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CONTENT

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The IUCN Otter Specialist Group Bulletin appears biannually. Articles, reports, symposium announcements and information on recent publications are welcome. All submissions should be typed double-spaced. The submission of an electronic manuscript on diskette or by e-mail is strongly recommended. Reports should not exceed 2000 words in length, i.e. not to exceed four printed pages, including diagrams and tables. Articles may be longer. Diagrams, maps and tables should be included as a photocopy ready for reprint. A short abstract for translation into Spanish and French has to be included.
Articles will be fully reviewed. Authors are requested to add a notice as to whether they submit an article or a report.

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NOTE FROM THE EDITOR

NOTE FROM THE EDITOR

There has been quite some delay between the last issue that was sent out earlier this year and the moment that this new issue goes online. There had been some discussions within a group of people that have actively been engaged in the IUCN OSG Bulletin in the past about the future. The problem was the steady increase of printing and postage costs and at the same time an every increasing problem to rise funding.

I presented 3 options to the discussion group, namely to go on like in the past with the problem that somebody has to take the initiative and action to secure at least mid-term funding. Another option was to use the newly launched website and to place the manuscripts online once received and accepted. The third option was the simple solution to stop the IUCN OSG Bulletin. It turned out immediately that option number 3 was no option and that nobody had the financial means or contacts to pay for a three year period. Actually everybody was enthusiastic about the idea to have the IUCN OSG Bulletin online. As a service for those that really have no access to the internet a limited number of "handmade" copies will be made available upon request.

As a result of these discussions you can read now the first articles and reports on our new website at:

http://www.otterspecialistgroup.org/Bulletin/IUCNOSGBull.html

This development would have been impossible without the dedicated work of Lesley for which we all owe her lots of thank! As you all may have noticed the website has completely been renewed and we have at least some information available. Please keep in mind that a website is as good as the information provided by the embers to Lesley! We may now and then come with specific requests to some of you! Please send us for example the links to new publications that are online at various journals.

I hope that the group will accept this new form and that we have a lot of pleasure with the Bulletin in the future!

With regards,

Arno

In addition to the IUCN OSG Bull that is now available online I was informed that the Proceedings of the conference held on Skye in 2003 are finally in the printing process and copies may be order from Grace. Please contact her for details (Grace M. Yoxon, E-mail: iosf2@aol.com, www.otter.org).

IUCN/SSC OSG GROUP

FROM THE CHAIRMAN'S DESK

Once again, Arno and his colleagues have successfully produced the OSG Bulletin – congratulations and well done. As many of you may have been aware there has, for the past few years, been a problem with finding the necessary funds to produce the Bulletin as a 'hard-copy'. The costs of production and posted coming to in excess of 1000 euros, in fact, there have been several instances where the Editor had to use his own money to meet the costs of an issue. This could not continue, so earlier this year, Arno established a small group to look at the various options regarding future of the Bulletin. The result is that it was decided that the publication would be produced electronically. In many ways this has appeared to be the logical development. Already the older editions of the Bulletin are being put on the OSG web page. It also means cheaper production costs and a faster means of making members aware of what is happening. A 'hard copy' can still be obtained. Arno will be giving more details about this elsewhere in the Bulletin. I hope you like the new presentation.

The OSG web site has lain 'dormant' for a long time. Lesley Wright agreed to take over the responsibility for it. Unfortunately it took some time to get ownership etc transferred. Now, however, it is up and running at www.otterspecialistgroup.org. Thanks to Lesley and her merry band of helpers. The webpage is he best means of passing information between members and activities. Remember this is your page; it is only as good as the information you put in – so please view and use it.

Next year sees the Xth Otter Colloquium. This will be held between 10th and 16th October 2007 in Kwachean Province, Gangwan, South Korea. The meeting is being organised by Professor Sung-Yong Han, Director of the Korean Otter Research Centre. Details can be found on the Colloquium web site (www.otter2007.org), which can also be accessed through the OSG web site. I recently returned from a trip to Professor Han to discuss the Colloquium and see the facilities. There is a separate article about this visit on the OSG web page. Here I will only summarise what I have already said. Professor Han with the support of the Mayor of Hwachean, has the organisation very much in hand. The venue is ideal, good lecture facilities and plenty of small meeting rooms, which we can use. Hwachean County lies in a beautiful part of Korea – an area of woodland, lakes and mountains. There is little industry so the air is clear. The Colloquium offers a great opportunity for delegates to visit a wonderful part of the world and, for many, to experience a new and wonderful culture.

I had originally intimated that it was my intention to leave the current structure of the OSG very much as it was, at least until I had some experience of what was needing to be done. Any changes would be intimated at the Colloquium. However, 'the best laid plans of mice and men….' It has been necessary to make some changes and to move with some of the organisation.
Firstly Jan Reed-Smith has agreed to act as convenor of the Otters in Captivity Task Force – its memberships appears to be in place and no doubt we will be hearing of its activities in the not too distant future.
Tom Serfass has also accepted the convenor ship of the Reintroduction Task Force. This has only recently been done, but hopefully Tom will soon have its membership organised and it will be up and running.
The Red List Group will continue to be chaired by Sayed A. Hussain, no doubt he will be in touch with his members trying to get up dated information on the status of the various species. I would hope that at the Colloquium we would be able to have a review on the species status.

Several members have asked about the Otter Action Plan – at present there is not much to report. I have set up a small group to look into what we can/should do. I would expect to report on this in the next Bulletin.

In May I attended an IUCN European Mammal Assessment meeting in Austria where the status of the species was discussed. Over all the picture appears to be positive, but I emphasised that there were still many problems and got an agreement that the current status will not be changed.

Like the web page, the activities of the Chair depend very much on the support and co-operation of the members. I am afraid that over the past few months several people have been asked by me to do a number of jobs – for those who have responded, many thanks. Too often it is the willing horses that get asked. All I ask is that if I request information and/or help, you respond, even if only to say 'sorry'. It is unfortunate when requests for information/help go unanswered.

May I wish you all the best for 2007 and look forward to seeing many of you in Korea.

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R E P O R T

THE OTTER IN NEW ZEALAND - DID SUCH AN ANIMAL EXIST?

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There have recently been some renewed interests in the possibility that a species of otter existed in New Zealand. This short note examines the information available. It makes no attempt to evaluate the existence or not of such an animal, rather it is presented to perhaps further discussion on the matter.

New Zealand was reputed to have had an indigenous mammal living in the lakes and rivers of South Island at the time of the first European settlement (see COOK, 1777, Vol. 1: p. 98 for example). No specimen was ever collected, the information being based primarily on second-hand Maori accounts and other unsubstantiated observations.

Early reports from 1844, referred to beavers living on the east side of Lake Wanaka (HOCKEN, 1898), but MANTELL (1851), describing accounts of this animal by the local Maoris, concluded that *altogether the account pointed to an animal resembling the otter or badger, rather than to the beaver.* Von HOCHSTETTER (1867, p. 161) mentions a letter received from a Julian Haast in 1861, in which the author wrote *I frequently saw its tracks ..... They resemble the tracks of our European otter - only a little smaller.*

An early dictionary (TAYLOR, 1848), translated the Maori word waitoreke as *otter (uncertain seal)*; but a more recent standard Maori dictionary (WILLIAMS, 1957) omits *waitoreke* altogether; the word being considered ungrammatical (KRUMBIEGEL, 1950).

With the revised interest in the "*New Zealand otter"* in the mid 1900s, WATSON (1960) reviewed all the available literature and concluded that: *there is very little ground for any belief in the animal's existence; nevertheless a shadow of doubt remains and it would be unwise altogether to ignore the possibility however remote it may be.*

The possible existence of the New Zealand otter is discussed, because if such an animal ever existed, its importance and significance could hardly be exaggerated. DARWIN (1888, vol. 3: p. 6) said of the animal, should one be found it might "*turn out something like the Solenhofen bird"* (*Archaeopteryx*).

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R E P O R T

DIET OF THE OTTER *Lutra Lutra* IN DIFFERENT HABITATS OF SOUTH-EASTERN BULGARIA

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Abstract: The study was carried out in three geographic regions of southeastern Bulgaria with similar conditions: Upper Thracian Valley, Kazanlashka Valley, Surnena Sredna Gora Mountain and Black Sea Coast. The material was collected between 29.02.2005 – 21.03.2006 from various habitats. A total of 78 species were registered in the otter diet, and 65 of them were new records for Bulgaria. Following this study, a total of 101 different species of prey are known in this country. The main food source of the otter was found to be fish (*Carassius auratus gibelio*, *C. carassius*, *Perca fluviatilis*, *Lepomis gibbosus*, *Barbus cyclolepis*), but in rivers marsh frogs (*Rana ridibunda*) and freshwater crabs (*Potamon ibericum*) were also dominant prey. The main food source species and the trophic niche breadth of the otter in the region studied varied through the seasons and according to different habitats.
Keywords: otter, *Lutra lutra*, diet, habitats, Bulgaria

INTRODUCTION

The diet of the otter in Bulgaria was poorly known. Until now (GEORGIEV, 2004) 36 food components were reported: 2 species of molluscs (Mollusca: Bivalvia), 5 species of crustaceans (Crustacea), 4 species of insects (Insecta), 9 fish species (Pisces), 2 amphibian species (Amphibia: Anura), 3 species of reptiles (Reptilia: Serpentes, Chelonia), 4 bird species (Aves), 2 species of mammals, one of them eaten as a carcass (Mammalia), fruits from 4 plant species and garbage. Information of the seasonal variation of the diet in one urbanized habitat was also obtained, calculated as a relative percentage of frequency. Before this study, there were only 36 species of prey known in this country, but after this study, the number has increased to 101.

Our study was aimed on the otters' diet when using different habitat types in south-eastern Bulgaria, and focused on the following tasks: 1. to provide more precise data on the species spectrum of the diet; 2. to determine the main food sources; 3. to gather some information on the seasonal variation in the food and the trophic niche breadth.

STUDY AREA, MATERIAL AND METHODS

The study was carried out in three geographic regions of south-eastern Bulgaria with similar conditions: Upper Thracian Valley, Kazanlashka Valley, Surnena Sredna Gora Mountain and Black Sea Coast. Most of the main otter habitats up to 500 meters a. s. l. were investigated. The mean annual temperatures in the region are 9-12° C with strong to moderate Mediterranean climate influence. The average annual rainfall is 550 mm (GRUEV and KUZMANOV, 1999).

Habitat types were considered according to the classification of GEORGIEV (2005). Different habitat sub-categories were also divided on the basis of the presence or lack of fish growing human activities:

1. Medium sized reservoirs combined with streams, floods, medium sized rivers and irrigation canals, not used for fish farming. Upper Thracian Valley – artificial lake in a city park (Stara Zagora Town, UTM: LG89); Surnena Sredna Gora Mountain - artificial lake in a park, (Starozagorski Bani Resort, UTM: LH70), 2 microdams north of Starosel village (UTM KH91) and Matenica village (LH90). Total spraints

collected 256 (173 – spring-summer period, 83 – autumn-winter period), and also food remains from feeding sites were gathered.

2. Medium sized reservoirs and fishponds combined with streams, floods, various sized rivers and irrigation canals, used for fish farming. Upper Thracian Valley – microdams near the villages of Trankovo (UTM: MG08), Podslon (UTM: MH00), Aprilovo (UTM: MG07), Konush (UTM: LG35), fish farms near Plovdiv Town (UTM: LG17); Kazanlashka Valley – microdam near Sheinovo village (UTM: LH62), fish farms near Nikolaevo Town (UTM: MH01). Total spraints collected 322 (130 – spring-summer period, 192 – autumn-winter period), and food remains gathered.

3. Large reservoirs in hilly areas, without any combinations with other habitats, not used for fish farming. Upper Thracian Valley – Trakiec Dam (UTM: LG63) and Kazanlashka Valley – Jrebchevo Dam (UTM: MH02). Total spraints collected 78 (45 – spring-summer period, 33 – autumn-winter period).

4. Large reservoirs in plain areas, combined with medium sized rivers and floods, used for fish farming. Upper Thracian Valley – Ovcharica Dam (UTM: MG27, MG37). Total spraints collected 108 (48 – spring-summer period, 60 – autumn-winter period), and food remains gathered.

