Somogyi Múzeumok Közleményei 14: 373-381. (2000)

Diet of a Carnivora community in the Boronka Nature Conservation Area, in Somogy County

JÓZSEF LANSZKI – SÁNDOR KÖRMENDI

LANSZKI J. - KÖRMENDI S.: *Diet of a Carnivora community was studied by scat analysis in the Boronka Nature Conservation Area (Somogy County, southern Hungary).*

Abstract: The numbers of samples elaborated were 335 for red fox (*Vulpes vulpes* L.), 130 for pine marten (*Martes martes* L.), 90 for badger (*Meles meles* L.) and 1280 for otter (*Lutra lutra* L.). The numbers of species or distinguishable taxons eaten by the predators were 23 vertebrates, 15 invertebrates and 13 plants by red fox, 16 vertebrates, 19 invertebrates and 10 plants by pine marten, 11 vertebrates, 22 invertebrates and 7 plants by badger and 17 vertebrates, 10 invertebrates and 4 plants by otter.

Small mammals were dominant in the food of red foxes in winter, spring and autumn (57, 37 and 38%, resp.). Invertebrates (42%) and plants (28%) represented the biggest ratios in summer. Small mammals in winter (55%) and in autumn (40%), small mammals (30%) and invertebrates (29%) in spring and invertebrates (42%) in summer were the most common food of martens. Corn grains (52%) originating from wild boar feeders and invertebrates (23%) were the dominant food components of badgers in winter, while insects (73%) and ringworms (68%) dominated in spring, summer and autumn. The dominant food of otters was fish (67 to 91%), irrespective of season or period of time.

Introduction

Scat analysis is a widely used method for studying the feeding ecological characteristics of carnivorous species. Qualitative evaluation performed on the basis of scat analysis provides a fairly true picture of the types of prey animals and plants eaten and of the frequency of occurrence of these. In the relevant literature on feeding ecology the description of food composition is very often restricted to the larger taxonomic units. If detailed lists are published, these usually refer to some important food categories only (e.g. CIAMPALINI and LOVARI 1985, GOSZCZYNSKI 1986, JEDRZEJEWSKI et al. 1989, SERAFINI and LOVARI 1993, LANSZKI and KÖRMENDI 1996a). There are some examples of detailed food composition lists from the Mediterranean (PAPAGEORGIOU et al. 1988), western European area (DEBROT et al. 1984), central European area (SUCHENTRUNK 1984, KOZENA 1988, ZALEWSKI et al 1995) and northern European area (ENGLUND 1965, ERLINGE 1967, JENSEN and SEQUIRA 1978) and Scotland (KOLB and HEWSON 1979, KRUUK 1989, 1995). There is a serious shortage of information in the literature on this subject for Hungary. Only the food composition of the fair red fox (ERDEI 1977, FARKAS 1983) and of the strictly protected otter (KEMENESNÉ and NECHAY 1990, LANSZKI and KÖRMENDI 1996b) has been studied so far.

In this paper the diet of a Carnivora community was studied in a nature conservation area including ponds and forest habitats. The species studied were red fox, marten, badger and otter. Our objective was to analyse the seasonal food composition of these species qualitatively and to draw up and publish detailed lists of their food composition.

Study area and methods

The investigations were carried out in the Boronka Nature Conservation Area (10 x 10 km UTM code: YM04). Its streams belong to the water catchment area of Lake Balaton. In the Dávod area there are six fish ponds that were established by erecting dams in the valleys on a (*Dryopteridi-Alnetum*) vegetation area at the end of the 19th century. These ponds are 100 cm deep on average, their total surface 83 ha. Over one quarter (approx. 25 ha) of the surface is covered with reeds (*Scirpo-Phragmitetum*). The system of fish farming can be regarded as extensive in the nature conservation area. The ponds are surrounded by *Calamagrosti-Salicetum cenereae* and *Dryopteridi-Alnetum* and by extended *Fraxino pannonicae-Carpinetum* habitats.

The food composition of the predators was investigated by scat analysis. The scats were collected every two weeks on a standard route (approx. 5000 m long). The sample collection spots were divided between dams of the ponds (80 %) and forest pathways (20 %), these being the main routes of movement of carnivores.

