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Otter monitoring between 2000 and 2004 in the Drava region (Hungary)

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LANSZKI J: *Otter monitoring between 2000 and 2004 in the Drava region (Hungary).*
Abstract: The monitoring of the strictly protected Eurasian otter (*Lutra lutra*) started during the winter of 2000, in the Danube-Drava National Park, along the Drava River (between Őrtilos and Barcs). The relative density of otters was surveyed by spraint counts along a standard route (line transect survey). The highest otter spraint density was measured at Bélavár (on Drava and backwater), and relatively high values were also found on ponds where the human disturbance was low. On the Dráva River, the mean relative density was moderate, which may be associated with the high fluctuations of water levels and the steep riverside. Otter density was lower on gravel-pit lakes and backwaters with intensive angling, as well as on watercourses and streams in connection with the Dráva River. From 2002 the monitoring was completed by genetic analysis (using nine DNA markers) from freshly collected spraints. The results of the diet composition examined by spraint analysis are also summarized. It can be concluded on the basis of the above findings that the otters' population sensitively reflects the changes of the habitats, preservation of the riverside vegetation and that of the landscape.

Key-words: Lutra lutra, Drava River, backwater, relative density, diet

Introduction

The Eurasian otter *Lutra lutra* (Linnaeus, 1758) is a widely occurring predator in Europe, living in a large variety of watery habitats (MASON and MACDONALD 1986, KRUUK 1995, KRANZ 2000, CONROY and CHANIN 2002). The species shows continuous presence in all the habitats along the Drava River (HELTAI et al. 2004), which is one of the least artificially modified rivers in Central Europe, being rich in natural habitats. All sections of the river are included in the Danube-Drava National Park (IVÁNYI and LEHMANN 2002). Monitoring of the strictly protected and threatened otter started in year 2000 on the Drava River and on connecting watery habitats, after planning a high-capacity hydroelectric power station on the river in the region Novo Virje.

Otter numbers are limited by fish populations (reviewed by KRUUK 1995), and feeding behaviour is dependent on the available food supply (ERLINGE 1967, 1969, WISE et al. 1981, KRUUK and MOORHOUSE 1990, KRUUK et al. 1991, CARSS 1995, RUIZ-OLMO et al. 2001). In addition to the abundance of available food, other factors affecting occurrence and feeding habits are type of habitats, quality of bankside, steepness of waterside banks and the degree of human influence to which the area is exposed (ERLINGE 1967, KEMENES and DEMETER 1995, JEDRZEJEWSKA et al. 2001, RUIZ-OLMO et al. 2001, LANSZKI 2002, RUIZ-OLMO et al. 2002, CLAVERO et al. 2003).

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The freshwater otter has a secretive habit and is active at night; therefore spraints and tracks indicating the presence of the species (REUTHER et al. 2000) give the primary base for confirmation of its occurrence and presence and for monitoring of changes in occurrence by means of systematic questionnaire-based surveys. Determination of the size of an otter population often poses practical problems. Genetic analysis (e.g. DALLAS et al. 1999) is the method primarily suitable for application for this purpose, which were also started along the Drava River in 2002. Relative density of otters can also be measured on the basis of the number of spraints and tracks indicating the presence of the species in relation to the unit length of the route used; this allows comparison of areas studied by identical methods. The line transect method (e.g. ROBSON and HUMPHREY 1985, MASON and MACDONALD 1986, REID et al. 1987, PRIGIONI et al. 1995) is suitable for this, but can also entail error. Primary considerations are the frequency of sample collection and the determining and fixing of the route, together with the importance of extending the study for as long as possible. Territory marking by the otter (i.e., frequency of defecation) is influenced by social behaviour related to breeding, and also by season (e.g. CONROY and FRENCH 1985, KRUUK and CONROY 1987).

The objective of this study, initiated in 2000, was to monitor the otter population living beside the Drava, to assess the basic situation in sampling areas and to examine possible factors influencing distribution.

Material and methods

The study was carried out in SW Hungary. The main data recorded for the habitats studied alongside the Drava, which served as sampling areas, are shown in Table 1. This study included not only the above areas but also several aquatic habitats in the Balaton-Drava ecology network.

