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HABITATS OF THE OTTER (*Lutra lutra* L.) IN SOME REGIONS OF SOUTHERN BULGARIA

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Abstract: The aim of present study was to gather base information on the distribution and relative quantity of otters in some habitats and regions, and thus to assist future monitoring of the species in Bulgaria. The otter was searched for in 111 UTM-grid squares mainly in Southern Bulgaria. It was found in 88 and absent from 23 of them. Environment stratification and habitat classification for 5 mountains, 3 valleys and Black Sea Coastal region was made. Data on otter quantity in some rivers and reservoirs is also presented.

Key words: otter, *Lutra lutra*, habitats, Bulgaria.



INTRODUCTION

The previous study of otter (*Lutra lutra* L.) distribution in Bulgaria was done by SPIRIDONOV and SPASSOV (1989). The inquiry method was mainly used, and the authors recommended a careful investigation of the population of the species in the country should be carried out. Some information on the distribution of the otter derived from studying its parasites was presented by YANCHEV (1987) and NIKOLOVA et al. (2001). GEORGIEV (2004) reported on materials in the food spectrum.

The aim of the present study was to gather base information on the distribution and the relative number of otters in some habitats and regions, and thus to assist future monitoring of the species in Bulgaria.

MATERIALS AND METHODS

For the stratification census method (CAUGHLEY, 1977), base data on the distribution and possible relative quantity of a given vertebrate species from various habitats and regions is needed.

To study the distribution of the otter the method of MACDONALD and MASON (1983, 2004) was mainly used and some observation and tracking was also done. Bank side areas smaller than 600 m were searched as a whole. For ponds and reservoirs, the upper and lower parts near the river were considered as sites for monitoring for several reasons: frequently dense vegetation, low disturbance, suitable bank slope for dens and possible home range border areas are present. Questioning of biologists and experts from NGO "Green Balkans" and "Trakiiski University" was undertaken too. A little information was gathered from them and from hunters, fishers and other people. Data was gathered during 1994-2005 from various habitats (total of 111 UTM-grid squares and 148 sites) in Rhodopy Mountain, Surnena Gora Mountain, Stara Planina Mountain, Sakar Mountain, Derwent Heights, Upper Thracian Valley, Tundza Valley, Kazanlashka Valley and Black Sea Coast. These regions were chosen as they are considered the parts of Southern Bulgaria with strongest otter population (SPIRIDONOV and SPASSOV, 1989).

The census was taken mainly during the period of 01.03-10.07.2005. Three main habitat types were investigated (due to their relative abundance in the regions studied): reservoirs (dams, ponds, fishponds), middle size rivers and large rivers situated in Upper Thracian Valley. Fifteen reservoirs were searched and a total of 77,5 km of bank side from 4 middle size rivers and 45 km of one large river (Maritza) were surveyed for food availability. A combination of methods was used, and some adaptations were made: mean spraints per sprainting site were considered (CHANIN, 2003), and compared to the results from observations or from the method of SIDOROVICH (1991) wherever

possible. The mean spraints per sprainting site around dens, hunting sites or home range overlaps and other marking site-types were analyzed separately from each other. The intensity of marking was related with the number of individuals indicated by tracks and observation, and the data for the Bulgarian conditions during the study period was extracted. In rare cases only the tracking method was used. The number of individuals was calculated as individuals with marking behaviour (subadults and adults) per 10 km of river or 0.5 km² reservoir water surface, and for rivers only, possible resident females per 10 km. The home range overlaps of the possible resident females were determined according to the papers of ERLINGE (1967, 1968), VSHIVCEV (1967, 1972) and MASON and MACDONALD (1986).

To study the habitats, the vegetation (trees, bushes and littoral plants), bank slope and disturbance levels were rated up to 10 meters away from the water. At river sites these characteristics were considered in 200-meter transects along the route for both banks, and then calculated for the whole route. At dams and ponds the whole territory was looked at. For vegetation dominance and levels of disturbance a 5-point scale was used following papers of MASON and MACDONALD (1985) and OTTINO et al. (1995). For the bank slope assessment (which we suppose is important factor for the den making) a 3 point scale was used as follows: 1 (0°-30°); 2 (30°-60°); 3 (>60°) was chosen and only the dominant slope category was recorded in the transect. Presence or absence of other suitable habitats up to 3 km away from the studied one was recorded. To categorize the habitat types the classification of SIDOROVICH (1995) and also the map base of NGO “Green Balkans” was used.

For the observations a binocular and a night vision monocular (model Yukon, NV Tracker 2.5x42) were used, and for marking otter signs and habitat study, a GPS (model Garmin, E-Trex Summit). Most of the trips made were financed by various projects of NGO “Green Balkans”.