The numbers of scats evaluated during the two years of investigations were: red fox (*Vulpes vulpes* L.) 335, pine marten (*Martes martes* L.) 130, badger (*Meles meles* L.) 90 and otter (*Lutra lutra* L.) 1280.

Prey determination was performed by microscope on the basis of indigestible remains such as hair and dentition (TEERINK 1991, DEBROT et al. 1982, ÚJHELYI 1986), feather (BROWN et al. 1993), scales, pharyngeal teeth and bones (BERINKEY 1966, PAUNOVIC 1990, PINTÉR 1992) and scutellum and calciferous skeleton (MÓCZÁR 1969). Reference collections were also beneficial in the identification of fish and plant species.

To survey the dominant food supply of ground predators the authors applied traps for catching small mammals live in the Dávod area on a monthly basis between April and November 1998. The species caught by the traps were common shrew (*Sorex araneus*), fat dormouse (*Glis glis*), common dormouse (*Muscardinus avellanarius*), common field mouse (*Apodemus sylvati-*

cus), yellow-necked field mouse (*Apodemus flavicollis*), striped field mouse (*Apodemus agrarius*), (*Apodemus microps*) bank vole (*Clethrionomys glareolus*). The species observed in the quadrats were squirrel (*Sciurus vulgaris*) and water-shrew. (*Neomys fodiens*) Other *Carnivora* species observed on the Boronka area are stoat (*Mustela erminea*), and European polecat (*Mustela putorius*) and wild cat (*Felis silvestris*), but the number of scats collected was too low.

To express the relative frequency of food components per category the smallest values were taken into consideration in each case. The data obtained in two years were handled as one data set in the evaluations. Seasons, however, were used as group-forming criteria in data processing.

Results and discussion

Small mammals formed the most important food for red foxes in winter, spring and autumn (Table 1, Figure 1). The most commonly occuring species were bank vole (*Clethrionomys glareolus*) and wood mice (*Apodemus* spp.). In addition insectivores, muskrat (*Ondatra zibethicus*) in spring and squirrel (*Sciurus vulgaris*) and fat dormouse (*Glis glis*) were also identified. In winter and early spring when food was rather scarce carcasses of deer (*Cervidae*) and wild boar (*Sus scrofa*) served as „prey", among others. The occurrence of birds was highest in winter and decreased gradually until autumn. Particularly small-bodied songbirds (*Passeriformes*) but also pheasants (*Phasianus colchicus*) and - mainly in spring - waterfowl were components of the foxes' food. Basically grass snake (*Natrix natrix*) and frogs (*Anura* spp.) were present in the food only in spring and summer and fish species only in winter. The consumption of invertebrates was insignificant in winter but significant from spring to autumn (23.3 to 42.2%), including a wide range of species, with a *Carabidae* dominance. Red foxes ate corn and a variety of grasses in winter and spring and fruits (esp. *Pirus* spp.) in summer and autumn.

In the food of pine martens the dominant components were small mammals (esp. *C. glareolus*) from autumn to spring, but *Apodemus* spp., *Insectivora* spp. and *G. glis* were also present (Table 1, Figure 1). The consumption of carcasses in winter and spring (*Cervidae, Sus scrofa*) and the lack of birds in the food in winter are worthy of note. For the rest of the year the bird components were mainly *Passeriformes. N. natrix, Anura* spp. and some fish species were also present. Invertebrates formed a substantial proportion of the food throughout the year (20.0 to 33.9%). *Carabidae* and leaf-horned beetles (*Lamellicornia* spp.) were found to be the most common components. Invertebrates were present in a rich variety (19 species). The plant food of martens (mainly fruits) played a considerable role (25.2 to 31.0%) in summer and autumn.

Badgers ate much plant food (52%) in winter, particularly corn grain available from the wild boar feeders, since there was no agricultural cultivation in the area in question. For the rest of the year plants no longer played an important role in the nutrition of badgers. Millipedes (*Diplopoda* spp., 23%) and animal carcasses (*Cervidae*) were significant food components in winter (Table 1, Figure 1). Invertebrates dominated in the food supply in spring (72.9%) and in summer and autumn (combined 67.6%). The most frequent components were *Carabeidae*, scarabs *(Scarabeidae*), social wasps (*Vespidae*) and ringworms (*Annelida* spp.). The presence of small mammals and birds was insignificant. Amphibians, however, occurred in significant numbers, particularly in spring. In these habitats the most common frog species were common toad (*Bufo bufo*) and agile frog (*Rana dalmatina*). In summer, eggs of marsh tortoise (*Emys orbicularis*) were also detected in the food of badgers.