5. Medium sized rivers and similar sized soil bank canals with relatively constant water levels combined with small canals and floods. Upper Thracian Valley – rivers Blatnica (UTM: MH10), Oriahovica (UTM: MH00), and Sazliika (UTM: LG98), canals near Plovdiv (UTM: LG16) and Stara Zagora Towns (UTM: LG99). Total spraints collected 200 (84 – spring-summer period, 116 – autumn-winter period), and food remains gathered.

6. Large rivers combined with canals, microdams, and rice fields. Upper Thracian Valley – Marica River (UTM: MG13, MG14, LG06, LG16). Total spraints collected 170 (85 – spring-summer period, 85 – autumn-winter period), and abundant food remains gathered.

7. Black Sea coast rocky areas combined with a small freshwater river north of Carevo town (UTM: NG67), spring-summer period only, total 21 spraints and abundant food remains collected.

The material (spraints and food remains collected between 29.02.2005 – 21.03.2006) was air-dried at room temperature, labeled and stored in plastic bags. It was studied under binocular microscope and dissected in 70 % alcohol. The food components were determined using keys mainly by DAY (1966), MARZ and BANZ (1987), KARAPETKOVA and JIVKOV (1995), POPOV and SEDEFCHEV (2003). A reference collection of fish bones and scales made especially for this study and the whole animal collections of the Faculty of Biology of Plovdiv University were also used. In addition, the fish (MIHAILOVA, 1965, 1970; KARAPETKOVA and JIVKOV, 1995; JIKOV and DOBREV, 2001) and mammal (POPOV and SEDEFCHEV, 2003) species' distribution was considered.

For the quantification study the minimal number of individuals was accepted and measurements were taken using a caliper.

The inquiry method was only used for the identification of *Acipenseridae* species (farmed in Ovcharica Dam) in the otters' diet and this prey was not included in the statistics.

The trophic niche breadth was derived from the LEVIN`s index (FEINSINGER et al., 1981):

$$B = 1/R\Sigma p_i^2$$

where R is the number of food categories available (here R = 11: *Mollusca*, *Crustacea*, *Myriapoda*, *Insecta*, *Pisces*, *Anura*, *Reptilia*, *Aves*, *Mammalia*, fruits and unidentified) and p_i is the proportion of each food categories.

RESULTS AND DISCUSSION

A total of 78 species were identified in the otter diet: 7 Mollusca, 9 Crustacea, 2 Myriapoda, 7 Insecta, 31 fish, 5 frogs, 5 reptiles, 4 birds, 6 mammals, and fruits from 2 plant species (Table 1, 2, 3).

We consider that some of the invertebrates were not eaten directly but were taken in the stomach content of other prey (for example mussels, small gastropods, insects and isopods), and some (for example *Dreissena polymorpha)* were present only occasionally in the spraint, as shell or chitin remains. Larger invertebrates, we consider were taken by the otter (*Helix lucorum*, *Gryllotalpa gryllotalpa*, *Ditiscus marginalis* and others). The species *Scardinius erythrophtalmus*, *Emys orbicularis* and carcass of a domestic dog and garbage remains reported for the same region by GEORGIEV (2004) were not found during this study, and we consider they are occasional and rare components in the otters' food here. The first species is relatively rare in the ichthyofauna of the area investigated (KARAPETKOVA and JIVKOV, 1995).

In most of the habitats studied the main food source was fish and the following species seemed to be the most important prey in the region - *Carassius auratus gibelio* and *C. carassius* (medium sized and large reservoirs used for fish farming, large rivers), *Lepomis gibbosus* (the two sub-categories of medium sized reservoirs and large dams used for fish farming), *Perca fluviatilis* (large and medium sized reservoirs not used for fish farming), *Barbus cyclolepis* (rivers and irrigation canals, especially during the autumn-winter period). From the marine environment fish from the families Labridae and Gobiidae were most abundant in the diet. Only in the region of the large Marica River was the main prey throughout all seasons the freshwater crab (*Potamon ibericum*), and the frog *Rana ridibunda* was very common during spring–summer period in the region of medium sized rivers and the soil bank canals.

Two of the dominant species in the otter's food, *Potamon ibericum* and *Barbus cyclolepis*, occur in Europe mostly in the Balkans and no reference papers for their preying on these species were found. The marsh frog (*Rana ridibunda*) has a southern distribution and is not a typical prey species for most of the regions of northern countries (TUMANOV and SMELOV, 1980; MCFADDEN and FAIRLEY, 1984; WEBER, 1990; OTTINO and GILLER, 2004; BRZEZINSKI et al., 1993; TAASTROM and JACOBSEN, 1999; SIDOROVICH, 1995; SIDOROVICH et al., 1998). The marsh frog was reported from neighboring countries like Albania (PRIGIONI et al., 1986) and Hungary (LANSZKI et al., 2001) as one of the otter's main prey.

The food niche breadth calculated was rising from 0.10 to 0.24. It had highest levels in the medium sized reservoirs and fishponds during the autumn-winter period and in large rivers during spring and summer. The narrowest trophic niche was estimated for all of the types and seasons in the large dams.

CONCLUSIONS

A total of 78 species were registered in the otter diet, and 65 of them were new records for Bulgaria. Until now 101 different species of prey were known for this country. The main food source of the otter in the lowland and hilly areas of south-eastern Bulgaria was fish, but in rivers frogs and freshwater crabs were also dominant prey. The main food source species and the trophic niche breadth of the otter in the region studied varied throughout the seasons and with different habitats.

Table 1. Invertebrates in the diet of the otter (*Lutra lutra*) from different habitats in south-eastern Bulgaria. The habitat numbers correspond to those mentioned in the text, n-minimal number of individuals, %-percent of occurrence, a-spring-summer, b-autumn-winter.

	1a		1b		2a		2b		3a		3b		4a		4b		5a		5b		6a		6b		7	
Diet component	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Dreissena polymorpha	-	-	-	-	-	-	-	-	4	5,6	-	-	-	-	3	3,4	-	-	-	-	-	-	-	-	-	-
Mitilus galloprovincialis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	5,9
Mytilaster edulis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,2
Pomatias elegans	-	-	-	-	-	-	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oxyloma elegans	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	2,6	-	-	-	-
Monacha sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,8	-	-
Helix lucorum	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,9	1	0,8	-	-
Total Mollusca	**1**	**0,4**	**-**	**-**	**-**	**-**	**1**	**0,5**	**4**	**5,6**	-	-	**-**	**-**	**3**	**3,4**	**-**	**-**	**-**	**-**	**4**	**3,4**	**2**	**1,5**	**6**	**7,1**
Gammaridae spp.	1	0,4	-	-	1	0,5	-	-	2	6,3	-	-	-	-	-	-	2	0,9	-	-	2	1,7	5	3,8	2	2,4
Isopoda sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	25	29,4
Astacus leptodactylus	19	7,6	8	7,3	6	3,0	6	2,9	-	-	-	-	-	-	-	-	-	-	-	-	1	0,9	-	-	-	-
Astacus/Austropotamobius sp.	1	0,4	-	-	2	1,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potamon ibericum	18	7,2	4	3,7	6	3,0	4	1,9	-	-	-	-	-	-	-	-	117	50,4	30	24,4	11	9,5	2	1,5	-	-
Cancer pagurus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,2
Xantho poressa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,2
Pachygrapsus marmoratus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	14,1
Eriphia verrucosa	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,2
Decapoda sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,2
Total Crustacea	**39**	**15,7**	**12**	**11,0**	**15**	**7,5**	**10**	**4,8**	**-**	**-**	-	-	**-**	**-**	**-**	**-**	**119**	**51,3**	**30**	**24,4**	**14**	**12,1**	**7**	**5,4**	**43**	**50,6**
Diplopoda indet.	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Myriapoda indet.	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Myriapoda	**2**	**0,8**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	-	-	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Coleoptera spp. /small/	7	2,8	1	0,9	3	1,5	3	1,4	-	-	-	-	1	1,7	-	-	7	3,0	-	-	10	8,6	7	5,4	-	-
Coleoptera spp. /large/	1	0,4	-	-	-	-	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	3	2,6	-	-	-	-
Dityscus marginalis - larvs	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dityscus marginalis	2	0,8	4	3,7	4	2,0	4	1,9	-	-	-	-	1	1,7	-	-	-	-	-	-	1	0,9	-	-	-	-
Gryllotalpa gryllotalpa	1	0,4	-	-	1	0,5	1	0,5	-	-	-	-	-	-	-	-	2	0,9	-	-	-	-	-	-	-	-
Forficula sp.	-	-	1	0,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Orthoptera sp.	-	-	1	0,9	-	-	-	-	-	-	-	-	-	-	-	-	1	0,4	-	-	-	-	-	-	-	-
Anisoptera - larvs	-	-	-	-	-	-	5	2,4	-	-	-	-	-	-	-	-	1	0,4	-	-	-	-	-	-	-	-
Insecta indet.	-	-	3	2,8	2	1	3	1,4	-	-	-	-	-	-	-	-	1	0,4	-	-	1	0,9	3	1,5	-	-
Total Insecta	**12**	**4,8**	**10**	**9,2**	**10**	**5,0**	**17**	**8,1**	**-**	**-**	**-**	**-**	**2**	**3,3**	**-**	**-**	**12**	**5,2**	**-**	**-**	**15**	**12,9**	**10**	**7,7**	**-**	**-**

Table 2. Fish in the diet of the otter (*Lutra lutra*) from different habitats in south-eastern Bulgaria. The habitat numbers correspond to those mentioned in the text, n-minimal number of individuals, %-percent of occurrence, p-presence but not included in the statistics, a-spring-summer, b-autumn-winter