RESULTS AND DISCUSSION

The otter was found in 88 UTM-grid squares, in various habitat types (constantly inhabited or temporary usage), see Fig.1. The species was not recorded in 23 UTM-grid squares in the highest mountainous areas: Stara Planina Mountain (LH32, LH82, MH44, MH64); Western Rhodopy Mountain (GM32, GM44; KG74; KG54, KG70, KG91, KG90, LG00, LG10, LG11, LG12, LG22, LG23, LG33, LG31); Sredna Gora Mountain (KH82, LH40, LH50, LH80). This was where the rivers present were without fish and ponds froze long term during winter. According to the information gathered, the following habitats were considered as important for otters in the regions studied in Southern Bulgaria:

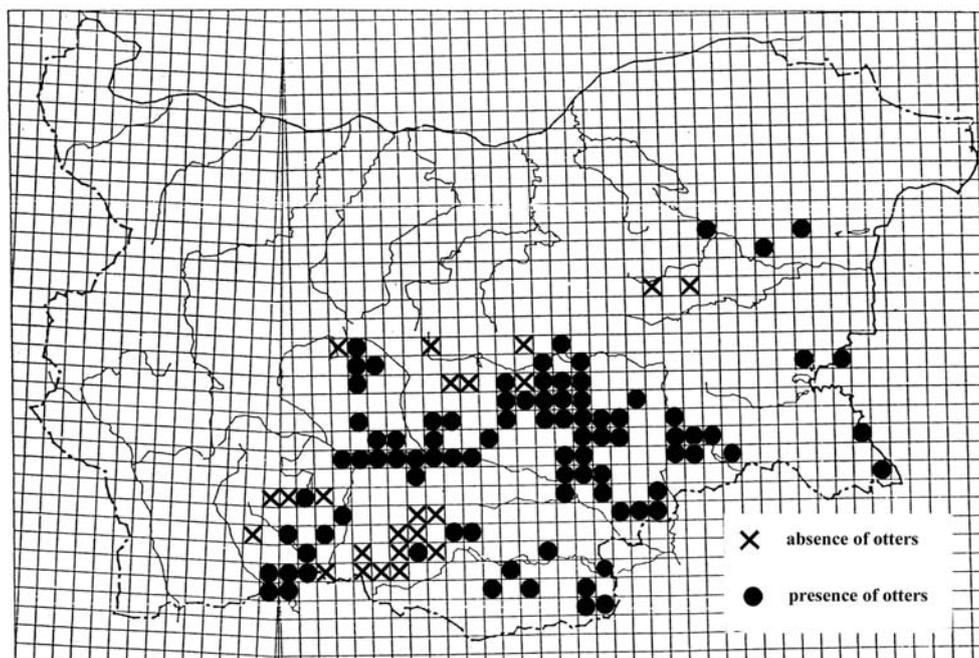


Figure 1. Distribution of the otter (*Lutra lutra* L.) in the regions where the environment stratification and habitat classification was made to assist future monitoring.

1. Main habitats (habitats where otters could live during most time of the year, providing constant food and shelter for the resident animals; in some cases combinations of these habitats could support otters in this way).

1.1. Running waters

1.1.1. Middle sized rivers – rivers from 2 up to about 15 meters wide and not more than 2 meters deep, not freezing during winter. Often various suitable habitats are present.

a) mountainous areas – often non canalized banks, with dense tree and bush vegetation, a lot of rock and stones along stream, low disturbance and pollution; number of sites: 21, all positive – Sredna Gora Mountain (LH70, LG79, KH92), Rhodopy mountain (LG06, LG29, LG42, LG52, LG79, LF89, MF18, MF20, KG50, KG52, KG72, GL49, GM40, KF59), Dervent Heights (MG76), Sakar Mountain (MG53, MG33, MG43). Estimated number of individuals with marking behaviour per 10 km, along 19,6 km of Sazliika river (Sredna Gora) was 3,1 and of this, possible resident females was 2,0.

b) middle canalized areas and similar sized soil bank canals through the plain – steep soil banks, rarely with patches of dense vegetation, sometimes dense littoral vegetation (*Typha* sp., and *Phragmites* sp.), high disturbance and some times high pollution, number of sites: 9 (8 positive, 1 negative) – Upper Thracian Valley (MG16, MH20, MG19, MG18, LG98, MG08, LG17, LG07). Estimated number of individuals with marking behaviour per 10 km, along 16,6 km of Sazliika River (through Upper Thracian Valley) was 2,4 and of this, possible resident females – 1,2; for Blatnica River (17 km studied) it was respectively 1,8 and 1,2.

c) free-flowing rivers – same characteristics as b), but with more space and probably more food available. The estimated home range stretches of the possible resident females upstream was: Sazliika river – 3,8 km; Cherkezitza river – 5,0 km; Parvenecka river – 2,9 km. Total sites 4, all positive – Upper Thracian Valley (KG98, MG05, LG36, LG06).