The dominant food of otters was fish, irrespective of season (67 to 91%) (Table 1, Figure 1). Birds formed a small proportion of the food (*Passeriformes* and waterfowl, 0.3 to 5.5%). Anura spp. consumption was significant in spring and summer (11.9 and 12.6%, resp.). Among invertebrates the most common food component was water tiger (*Dytiscus marginalis*). Not only water-linked species, e.g. dragonflies (*Odonata* spp.), decapods (*Decapoda* spp.), freshwater hoppers (*Gammarus* spp.) and ram's horn (*Planorbis planorbis*) but also terrestrial species living in the forests surrounding the ponds were present, e.g. violet ground beetle (*Carabus violaceus*) and cockchafer (*Melolontha melolontha*).

The numbers of food taxons eaten by the predators and distinguishable to the evaluators on the basis of scat analysis were: 23 vertebrates, 15 invertebrates and 13 plants in red fox, 16 vertebrates, 19 invertebrates and 10 plants in marten, 11 vertebrates, 22 invertebrates and 7 plants in badger and 17 vertebrates, 10 invertebrates and 4 plants in otter.

Acknowledgements

The authors appreciate the cooperation of the Somogy Nature Conservation Organization. They thank György Rozner for participating in the identification of invertebrates included in the food of badgers. This research project was supported by the Hungarian Research Fund (OTKA, no.: F23057).