The main stem of the Drava River has a steep riparian region, characterised by Central European slow river floodplain woods, composed of willows and poplar. Backwaters on lower relief are covered by Central European slow river floodplain woods and ash-alder woods, while those on higher relief are surrounded by ash-oak-alder forests (IVÁNYI and LEHMANN 2002, JUHÁSZ 2004). The Drava is a high regime watercourse river, the early-summer and autumn flood marks and winter-end low-water marks are characteristics (the difference is approximately seven metres). The river remains "near natural", unpolluted, with meandering courses and many old river-beds.

Diet composition was determined by spraint (faecal) analysis. Sampling commencing in January 2000 alongside the Drava was performed every six weeks at first, then every four weeks from May 2002 to June 2004 and after every six weeks along a standard route (Table 1).

The feeding habits of the otter were examined by spraint analysis. The data obtained related to samples for winter and spring and summer and autumn collectively. Diet composition was determined through microscope examination, on the basis of characteristics of feather, bone, scales, pharyngeal teeth, chitin shell, teeth and hair (LANSZKI et al. 1999, 2001) Diet composition and food niche breadth were calculated on the basis of the relative frequency of occurrence of items in the spraints, this in turn being based on minimum number present per sample.

Food niche breadth for each period was calculated by the Levins index (KREBS 1989). The taxa used were: mammals, birds, reptiles and amphibians, fish, invertebrates and plants. To calculate relative otter density the number of spraints (both the total and fresh)

Fig. 1.: Otter (*Lutra lutra*)

Fig. 2.: River Dráva at Novo Virje

Fig. 3.: River Dráva at Vízvár

Fig. 4. Erzsébet Island at Babócsa

Table 1. The main parameters of the sample collection. WS - winter and spring, SA - summer and autumn, *under bridges and surroundings, - no sample collection was performed

Areas	2000	2000	2001	2001	2002	2002	2003	2003	2004	2004	Line transect
	WS	SA	WS	SA	WS	SA	WS	SA	WS	SA	
	Sample size per periods										m
Monitoring areas:											
Õrtilos, Drava	15	23	53	68	40	18	90	15	61	18	1800
Dombó canal, Gyékényes	30	24	41	62	36	114	28	42	48	55	600*
Lankóci wetland forest	23	13	43	27	28	32	39	0	0	3	2000
Bélavár, backwater	-	46	104	67	117	86	68	58	54	28	500
Bélavár, Drava	-	-	-	-	43	99	302	106	153	63	500
Vízvár, Drava	36	20	33	15	80	26	73	26	63	16	1500
Babócsa, backwater	114	26	35	40	46	46	92	52	196	18	1600
Connecting areas											
Dombó canal, Berzence	-	47	62	22	52	77	206	42	142	42	200*
S.udvarhely, gravel pit ponds	5	0	35	14	70	57	42	51	14	-	2000
Babócsai stream	53	126	84	40	77	106	90	21	91	9	400
Barcs-Komlósdi stream	-	9	15	52	112	72	106	58	79	11	200*
Barcs, Kis-bóki backwater	4	0	45	20	83	62	32	21	27	5	600
Barcs, Középrigóci ponds	199	64	151	191	120	117	161	248	102	3	2000
Korcsina canal, Lakócsa	-	31	38	26	0	24	18	3	19	27	200*

Table 2. Diet composition of otters living in different habitats in SW Hungary. MA-mammals, BI-birds, RA-reptiles and amphibians, IV-invertebrates, PL-plants