	1a		1b		2a		2b		3a		3b		4a		4b		5a		5b		6a		6b		7	
Diet component	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Raja clavata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,2
Acipenseridae sp.	-	-	-	-	-	-	-	-	-	-	-	-	p	-	-	-	-	-	-	-	-	-	-	-	-	-
Esox lucius	-	-	1	0,9	1	0,5	1	0,5	-	-	-	-	-	-	2	2,3	8	3,4	2	1,6	-	-	-	-	-	-
Rutilus rutilus	18	7,2	8	7,3	-	-	-	-	1	1,4	4	12,5	1	1,7	3	3,4	1	0,4	2	1,6	4	3,4	6	4,6	-	-
Leuciscus cephalus	8	3,2	3	2,8	4	2,0	3	1,4	-	-	1	3,1	1	1,7	-	-	2	0,9	5	4,1	6	5,2	8	6,2	-	-
Aspius aspius	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,1	-	-	-	-	2	1,7	-	-	-	-
Tinca tinca	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3,4	-	-	-	-	-	-	-	-	-	-
Alburnus alburnus	9	3,6	3	2,8	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alburnus/Alburnoides sp.	-	-	-	-	-	-	2	1,0	3	4,2	8	25,0	1	1,7	13	14,8	-	-	6	4,9	-	-	1	0,8	-	-
Abramis brama	-	-	-	-	1	0,5	-	-	-	-	-	-	13	21,7	1	1,1	-	-	-	-	-	-	-	-	-	-
Vimba melanops	-	-	-	-	-	-	-	-	-	-	1	3,1	-	-	-	-	1	0,4	1	0,8	-	-	-	-	-	-
Chondrostoma vardarense	-	-	-	-	-	-	1	0,5	-	-	-	-	-	-	-	-	-		4	3,3	-		1	0,8	-	-
Rhodeus sericeus amarus	-	-	1	0,9	1	0,5	-	-	-	-	-	-	-	-	-	-	2	0,9	6	4,9	1	0,9	18	13,8	-	-
Pseudorasbora parva	1	0,4	-	-	20	10,0	25	11,9	-	-	-	-	4	6,7	2	2,3	-	-	-	-	1	0,9	3	1,5	-	-
Gobio gobio	2	0,8	4	3,7	-	-	11	5,2	-	-	1	3,1	-	-	-	-	-	-	-	-	-	-	1	0,8	-	-
Barbus cyclolepis	4	1,6	8	7,3	-	-	12	5,7	-	-	-	-	1	1,7	-	-	21	9,1	21	17,1	9	7,8	20	15,4	-	-
Cyprinus carpio	6	2,4	1	0,9	9	4,5	13	6,2	-	-	-	-	-	-	3	3,4	6	2,6	1	0,8	-	-	-	-	-	-
Carassius carassius	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crassius auratus gibelio	-	-	1	0,9	-	-	2	1,0	-	-	-	-	-	-	-	-	1	0,4	-	-	-	-	1	0,8	-	-
Crassius sp.	7	2,8	-	-	23	11,5	24	11,4	2	2,8	1	3,1	10	16,7	2	2,3	28	12,1	6	4,9	4	3,4	10	7,7	-	-
Hypophtalmychtis sp.	-	-	1	0,9	7	3,5	4	1,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ctenopharygodon idella	-	-	-	-	1	0,5	2	1,0	-	-	-	-	-	-	-	-	-	-	-	-	1	0,9	-	-	-	-
Cyprinidae sp.	10	4,0	5	4,6	15	7,5	16	7,6	2	2,8	2	6,3	6	10,0	1	1,1	6	2,6	12	9,8	3	2,6	12	9,2	-	-
Cobitidae sp.	-	-	1	0,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,8	-	-
Silurus glanis	-	-	-	-	-	-	-	-	-	-	3	9,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silurus/Ictalurus sp.	-	-	-	-	-	-	-	-	-	-	-	-	1	1,7	-	-	-	-	-	-	-	-	-	-	-	-
Gadidae sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2,4
Lepomis gibbosus	65	26,1	19	17,4	27	13,5	16	7,6	-	-	-	-	8	13,3	47	53,4	-		3	2,3	1	0,9	1	0,8	-	-
Serranidae sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,2
Stizostedion lucioperca	-	-	-	-	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perca fluviatilis	28	11,3	5	4,6	8	4,0	6	2,9	58	81,7	8	25,0	3	5,0	3	3,4	-	-	-	-	3	2,6	2	1,5	-	-
Gymnocephalus cernuus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1,1	-	-	-	-	-	-	-	-	-	-
Labridae sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	10	11,8
Proterorchinus marmoratus	-	-	2	1,8	-	-	6	2,9	-	-	-	-	-	-	-	-	3	1,3	1	0,8	5	4,3	2	1,5	-	-
Gobiidae sp.	-	-	-	-	-	-	-	-	-	-	-	-	2	3,3	-	-	-	-	-	-	-	-	-	-	18	21,2
Total Pisces	**159**	**63,9**	**63**	**57,8**	**119**	**59,5**	**144**	**68,6**	**66**	**93,0**	**29**	**90,6**	**52**	**86,7**	**82**	**93,2**	**79**	**34,1**	**85**	**69,1**	**42**	**36,2**	**87**	**66,9**	**32**	**37,6**

Table 3. Various food components in the otter's diet (except Invertebrates and Fish) from different habitats in south-eastern Bulgaria. The habitat numbers correspond to those mentioned in the text, n-minimal number of individuals, %-percent of occurrence, a-spring-summer, b-autumn-winter. Total number of individuals/objects for a given habitat registered and the whole food niche breadth calculated is represented.

	1a		1b		2a		2b		3a		3b		4a		4b		5a		5b		6a		6b		7	
Diet component	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Bombina variegata	-	-	-	-	16	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rana ridibunda	7	2,8	9	8,3	20	10	23	11,0	-	-	1	3,1	2	3,3	-	-	11	4,7	3	2,3	20	17,2	12	9,2	1	1,2
Rana dalmatina	1	0,4	1	0,9	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rana spp.	6	2,4	5	4,6	5	2,5	5	2,4	-	-	-	-	-	-	-	-	1	0,4	2	1,6	4	3,4	1	0,8	-	-
Bufo bufo	3	1,2	-	-	17	8,5	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bufo viridis	-	-	-	-	-	-	1	0,5	-	-	-	-	2	3,3	-	-	-	-	-	-	-	-	1	0,8	-	-
Bufo spp.	-	-	1	0,9	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,8	-	-
Anura spp.	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	1,3	1	0,8	2	1,7	3	1,5	-	-
Total Anura	**18**	**7,2**	**16**	**14,7**	**46**	**23,0**	**30**	**14,3**	**-**	**-**	**1**	**3,1**	**4**	**6,7**	**-**	**-**	**15**	**6,5**	**6**	**4,9**	**26**	**22,4**	**-**	**-**	**1**	**1,2**
Lacerta cf. trilineata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,9	-	-	-	-
Lacerta viridis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,9	-	-	-	-
Natrix tessellata	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,4	-	-	-	-	-	-	-	-
Natrix natrix	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Natrix sp.	4	1,6	1	0,9	4	2	2	1	-	-	-	-	-	-	-	-	3	1,3	-	-	-	-	-	-	-	-
Elaphe longissima	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colubridae sp.	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	1	0,4	-	-	-	-	-	-	-	-
Total Reptilia	**7**	**2,8**	**1**	0,9	**5**	**2,5**	**2**	**1,0**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**5**	**2,2**	**-**	**-**	**2**	**1,7**	**-**	**-**	**-**	**-**
Gallinula chloropus	-	-	-	-	1	0,5	-	-	-	-	-	-	-	-	-	-	1	0,4	1	0,8	1	0,9	-	-	-	-
Anas platyrhinchos f. dom.	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anatinae sp.	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Acrocephalus sp.	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ralliformes sp.	1	0,4	-	-	1	0,5	1	0,5	-	-	-	-	1	1,7	2	2,3	-	-	-	-	-	-	-	-	-	-
Charadriiformes sp.	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	1	1,1	-	-	2	-	-	-	-	-	-	-
Anseriformes sp.	-	-	-	-	-	-	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Passeriformes sp.	-	-	1	0,9	-	-	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aves indet.	-	-	1	0,9	1	0,5	1	0,5	1	1,4	1	3,1	-	-	-	-	1	0,4	1	-	2	1,7	-	-	-	-
Total Aves	**5**	**2,0**	**2**	**1,8**	**3**	**1,5**	**4**	1,9	**1**	**1,4**	**1**	**3,1**	**1**	**1,7**	**-**	**-**	**2**	**0,9**	**2**	**1,6**	**3**	**2,6**	**-**	**-**	**-**	**-**
Talpa cf. europaea	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neomys anomalus	-	-	1	0,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1,7	2	1,5	-	-
Neomys sp.	-	-	-	-	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crocidura leucodon	-	-	1	0,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crocidura sp.	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,9	-	-	-	-
Mus sp.	-	-	1	0,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,9	-	-	-	-
Microtus sp.	-	-	1	0,9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1,7	2	1,5	-	-
Arvicola terrestris	3	1,2	-	-	1	0,5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1,7	1	0,8	-	-
Rodentia sp.	1	0,4	1	0,9	-	-	1	0,5	-	-	1	3,1	-	-	-	-	-	-	-	-	0	0,9	2	1,5	-	-
Total Mammalia	**5**	**2**	**5**	4,6	**2**	**1,0**	**1**	**0,5**	**-**	**-**	**1**	**3,1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**8**	**6,9**	**-**	**-**	**-**	**-**
Prunus cerasifera	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0,9	-	-	-	-
Rosa sp.	1	0,4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Fruits	**1**	**0,4**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**0,9**	**-**	**-**	**-**	**-**
Unidentified	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**0,5**	**-**	**-**	**-**	**-**	**2**	**3,3**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**0,9**	**-**	**-**	**-**	**-**
Total individuals/objects	**249**	**100**	**109**	**100**	**200**	**100**	**210**	**100**	**71**	**100**	**32**	**100**	**60**	**100**	**88**	**100**	**232**	**100**	**123**	**100**	**116**	**100**	**130**	**100**	**85**	**100**
Trophic niche breadth	**0,21**		**0,24**		**0,22**		**0,18**		**0,10**		**0,10**		**0,12**		**0,10**		**0,24**		**0,17**		**0,24**		**0,19**		**0,23**	

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R E P O R T

DO OTTERS OCCASIONALLY VISIT ISRAEL'S COASTAL PLAIN?

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1

Up until the middle of the 20th century, Eurasian otters (*Lutra lutra*) were abundant in Israel in all coastal rivers extending from the Lebanese border to the Tel-Aviv region, as well as along the Jordan River from its source to the Dead Sea. Only these two water systems, the Jordan River basin in the East and the coastal plain in the West, can support otter existence. A connecting corridor between these regions exists on the Harod valley and the Yizrael Valley. However, during the 1960s the otter population underwent a dramatic decline due to illegal hunting, water pollution, and the drainage of water sources (MENDELSSOHN and YOM-TOV, 1999), and the coastal plain population was considered extinct (SHALMON, 1994).

An initial field survey for signs of the Eurasian otter, in accordance with the 'Standard Method', was carried out in 2000 (REUTHER and DOLEV, 2000). Since then, we have been conducting annual surveys at 94 permanent sprainting sites along the Jordan River basin and the coastal plain (DOLEV et al., 2006). Whilst otter signs (spraints, footprints) were found regularly along the Jordan valley, and the percentage of positive sites there is relatively constant, otter signs were very rare in the western region. In fact, signs were found along the Mediterranean shore only three times: in March 1986, spraints were found in a small river in the northern coastal plain near Akko (Acre) (MACDONALD et al., 1986); in October 2000, spraints and footprints were found in two streams in the central coastal plain (REUTHER and DOLEV, 2000); and finally in a recent survey carried out in March 2006, spraints were found again in a river outlet near Akko (Figure 1). Direct observations of otters along the coastal plain are even more unusual: the last records of sightings of individuals along the coastal plain were in 1967 (south to Haifa) and in 1988 (along the northern coastal plain) (GUTER, 2004). Two recent but unconfirmed observations of otters from the central coastal plain are dated to November 2000.

Since field surveys have been carried out in the same method by the same surveyors during the last six years, we believe that the sporadic records of spraints found in 2000 and then later in 2006, in the coastal plain cannot indicate a stable population. It seems more likely that these signs belong to migrant otters coming from the Mediterranean Sea, presumably from the Lebanese coast (40 to 80 km away). These visits are uncommon but may indicate a pattern repeated once in a few years. The Israel otter population forms the southeastern border of the Mediterranean-Arab range of this species. It is unclear whether the Israeli otter population is connected to its counterparts in Syria and in Lebanon and whether they still exist there at all. Therefore, the otter population in Israel might be isolated. Hence, this phenomenon is of great importance to the Israeli otter population as it may be one of the few sources of genetic variability.