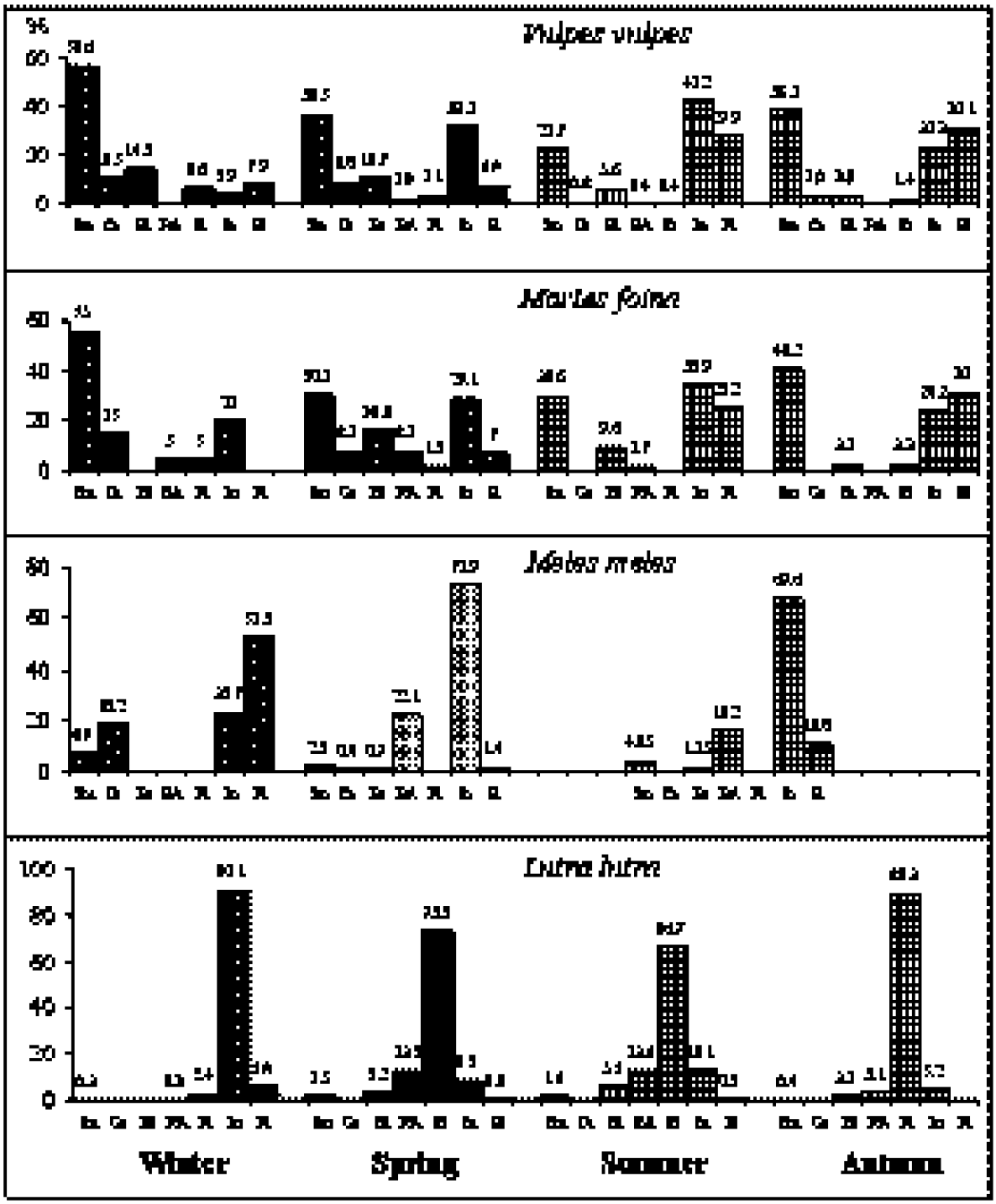

Figure 1: Diet of Carnivoras at Boronka Nature Conservation Area
Sm= small mammals, Ca= carcasses, Bi= birds, RA= reptiles & amphibians, Fi= fish, In= invertebrates, Pl= plants

Taxa	Vulpes vulpes				Martes martes				Meles meles			Lutra lutra			
	Seasons														
	Wi	Sp	Su	Au	Wi	Sp	Su	Au	Wi	Sp	Su-Au	Wi	Sp	Su	Au
	Relative frequency %														
Small mammals	[illegible]	[illegible]	22.7	[illegible]	[illegible]	[illegible]	[illegible]	40.2	[illegible]	[illegible]	[illegible]	[illegible]	1.3	[illegible]	0.4
Sorex araneus		0.5	0.8				0.9								
Sorex spp.				0.4	[illegible]		0.9			1	1.56				
Sciurus vulgaris				0.3											
Glis glis				0.7				1.75							
Apodemus sylvaticus	17.1	6.7	1.6	5.7		[illegible]	2.6	4.6	[illegible]		1.56			[illegible]	
Apodemus flavicollis	[illegible]			5.7	6	[illegible]	4.5	1.75							
Apodemus spp.	4.3	1.9	0.8	4.4	5	3.3	2.6	11.5		0.4			0.3		
Clethrionomys glareolus	37.5	[illegible]	[illegible]	[illegible]	40	[illegible]	[illegible]	[illegible]	[illegible]	6.7	1.56	0.5	0.8	[illegible]	0.4
Ondatra zibethicus		[illegible]													
Microtus spp.	3.7	1.9	1.2	2.7		1.3	2.6	1.75	3.3	0.4			0.6	0.5	
Carcasses	[illegible]	[illegible]	0.8	3	15	[illegible]	-	-	10.2	0.4	·	-	-	·	·
Sus scrofa		6	0.4	0.5	10	[illegible]									
Capreolus capreolus	4.25	1.3		0.7		3.3			4.6						
Cervus elaphus	8.25	1.3	0.4	2	5	3.3			13.7						
Cervidae spp.		1.9								0.4					
Birds	[illegible]	[illegible]	[illegible]	5	·	[illegible]	[illegible]	[illegible]	·	6.7	1.56	0.5	[illegible]	[illegible]	[illegible]
Carduelis carduelis		0.5													
Phasianus spp.						1.3									
Sturnus vulgaris													0.5		
Passeriformes spp.	10.5	[illegible]	[illegible]	1.7		[illegible]	[illegible]	[illegible]		0.4	[illegible]	0.3	[illegible]	[illegible]	1.1
Gallinula chloropus		[illegible]													
Anas spp.	[illegible]														[illegible]
Fulica atra				0.3											0.4
[illegible] spp.		0.5	0.8												
[illegible] spp.		[illegible]													
Phasianus colchicus	3.7	0.5		1											
Egg		1.3				1.3				0.3					
Reptiles and amphibians	·	[illegible]	[illegible]	-	5	[illegible]	1.7	-	·	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Emys orbicularis - egg											2.7				
Natrix natrix		1.3	0.4			3.3				1.5					
[illegible] spp.							0.9								
Anura spp.		[illegible]				[illegible]	0.9			7.6					
Bufo bufo										12.1					
Rana spp.										0.7					
Fish	[illegible]	[illegible]	[illegible]	[illegible]	6	[illegible]	-	[illegible]	·	·	·	[illegible]	[illegible]	[illegible]	[illegible]
Lepomis gibbosus												7.2	0.3		0.7
Pseudorasbora parva												[illegible]	11	4.4	[illegible]
Perca fluviatilis								1.75				0.5	0.5	[illegible]	[illegible]
Carassius auratus gibelio	[illegible]	[illegible]		0.7	[illegible]							[illegible]	[illegible]	[illegible]	[illegible]
Cyprinus carpio												3.5	2	[illegible]	[illegible]
Ctenopharyngodon idella								1.75					[illegible]	[illegible]	[illegible]
Esox lucius		[illegible]										[illegible]	[illegible]	[illegible]	[illegible]
Rutilus rutilus		0.5										[illegible]			[illegible]
Alburnus alburnus													[illegible]		
[illegible]													0.5		
Rhodeus sericeus amarus													[illegible]		
Unidentified fish	3.9	1.3	0.4	0.7		1.3						1.1	5.5	4.4	4.3
Invertebrates	[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] spp.			0.4												
[illegible]	1.3	[illegible]	[illegible]	8.5	10	[illegible]	3.5	[illegible]		1.1	[illegible]				
[illegible]		[illegible]	[illegible]				[illegible]			1.1	[illegible]				
[illegible]	[illegible]	[illegible]	[illegible]	1	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]			[illegible]	[illegible]
[illegible]		[illegible]	4.4	2.7		3.3		[illegible]		0.7	[illegible]				
[illegible]		[illegible]													
[illegible] spp.			4	1.7		[illegible]	2.6	[illegible]		1.1	2.7				
Harpalus spp.			0.4				0.9			0.4	[illegible]				
[illegible] spp., grub							0.9			3.1					
[illegible] spp.		[illegible]	[illegible]	5		[illegible]	[illegible]	1.5		[illegible]	[illegible]				
[illegible]							0.9								
Dytiscus marginalis				1.7								[illegible]	[illegible]	[illegible]	[illegible]
Dytiscidae spp., grub														[illegible]	
Dytiscidae spp.														[illegible]	
Hydrous piceus								1.75							