1.1.2. Large rivers – rivers wider than 15 m, and up to about 0.5 km. Often various supporting habitats are present.

a) mountain areas – same characteristics as the equivalent parts of the middle rivers, but providing more space and probably food resources. Two positive sites in Rhodopy Mountain (MG01, KG83).

b) middle parts in the plain – steep or relatively steep soil or sand banks, often with dense vegetation areas, remnants of flooded forests in the past, presence of pollution and disturbance very high in some areas. A total of 15 sites were checked, all positive; Kazanlashka and Tundza Valley (MG68, MG67, MG66, LH91, MH01), Upper Thracian Valley (MG04, KG86, LG06, LG16, LG26, LG36, LG46, LG56). There were 3,7 and 4,6 individuals with marking behaviour and respectively 1,9 and 3,3 possible resident females per 10 river kilometers in stretches away from urbanized areas on the Maritza River (respectively 16,2 and 15 river kilometers investigated). From a highly urbanized area (14 km studied), where the Maritza river passes through Plovdiv Town and flows near one village, 2,9 individuals with marking behaviour per 10 km and 1,4 possible resident females were found. The bank for about 5 km was shallow and often flooded, disturbance was very high.

c) free-flowing rivers – One positive site in Upper Thracian Valley, at the influx of the Maritza river (LG06), and one at Black Sea Coast (NG75). In the inland site these parts are always canalized, but at Black Sea Coast there are large flooded areas occupied by *Phragmites* sp. These habitat types could be monitored separately, because of their different conditions.

1.2. Standing waters

1.2.1. Middle size reservoirs – Not freezing during winter, or only doing so partly or for short time. These habitats were monitored at their parts nearest the river, and 100% effectiveness was gained. In all the sites spraints were found, except one case, but there tracks were recorded. Sometimes with no adjacent suitable habitats.

a) in hilly areas – in low mountain areas the banks have dense patches of bush and trees; in hilly areas in the valleys there was no such good vegetation cover, but on the flowing rivers' banks there was always good cover and low disturbance levels. Suitable bank slope for dens were present along almost the whole bank, but there was high disturbance. Pollution was registered in one site. A total of 20 reservoirs were visited, all positive: Upper Thracian Valley (LG19, LG36, LG38, LG48, LG37, LG78, MG37, MG39, MG19, MH00, LG89), Sredna Gora Mountain (KH91, LH90) and Sakar Mountain (MG24, MG15, MG16). Results from the census of 10 such reservoirs were a mean of 4,6 individuals with marking behaviour per 0,5 km² of water surface.

b) in plains areas, 5 sites, all positive: Upper Thracian Valley (MG28, MG08, MG19, LG67). Vegetation was very poor (but some times dense littoral vegetation was present), high disturbance

levels, banks shallow on rivers and streams. Pollution was registered at two sites. Five reservoirs censused, mean number of individuals with marking behaviour were 1,7 per 0,5 km² water surface.

1.2.2. Large reservoirs – same characteristics as the middle size ones. The difference was that in dams in hilly areas, there were sites with almost no disturbance at all. In hilly areas, the only suitable adjacent habitat was the river, but in the plain areas, there were diverse supporting habitats present.

a) in hilly areas – Seven sites, all positive: Stara Planina Mountain (NH36, MH94), Rhodopy Mountain (MG20, KG64), Derwent Heights (MG86), Kazanlushka Valley (MH01, MH11).

b) in plain areas – Three sites, positive: Upper Thracian Valley (MG06, MG27, MG37, MG38).

1.2.3. Saline lagoons and coastal lakes – lack of bush and tree bank vegetation, but dense littoral vegetation, sometimes with high disturbance, shallow banks. Two lakes visited, positive (NH31, NH51). Supporting habitats were flooded areas and soil bank canals, connecting the lake with the sea.

1.2.4. Black Sea coast rocky areas – one site visited and otters found (NG67). High disturbance, no dense vegetation marked. In this case the only supporting habitat was small freshwater river, flowing in the sea, but no otter signs were recorded there.

2. Supporting habitats – these could not be inhabited by otters during the whole year, but could temporarily provide some extra food and space during warm seasons and enhance the carrying capacity of the main habitats. Some of them assist the migration and travels of otters between different sites. When not combined each other or with main habitats often no otter signs recorded.

2.1. Running waters

2.1.1. Small canals with soil banks – Poor bank vegetation, but often dense littoral one, high disturbance, slow running waters, sometimes polluted. Use by otters recorded at three sites: Upper Thracian Valley (LG07, LG99) and Kazanlashka Valley (MH01).

2.1.2. Middle size cement bank canals constantly filled with water – Poor vegetation on banks, no littoral vegetation, fast running water, presence of fish, moderate disturbance, often with no proper bank material for den making. After further investigations, this habitat type possibly could be classified as “main”, if resident animals were found. Otters recorded at 4 sites: Upper Thracian Valley (LG99, LG17, LG06).