Area	MA	BI	RA	Fish	IV	PL
	Percentage relative frequency					
Õrtilos, Drava	1.4	5.7	7.2	79.7	6.0	0.1
Dombó canal, Gyékényes	5.2	3.7	29.4	44.6	16.0	1.1
Lankóci forest	7.1	2.4	23.1	48.8	17.3	1.2
Bélavár, Drava	0.2	3.1	9.1	84.8	2.1	0.7
Bélavár, backwater	1.0	1.0	14.4	71.3	11.9	0.5
Vízvár, Drava	2.4	11.1	8.5	67.9	9.3	0.9
Babócsa, backwater	1.0	2.0	13.4	72.8	10.8	0.0
Dombó canal, Berzence	7.0	1.4	10.1	68.4	12.4	1.0
S.udvarhely, g.p.ponds	2.6	0.0	17.9	70.4	8.0	1.2
Babócsai stream	7.8	2.5	14.4	55.3	19.0	0.9
Barcs-Komlósdi stream	4.0	2.3	8.7	62.7	21.6	0.7
Barcs, backwater	0.9	1.5	8.2	73.6	15.7	0.2
Barcs, ponds	0.7	3.9	9.5	67.3	17.9	0.7
Korcsina canal	1.9	0.0	22.0	32.5	41.7	1.9
Boronka, fish ponds	1.7	2.7	7.6	80.9	6.9	0.4
Fonó, fish pond	1.5	5.9	12.6	66.5	9.2	4.4
Petesmalom, fish ponds	1.1	1.1	4.7	86.0	5.8	1.3
Fonói stream	2.6	1.1	22.9	52.8	18.0	2.8

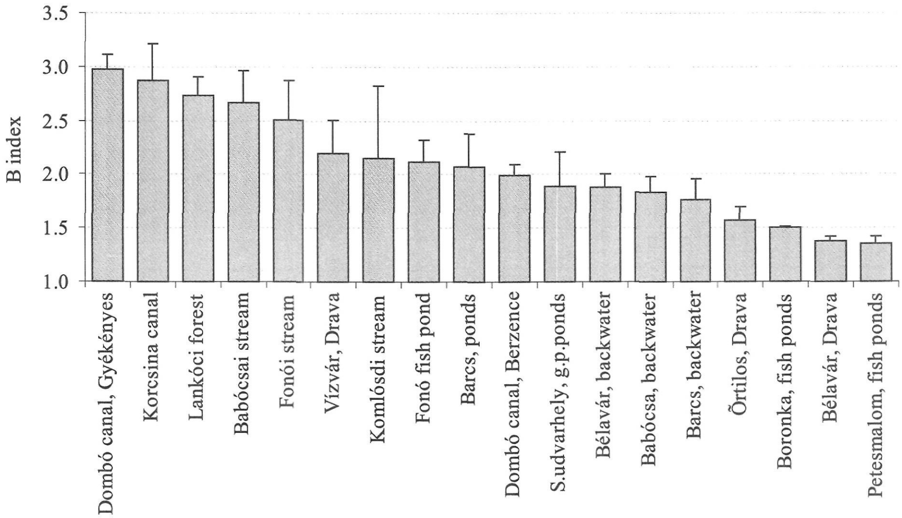


Fig. 5.: Trophic niche breadth (B) of otters in SW Hungary (2000-2004)

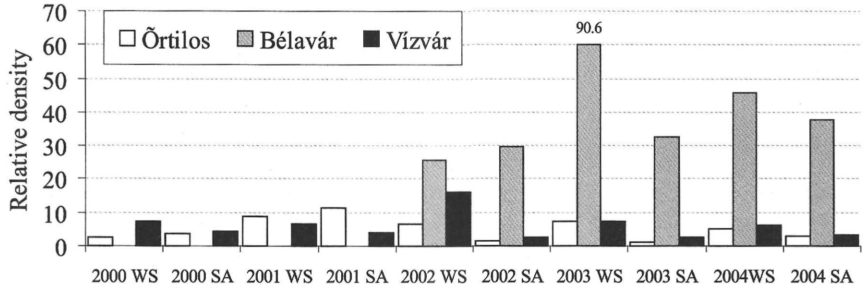
collected was taken relative to the unit length of the route section. Calculation of density ranking involved correction on the basis of duration and frequency of sampling. The data were recorded in an Excel spreadsheet, and the SPSS 10.0 program (1999) was used for data processing.