Items	Vulpes vulpes				Martes martes				Meles meles			Lutra lutra			
	Season														
	Wi	Sp	Su	Au	Wi	Sp	Su	Au	Wi	Sp	Su-Au	Wi	Sp	Su	Au
	Relative frequency %														
Lucanus cervus						25									
Carabus spp.		3.6	3.4	1			3.6	1.45							
Geotrupes vernalis										7.1	2.7				
Geotrupes spp.			4.7	0.7			3.6	1.45		10.2	9.6				
Scarabaeidae spp.										0.7					
Curculionidae spp.										0.4					
Elateridae spp.										1.4	2.7				
Coccinella septempunctata											1.3				
[illegible] spp.							0.6			3.2					
[illegible]							9.5			0.4	1.7				
Chrysomelidae spp.						1.3									
Melolontha melolontha		3.6				1.3							0.5		
[illegible] spp.								1.45							
Coleoptera spp.		2.6	2	2	5	24	4.8	7.4		3.2			9.3	0.09	
Coleoptera spp., grub										8.4					
Formica spp.											1.7				
Vespa crabro	1.3						4.9				1.4				
[illegible] spp.						1.3									
Odonata spp.							0.6								0.25
Odonata spp., grub		1.2	0.4							2.8					
[illegible] spp.			0.4	0.7		2.4				8.7		0.2	0.5		
Diplopoda spp.										5	2.7				
[illegible] spp.															0.75
[illegible]													9.5		
[illegible] spp.												0.4			
[illegible] spp.										0.7					
[illegible]														0.09	
[illegible] spp.									21.7	28.6	18.2				
Planorbis planorbis													0.2		0.25
[illegible]										0.4					
[illegible] spp.				6.2			1.7			0.4					
[illegible] spp.						1.3						0.4		1.1	
Plants	7.5	4.9	27.5	31.1	-	7	28.2	31	62.7	1.4	40.5	-	4.5	0.5	-
Vitis vinifera				2.7				4.4							
Rubus spp.		0.6	15.1	2.7			7.4	7.4			2.7			0.5	
[illegible]			2			12	9.5								
Prunus spinosa				0.7											
Prunus domestica			0.4	0.2											
Pyrus spp.			7.3	13.6			3.6	10.3			1.35				
Fruit undetermined						27	17								
Zea mays	3.9	1.3		3				3.3	27.3		1.25				
Helianthus annuus				8.4							1.4				
Seed	1.3			4.5				2.7	22.7				9.3		
Grass	2.7	4.4	2.4	2			2.9	4.4		1.1	4		9.3		
Typha/Carex spp.													0.2		
Leaf		9.6	9.4												
Soil						25			2.3	0.3					
[illegible]						1.3									
[illegible]			0.4												
Others															
Nylon		+	+												
Thread			+												
[illegible]				+		+									
n	45	72	87	131	5	30	41	33	12	44	52	470	451	522	346

