

## THE FOOD OF MONTAGU'S HARRIERS DURING PRE-LAYING PERIOD

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**Abstract.** Food of the Montagu's Harrier was analysed from 158 pellets and 375 direct observations in two Nature Reserves: "Roskosz" and "Bagno Serebryskie". Pellets collection was conducted in the seasons 1992–1995 at calcareous marshes of Chełm region in eastern Poland. Pellets were collected from perching places, male platforms, roosting and resting places. 210 prey items were identified from 158 pellets. Main component of the food were small mammals (56,2 %), small passerines (24,3 %), eggs (9,5 %), lizards (8,1 %), frogs (1,4 %) and fishes (0,5 %). Small mammals like rodents were common prey in the diet of the Montagu's harrier. They represented 85,0 % of mammalian prey. The Common Vole was the most frequent rodent (50,0 %) in the pellets. The largest mammalian prey were Common Rat. The direct observations of food transfer were made using binoculars and scope. Results showed that main food component were vertebrates (98,4 %). Only 1,6 % were represented by insects. Most common prey were small mammals (58,7 %). Birds, reptiles (lizards) and amphibians (frogs) were represented by less than 2 % of prey. Non identified vertebrates accounted for 37,8 %. Both data, based on the pellets and direct observation showed that small mammals were the main component of harrier's food.

**Key words:** Poland, Montagu's Harrier, *Circus pygargus*, birds of prey, food, pellets.

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**Питание лугового луня в начале гнездового периода. - Я. Вяцек, М. Недведз. - Беркут. 14 (2). 2005.** - Питание анализировалось по 158 погадкам и 375 прямым наблюдениям в двух заповедниках. Погадки собирались в 1992–1995 гг. на известняковых болотах в районе Хелма на востоке Польши. Собирали их возле присад, в местах ночевки и отдыха. В них было определено 210 экземпляров добычи (в среднем 1,3 на погадку). Основными компонентами пищи были мелкие млекопитающие (56,2 %), мелкие воробьиные (24,3 %), яйца (9,5 %), ящерицы (8,1 %), лягушки (1,4 %) и рыба (0,5 %). Среди млекопитающих 85 % составляли грызуны. Чаще всего в погадках встречалась обыкновенная полевка (50,0 %). Наиболее крупной добычей из млекопитающих была серая крыса. Прямые наблюдения за передачей пищи от самца к самке при помощи бинокля и телескопа показали, что основной добычей были позвоночные (98,4 %). Только 1,6 % приходилось на насекомых. Преобладали мелкие млекопитающие (58,7 %). Птицы, пресмыкающиеся (ящерицы) и земноводные (лягушки) составляли менее 2 % рациона. Не определенные позвоночные насчитывали 37,8 %. Собранные обоими способами данные показывают, что основу питания луговых луней составляют мелкие млекопитающие.

### Introduction

Montagu's Harrier (*Circus pygargus*) is a bird of prey of wide spectrum of food (Clarke, 1996). This typically diurnal predator is active forager in open country, meadows and barrens foraging in sites situated even up to 22 km away from nest (Guixe, 2004). Hunting behaviour of the Montagu's Harrier and other European species of that kind is the slow cruising 1–2 m above the ground to detect the prey and eventually attack.

During the whole nesting season there are distinctive differences in amount and size of the prey caught by both sexes (Cramp, Sim-

mons, 1980). These differences are caused by quite different participation of males and females in the care of eggs and nestlings. This fact is particularly visible in the pre-laying season, when the females are almost wholly food dependent from males (Wiacek, 1997, 1998; Wiacek, Koziol, 1997).

The aim of the research was to know the components of the diet of Montagu's Harrier in the pre-laying period.

