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Establishing the background of saving
the Hungarian
meadow viper (*Vipera ursinii rakosiensis*)
from extinction



Layman's Report of the LIFE-Nature program
(LIFE04NAT/HU/000116)



Imprint

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Original goals of the Hungarian meadow viper LIFE-program

The joint LIFE-Nature program of Hungarian Ornithological and Nature Conservation Society, together with Kiskunság National Park Directorate and Duna-Ipoly National Park Directorate, named as „Establishing the background of saving the Hungarian meadow viper (*Vipera ursinii rakosiensis*) from extinction, targeted the long-term conservation of the small venomous snake, directly threatened with extinction. The complex program consists of several actions, which can be grouped into four major parts:

- creation and operation of Hungarian Meadow Viper Conservation Centre;
- monitoring of recent habitats and related studies;
- grassland reconstruction on forested former habitats;
- public awareness campaign, informing

people about the project and the importance of the species' conservation.

LIFE-project data

Name: Establishing the background of saving the Hungarian meadow viper (*Vipera ursinii rakosiensis*) from extinction

Registration number: LIFE04NAT/HU/000116

Beneficiary: Hungarian Ornithological and Nature Conservation Society (MME BirdLife Hungary)

Partners: Duna-Ipoly National Park Directorate (DINPI) Kiskunság National Park Directorate (KNPI)

Co-financer: Ministry of Environment and Water Affairs

Total budget: 649 000 Euro

European contribution: 50%

Duration: 48 months, between 01.01.2004. - 12.31.2007.



Hungarian meadow viper

Hungarian meadow viper is an inhabitant of steppe remnants. Meadows and pastures forming a mosaic of wet and dry grass habitats is favoured by the species, because of high microclimatic diversity and abundance of prey. They use rodents' burrows as hiding places and for winter hibernation.

The most probable of spotting a viper is during spring, in mating season in, when males tend to move much more.

Late summer, early September females give birth to 6-14 young vipers, with length of 13-18 cm. Maximum length of adult males is 40-50 cm, while females can reach 60 cm.

Youngsters feed mainly on orthopteran insects (grasshoppers, crickets), while adults consume vertebrate prey as well, such as lizards, nestlings

and rodents. Venom of the species is mainly harmless for humans. In the case of biting, although because of the rareness and shyness of the species it is rather rare, consequences are usually quick and slight.

Tendency for hiding behaviour is not by chance, as the species is preyed by many other species, especially during its first few years. The list of predators mainly consists of birds, such as storks, herons, harriers, roller, pheasant and even the rare Great Bustard. Wild boar, badger and fox dig them out from their hiding burrows.

Distribution of the species

This small venomous snake lost most of its range during the 20th century, with a former wide Carpathian distribution, from Vienna to Transyl-

vania shrank into fragmented populations, located in Hanság and Kiskunság. Outside Hungary only one remaining population can be found in Romania

The main factor behind this rapid decline is habitat loss, which roots in the changes of land use in the region during the last centuries, which meant drainage programs and ploughing of huge areas. The spreading of intensive techniques in cattle breeding and machinery in hay-making changed land-use on remaining grasslands, serving as main habitat of the species. Illegal collection made situation worse on several sites.

The Hungarian meadow viper became protected in 1974 in Hungary. From 1988 it is strictly protected, and from 1992 its conservation value