Notes: + occurred in the diet, n= number of samples (scats)

Table 1: The Carnivora's diet at Boronka Nature Conservation Area (from December 1996 to November 1998)

References

BERINKEY L. 1966: Halak - Pisces. Akadémiai Kiadó, Budapest

BROWN R. FERGUSON, J., LAWRENCE, M. and LEES, D. 1993: Federn, Spuren & Zeichen der Vögel Europas: Ein Feldführer. Aula- verlag Wiesbaden

CIAMPALINI B., LOVARI S. 1985: Food habits and trophic niche overlap of the badger (*Meles meles* L.) and the red fox (*Vulpes vulpes* L.) in a mediterranean coastal area. Z. Säugetierkunde, 50: 226-234.

DEBROT, S., FIVAZ, G., MERMOD C, and WEBER, J.-M. 1982: Atlas des poils des mammiferes d`Europe. Institut de Zoologie, Neuchatel.

DEBROT S., FIVAZ G., MERMOD C. 1984: Note sur le gite et la nourriture hivernale d'une hermine (*Mustela erminea* L). Bulletin de la societé neuchateloise des Sciences naturelles, 107: 137-141.

ENGLUND J. 1965: Studies on food ecology of the red fox (*Vulpes vulpes*) in Sweden. Viltrevy, 3: 371-442.

ERDEI M. 1977: Food -biological investigation on the fox populations in southern Hungary. Acta Biologica, Szeged 23 (1-4): 97-107.

ERLINGE S. 1967: Food habits of the fish-otter *Lutra lutra* L. in South Swedish habitats. Viltrevy, 4: 371-443.

FARKAS D. 1983: Újabb adatok a róka táplálkozásáról. Beszámoló jelentés a Természet- és Vadvédelmi Állomás 1983. évi munkájáról, Fácánkert, 41-44.

GOSZCZYNSKI J. 1986: Diet of foxes and martens in central Poland. Acta Theriologica, 31: 491-506.

JEDRZEJEWSKI W., JEDRZEJEWSKA B., SZYMURA A. 1989 Food niche overlaps in a winter community of predators in the Bialowieza Primeval Forest, Poland. Acta Theriologica, 34 (34) 487-496.

JENSEN B., SEQUEIRA D. M. 1978: The diet of the red fox (*Vulpes vulpes* L.) in Denmark. Danish Review of Game Biology, 10: -16.

KEMENESNÉ K.I., NECHAY, G. 1988: The food of otters *Lutra lutra* in different habitats in Hungary. Acta Theriologica, 35 (1-2): 17-24.

KOLB H.H., HEWSON R. 1979: Variation in the diet of foxes in Scotland. Acta Theriologica 24: 69-83.

KOZENA I. 1988: Diet of the red fox (*Vulpes vulpes*) in agrocoenoses in southern Moravia. Acta Sc. Nat. Brno, 22 (7): 1-24.

KRUUK H. 1989: The social badger - Ecology and behaviour of a group-living carnivore (*Meles meles*). Oxford Univ. Press.

KRUUK H. (1995): Wild otters. Predation and population. Oxford Univ. Press.