2.1.3. Streams and small rivers – Clean water, often dense vegetation and low disturbance. Because of the very constant marking recorded near reservoirs, we consider this habitat type is important for migrations and travels. In rare cases otter signs were found over 200 meters up or downstream of the reservoir where it is very small, but in one case a den was found 57 meters away from the dam (downstream). In another case, use of a pond 2,13 km away from the river was recorded, where a small stream which dried out during summer was the only connection.

2.2. Standing waters

2.2.1. Ponds and small reservoirs

a) hilly areas in Upper Thracian and Kazanlashka Valleys, Derwent Heights, Sredna Gora, Rhodopy and Sakar Mountains (MH00, LG06, LG78, MG06, MG25, MG29, MG96, LH01, KH90, LG79, LH70, LH62, MF19), 13 sites, 10 positive and 3 negative.

b) in plain areas, one negative and one positive site in Upper Thracian Valley (MG28, MG09).

2.2.2. Dumphill pit filled with water – one case, use of the food source of *Perca fluviatilis* inhabiting the pit (Upper Thracian Valley: LG06). Steep, unstable banks, high disturbance and pollution.

2.2.3. Rice fields – one case (Upper Thracian Valley: LG07), otter feeding site, two individuals recorded. Shallow banks, no tree or bush vegetation, high disturbance, no pollution.

2.2.4. Flooded areas – three sites searched, one positive (MG19, MG08, LG07). Shallow banks, no tree or bush vegetation, dense *Phragmites* sp. or *Typha* sp. vegetation. Could provide some shelter and frogs as a food source, and sometimes fish.

2.2.5. Black Sea sandy beach areas – two sites positive (NH51, NG75). High disturbance and no places for hiding, but providing extra food from the sea.

2.3. Negatively human influenced waters

2.3.1. Clean running waters without fish – Middle size rivers in mountain areas, where the lack of fish is due to overfishing by humans, good bank slope and vegetation, low disturbance. From 25 sites visited, otters were found in 3 of them: Rhodopy (LG21) and Sredna Gora Mountains (MH00).

2.3.1. Polluted running waters – sometimes with dense bank vegetation and low disturbance, canalized banks, no fish and sometimes no frogs. Otters recorded in 4 sites in Upper Thracian Valley (MG19, MG09, LG99).

This environment stratification and habitat classification was made for Rhodopy Mountain, Surnena Gora Mountain, Stara Planina Mountain, Sakar Mountain, Derwent Heights, Upper Thracian Valley, Tundza Valley, Kazanlashka Valley and Black Sea Coast, but could be used also for otter monitoring in other regions of Bulgaria. Other habitat types will have to be considered as well, like, for example, swamps, mountain lakes and the River Danube.

CONCLUSIONS

The otter was searched for in 111 UTM-grid squares. It was found in 88 and absent from 23 of them. On the basis of otter presence or absence, possible otter numbers, and various environmental features, a total of 23 habitat types and human influenced otter habitats were divided and classified for Southern Bulgaria to assist future monitoring. The environment stratification and habitat classification was made for 5 mountains, 3 valleys and the Black Sea Coastal region.

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RESUME

HABITATS DE LA LOUTRE (*Lutra lutra* L.) DANS CERTAINES RÉGIONS DU SUD DE LA BULGARIE

Le but de cette étude a été d'obtenir des informations sur la distribution et la quantité relative de loutres dans certains habitats et certaines régions, afin de les intégrer à un futur suivi des espèces présentes en Bulgarie. La loutre a été recherchée dans 111 carrés UTM, principalement dans le sud de la Bulgarie. Sa présence a été détectée dans 88 carrés et son absence dans 23 carrés. Une stratification de l'environnement et une classification de l'habitat ont été effectuées pour 5 montagnes, 3 vallées et la région côtière de la Mer Noire. Des données sur la quantité de loutres dans certaines rivières et certains réservoirs ont également été représentés.

RESUMEN

HÁBITATS DE LA NUTRIA DE RÍO (*Lutra lutra* L.) EN ALGUNAS REGIONES DEL SUR DE BULGARIA

El propósito del presente estudio fue coleccionar información básica sobre la distribución y abundancia relativa de nutrias de río en algunos habitats y regiones, y así asistir en el futuro monitoreo de la especie en Bulgaria. Las nutrias fueron investigadas en 111 grillas cuadradas en UTM, principalmente en el sur de Bulgaria. Nutrias estuvieron presentes en 88 grillas y ausentes en 23. Estratificación ambiental y clasificación de habitats fue realizada para 5 montañas, 3 valles y la región Costa del Mar Negro. Pudo coleccionarse información sobre cantidad de nutrias de río en algunos ríos y cuerpos de agua.