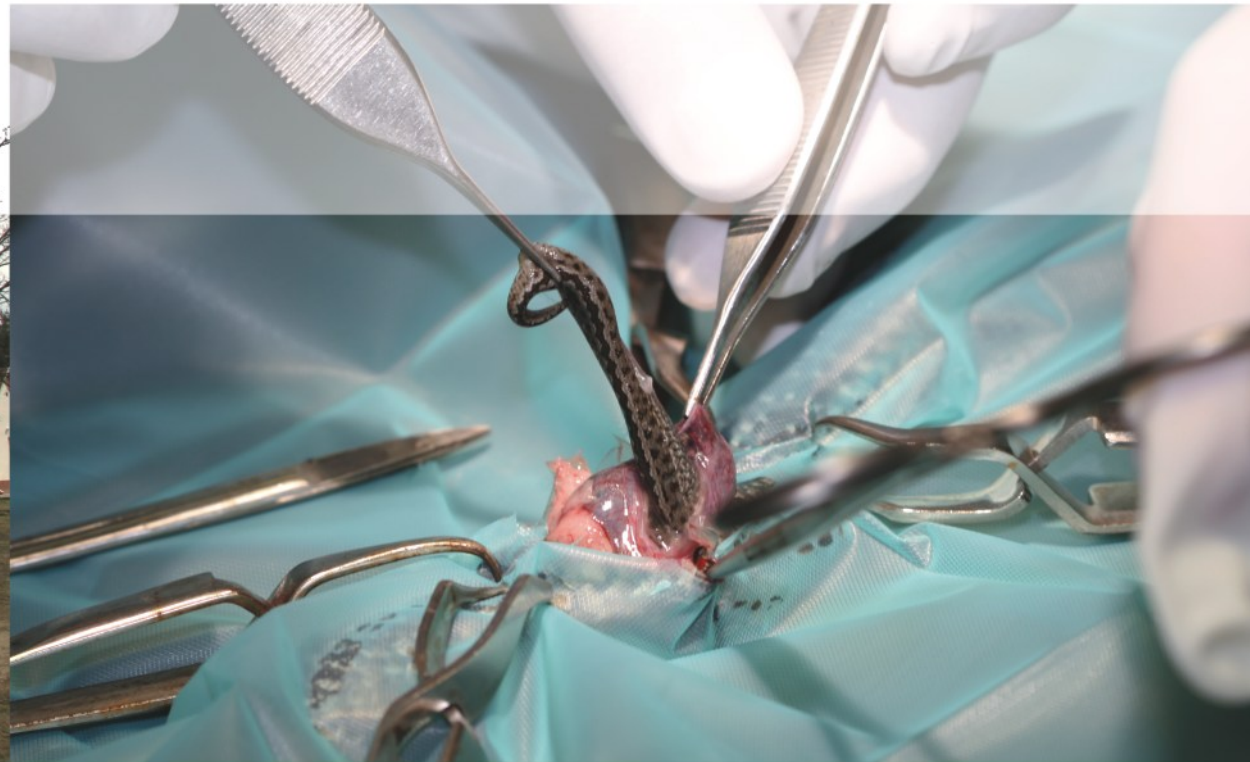
was raised to highest category, currently at 1 million HUF (~4000 EURO). Bern Convention listed the species in Annex II., had two recommendations towards Hungary regarding the species and a European Action Plan on *Vipera ursinii* was developed in 2006. The IUCN classified it as "threatened" and CITES listed the species in Appendix I. It is selection criteria in Natura2000, as being mentioned on list II.

Minister of Environment and Water Affairs signed the Species Conservation Plan of Hungarian meadow viper in 2004.

It is currently considered as Hungary's most endangered vertebrate, Europe's most endangered venomous snake. Rough estimations put the subspecies' surviving numbers below 500 individuals.



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Hungarian Meadow Viper Conservation Centre and its operation

The need for the creation of a captive breeding centre was raised years ago, as the continuous decline of wild populations projected the grim picture of extinction of the species. Main goal of the Hungarian Meadow Viper Conservation Centre is the breeding of vipers collected from threatened populations.

In seminatural enclosures of the Centre it is possible to mate individuals of different populations, overcoming possibility of inbreeding depression. Juveniles thanks to high food abundance and no predation can reach maturity in higher percentage than in the wild.