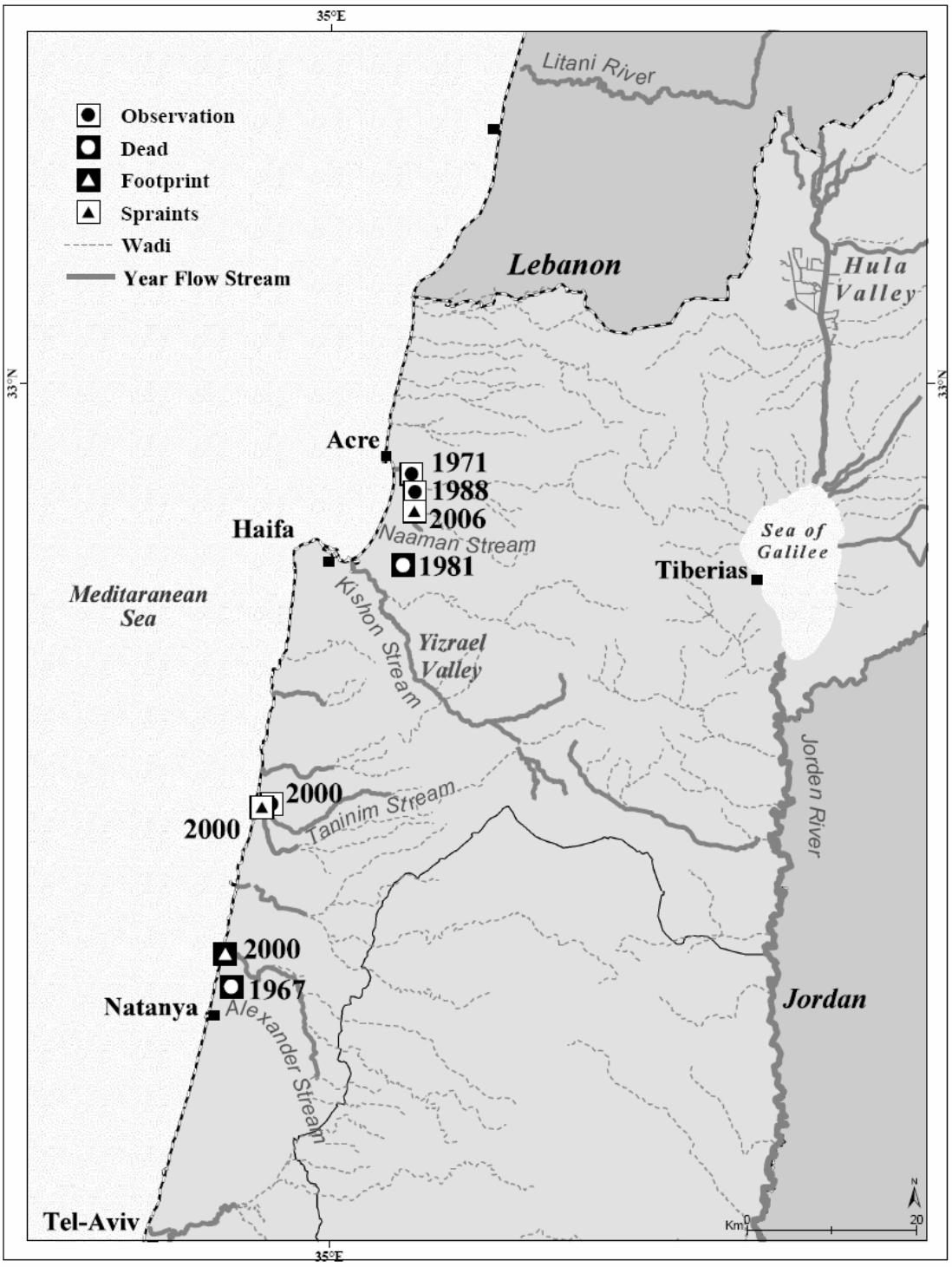

Figure 1. Otter records from Israel's Coastal Plain from 1967 to 2006. The terms 'Central' and 'Northern' coastal plain mentioned in the text are southern and northern to Haifa respectively. Circles represent direct observations while triangles represent otter signs (spraints, footprints). Year of finding is indicated next to each record.

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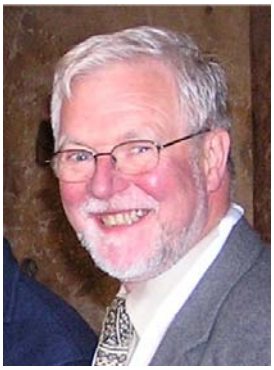
REPORT

THE OTTER - AMBASSADOR OF PEACE



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THE OTTER – AMBASSADOR OF PEACE
The 10th International Otter Colloquium
Hwacheon, Korea
10-16th October 2007

I have recently returned from a week in Korea visiting Hwacheon, the location for next year's Otter Colloquium. It was an opportunity for me to meet with Professor Sung-Yong Han, the Director of the Korean Otter Research Centre and organiser of the meeting, see the conference facilities and discuss the event with the mayor of the city.

Hwacheon County lies in the north east of the country. It is close to the border with North Korea, the Demilitarised Zone (DMZ) being about half an hour from the city itself. The countryside is very beautiful – a land of lakes, mountains and woodlands. The dates of the colloquium next year will coincide with autumn – a time when the leaves on the trees will be turning to red, gold and browns, giving a colourful vista. The temperature too is very pleasant, in the mid twenties and the humidity is low. To see more of the area visit http://www.ihc.go.kr/English/html/main.html.

Plans for the conference are well in hand. The building where the meeting will take place is large and modern. The main lecture theatre will easily accommodate all our delegates, while there are a number of smaller rooms which can be used for smaller meetings and workshops. It is planned that all the meals will be served here. Final details of the programmes will be produced early in the New Year, when the call for papers will be opened.

Hwacheon city and county play a leading role in efforts to achieve peace, reconciliation and harmony with their North Korean neighbours. In this the Mayor has been one of the principal instigators. He has been most supportive of the conference. I spent a couple of hours with him discussing the event – his enthusiasm for both the colloquium and otters were very obvious. In fact such is the importance placed on the otters, it has been declared the *Ambassador of Peace* for the country.

This important role for the species is reflected in the work of Professor Han and his colleagues. They have instigated the DMZ Otter Project – an attempt to bring together scientists in both North and South Korea in a joint study in monitoring the otter. This is currently one of the only species which by travelling along the river can cross the border between the two countries. No doubt Professor Han will give more details of this important project at the colloquium and there will be an opportunity to visit some of the study area.
As part of the plans to foster peace with North Korea, the country has set aside an area on Lake Paroho the scene of some of the fiercest fighting in the Korean War as a peace park. The Peace Dam has already been built. It is also planned to construct a peace bell from the shells of the war and to create peace sculptures using tanks and/or other weapons. Delegates will have an opportunity to visit this during the Colloquium. Further information about the Peace Bell project will be found on http://www.peacebell.or.kr - this, however, has yet to be opened.

While in Korea, the County inaugurated the DMZ Society, the aim of which is to foster peace. Because of the role the otter is playing in this, as Chair of the IUCN OSG, I was honoured to be asked to be one of the founding signatories of the Society.

So really the Xth International Otter Colloquium is more that just another meeting, it will be very much a cultural event. It gives on a chance to meet with old and make new friends, discover more about otters, particularly in south East Asia and exchange ideas. The country is a 'hidden gem' with its delightful people, delicious food and really interesting culture that we have little opportunity to experience.

While attending the conference you should also take the opportunity to visit other parts of this fascinating country. It has a heritage going back for many centuries. Seoul, itself, is a vibrant 21st century city with much to offer the tourist/delegate.

I am sure that if you come you will leave with a memory of a well-organised meeting and a land of friendly people, temples, lakes and mountains, as well as a sense of history.

I would urge as many of you who can to make every effort to attend the Colloquium next year. Regular newsletters about the meeting will be produced by the organisers; these will appear in the Colloquium website (http://www.otter2007.org) and be copied on the OSG Library webpage.

R E P O R T

THE OTTER (*Lutra lutra* L.) ON CORFU ISLAND (GREECE): SITUATION IN 2006

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Abstract: The distribution of the otter *Lutra lutra* on Corfu Island (Ionian Sea, Greece) was assessed by means of a standard otter survey in spring 2006. A total of 55 sites were surveyed, with otter being detected in 19 of them (34.5%). The otters are widespread and breeding within the Corfu Island rivers and streams, the species being very scarce or absent from the marine habitats. Fish were the main foods of otter both in the rivers and streams and in the coastal lagoons, but amphibians, reptiles, crabs and insects have some importance as well.
Corfu Island is still undergoing important changes that could affect otters soon. The main conservation problems found were: house building; high human presence and disturbance; habitat loss; and conflicts with intensive fishing and angling. These special populations should be protected. No rivers or streams with otter populations are included within Natura 2000 network.

Key words: Otters, *Lutra lutra*, Corfu Island, Greece, Mediterranean Sea

INTRODUCTION

While otters (*Lutra lutra* L.) have been endangered during the second half of the 20th century in most European countries (Mason and Macdonald, 1986; Macdonald and Mason, 1994), healthy populations remained in Greece during the decade of the 1980s (Macdonald and Mason, 1982, 1985; Gaethlich, 1988). Among Greek populations, the otter was detected on the Ionian island of Corfu (Kerkyra), and also the Euboea and Chios Islands, in the Aegean Sea. These islands are the only Mediterranean islands where the regular presence of otters has been reported (Macdonald and Mason, 1982; Gaethlich, 1988; Grémillet, 1995; Ruiz-Olmo, in press).

During 1985-86, Gaethlich (1988) surveyed a total of eight 600m-length sites on Corfu Island. Otters were present in four sites, being detected in the rivers Melissoudi and Messonghi, and in the Korission lagoon. In 1990, Ruiz-Olmo (unpublished, in press) surveyed a total of 25 600m length sites (including some along the sea shoreline), the otter being detected on five (20%): rivers Melissoudi, Astrakeri and Messonghi, and again in the Korission lagoon. Grémillet (1993) surveyed a higher number of 2.000 m long sites during 1991 and 1992. This author found the otters in more localities, the species being found on the rivers Melissoudi, Dasia/Daphnila, Potamos and Messonghi, the lagoons of Antinioti, Aghios Stephanos and Chalkiopoulou, and the salinas of Alikes. Despite the considerable effort invested in looking for otters, this mustelid was absent from the remaining streams and water body masses. This author concluded that otters were absent on the Western coast of this island. After this, Urban (1998) and Ruiz-Olmo (in press) - the latter including some data from Michaela Bodner (pers. comm.), who surveyed some sites during the summer 2003 - also obtained some results. The otter was found in the rivers Messonghi, Ropas and Potamos, and in the Korission lagoon.

According to these authors, the existence of such island populations in the Mediterranean sea may be explained by two factors: (a) the existence of a suitable habitat of high quality; and (b) the proximity of the continent, in the case of Corfu, the Albanian coast 2 km away where a healthy otter population was found by Prigioni et al. (1985).

Despite these data, general reviews have pointed out the scarcity of whole surveys for the island (Conroy and Chanin, 2000; Ruiz-Olmo, in press). Due to the absence of Mediterranean island otter populations; these scarce island otter populations require special conservation efforts. However, some authors have pointed out the existence of important threats for these populations (Grémillet, 1993, 1995).

The present work presents the results on the otter distribution on Corfu Island in spring 2006, together with some data on habitat preference. We also present the first data on otter diet there, and we deal with the current threats for this otter population.

METHODS

Corfu Island (592 km^2) has an increasing human population of 130.000 (2001), compared to 99.447 inhabitants in 1981 (219 and 168 per square kilometer, respectively). In summer, the island population increases dramatically, and human density is also much higher.

Distribution, breeding, habitat use and threats

Otter distribution was assessed by means of a standard otter survey (Mason and Macdonald, 1986; Reuther et al., 2000), based on field observations. 600 m long sites were surveyed on both banks and in the middle of watercourses, in search of otter signs (spraints and tracks). In some cases, characteristic crab remains were noticed. In addition, at particular points, we carried out detailed searches (see Crawford, 2003), 1-25 m long often under or near bridges, looking for the same types of signs. The survey stopped when otter signs were discovered (Ruiz-Olmo and Delibes, 1998). All the rivers and streams and lagoons were surveyed, except Lefikimi/Chimaros River and Alikas salinas, in the southernmost area, because storms prevented us from completing this work (no extra days were available).

For each site (including detailed search sites) we compiled the following data: river/waterbody name, place, length of the survey, results (presence/absence), signs found, presence of breeding evidence (cub tracks), apparent visual pollution level (see Ruiz-Olmo et al, 1998: very high, high, medium, low, null), river width (dry, < 0.5 m, 0.5-1m, 1-2m, 2-5m, 5-10m, 10-20m, >20m), vegetation cover of both banks (0%, 1-20%, 21-40%, 41-60%, 61-80%, 81-100%), observed threats and disturbances, and potential prey species recorded during the search.

Diet

Spraints were collected and conserved, and analyses were carried out following the methods described in Ruiz-Olmo and Palazón (1997). Results are presented as relative frequency of occurrence (RFO) (number of occurrences of the prey-item as a percentage of the total number of occurrences of all prey-items) and percentage of occurrence (%O) (= percentage of spraints containing the food category).

Statistics

Results were compared by means of the chi-square test (Siegel, 1952).

RESULTS

Distribution

A total of 55 sites were surveyed (Fig. 1a), the otter being detected in 19 of them (34.5%). 14 sites were surveyed at the sea shoreline – coast and ports - (excluding estuaries), all with negative results (0%). According to the data obtained, otters were found in most of the available freshwater habitat on the island (Fig. 1b). Otters were found in the catchments of the rivers Melissoudi, Dasia/Daphnila, Potamos, Messonghi, Petriti and Ropa, the Agios Giorigios River, and lagoons Antinioti, Chalkiopoulou/Halkiopoulos (where two otters were directly observed by us on April 14th) and Korission. Despite the fact that the rivers Astrakeri and Lefkimmi/Potami were not surveyed, the presence of the otter was suspected on the basis of the precedent data found in the literature.