LANSZKI J., KÖRMENDI S. 1996a: Négy ragadozó emlõs faj táplálkozásökológiai vizsgálata a fonói halastó (Somogy megye) körzetében. (Examination of food ecology of four carnivorous mammals in the vicinity of Fonó fish-pond (Somogy county). Állattani Közlemények, 81. 73-85.

LANSZKI, J., KÖRMENDI, S. 1996b: Otter diet in relation to fish availability in a fish pond in Hungary. Acta Theriologica, 41: 127-136.

LINDSTRÖM E. 1989: The role of medium-sized carnivores in the Nordic boreal forest. Finnish Game Research, 46: 53-63.

MÓCZÁR L. (1969): Állathatározó I-II. Tankönyvkiadó, Budapest

PAPAGEORGIOU N.K., SEPOUGARIS A., CHRISTOPOULOU, O.G., VLACHOS, C.G., PETAMIDIS, J.S. 1988: Food habits of the red fox in Greece. Acta Theriologica 33: 313-324.

PAUNOVIC M. 1990: Vodozemci iz proslosti I sadasnjosti Odredivanje skeletnih dijelova. (Kétéltû határozó csonttani bélyegek alapján), Zagreb.

PINTÉR K. 1989: Magyarország halai. Akadémiai Kiadó, Budapest

SERAFINI P., LOVARI S. 1993: Food habits and trophic niche overlap of the red fox and the stone marten in a Mediterranean rural area. Acta Theriologica, 38 (3) 233-244.

SUCHENTRUNK F. (1984): Aspects of food ecology of some austrian red fox population (*Vulpes vulpes*) and possible consequence for the spread of rabies. Dissertation, Univ. Wien

TEERINK B.J. 1991: Hair of West-European mammals. Cambridge University Press, Cambridge

ÚJHELYI P. 1989: A magyarországi vadonélõ emlõsállatok határozója. (Küllemi és csonttani bélyegek alapján) A Magyar Madártani Egyesület kiadványa, Budapest

ZALEWSKI A., JEDRZEJEWSKI W., JEDRZEJEWSKA B. 1995: Pine marten home range, numbers and predation on vertebrates in a deciduous forest (Bialowieza National Park, Poland). Ann. Zool. Fennici 32: 131-144.

Ragadozó emlős közösség táplálékösszetétele a Boronka-melléki Tájvédelmi Körzetben, Somogy megyében

LANSZKI JÓZSEF – KÖRMENDI SÁNDOR

A Boronka-melléki Tájvédelmi Körzetben (Somogy megye, Magyarország) élő ragadozó emlős életközösség táplálék-összetételét hullaték-analízissel tanulmányoztuk. A feldolgozott minták száma vörösróka (*Vulpes vulpes* L.): 335; nyuszt (*Martes martes* L.): 130; borz (*Meles meles* L.): 90; vidra (*Lutra lutra* L.): 1280. A ragadozók által fogyasztott fajok, illetve elkülöníthető taxonok száma: vörösróka esetében: 23 gerinces, 15 gerinctelen, 13 növény, a nyusztnál: 16 gerinces, 19 gerinctelen, 10 növény, a borznál: 11 gerinces, 22 gerinctelen, 7 növény és a vidránál: 17 gerinces, 10 gerinctelen és 4 növény.

A vörösróka téli, tavaszi és őszi táplálékában a kisemlősök (57, 37 ill. 38%), nyáron a gerinctelenek (42 %) és a növények (28 %) voltak a legjelentősebbek. A nyuszt téli és őszi táplálékában a kisemlősök (55, ill. 40 %), tavasszal a kisemlősök (30 %) és a gerinctelenek (29 %), nyáron a gerinctelenek (42 %) domináltak. A borz téli táplálékában a növények (vaddisznószórókról származó szemes kukorica) (52 %), valamint gerinctelenek (23 %), tavasszal és a nyári-őszi táplálékban a gerinctelenek (bogarak és gyűrűsférgek) (73, ill. 68%) voltak a legjelentősebbek. A vidra táplálékában évszaktól és időszaktól függetlenül a hal dominált (67-91 %).

Authors' addresses:
LANSZKI József
University of Kaposvár
Faculty of Animal Science
H-7401 Kaposvár, P.O.Box 16
HUNGARY

KÖRMENDI Sándor
University of Kaposvár
Faculty of Animal Science
H-7401 Kaposvár, P.O.Box 16
HUNGARY