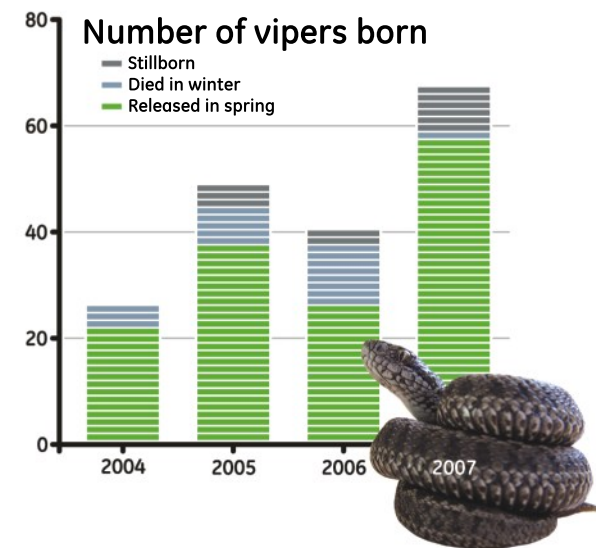
The Centre also provides chances to learn more about this hiding species, and information gathered can help in the conservation effort of wild populations.

Hungarian Meadow Viper Conservation Centre was built in 2004 on a farm possessed by Kiskunság National Park Directorate. MME is responsible for the operation of the Centre,



cooperating with KNPI, supervised by Hungarian Meadow Viper Conservation Council, formed of experts of the subject.

Veterinary support is provided by Budapest Zoo. The Zoo also helps in the breeding of large amounts of crickets, serving as prey for vipers. Genetic screening was carried out by experts of Eötvös Lóránd University of Sciences, Department of Genetics, who later moved to Hungarian Natural History Museum, Laboratory of Molecular Taxonomy.

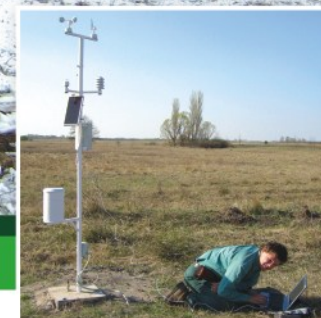




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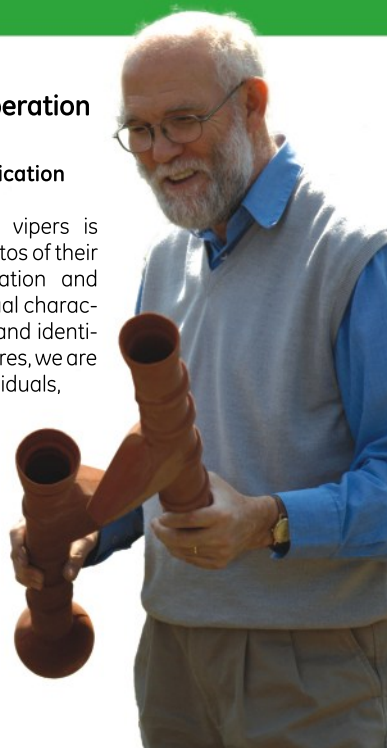
Hungarian Meadow Viper Conservation Centre and its operation

Captive breeding

Breeding was started with 10 adult vipers, collected from 5 different populations of Kiskunság. Breeding pairs were kept in 3x3 meters outside terrariums, covered with wire net from below and above. We had successful breeding through 4 consecutive years, even with females born in captivity. At the moment we have 161 Hungarian meadow vipers in the Centre.

Photographic identification

Identification of the vipers is possible by using photos of their head, as their scalation and pattern show individual characteristics. Description and identification of these features, we are able to identify individuals, minimising their disturbance. A further advantage of the method is that even the complete shedded skin is useful for identifying the viper, if registered.



Genetic screening

One goal of the breeding is to lower possibilities of inbreeding depression. Genetic screening is necessary for control of breeding. We used parallel methods, and all resulted the same assumption, that offsprings tend to show higher genetic diversity than their parents.

Thanks to genetic methods we can identify parents of individuals, making possible the creation of larger breeding groups, and still keep control over breeding lineages.

Wintering

We have developed an artificial burrow that can serve as hiding and wintering place for vipers. Our experiences are positive and we installed some to recent habitats in order to use in monitoring of the species. We have not recorded usage by vipers so far, but other amphibians and reptiles are already using these shelters in numbers.