Figure 1a. Distribution of the otter on Corfu Island in spring 2006. Results shown as positive (filled) and negative (unfilled) surveyed sites of 600m length sites (circles) or detailed searches (squares).

Figure 1b. Results shown as stretches in which the presence of the otter was inferred according to the field results. Solid line: rivers and streams where the otter was found; dotted line: non-surveyed rivers and streams where the presence of the otter was suspected (according to the habitat quality and previous results of Gaethlich, 1988; Gemillet. 1993; J. Ruiz-Olmo. unpublished; M. Bodner. unpublished); grey and arrows: lagoons and lakes where the otter was found.

Habitat use

Otters preferred the widest rivers and medium freshwater streams and coastal lagoons, while the sea shoreline and the estuaries were avoided during the study (Fig. 2a). Otters were found significantly more often at watercourses 2-20 m wide in the lowlands (Fig. 2b). No effect of apparent water pollution was found ($\chi 2 = 2.836$, 2 d.f., $P = 0.2422$), but we surveyed only one site with a high apparent pollution level. This was also the case with the vegetation cover of banks ($\chi 2 = 4.117$, 2 d.f., $P = 0.249$); this may be an effect of the sample size, because, no site was found with 0% of vegetation cover (n=3), 38.5 % with 1-40 % (n = 11), 45.5 % with 41-80 % (n = 13) and 61.5 % when > 80 % (n = 13).

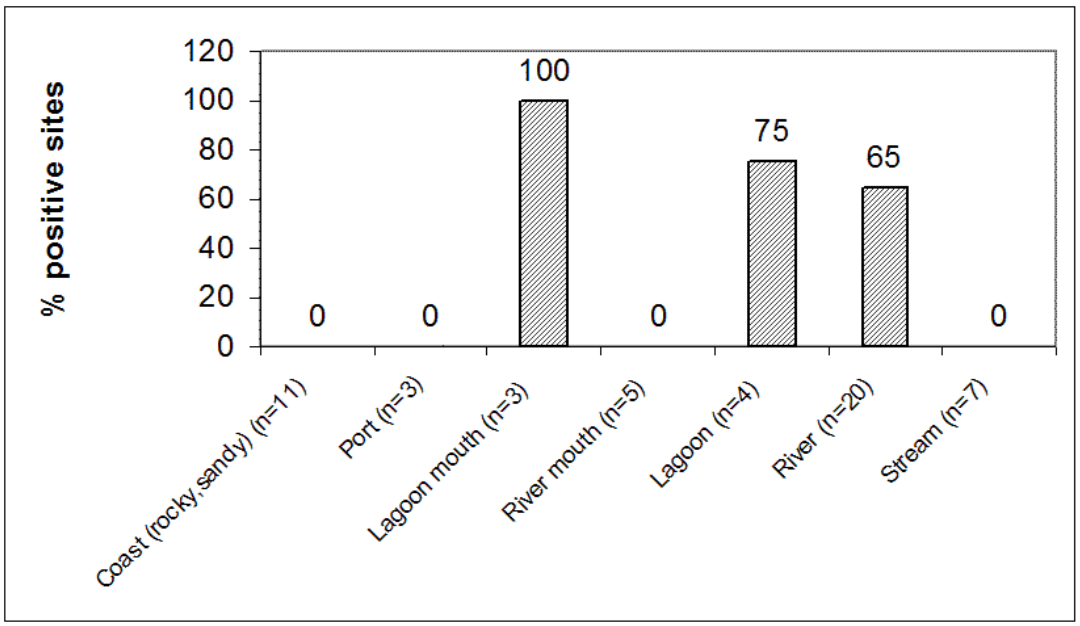

Figure 2a . Differences in habitat use by otters on Corfu Island.
Habitat type ($\chi 2$ = 29.95. 6 d.f., P<0.0001).

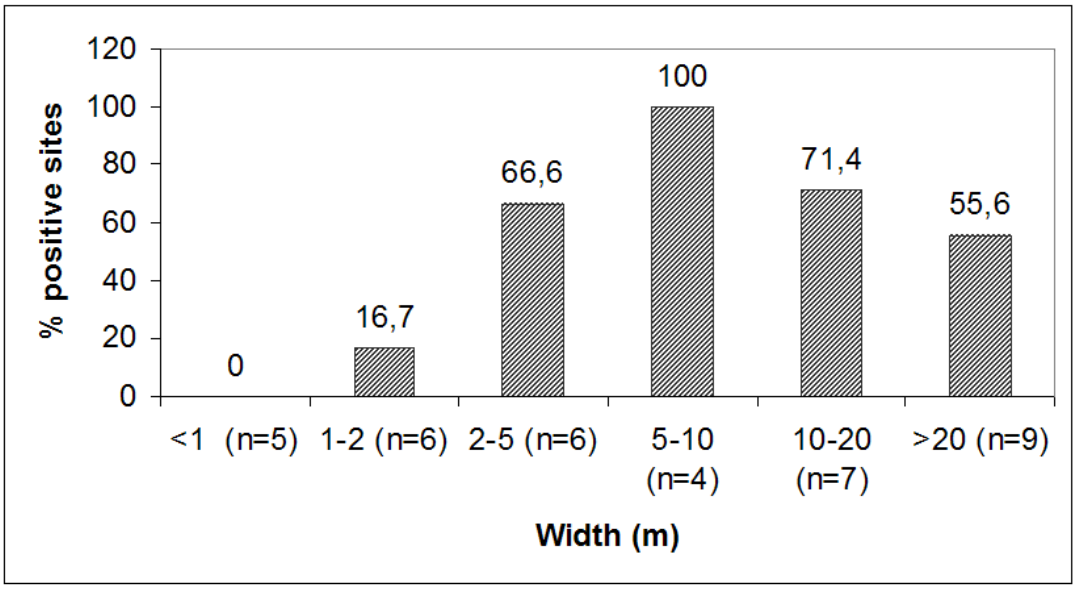

Figure 2b . Differences in habitat use by otters on Corfu Island.
Rivers, stream or lagoon width, ($\chi 2$ = 13.71. 5 d.f., P< 0.0175).

Evidence of breeding
We found breeding evidence in the river Messonghi, near Messonghi city, where we found tracks of one small cub.

Diet
A total of 48 otter spraints were collected and analyzed, containing a minimum of 91 prey-items (Fig. 3; Table 1). Fish were the main otter food, both in the rivers and streams and in the coastal lagoons. For the inland samples, a typical freshwater diet based on Cyprinids was found. The same was true for the lagoon samples, where migratory eurihaline fish were dominant. It was interesting that no representative of the dominant prey for each type of habitat was found in the other one.

Table 1: Diet of the otter in Corfu Island, expressed as Frequency of Relative Occurrence (FRO), and percentage of occurrence

	FRO		% Ocurrence	
	Rivers (n =51)	Lagoons (n = 40)	Rivers (n=34)	Lagoons (n=14)
Cyprinid	50.98	0	52.94	0
Eel	0	10	0	21.43
Mugilidae	0	20	0	28.57
Gambussia/ Valencia	0	47.50	0	21.43
Unident. Fish	5.88	7.50	8.82	14.29
TOTAL FISH	56.86	85.00	61.76	92.86
Rana sp	11.76	0	8.82	0
Unident. Amphibian	15.69	10	23.53	28.57
TOTAL AMPHIBIANS	27.45	10	20.59	28.57
NATRIX TESELLATA	5.88	0	8.82	0
Lacertidae	1.96	0	2.94	0
TOTAL REPTILES	7.84	0	11.76	0
Small Mammals	1.96	0	2.94	0
Crabs (Decapoda)	0	5.00	0	7.14
Aquatic insects	5.88	0	5.88	0

Factors affecting otters and threats
In a 47.4% of the surveyed points inland (n=38) we found at least one kind of threat, disturbance or danger. In 23.7% of the cases we found buildings or new constructions on or near the bank; in 21.1% banks were destroyed or a channel had been built; in 15.8% a high tourist (people) level was found; in 13.2% the bank side vegetation was cut (as for example in the river Ropa and its tributaries on the Ermones golf course); in 7.8% professional fishing and angling activities (with no stopgrids in the fishnets); in 5.2% boat traffic or small ports; in 2.6 % hard works; and in 2.6% the use of chemicals and pesticides (posters warning people of the risks of these were again found on the same golf course). Rubbish was present to a high degree in most of the rivers, including in high mountain streams.

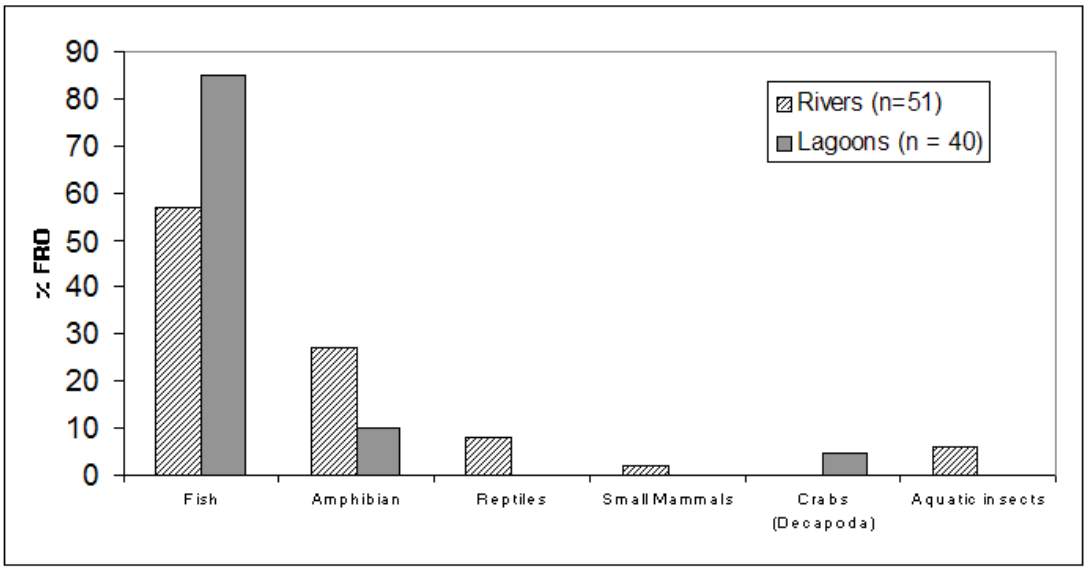

Figure 3 . Diet of the otter in Corfu Island as frequency of relative occurrence.

In the marine habitats, we found at least one kind of threat, disturbance or danger, in 75% of the surveyed sites (n=12). 50% of the surveyed sites presented a high tourist level; 33.3% of the coastal sites surveyed were altered; in 25% we found construction in progress; and in 16.7% the presence of buildings along the shore was found.

DISCUSSION

According to our findings, otters are widespread in the rivers and streams of Corfu Island, the species being very scarce or absent from the marine habitats. These results are in total agreement with earlier works (Grémillet, 1993; Ruiz-Olmo, in press). As the surveys carried out during the decades of the 80s and 90s (20th century) showed the lack of the otter in some areas or rivers of the island (for instance the west part) (see Introduction), a recovery or recolonization of the island could explain the present range.

It is important to remember that in Corfu this mustelid lives in Mediterranean habitats, the watercourses drying during summer or during droughts (see Grémillet, 1993, 1995). A water dependent dynamic may explain such changes in distribution. However, comparing distributions for different years, the first theory seems to be more consistent.

On the other hand, otters are still breeding on Corfu, according to our finding of cub's tracks. Grémillet (1993, 1995) also found other evidence of otter breeding in several parts of the island.

Otters present a typical diet pattern, based mostly on the fish consumption in both rivers and streams. Potential prey-species are less diverse on the island than on the continent (Delaki et al., 1993; Ruiz-Olmo and Palazón, 1997), so these otters have lower diet diversity, and this has been suggested as a potential problem for the long-term conservation of the species (Ruiz-Olmo and Palazón, 1997; Ruiz-Olmo et al., 2001). Fluctuations in such low diversity prey communities can severely affect food availability and, for this reason, increase mortality, decrease breeding success and migration.