### Material and methods

Montagu's harriers were observed on the calcareous marshes near Chełm in eastern Po-

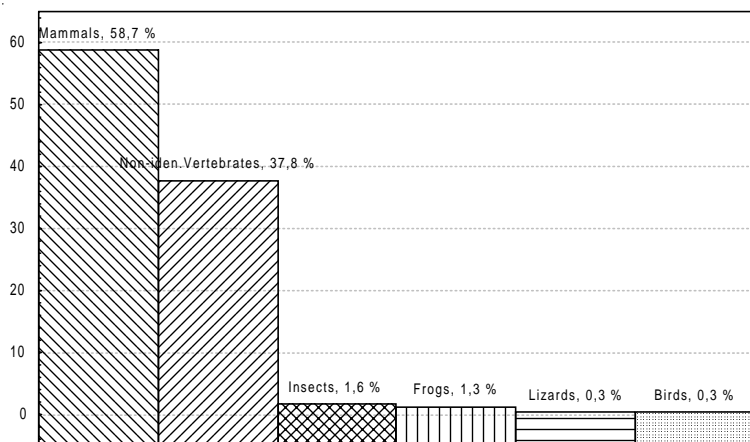


Fig. 1. Food of the Montagu's Harrier by direct observations.

Рис. 1. Питание лугового луны по прямым наблюдениям.

land. The landscape of the study area is dominated by sedge community *Cladietum marisci*. Pellets was collected in two Nature Reserves: "Roskosz" and "Bagno Serebryskie" in the seasons 1992–1995.

Food of the Montagu's harrier was analysed from pellets and direct observation. Pellets were collected from perching places, male platforms, roosting places, resting places and nests before start to egg-laying. Every day of observation pellets were collected twice a day, at

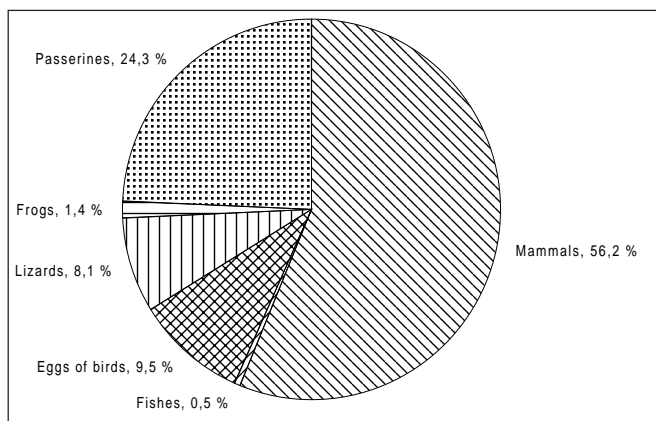


Fig. 2. Food of the Montagu's Harrier by pellets.

Рис. 2. Питание лугового луны по погадкам.

morning and late afternoon. Pellets were analysed in laboratory, later. The direct observation were made using 10 x 50 binoculars and scope Kowa 20–60 x 72 from distance of 100–150 m. Food delivery was observed from last days of April to the end of May. Each day of courtship feeding observation was started at 7 a. m. and finished near sunset.

## Results

In most of 375 direct observations of prey which were provided by males to females, dominating items were vertebrates which cover 98,4 % of all prey provided. 1,6 % of observed prey were insects, difficult to identify. The analysis of the direct observations of the provided food is shown in Figure 1. Among identified prey, small mammals were dominated (58,7 % of prey). As far as other vertebrates classes are concerned, the brought prey were represented by birds, reptiles (*Lacerta* sp.) and amphibians. Quite big group were unidentified small vertebrates which were 37,8 % of all brought prey. The difficulties in identifying of the most of prey were caused by the fact that males used to bring the prey which were nibbled, or only fragments of them.

The analysis of 158 pellets collected during the pre-laying season brings more



clear picture of the composition of the food of these raptors. These data have been shown in Figure 2. The great amount of pellets (67) includes the remains of 134 insects, mainly *Colleoptera* and few representations of *Orthoptera*, *Heteroptera* and *Diptera*. But more precise analysis of these insects showed that all of them came from stomach of insectivorous birds or mammals which were the prey of Montagu's Harrier. The precise analysis of the quantitative composition of the food has shown the presence of 210 prey items in 158 pellets. It was 1,3 of items per 1 pellet. From among vertebrates small mammals were dominated in the food. Among mammals found in the pellets, rodents *Rodentia* and insectivores *Insectivora* were observed (Table).