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Monitoring vipers

Since 2004 we observed 49 vipers of 6 populations in Kiskunság. Since 2006 we participated in the monitoring of Hanság populations, observing further 11 individuals. In April 2007 together with Romanian partner LIFE-program, we observed 12 vipers of Transylvanian population. All observed individual were measured, scalation was recorded and photographed for future identification.

Genetic screening of wild population was started in 2006, after being urged by Hungarian Meadow Viper Conservation Council, collecting blood samples from adult individuals of each population.

First results among our samples show no abrupt classification according to their origin, including samples from Transylvania.



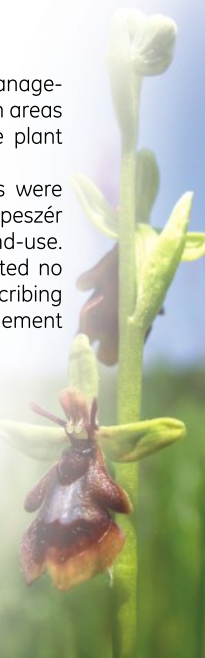
Vegetation mapping and botanical monitoring

An interesting picture evolved following botanical observations of grasslands, serving as Hungarian meadow viper habitats. The species was found on open sandy pasture, mezofil steppe meadows or deeper drying marsh-meadows, and even on some extensively used agricultural fields, alfalfa fields or former ploughlands.

During monitoring of vegetation we made an attempt to find favoured vegetation types of meadow vipers. Altogether 20 transects were selected on 10 known and potential habitats, where we collected data annually twice on the structure, species composition, amount of cover and degradation of vegetation, and recorded effect of actual management. We tried to map

landscape level effects of previous management. Vegetation maps were prepared on areas of sampling places in order to describe plant associations and their current state.

Full vegetation map of 8 viper habitats were prepared. Furthermore one area in Upper-peszér was mapped regarding historical land-use. During 4 years of monitoring, we detected no major changes in recorded variables describing vegetation on areas where land management was unchanging.





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Monitoring orthopterans

Monitoring of orthopterans were carried out on different vegetation patches along transects selected together with botanists. Standardised sweep netting was used as main sampling method, complemented with singling and acoustic detection and visual density-estimation by line-transect method. Annually 2 or 3 sampling rounds were carried out. We estimated living biomass, by measuring live specimens. Counting of cricket holes and analysis of results was carried out together with rodent-hole counting.

In 4 years of field study on the sampling sites in Kiskunság, which covered 10 habitats and potential habitats of Hungarian meadow viper we found altogether 49 species, 41 % of the total Orthoptera fauna of Hungary. The list contains

six species protected at national and EU level (*Acrida ungarica*, *Calliptamus barbarus*, *Celex variabilis*, *Gampsocleis glabra*, *Isophya costata*, *Tettigonia caudata*) as well. The species richness itself indicates the good naturalness of these habitats. On the different types of grassland habitats (fen meadows, steppe meadows and sandy grasslands) characteristic and more or less constant orthopteran assemblages were found. The most abundant species were *Chorthippus*, *Euchorthippus* and *Metrioptera* spp. Results show that in autumn elevated steppe habitats provide higher availability of orthopteran preys.



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Monitoring rodents

Presence of different small mammal populations in the habitats of Hungarian meadow viper has significance from two main points of view. On the one hand they can provide stable and easily accessible food resource, on the other hand their burrows can solve as perfect hiding or overwintering place for vipers. Two main methods were used in monitoring, live-trapping and burrow counting.

Trapping of small rodents was executed by 50 or 100 live-traps in an area during 3 or 4 days of summer trapping session. We estimated the small rodent density by the methods of multiple recapture studies.

Burrow counts were conducted at the beginning period of the yearly activity cycle of the vipers and before their disappearance for over-

wintering. In all areas we counted along standard transects composed of 5 or 9 sampling unit of 50 m length and 5 or 10 m width. Burrows found in the sample areas were categorized as holes of mice, voles, ground-squirrels, crickets or any other species (e.g. ferret or spider).