The otter has shown a trend of increasing population during the last 20 years, even though Corfu Island is still undergoing important changes that could affect otters soon. The conservation problems that Grémillet (1993, 1995) pointed out are still being realized. Amongst them we would like to note:

1. Building of houses and housing complexes: the coast and many rivers are heavily built up, and this process is still in progress.

2. Human presence and disturbance: outside of undisturbed areas there are many people (boat traffic, tourism).

3. Habitat destruction: an increasing number of banks are being transformed by canalization, artificial banks, elimination of edge vegetation,

4. Otter persecution and/or deaths in fishnets: the intensive fishing and angling in lagoons seems to still being a danger for otters. Despite the fact that we found one old spraint and some old crab predation remains in Korission lagoon, surprisingly, no recent signs have been found in the most optimal Corfu otter habitat. Fishnets had no stop grids, and anglers' attitudes seemed to be the same as that in the 80s and 90s (Grémillet, 1993, 1995).

As Greece forms part of the European Union, and the otter is among the species included in annexes II and IV of the Habitats Directive (1992), the species should be effectively protected. Also, as the Mediterranean island otter populations are so scarce, an important part of the freshwater Mediterranean Island otter habitat must be included in the Natura 2000 protected network. At the moment only a few areas are proposed to be included as a part of this Network by the Greek Government. Of these, all are coastal wetlands (lagoons). No rivers or streams including known otter populations are included. The nearest Albanian and Greek otter populations must be healthy, as the Corfu ones may depend on these for recolonization and avoiding the effect of inbreeding (there is no estimate of the Corfu's otter population). To assure the conservation of these island populations, the maximum quantity of habitat has to be protected.

Presently, a study on these island otter populations is being undertaken. A long-term study of them will provide us a more detailed picture of their conservation status, including an estimation of the population size, relationships with mainland, etc. In line with this research, surveys of new islands will be developed, including Ithaca island (south of Corfu, where one otter was seen in 2005).

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RESÚMEN

La distribución de la nutria en la isla de Corfú (Mar Jónico, Grecia) fue establecida mediante la utilización de la metodología estándar de sondeo durante la primavera de 2006. Un total de 55 puntos fueron muestreados, detectándose a la nutria en 19 de ellos (34.5%). Las nutrias están bien repartidas y se reproducen por los ríos de la isla de Corfú, estando ausente de los hábitats marinos. Los peces constituyen su principal alimento, tanto en los curso de agua dulce como en las lagunas costeras, aunque anfibios, reptiles, cangrejos costeros e insectos tienen cierta importancia.

La isla de Corfú sigue experimentado cambios importantes que podrían afectar a la nutria en un futuro próximo. Los principales problemas de conservación son: urbanización de áreas naturales, alta presencia humana y molestias, pérdida de hábitat y conflictos con la pesca profesional. Estas poblaciones singulares deben de ser protegidas. No existen tramos de cursos fluviales incluidos en la red europea de espacios protegidos Natura 2000.

Palabras clave: Nutrias, *Lutra lutra*, isla de Corfú, Grecia, mar Mediterráneo

R E P O R T

AN ITALIAN ACTION PLAN FOR THE EURASIAN OTTER (*Lutra lutra*): PRELIMINARY CONTENTS

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Abstract: Only a few populations of otters survive in the southern regions of the Italian peninsula. Following the decisions taken at the European Otter Workshop, the Italian Ministry for the Environment established a technical and institutional team tasked with the production and application of an Italian National Action Plan for *Lutra lutra*. The Ministry promoted a first meeting of the technical commission in June 2006 to define the structure of a technical report containing a proposal for the contents of the action plan and collections of all data and information available on different topics related to otter biology, status, conservation and threats. Two workshops will be specifically organised to discuss the priority areas for conservation actions and the threats for otter population in Italy.

Following the decisions taken at the European Otter Workshop (Padula, 20-23 October 2005), the Italian Ministry for the Environment established a technical and institutional team tasked with the production and application of an Italian National Action Plan for the otter *Lutra lutra*. Despite its global status having recently been reclassified from LR to NT (IUCN, 2004), the species is still classified as critically endangered in Italy. Few populations only survive in the southern regions of the Italian peninsula, namely Campania, Calabria, Basilicata, Puglia, and, recently, Molise. The core population is concentrated mainly in the National Parks of Cilento and Vallo di Diano (Campania) and in the National Park of Pollino (Calabria and Basilicata). The two teams were established to respectively be responsible for the collection of data and the production of the action plan, and for promoting a large participation and involvement of all institutions having territorial authority within the current range of the otter. The technical team is coordinated by the government agency Istituto Nazionale per la Fauna Selvatica (I.N.F.S.), the institutional team by the National Park of Cilento and Vallo di Diano, one of the leading institutions in otter conservation in Italy.

The Italian Ministry for the Environment promoted a first meeting of the technical commission in June 2006 at Ozzano Emilia, (Headquarter of INFS). The meeting was attended by many public institutions involved in otter research and conservation projects across Italy (Università di Roma 'La Sapienza', Università di Pavia, Università di Trieste, Università del Molise), together with representatives of government and public agencies for wildlife conservation and management (Italian Ministry of Environment, Corpo Forestale dell Stato, Istituto Nazionale della Fauna Selvatica).

The aim of the meeting was to define the structure of a technical report, to be compiled by May 2007, containing a proposal for the contents of the action plan and collections of all data and information available on different topics related to otter biology, status, conservation and threats.

Specifically, the wide-ranging discussions resulted in the decision to produce a technical document that will include the following topics:

- List of international directives and national laws concerning the protection of the otter, the protection of fresh waters and riparian habitats and fishing regulations. In this the role of the otter as a flag, umbrella and a key species for the river and riparian ecosystems was stressed.
- Production of an updated map of the area of occupancy and extent of occurrence of the otter in Italy, taking into consideration the regions in which is actually recognised the otter presence, i.e. Campania, Basilicata, Puglia, Calabria, and Molise. The map will contain all records collected in the years 2000-2006. It will be GIS based, to allow continuous monitoring and to support the international efforts to develop an Internet and GIS based worldwide databank system to store, process, and present distribution data for all otter species, as recommended by the OSG at the last International Otter Colloquium (Frostburg 2004).
- Tentative evaluation of range size and population trend.
- Collection of all information available on the biology of Italian otters, including recent data on the feeding habits, spatial and territorial behaviour collected in south central Italy.
- Identification of priority areas where research on the distribution, biology and/or on threats to otters should be carried out if and when financial and personnel resources are available.
- Genetic structure of the Italian otter population, including mtDNA characterisation, degree of isolation, heterozygosity and degree of inbreeding. The genetic information will be complementary to the guidelines for the non invasive genetic survey of Italian carnivores that will be produced by the Italian Ministry for the Environment
- Collection of data on all captive breeding centres still active in Italy, including the studbook of specimens. Proposal for the transformation of these structures in Otter Recovery Centres.
- Database of dead specimens recovered in the last ten years, possibly including geographic coordinates of each locality, date, causes of decease, measurements and the eventual place of storage of the specimen.
- List of threats and factors affecting the survival of otters in Italy, including water pollution, habitat destruction and fragmentation, water catchments, genetic and demographic factors, direct persecution, human disturbance, and road casualties.
- Updated information on habitat suitability for otters in Italy. These data will be specifically useful to develop an ecological network for the species in Italy. The network will allow an evaluation of the degree of isolation of peripheral populations, and to identify the most important actions and areas of interventions to promote the future expansion of the otter and connectivity among populations.
- The role of nature reserves and national parks in otter conservation

Finally, special protocols will be compiled for the following topics:

- Injured or sick specimens, including the designation on official institutions for their recovery.
- Live capture for research purpose or release programmes, including making the use of trap transmitters mandatory.
- Standard survey at regional or national level, based on the Standard Survey Method recommended by the OSG
- Necropsies, possibly in accordance with the protocol that will be compiled and adopted by the OSG

Two workshops will be specifically organised to discuss the priority areas for conservation actions and the threats for otter population in Italy.

All people interested in contributing to the action plan have been formally invited through an open call made to the Italian otter newsletter LONTRA-list@yahoogroups.com managed by Maurizio Marrese. They will be included by the INFS in a mailing list and will receive all documents produced by the committee for comments and suggestions.

REPORT

STATUS OF EURASIAN OTTER *(Lutra lutra)* IN IRAN

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INTRODUCTION

Eurasian Otters are distributed through most of Iran's aquatic ecosystems. Since there are no comprehensive reports on their occurrence, Dr. Karami (Tehran University) decided in 2005 to start studying the species in this country. He therefore instigated two theses on this. In this report we review all information about the species in Iran, and we later hope to publish scientific articles about the status of Eurasian otter in Iran.

DISTRIBUTION

Review of scientific sources and interviews with otter-aware people clearly showed that the Eurasian Otter lives in most of the aquatic ecosystems of Iran. Extensive distribution, however, does not mean the species has a high population or high density. The species is found in most of Iran's rivers, lakes, pools, etc. such as Gilan, Mazandaran, Azarbayejan, Tehran, Kordestan, Kermanshah, Markazi, Isfahan, Khorasan, Chaharmahal-Bakhtiari, Fars, Khozestan, and Lorestan provinces (Kiabi, 1993). Eetemad (1984) in his study of the physical and morphological characteristics of the Eurasian Otter referred to the subspecies *L. l. seistanica* and *L .l. meridionalis*. The first subspecies was found in most areas referred to in the text above. The second subspecies was found only on the banks of the Heermand River (Eetemad, 1984). Dr. Kiabi in 1993 introduced the Eurasian Otter in Aquatic Organisms Magazine, in which the distribution was described (Kiabi, 1993; Figure 1). Later, when discussing mainly Smooth-Coated Otter in the Haw-al-Azim wetland also Eurasian Otters were covered (Ziaee, 1996). Mirzajanei (1998) referred to locations where Eurasian Otters are found in Iran, including biometry of dead animals from various locations.

We interviewed Dr Abdoli, who has searched many Iranian rivers for otter signs, and who has found indications of their presence in most of them, such as the Chaharmahal-Baktiari. In addition he has seen a number of otters in the Fars province, and along the Haraz River. Mirzajanei (1998) described finding otters in Kordestan and Gilan provinces. Karami found a carcass of a Eurasian Otter in Kermanshah, and one from the Jajrood River (pers. comm.). Mirzaei, who is currently studying *Lutra lutra* on the river Jajrood, found two carcasses of otters during his fieldwork on the Jagrood River, and also otter signs (spraint and tracks) in the area and Taleghan River. He recounted that when visiting Anzali, he understood that otter skins were sold commonly in one of the bazaars, and that they are caught accidentally in fishing nets in this area. In Golestan province, many skins were recovered by environmental officers from criminals (Figure 7).

