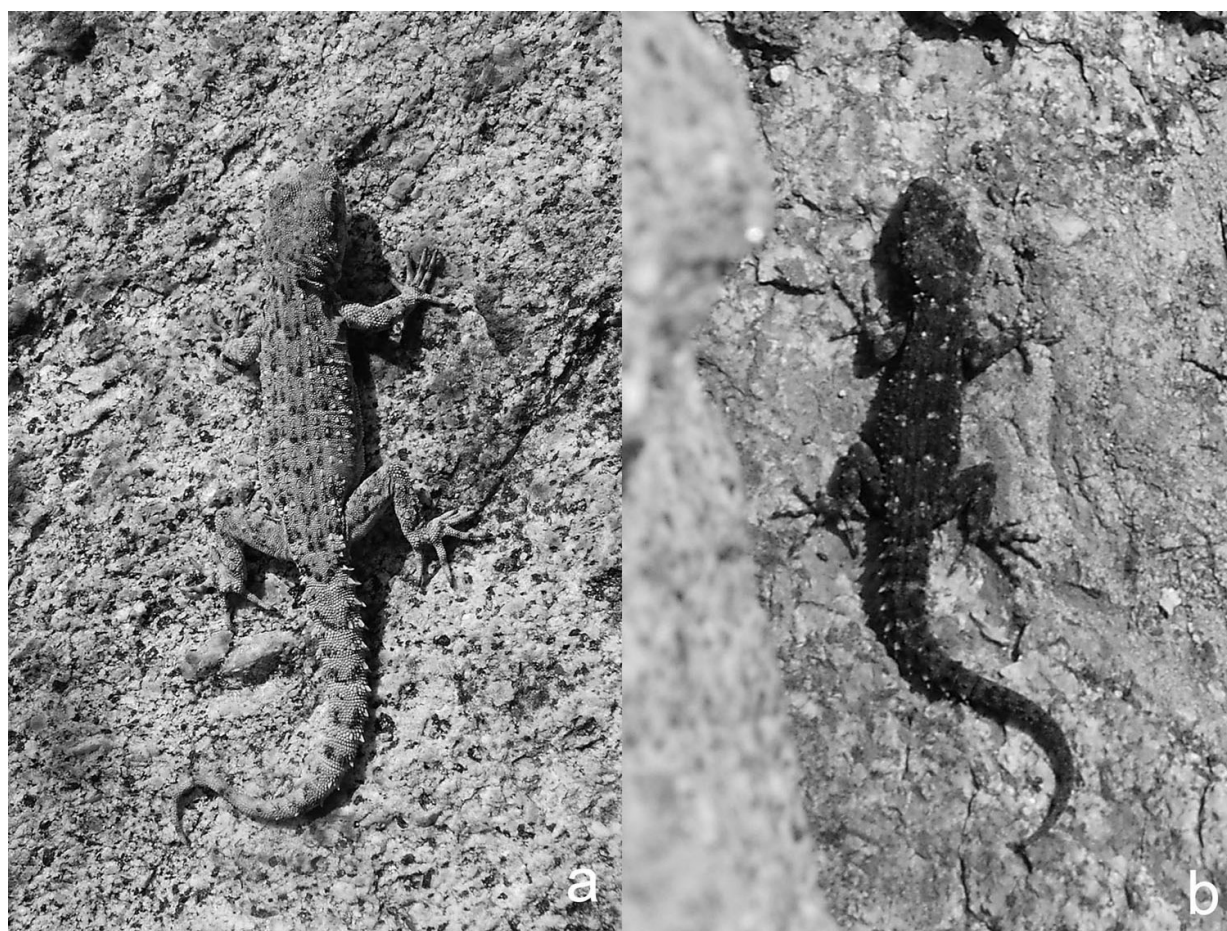
4. From biogeographical point of view the batracho- and the herpetofauna in all three protected territories showed homogeneity in its zoogeographic characteristics, consisted by three faunistic complexes (European, Steppe Euroasiatic and Siberian complex).

5. The recorded species of amphibians and reptiles have high conservation significance – all nine species are included in the appendices of the Bern convention and Directive 92/43/EEC. Seven of them are included in the Red List of Threatened Species of IUCN from 2006 and the Biodiversity Act from 2002 protects five species.

6. The destruction of the suitable habitats and the reproduction sites (drying up, construction, pollution, fires) as well as the direct extermination by man are among the basic conservation problems and threats for the amphibians and reptiles, inhabiting all three protected territories in the town of Plovdiv.



**Figure 6.** *a* – a temporary pond in the south side of NL “Mladezki halm”;  
*b* – a juvenile green toad (*Bufo viridis*) and eggs from the same location;  
*c* – an adult specimen from the same location.



**Figure 7.** *Cyrtopodion kotschy rumelicus* (Müller, 1940) from NL “Mladezki halm”  
*a* – a specimen with light ashy-gray coloration;  
*b* – a specimen with dark brownish coloration.

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## ПРОУЧВАНЕ НА ЗЕМНОВОДНИТЕ (AMPHIBIA) И ВЛЕЧУГИТЕ (REPTILIA) ОТ ТРИ ЗАЩИТЕНИ ТЕРИТОРИИ В ГРАД ПЛОВДИВ

*Ивелин А. Моллов*

*Пловдивски Университет “Паусий Хилендарски”,  
Факултет по Биология, Катедра “Екология и ООС”  
ул. Цар Асен № 24, 4000 Пловдив  
E-mail: mollov\_i@yahoo.com*

### (Резюме)

В настоящата работа е направено цялостно проучване на батрахо- и херпетофауната от три защитени територии в гр. Пловдив. Установени са 2 вида земноводни и 7 вида влечуги, което представлява съответно 11,7% от батрахофауната и 19,4% от херпетофауната на България. Пет от тях (*Bufo viridis*, *Hyla arborea*, *Podarcis taurica*, *Coronella austriaca* и *Ablepharus kitaibelii*) се съобщават за първи път за изследваните защитени територии.

Установена е зависимост между площта на всяка от изследваните защитени територии, степента на антропогенизация и броя установени видове земноводни и влечуги (с намаляване на площта и увеличаване на антропогенното влияние – намалява броя на установените видове).

За първи път бе направена категоризация на установените видове земноводни и влечуги според степента си на синантропизация. От констатираните в защитените територии видове един вид (*Cyrtopodion kotschyi*) е синантропен, един вид (*Bufo viridis*) е хемерофилен, четири вида (*Hyla arborea*, *Lacerta trilineata*, *Lacerta viridis*, *Podarcis taurica*) са хемеродиафорни, а три вида (*Podarcis muralis*, *Ablepharus kitaibelii*, *Coronella austriaca*) – хемерофобни.

В зоогеографско отношение батрахо- и херпетофауната от трите защитени територии в гр. Пловдив показва еднородност и е съставена от три фаунистични комплекса (Европейски, Степен Европейско-азиатски и Сибирски).

Установените видове земноводни и влечуги имат висок консервационен статус – и деветте вида фигурират в приложенията на Бернската конвенция и Директива 92/43 на Съвета на ЕИО. Седем от тях са включени в Червения списък на застрашените видове на IUCN от 2006 г., а пет вида са защитени от Закона за биологичното разнообразие от 2002 г. Сред основните консервационни проблеми и заплахи за батрахо- и херпетофауната в трите защитени територии в гр. Пловдив стоят унищожаването на местообитанията и местата за размножаване (пресъхване, строителство, замърсяване, пожари) и прякото унищожаване от човека.