Results

Diet composition and food niche breadth

Various fish species composed the main proportion of the diet of the otter in the Drava, in some of its backwaters, in streams with constant flow rate, and in the fishponds (Table 2). In addition to these fish species which formed the principal food source, a significant role was also played by secondary food sources, i.e. amphibians and birds, along certain stretches of the Drava (at Vízvár), and in the gravel pit pool close to the Drava (Somogyudvarhely). Consumption of mammals and invertebrates not normally characteristic of the otter diet occurred frequent in the habitats alongside the Drava which periodically dried up, e.g. the Lankóci alder forest, the canals and some streams. For more detail see LANSZKI et al. 2001, LANSZKI 2002, LANSZKI and MOLNÁR 2003.

The food niche of the otter (Fig. 5) proved narrow in the areas where fish were its primary food source. The niche was moderately broad in areas where, in addition to fish, secondary food taxa (amphibians and birds) also occurred frequently in its diet. The areas characterised by a broad food niche were exposed to periodically arising disadvantages (i.e., running dry, large fluctuations in water level, and fishing/human disturbance). The scale of these fluctuations in habitat conditions was indicated by deviation values relative to the mean (s.e.).



Drava backwaters

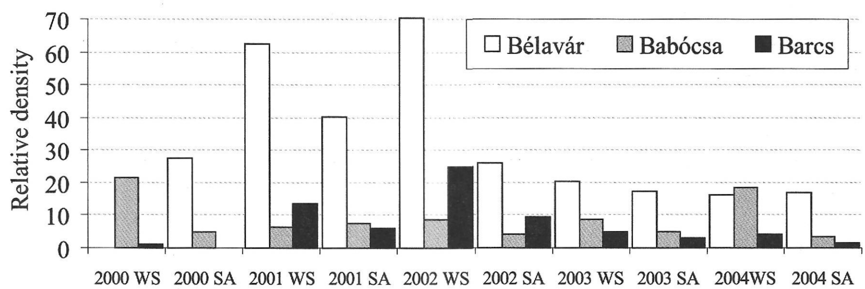


Fig. 6.: Relative abundance of otters along the Drava River and habitats, in Hungary WS - winter and spring, SA - summer and autumn

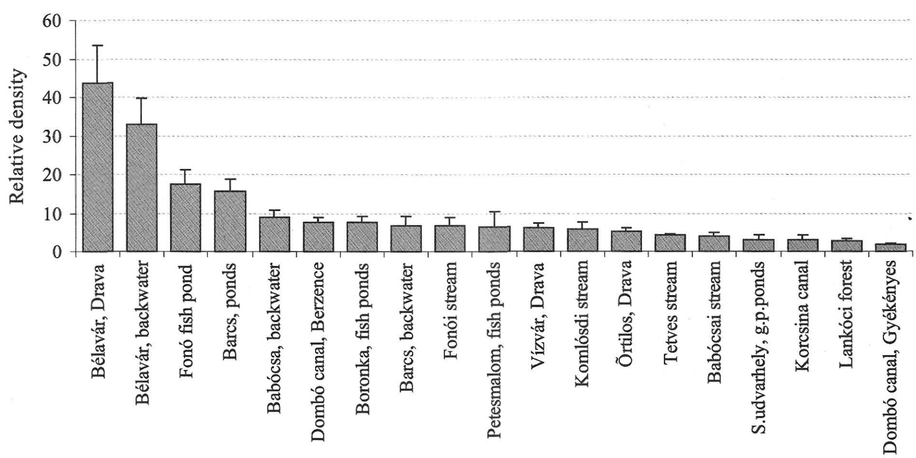


Fig. 7.: Relative density of otters in SW Hungary (2000-2004)

Population density

The indirect line transect method based on the number of spraints collected over the five years of the study (Fig. 6) was used for the purpose of monitoring otter density ranking for each habitat (Fig. 7) and to follow changes in this ranking. It would not be possible to draw distinct boundaries between the areas of high, medium and low otter density shown in Fig. 7. The highest otter density data were recorded in the habitats in which human influence was minimal (in areas protected by enhanced conservation management: in the backwater and on the Drava at Bélavár, in the Barcs, Középrigóci ponds, and in places where the primary aim was fish production, such as Fonó fish pond). Medium otter density was recorded in the rapidly flowing, open stretches of the Drava (i.e., in Őrtilos and Vízvár), the backwaters alongside the Drava (Barcs and Babócsa), the ponds under conservation management (Boronka and Petesmalom) and the streams with constant flow rate. Otter density proved low in the habitats which ran dry periodically (the Lankóci alder forest, the Dombó canal and the Korcsina canal), the streams with low flow rate (Tetves stream) and the ponds where there was intensive fishing (Somogyudvarhely).