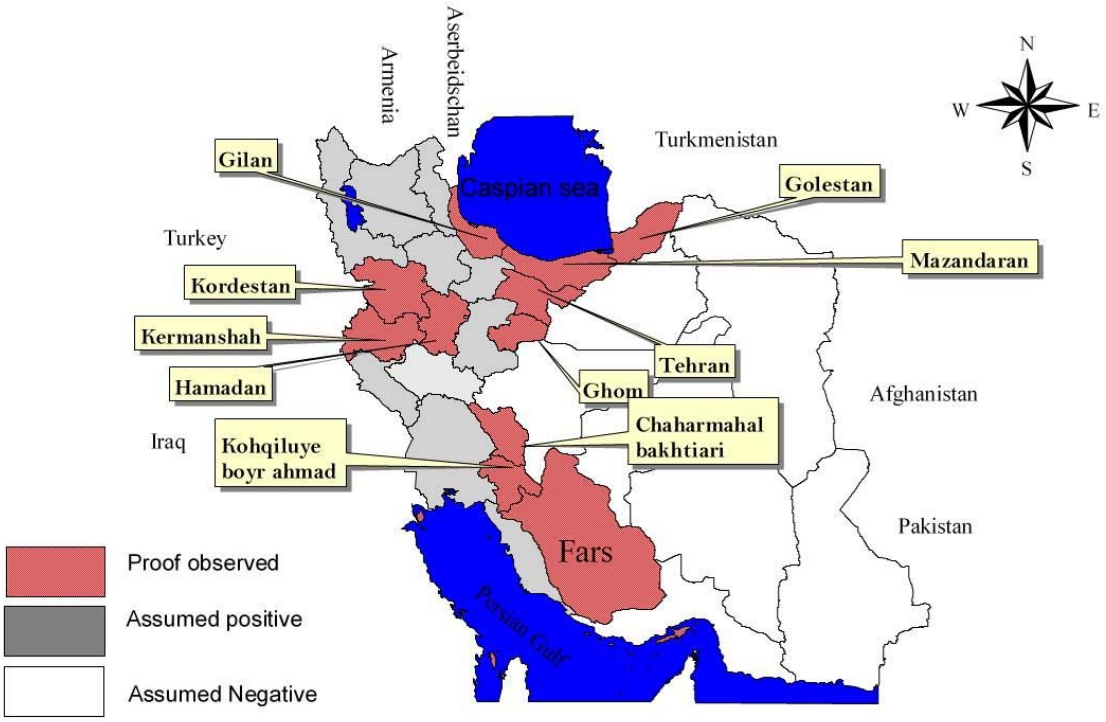

Figure 1: Map of Eurasian Otter Distribution in Iran (Mirzaei, 2006)

Mona Hamzehpour is working on a study of the presence, distribution and population density of Eurasian Otters in Deylaman-Dorfac hunting-prohibited area, where she found a number of otter-signs (spraint and tracks) on the long Shenrood river, where she live-trapped an otter, releasing it four months later.

We also understand from interviews with the Environment Department's specialist in Malayer, that the species occurs in Hamedan province.

It therefore appears that Eurasian Otters are well distributed in our country, but we should begin an orderly and systematic program for studying population densities and distributions so we can regulate management actions. The information available already today is summarized below (Tab.1):

Table 1: Some information about researchers who study Eurasian Otters in Iran

AREA MONITORED	Name of Researcher	Date of Study
All of Iran	E. Eetemad	1984
All of Iran	B.H. Kiabi	1993
Haw-al-Azim wetlands (Mesopotamian)	H. Ziaei	1996
Mahabad Dam, Sefidrood River, Anzali wetland & Kermanshah	A. Mirzajanei	1998
Jajrood River, Tehran	R. Mirzaei	2005-2006
Shenrood River	M. Hamzehpour	2005-2006
Shafarood River, Gilan	M. & M. Ershad	2006

BIOMETRY

Very little information on the biometry of Eurasian Otter in Iran is available (Tab. 2, 3).

Table 2: Characteristics of Otters from different areas in Iran

PROVINCE	Area of capture	Head and body (cm)	Tail (cm)	Back foot (cm)	Ear (cm)	Sex (m/f)
Mazandaran	Neka River	68	40	9	-	f
Gilan	Sangar Dam	66	39	12	2	f
Golestan	Gorgan	43.5	27	10.5	1.7	f
Tehran	Jajrood River	71	41	21	-	f
Gilan	Shenrood River	67	42	18.5	1	f

Table 3: Some Information about two Otters from Anzali and Kermanshah.

	Anzali Wetland	Kermanshah
Length of skull	10.80	11.62
Width of mastoid	6.40	7.11
Distance between eyes	1.5	1.51
Length of nose	4.05	3.60
Width of zygomatic	7.69	7.12

REPRODUCTION

We do not have any information about timing of reproduction.

FOOD HABITS

Diet has been investigated on the Jajrood River during the current study (Tab. 4) (Mirzaei, 2005).

Table 4: Food diet of Eurasian Otters on the Jajroor River during a year

Prey	Frequency (%)
Fish	90.76
Crabs	3.66
Birds	3.58
Insects	2.00

PARASITES

Mona Hamzehpour recorded parasites of the otter in her thesis (Tab. 5) (Hamzehpour, 2005).

Table 5: Parasites of otters found by examination of 158 spraints in Deylaman-Dorfak hunting-prohibited area

Parasites	Number
Isospora spp.	4
Fasciola hepatica	86
Trematode egg	837
Nematode larva	183
Nematode egg	388
Capillaria spp.	2391

THREATS

Eurasian Otters have been hunted cruelly in our country because of their economic value, and because they are piscivorous carnivores.

In Iran, the species has been hunted to protect fish farms, and for their pelts for sale, for taxidermy and for decoration in houses and shops. In the provinces in the north of Iran, where the habitat is especially suitable for otters, they are common as taxidermic mounts. On fish farms, they are hunted with traps, electric fencing and weapons, and this is an important factor in reducing numbers. In one fish farm pool, five otters died due to electric fencing in only 2 years, and 2 died similarly in Tehran. In the north, otters are drowned in fishery nets, whereas in the central provinces, habitat destruction and riverbank degradation are the problem. We do not have any information about otter deaths due to pollution.

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Figure 2: Live otter from Deylaman-Dorfak hunting-prohibited area (Hamzehpour, 2005)

Figure 3: Hand of live otter from Deylaman-Dorfak hunting-prohibited area (Hamzehpour, 2005)

Figures 4: Otter from Jajrood River (Mirzaei, 2005)

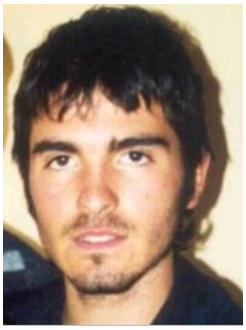
Figures 5: Otter from Jajrood River (Mirzaei, 2005)

Figure 6: Footprints of an otter on bank of Jajrood River (Mirzaei, 2005)

Figure 7: Some of otter skins from Golestan National Park (photo: Khosroshahi, 2006

R E P O R T

FIRST BINATIONAL SOUTHERN RIVER OTTER CONSERVATION WORKSHOP



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During 30th – 31st of September 2005 the 1st Binational Southern River Otter Conservation Workshop was organized in Valdivia, Chile. The proposal of this event was to convene scientific people involved in otter research both from Argentina and Chile. Furthermore, different Public Governmental Services that coordinate conservation actions for this endangered species and its habitat were present. Forty-seven participants were registered from Chile and Argentina and more than 25 scientific oral presentations on the themes of surveying, distribution, feeding ecology, genetics, radio tracking studies, veterinary aspects and conservation discussion workshops were presented. After the event, the CODEFF team (The National Committee for the Defence of Flora and Fauna) developed the second training course entitled "Southern River Otter Survey Techniques and its Application to Riparian Habitat Assessment".

This meeting was organized by the Southern River Otter Conservation Project of CODEFF and supported by the Frankfurt Zoological Society - Help for Threatened Wildlife and the Darwin Initiative.

During the next months the proceedings of the meeting will be published under the coordination of the editor Dr. Marcelo Cassini (mhcassini@yahoo.com.ar) from Argentina and the recommendations of the workshop by Maximiliano Sepúlveda (maximiliano.sepulveda@gmail.com) from Chile. For further information, please contact them via their respective e-mails.

I would like, on behalf of the IUCN/SCC Otter Specialist Group, to thank the sponsors of this meeting: from Chile, Comision Nacional del Medio Ambiente, Comisión Nacional Forestal, Servicio Nacional de Pesca, Servicio Agricola y Ganadero; and from Argentina, Administración de Parques Nacionales.

The 2nd Binational Southern River Otter Conservation Workshop will be held next year 2007 in Argentina. Date and location still have to be confirmed.

R E P O R T

HABITATS, DISTRIBUTION AND POPULATION DENSITY OTTER SURVEY IN WESTERN RHODOPES MOUNTAIN (SOUTHERN BULGARIA)

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Abstract: The aim of our study was to investigate the otter habitats, their conditions in the Rhodopes Mountain (Bulgaria) and the effect on the otter distribution and population density. The investigation was carried out during the period 2004-2006.
The continually used (core) habitats were: 1. large high mountain dams combined with headstreams. These were all at altitudes above 1000 meters. The effect of ecotone between the two habitats (dams and headstreams) ensures food supply, shelter and space throughout the year. The otter was found in all such dams in Western Rhodopes: Golyam Beglik, Shiroka Polyana and Batak. When all the bankside of Golyam Beglik Dam (21.8 km) was searched, only one possible resident female was found. On Batak Dam (30.0 km), there were three possible resident females and one adult male; 2. Medium sized rivers. The otter was found in all such rivers in the Rhodopes. At a stretch of Chaya River between Jugovsko Hanche and Asenovgrad Town (14.5 km) two possible resident females, one adult and one sub-adult male were recorded. In Parvenetzka River, there were 2 possible resident female otters per about 24 river kilometres; 3. Large Dams with steep banks in the lower parts of the mountain. The otter was found at Dospat Dam; no data for the population density was estimated.
Temporarily used habitats and bank vegetation associations were also pointed according to their using by the otters in the area and their conservation status.

INTRODUCTION

The ecology of the otter in Bulgaria has been little known (PESHEV et al., 2004). Recommendations for detailed research were made by SPIRIDONOV and SPASSOV (1989) and SPIRIDONOV and MILEVA (1994). The conservation of the unique ecosystems in the Western Rhodopes Mountain is now underway. Data for otters in the Greek part of the mountain was presented by MACDONALD and MASON (1982, 1985). The otter is the top predator in the wetlands and is often highlighted as an indicator for the condition of whole river catchments (CHANIN, 2003). While studying otter ecology and conservation we gained data for the conservation of running and still waters in the area. The aim of our study was to investigate otter habitats in the Rhodopes Mountain and their effects on the population density.

MATERIALS AND METHODS

The investigation was carried out in 2004-2006. Between March and October 2006 the study was financed by the Scientific and Applied Activities Section of the Scientific Research Fund of Plovdiv University "Paisii Hilendarski". Previous trips were financed by various projects of NGO Green Balkans, especially for studying the Natura 2000 - rivers as potential bio corridors in Rhodopes Mountain, in a relation with the preliminary investigations for building up the Bulgarian part of the European Ecological Network. Some data from these travels (these one carried out in 2004 and at the beginning of 2005) has already been published by GEORGIEV (2005), and is summarized here, together with data from our new studies (during the second half of 2005 and 2006). Throughout all of the otter investigations a number of identical methods were used.

A total of 147 kilometers of bank were walked:
- Rivers – Ravnogorska (4.1); Pavlitza (1.0); Below Snejanka Cave (2.5); Parvenetzka (1.0); Stara (2.6); Chaya (14.5); a river parallel to the road from Batak Town to Dospat Town (3.0); a river flowing to Toshkov Chark Dam (3.0); tributary to Vacha River between village of Osenovo and Krichim Town (3.0); Dospat; Lepenitza; Ludi Dol; Mostovska Sushica; Bistritza; Chaya headstream; Malka Arda; Vacha; Devinska; Cherna; Manastirska (5 km routes covered on all these rivers).
- Lakes – near Momchil Yunak Hut; group of Smolyanski Lakes;
- Micro dams – Beglika Dam (1.0);
- Large Dams (the whole bank side was walked) - Batak (30.0) and Golyam Beglik (21.8). (Figure 1).