We can conclude that in the actual viper habitats in Peszéradacs the hiding and overwintering burrows should not be a limiting factor for the local viper population. In Bugac area these are even higher values. Densities of burrows are usually higher on elevated places. Presence of souslik can increase number of burrows significantly. Characteristic species are *Apodemus* and *Microtus* species.





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Grassland reconstruction

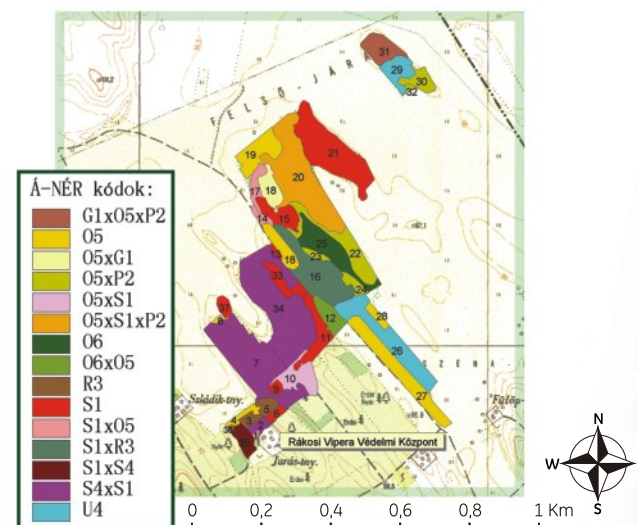
Grassland reconstruction is taking place on a forest patch that divides two recent viper habitats in the Peszéradacs area. These false acacia and pine forests were planted on local heights during the early '80s. The plantations not only occupied parts of viper habitats, but stolen the species of important wintering places that were safe from high water-table. Grassland reconstruction is supervised by experts of Kiskunság National Park, following guidelines of the Management Plan, developed by the project. At certain parts of the process the help of volunteers have great importance.

During the project we removed the tree plantations on 26 hectare. We also finished 2nd and 3rd part of reconstruction, consisting of actions like removal of pine-needles with

controlled fires, removal of stumps of false acacia, restricted use of chemicals to prevent growth of sprouts and other invasive plant species, and planting seeds of species forming natural grasslands in the area.

Our previous effort is showing results, as on the first 3 hectare area where grassland habitat was reconstructed, we detected patches of grassland similar to neighbouring natural grassland, and several protected species were recorded. We hope that vipers will use the reconstructed dry meadows, creating the chance to unite the two (sub)populations.

Vegetation map (Á-NÉR based) of grassland reconstruction site before start of activities





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Public awareness activities

Active conservation of a reptile, especially a venomous snake, always divides public. Our main priority was to increase the acceptance of the conservation program and the species, as well as to inform broad public. The program informed interested people through brochures and leaflets, information boards, frequent press-releases, on the project web-page and by public forums, educational presentations and scientific gatherings. Leaflet introducing the LIFE-program was published first, followed by a brochure about the species. The program results were published in a special issue of Duna-Ipoly National Park Newsletter, Cincér, in a book of Rosalia series and in this Layman's Report.

We presented our project on 10 international and 6 national scientific meetings in 9 posters and 12 presentations. Altogether 27 educational presentations were held fulfilling invitations. Press-conferences and public forums were held in settlements near recent viper habitats, where information boards were installed as well. It is important to mention that we had many groups visiting the Hungarian Meadow Viper Conservation Centre (arranged in advance), becoming an important segment in the active dissemination of our results. As the main role of the compound is the breeding of vipers we would like to separate the two functions in the future by building a visitor area.

Acknowledgement

We would like to express our thanks towards EU LIFE-Nature Fund and Ministry of Environment and Water Affairs Nature Conservation Authority for helping the program financially and morally (LIFE04NAT/HU/000116) and participating colleagues of Kiskunság National Park Directorate, Duna-Ipoly National Park Directorate, Fertő-Hanság National Park Directorate and Budapest Zoo. We are grateful to the following institutions for helping our program: Mapping Division and Táborfalva Shooting Range of Ministry of Defence, Lakto Kft., GuardianGlass Rt., REMS Hungary, Jász kun Nature Conservation Society, Szent-István University Department of Landscape Ecology Nature Conservation Club.