The results of the molecular genetic analysis have supported the otter observations, showing continuous otter presence along the River Drava between Őrtilos and Barcs (LANSZKI 2002 and unpublished data). The mean distance of 3.3 km between positive sites was less than a night movement of otters (ERLINGE 1968, JENKINS 1980). The genetic structure showed clear and close relation between populations living in different river sections and backwater habitats.

Discussion

In this study fish of various species constituted the main food source for the otter in the Drava, its backwaters and fishponds, where there was an abundant supply of fish. Low frequency of occurrence (below approx. 50-60%) of the principal fish prey indicated that were periods when these fish species were low, or that the quantities available fluctuated greatly from season to season. At such times secondary food sources became more significant. In the habitats prevalent in Hungary these sources were most frequently amphibians and birds. Frequent consumption of other taxa not characteristic in the diet of otters (e.g. mammals and invertebrates) highlighted a lack of commonly available (i.e., primary and secondary) food sources. Such disadvantages arose in habitats which periodically ran dry and where the food supply was sparse. When fish supply is plentiful the food niche of the otter is generally narrow, as the decisive proportion of its diet consists of various species of fish.

The generally moderate density of otters recorded on the Drava (one individual per 6-7 kilometres) may have been related primarily to strong river current and substantial fluctuation in water level, and, where the water level was low, may also have been due to the riverbank, which was too steep for the otters. Otters are discouraged by steep banks or those with unfavourable degrees of plant cover (i.e., where vegetation is too dense or bare) which prevent them getting into and out of the water (KEMENES and DEMETER 1995, KRUUK 1995). Water entry places play an important role in social behaviour, e.g. in play, grooming and the marking of territory. Deterioration of these areas (e.g. removal of vegetation on the banks) has a negative effect, as does substantial change in water level. Otters only occasionally mark territory on the stones surrounding the banks of the Drava, which protrude when the water level is low. Substantial fluctuations in water level, which can occur every few days, result in spraints which serve as important chemical and visual markers being washed away in the water prematurely.

It can thus be established that the hydroelectric power stations currently in operation exert an adverse effect on the rhythm of life of the otters studied on the banks of the River Drava. If a new, high-capacity power station is built on this tail-like river section, habitats alongside the Drava would suffer further from the effects of running dry, accompanied by deepening of the riverbed, moderate formation of river shoals and further lowering of the underground water table. This could pose a threat to the stability of populations of species associated with water, including otters living in the surrounding area.

Acknowledgements

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A vidra monitorozás 2000 és 2004 között a Dráva mentén

LANSZKI JÓZSEF

A fokozottan védett vidra (*Lutra lutra*) monitorozása a Duna-Dráva Nemzeti Park területén, Őrtilos és Barcs közötti szakaszon 2000 telén kezdődött. A táplálék-összetétel vizsgálat eredménye hullatékanalízisen alapult. A vidra relatív sűrűségének felmérése standard útvonalon (vonal transzekt módszerrel) végzett hullaték gyűjtéssel zajlott. Legnagyobb vidrasűrűség Bélaváron (a Dráván és a holtágon), valamint a kevéssé zavart halastavakon volt. A Dráván közepes volt a vidrasűrűség a nagy vízszintingadozásnak, a sebes folyásnak és a meredek partoldalnak köszönhetően. Az alacsony vízhozamú patakokon és időszakosan kiszáradó csatornákon a táplálékforrások mennyiségének nagymértékű ingadozása miatt szintén alacsony volt a vidrasűrűség. 2002-től a monitorozás kiegészült friss hullatékokból végzett molekuláris genetikai analízissel (kilenc DNS marker alkalmazásával). Megállapítható, hogy a vidra az élőhelyi változásokra az előfordulásán, a táplálkozási szokásain és az egyedsűrűségén keresztül érzékenyen reagál.