

Monitoring amphibians and reptiles

I. PROJECT. Monitoring of protected and endangered species

Target: To research/monitor the status of protected species, in compliance with the international agreements on data supply (conventions, OECD)

To monitor the species which are on the lists of the Bern Convention and the Habitats Directive.

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The importance of monitoring

Reptiles and amphibians are important and often key elements of the food web both in aquatic and terrestrial habitats. In the last years several amphibian and reptile species have become threatened. The decrease in the number of amphibian species and communities is primarily caused by the disappearance, alteration and fragmentation of habitats, environmental pollution, and the increasing disturbance by humans. The harmful effects of those are well-indicated by the changes in the herpetofauna. The dramatic decrease in the number of species affects the whole community. Currently the presence of 18 amphibian and 15 reptile species is known in Hungary. Primarily assemblages are monitored within the frame of the NBMS.

The conditions of monitoring

Strictly protected species can only be monitored by specialists, and it should be handled separately (from professional, methodological, financial point of view and way of financial support). The monitoring of not strictly protected amphibian and reptile species should be carried out based on uniform methods – following the current law of nature conservation, in possession of all licenses required. The monitoring should be carried out first of all by specialists but activists also can be included into the observations (for surveying species which are found in large numbers).

1. Questions

Which species occur at selected sites?

What is the composition of the amphibian communities and does it change?

How does species abundance change from year to year? Can any trends in species occurrence be observed in time and can the causes be defined?

Can differences in the spatial occurrence of certain species be observed (e.g. in the case of amphibians at the breeding ponds) in consecutive years? If yes, what are the causes?

What is the age-structure and the rate of juveniles (the progeny of that year)? The success of breeding (in case of amphibians the success of metamorphosis) can be judged from the progeny of that year.

Can development disorders be observed among amphibians at the surveyed sites and if yes what can be the reason?

On the basis of long-term studies can colonization, extinction, recolonization be detected and if yes, what kind of changes occur?

What are the habitat-preferences of certain species?

Is it possible to detect correlation between species frequencies and habitat change? In order to protect a species, communities what kind of habitat management, or creation of artificial habitats are needed?

2. Sampling sites

Sampling is carried out from 2001 at the following locations in the listed landscape units of Hungary:

Őrség-Vendvidék: Szakonyfalu (Grajka-patak völgye), Szentgotthárd-Máriaújfalu (Hársas-tó), Szalafő (Pityerszer, Felsőszer),

Pilis-Visegrádi hegység: Pap-réti tó, Paprét felső tó, Paprét alsó tó, János-tó, Alsó hosszúrét, Vadálló-kövek, Jeges-tavak

Ócsa: Vizes-erdő (XXVI. csatorna), Nagyerdő, Egreszek I-V. láprétek, Kiskőrösi-legelő,

Gödöllői Dombvidék: Babat-völgy (Aranyos-patak, 10-11. tó, tórendszer) Sülysáp-halastavak, Szada-Ivacsok,

Aggtelek-Jósvafő: Bacsó-nyak alja, Aggteleki-tó, Vörös-tó, Tengersizem-tó, Fekete-tó, Kenderáztató-tó, Ménes-patak völgye, Baradla-tető, Ördögszántás.

3. Sampling frequency

Based on the monitoring experiences of the past few years (2001-2007), in order to monitor *amphibians* at least 5+2 samplings are needed per year. The first 5 observations in the breeding season give the most representative evaluations of the number of breeding specimens. Adults are observed most easily in this period. The sampling days need to be chosen according to the peak time of species breeding. Later, the most suitable periods for the sampling are the end of summer (rainy period of the end of August) and the warmer periods of September. These samplings mainly provide the data on the progeny (young age-class).

To monitor *reptiles*, depending on the characteristics of the given species and the weather conditions, at least 5 sampling days are needed, evenly distributed between April and September. When deciding on the time of sampling, the most important factors to consider are meteorological (dry, sunny, windless weather). During sampling at the end of summer and the beginning of autumn juvenile individuals (hatched in the actual year) can also be observed.

4. Sampling methods

Different sampling methods are described below depending on species attributes and their habitat characteristics. The chosen method has to be suitable for estimating not only the presence but also the abundance and other parameters describing the populations (e.g. sex ratio, age-class, appearance of abnormality). At one sampling site more than one method may be required.

Observation of reptiles is more difficult than amphibians, the methods generally used for monitoring are less effective. To estimate the abundance of reptile species expensive and time-consuming trapping methods have to be used, these methods are not part of the programme yet.

The duration of the sampling should be identical at each sampling unit, and fit to the characteristics of the sampling site. The time allocated for each sampling has to be recorded (in order to estimate the efficiency of capturing and in order to produce comparable data).

4.1. Estimation of presence and abundance of amphibians

4.1.1. Visual counting of adults at the breeding sites at day and at night by lights:

Adult amphibians have to be sampled in the breeding season at defined field units or along transects (also convertible to field units). As a standard unit, a 5m wide and 50m long transect should be determined. The method is very efficient and easy to carry out. During the survey one should endeavour to do the sampling at least in 5 sampling units. If more species breed at the same water-body at the same time one should localize enough sampling units to survey each breeding community. One can change the width and length of the surveyed unit if it is required because of the visibility and shape of the surveyed field, provided it does not differ from the standard area (250 m²).