Without going into details we are thankful to the following persons for helping the realisation of the project at certain stage: Acs László, Almási Éva, Amati Gergely, Bakó Botond, Balázs György, Bálint Csaba, Balyi Balázs, Baracsi Ákos, Barta Aliz, Beke Zoltán, Benő Dávid, Bérces Sándor, Bíró Csaba, Bíró József, Boczek József, Bodor Ádám, Bóni Zoltán, Brankovics Dávid, Burghardt Tivadarné, Sir Robin Chancellor, Czére Zsolt, Csóka Annamária, Csuti Katalin, Dani László, Dankó Bettina, Dankovics Róbert, Deák Konrád, Demes Tamara, Emődi Andrea, Enyedi Róbert, Faragó Ágnes, Farkas Szilvia, Fatér Imre, Fidlóczky József,

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Participation of volunteers

Many volunteers helped the program. They were involved in some monitoring, bush-clearing, installation of artificial burrows, and even in building of viper enclosures. Altogether six occasions was used for holding training program for our volunteers and professional conservation rangers, where we introduced our program and the species, helped by program employees and invited experts. Volunteers attending these meeting were provided a plastic card, project T-shirt and training materials, including a laminated slate showing differences between various snake species in the region.





"... I would say, there is a considerable notability in this creature's nature, like it would reflect the tranquillity of the puszta and observing calmness of the people of puszta."

Lajos Méhely

A hazai viperákról /About native vipers/
(1912)

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Practical experiences of the project

Our knowledge increased considerably about behaviour and breeding of Hungarian meadow viper. We managed to observe such rare occasions like fight of males, courtship, mating or birth. Artificial burrows developed for semi-natural enclosures can be used for observation of other species. Veterinary knowledge increased as well, like caesarean section was carried out twice on viper female. Methodology of genetic screening was also developed in the frame of the project.

Several methods were used in the removal of false acacia and pine plantations. Our experiences about measures against the spread of common milkweed and other invasive plants increased as well.

Methodology and system of sampling used during monitoring viper habitats, belonging to Natura2000 Network, can be used in the deve-

lopment of an international monitoring protocol.

During the awareness raising campaign we found younger generations more open to the subject, although no serious opposition was felt overall. This practical experience can be used in the planning of communication strategy of future conservation programs.



Grass snake



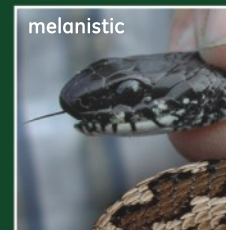
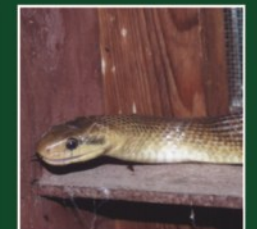
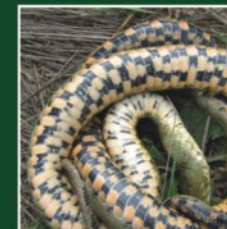
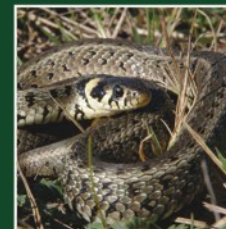
Dice snake



Smooth snake



Aesculapian snake



melanistic



Hungarian meadow viper

We tried to illustrate characteristic features of common snake species by the above collection of pictures and highlight some of the main differences from vipers.

- Generally vipers have shorter, thicker body, while other serpents are more elongated.
- Vipers' tail is significantly shorter, narrowing abruptly, while other serpents have long slender tails.
- Adult vipers, including the Common adder, never exceed total length of 60-70 cm, while all the other four species can grow larger.
- Viper's pupil is vertical while the other serpents have rounded.
- Vipers have a dorsal zigzag pattern, while all the other serpents have no such pattern.