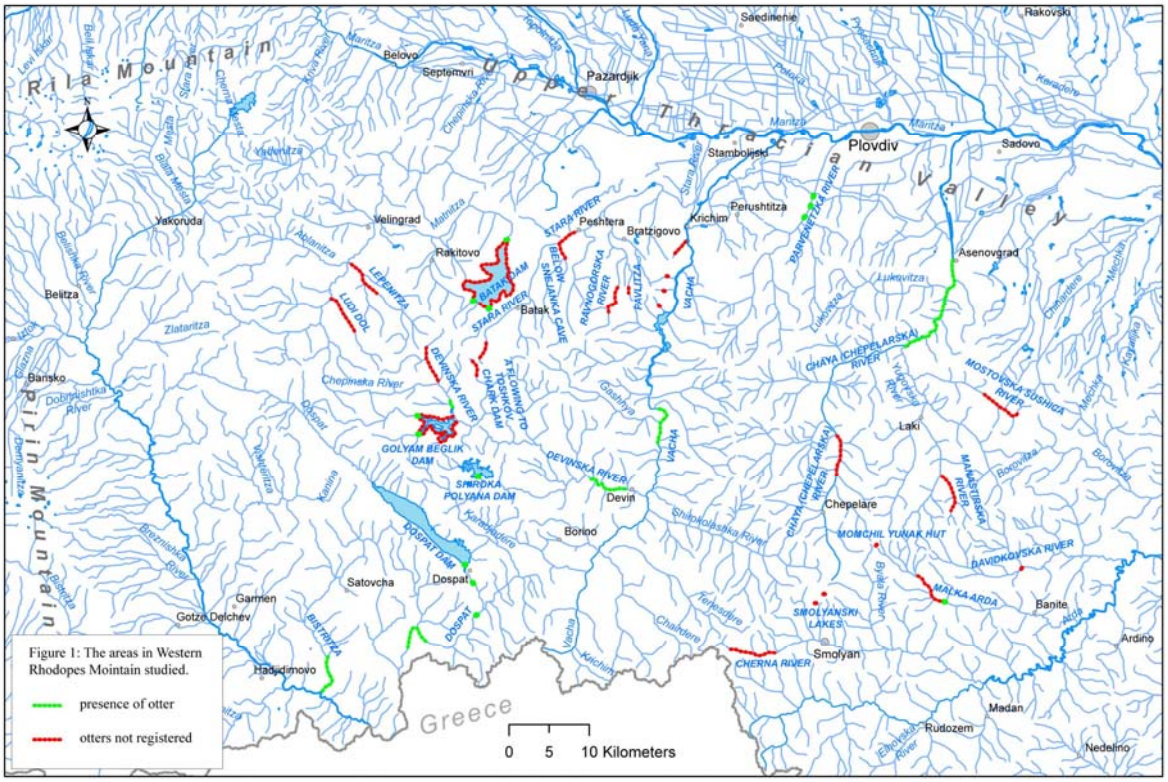


Figure 1: Study Area

The otter distribution was studied by the "standard" method of MACDONALD and MASON (1983) and a questionnaire of relevant people also carried out for extra areas and stretches. The otter's population density was estimated by track measuring (JENKINS, 1980; SIDOROVICH, 1991; OTTINO and GILLER, 2004), and sex determination according to the positioning of the urine towards the spraint (SIDOROVICH, 1995) only when was deposited on a horizontal plane surface (Figures 2 and 3). When the footprints were measured the specific substrates (mud, sand or wet soil) on which they were made was also considered as a factor for their size. The tracking was combined with home range boundaries localization when accumulation of great numbers of spraints (ERLINGE, 1967, 1968) on exposed places was registered (shelter sprainting sites like under rocks or bridge areas were ignored) or mounds of sand and soil made by otters (VSHIVCEV, 1972; MASON and MACDONALD, 1986). Such sites around dens or evidently favourable hunting sites (pools, dykes and others) were not considered, knowing that they sometimes are also marked such way (VSHIVCEV, 1972; KRUUK, 1995; LILES, 2003). Actually it was concluded that it is a certain home range boundary when after the possible overlap area the size of the tracks differed by size from those found on the previous bank section. For a more precise interpretation of the home range situation information from radio-tracking studies was also looked upon (GREEN et al., 1984; RUIZ-OLMO et al., 1995; DURBIN, 1996). All of the investigations were carried out during the warm seasons (late spring, summer and early autumn), all of the stretches were walked for a day, except the bank sides of Chaia River, Goliam Beglik and Batak Dams which were covered for two consecutive days, and no extra volunteers were working except the authors.

Figure 2. The position of the urine (pointed by an arrow) is far ahead from the spraint when deposited by a male otter.
Photo: D. Georgiev

Figure 3. The position of the urine (pointed by an arrow) is over or very close to the spraint when deposited by a female otter.
Photo: D. Georgiev

According to GEORGIEV (2005) the habitats were considered as continually used (core) and temporarily used subsidiary habitats by their existence during the year and their visible carrying capacity like size and food base. The first ones were with relatively constant environmental conditions, and providing food and shelter for the otters during the whole seasons, but the second did it only during a part of the year or was with evidently poor food base (polluted or over fished waters) and was visited sporadically by otters. The water basins were classified as still and running waters and their water capacity and flow rate was considered by SIDOROVICH (1995). We also noted down and the banks' vegetation associations used by otters as an important habitat components (MACDONALD and MASON, 1982, 1985), considering also the classifications of Directive 92/43/EEC according the standard ecological principles regarding the dominant plant species (GANEVA et al., 2005).

A GPS (E-Trex Summit) and a digital camera (Olympus) were used to locate and measure routes, transects and to record various important findings on the terrain.

RESULTS AND DISCUSSION

1. **Continually used (core) habitats.** These habitats were considered as basic for the otter population monitoring.

    a. **Large high mountain dams combined with headstreams.** These were all at altitudes above 1000 meters. They could be divided into two types: dams with steep banks (Golyam Beglik Dam) or with flattened banks (Batak Dam). This combination of habitats was essential for otter survival at highest altitude levels. The effect of ecotone between the two habitats ensures food supply, shelter and space throughout the year. The otter was found in all such dams in Western Rhodopes: Golyam Beglik, Shiroka Polyana and Batak. The highest point with otter signs was Golyam Beglik at 1545 meters and GPS coordinates N41˚ 49` 04.1`` E24˚ 04` 25.2`` The population density on the dams' bank sides was very low and the otter presence was always associated with headstream inflows. When all the bankside of Golyam Beglik Dam (21.8 km) was searched, only one possible resident female was found. On Batak Dam (30.0 km), there were three possible resident females and one adult male.
    b. **Medium sized rivers**. The otter was found in all such rivers in the Rhodopes: Chaya, Vacha, Parvenetzka, Devinska, Bistritza and Dospat. At a stretch of Chaya River between Jugovsko Hanche and Asenovgrad Town (14.5 km) two possible resident females, one adult and one sub-adult male were recorded. In Parvenetzka River, there were 2 possible resident female otters per about 24 river kilometers. This river was smaller and situated

on the north slope of the mountain. The home range of one of the otters was situated partly in the plain, so if this fact is considered, we found a very low population density.

c. **Large Dams with steep banks in the lower parts of the mountain**. The otter was found at Dospat Dam. There is no information on the population density but an otter conservation project is now in progress there and useful results are expected (Yanislav Yanchev, pers. comm.). Data from other similar dams in Kazanlashka Valley (Koprinka and Jrebchevo Dams) situated in Central Bulgaria showed a relative density of about one possible resident female otter per 3-5 kilometres bank line.

2. Temporarily used subsidiary habitats.

a. **Small rivers, headstreams of medium sized rivers and streams**. Most of them were described by GEORGIEV (2005). They are: Ravnogorska, Pavlitza, Under Snejanka Cave, a river parallel to the road from Batak Town to Dospat Town, inflow to Toshkov Chark Dam, tributary to Vacha River between village of Osenovo and Krichim Town, Lepenitza, Ludi Dol, Mostovska Sushitza headstream, Chaya headstream, Malka Arda headstream, Davidkovska, Vacha, Devinska headstream, Cherna and Manastirska Rivers. The only footprints found were of a subadult animal on the Malka Arda, near the village of Petkovo.

b. **Micro dams of medium size.** Micro dams are uncommon in the mountains. In contrast with the plains of southern Bulgaria, where the otters inhabit dams almost all year, in the Rhodopes Mountains the situation was different. Unfavourable conditions such as long term freezing in winter and drying in summer. The presence of otters here is strongly influenced by the proximity of "core habitat" such as a medium sized river. An otter family (female with cubs) was found at the river associated with Beglika Dam.

c. **Mountain lakes.** The otter was not found in the group of Smolyanski Lakes and also those near the Momchil Yunak Hut, so they were not included in the paper of GEORGIEV (2005). However the otter is found occasionally in such habitats in Byelorussia (SIDOROVICH, 1995).

3. Otter habitats' components: vegetation associations used by otters. The codes of the habitats with a conservation status considered according the Directive 92/43/EEC were marked. *(All photos were made by the authors).*

1. Forests: River bank forests dominated by *Salix* spp., with sub-dominants as *Ulmus* spp. and *Populus* spp. An otter den was found at Chaya River in a root system of *Salix alba*. Habitat code 92A0

2. Forests: River bank forests dominated by *Alnus glutinosa*. At the Chaya River using of the root systems as a shelter was registered. In Kazanlashka Valley, Central Bulgaria (Radovo River) an otter den was placed in the roots of *A. glutinosa*. Use of this habitat was also recorded in Strandza Mountain (Spassov, pers. comm.).

3. Forests: *Fagus sylvatica* forests. Otter using the habitat recorded on Devinska River. In Sredna Gora Mountain, near the village of Starosel an otter den was found in the root system of a beech-tree.

4. Forests: *Quercus* spp. forests. Mainly used in the smaller mountains and in the plains (Sakar, Sredna Gora, Upper Thracian Valley and other regions) and in the low altitude regions of Rhodopes. Dens were found often in oak root systems.

5. Forests: River bank forests dominated by *Platanus orientalis*. The roots were used for marking on by otters on the Chaya and Parvenetzka Rivers.

6. Forests: *Picea abies* forests, with sub-dominants often as *Pinus nigra* and *Pinus sylvestris*. Footprints of otters were found on such banks of rivers associated with Golyam Beglik and Beglika dams. Habitat code 9410.

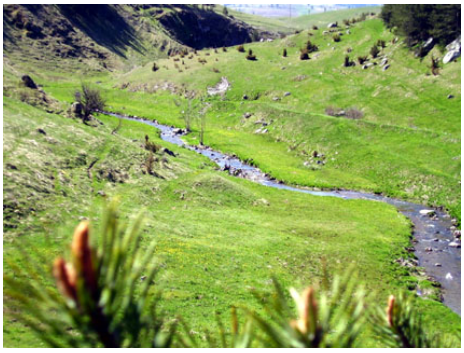
7. Forests: Flooded forests dominated by *Picea abies* and *Pinus sylvestris*. Otter tracks in such forests were recorded at the banks of Golyam Beglik Dam. Habitat code 91D0.

8. Shrub vegetation. Often the dominants were *Salix* spp., *Rubus* spp., *Rubus idaeus*, *Cornus* spp. and *Prunus spinosa*. Very important habitat as an otter shelter. The otter sprainting sites were often associated with the shrub vegetation on Parvenetzka and Chaya Rivers.

9. Herbaceous vegetation: Tall herbaceous vegetation dominated by *Petasites alba*. This very broad leaf vegetation ensures temporary shelter for otters during the vegetation season. Otter footprints were found among this vegetation on the banks of Vacha River.

10. Herbaceous vegetation: Other tall herbaceous vegetation often dominanted by *Mentha* spp., *Urtica* spp., *Sambucus* spp. Otter tracks registered among such vegetation on Vacha, Chaya and Parvenetzka Rivers, and Golyam Beglik Dam. Using of this habitat in mountainous regions was also registered in Stara Planina Mountain (area Uzana).

11. Herbaceous vegetation: Short grass vegetation as high mountain pasture lands and meadows. Rarely used by otters, because this habitat does not provide shelter. Feeding on crayfish in small mountain rivers surrounded by this habitat type was rarely recorded in Rhodopes and also in Stara Planina Mountains (area Uzana). Habitat code 6520.



12. Rocky banks sometimes with hazmophyt herbaceous vegetation. In the Rhodopes Mountain the rocks were often used as otters' holts (for example at Chaya River). The stones were also the commonest substrates for sprainting. Habitat codes 8210 and 8220.

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P R O C E E D I N G S

PROCEEDINGS OF THE EUROPEAN OTTER WORKSHOP, SKYE, 2003

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N E W B O O K

OTTERS: ECOLOGY, BEHAVIOUR AND CONSERVATION

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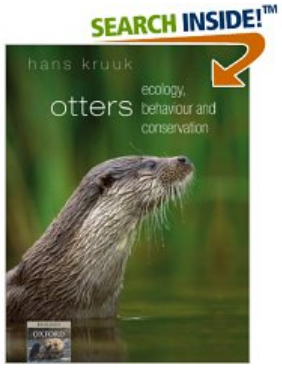

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