The number of sampling sites should be determined in a way that in case of water-bodies larger than 2 ha, they represent 30-50% of the shore, for smaller than 2 ha at least half of the shore should be sampled. In case of small water-bodies (outline smaller than 50 m used as standard length) the total area should be given.

The visual observation at daytime should be supplemented by surveying at night-time with lights. This method helps to detect the presence of tailed amphibians and anurans dwelling in water at the breeding period (or after that). The advantage of lighting is that it causes no or minimal damages in the habitat. Lighting is carried out after nightfall by crossing the migratory routes of amphibians, at the shore or close to the shore while walking (according to the shape of the sampling area).

4.1.2. Acoustic detection of adults at breeding sites

The method can be used if the aim of the monitoring is not to determine the exact number of specimens but only to point out the presence of the given species. The acoustic monitoring may be useful at sites where the vegetation limits access and the visual observation is difficult or impeded, or when the specimen of the species produce sound under water.

4.1.3. Capture of adults by trapping and netting

Trapping is an advisable method for detecting newts. Well applicable at still waters or slowly flowing waters deeper than 0.3 m. It is more time consuming, compared to other methods. The suggested number of traps is 25 pc/50 m. Bottle traps catching animals alive should be placed out at spring time in the evening hours for one night. In the morning the traps should be collected, the newts should be determined and counted. The traps are made of plastic bottles; the upper tierce is cut and turned inside the bottle. Then the traps should be placed in the water fixed to the bottom, by leaving an air-bubble in the bottle.

Netting can be an efficient method in every kind of water-bodies but it can cause strong damages in the habitat and also in eggs and larvae. If alternative methods can be used, netting should be avoided as a sampling tool.

4.1.4. Visual search of adults and juveniles out of breeding season

Except amphibians living in water, the survey of adults out of breeding season is not an efficient method. For detecting the presence of immature specimen the method is suggested in every wet habitat or near standing waters twice a year in the period of late summer – early autumn.

4.1.5. Determining the occurrence and the number of specimens by the laid eggs

This method can be used for determining the presence of species or for estimating the breeding population of some species. Counting the egg clumps can only be done where there is no disturbance or damage to the water-body. It can well be used to survey clearly visible

pools, ponds, and little overflow of streams with clear water. At bigger lakes the sampling is advised to be done from a boat instead of walking on the shore. The egg clumps of different species are counted at two or three occasions in the egg-laying period. To estimate the number of breeding adults the highest number of egg clump observed should be used. Counting of egg clumps is advisable to estimate the size of populations in the case of those species which only stay for one or a few days in the water.

4.1.6. Determining the occurrence of a species by surveying tadpoles, larvae

For the determination of the presence of a species this method can only be used if the occurrence of the given species is known from the previous years but was not observable by other methods and the larva can be well identified in the field. This method is applicable for the tadpole of *Pelobates fuscus*, and the detection of tailed amphibians by larvae. The monitoring of tadpoles proves only the presence of a species, it is not applicable to estimate the population size (the quantitative survey of anuran larvae is not reasonable).

4.2. Estimation of presence and abundance of reptiles

4.2.1. Surveying species occurring in water, with a lifestyle strongly related to water:

In the spring the survey can be done monitoring of amphibians. Other than this period, the method can be used independently. In the case of aquatic species or species strongly related to water, the survey should be done along a transect on the shore, with a standard area (250 m²). By applying observation from fix points without moving, the presence of several aquatic species (*Emys orbicularis*, *Natrix natrix*, *Natrix tessellata*) can be monitored. This method is especially recommended to reveal the sun-bathing places of *E. orbicularis*. Waiting in silence for half an hour and the use of telescope is suggested. The number of sampling areas is determined in the same way as it was described for amphibians, depending on the area of the water-body.

The use of turtle-trap is only reasonable at those sites where the occurrence of turtles is known and there is no other suitable observation. It is an expensive and labour-intensive method, so it is not suggested for general use.

4.2.2. Surveying species occurring in terrestrial habitats:

The methods of visual monitoring of reptiles living in terrestrial habitats (mainly lizards) by active search are carried out in transects, quadrates or points depending on the characteristics of the habitat. The units selected for sampling include the optimal habitats for reptiles. The size of the surveyed units should be equal or multiple to the standard area (250 m²).

The survey should be done in a 2-5m wide and 500-1000m long transect, if the size and characteristics of the chosen areas allow (meadow, rocky hillside, wayside spays). If it is not feasible, the real length should be given.

At a habitat with uniform vegetation where the sampling in a transect cannot be carried out, a square of 50m x 50m (or 100m x 100m) is depicted where 5 parallel transects with 10-25m between them is sampled (generally with 2,5-2,5m of observing distance on both sides). In the case of smaller habitat patches the real size of the track should be given.

5. Variables studied

Data recording is done in a unified table. According to the objectives it is necessary to register the sampling area, the geographic coordinates of each sampling area and unit, the circumstances of the sampling, the changes in the habitats compared with the last sampling (identifying the origin of threats, changes in the area, in the extension of the water-bodies),

the time and duration of the sampling, the name(s) of the person(s) doing the monitoring, the sampling methods used, the species and number of specimen observed (stage of development, age-class and sex) and the occurrence of disorders (number, character). The data on number of specimens is always valid for one sampling unit (e.g. 250 m² - 50 m long and 5 m wide area).