### Discussion

In the time of prey deliveries by direct observation the main prey were vertebrates (98,4 %). The main component of the vertebrates food were small mammals (58,7 %). More than 37 % of vertebrates were not identified. Birds, lizards and frogs were represented by less than 2 % prey. Similar results were described by Krogulec (1992) in the nesting period on the same study area in the Montagu's harrier. His data showed similar proportion of mammalian prey (57,5 %) but higher rate of birds (42,5 %) in the diet. This difference has become in later stages of the breeding season when big number of small passerines started to fly. In the time of early spring adult passerines are difficult to catch by harriers because energetic costs of hunting for them are high. Very similar data were presented by Kitowski (1994) in the time of post-fledging period. However, proportion of insects in the diet of Montagu's Harrier in this period were higher than in the courtship period.

Most important component of food for harriers were mammals and birds. This kind of food has a high energetic quality, therefore is very easy to assimilate by birds in comparison with other components of food. Problem of food assimilation were described in the

Mammals in the diet of Montagu's Harrier  
Млекопитающие в рационе лугового луня

Species	n	%
Micrommamalia	16	13,66
<b>Insectivora</b>		
<i>Sorex araneus</i>	2	1,70
<b>Rodentia</b> spp.	11	9,32
<i>Arvicolidae</i>	14	11,86
<i>Apodemus</i> spp.	4	3,38
<i>Microtus arvalis</i>	59	50,00
<i>M. oeconomus</i>	3	2,54
<i>M. agrestis</i>	2	1,70
<i>Mus musculus</i>	1	0,85
<i>Apodemus agrarius</i>	1	0,85
<i>Pitymys subterraneus</i>	3	2,54
<i>Rattus norvegicus</i>	1	0,85
<i>Micromys minutus</i>	1	0,85
Total	118	100,00

Australasian Harrier (*Circus approximans*) by Tollan (1988). Similar results for Montagu's Harrier described Krogulec (1992) and Kitowski (1994).

The food of the Montagu's Harrier in European population is different. In English population described by Underhill-Day (1993) the main component of the food were birds (50 %) which together with small mammals included 70–90 % of the diet. Similarly Clarke (1996) describing Cambridgeshire population showed that pellets contained more than 70 % of birds in the diet of Montagu's Harrier. In the French population high differences in the food contain were described by Thiollay (1968). Invertebrates or small mammals were dominated in these populations. The significant number of insects in the diet of French harriers were provided by Krogulec and Leroux (1994). The high invertebrates domination (55 %) in Spanish population and the high level of reptiles (10 %) in the harrier diet underlined Hiraldo et al. (1975).

In conclusion Montagu's Harrier is a opportunistic bird of prey which exploit most common prey on the foraging area. Similar behaviour were described in other species of har-



riers by Redpath (1992) and Barnard et al. (1987). Mammals and birds as a main component of the food in others harriers were described in literature (Schipper, 1973). In Dutch population of Marsh Harrier birds were a main component of the food (Clarke et al., 1993), but Canadian and Dutch populations of Hen Harrier have preferred mammals in the diet (Bernard et al., 1987; Clarke et al., 1993). Similarly African Marsh Harrier (*Circus ranivorus*) has preferred mammals in the diet (Simmons, 1991). French data from nine years of observations showed that main component of Montagu's Harrier diet was Common Vole (*Microtus arvalis*). Additionally this species of birds of prey select areas with high prey availability (Bretagnolle, De Cornulier, 2004).

## REFERENCES

- Barnard P., Mac Whirter B., Simmons R., Hansen G.L., Smith P.C. (1987): Timing of breeding and the seasonal importance of passerine prey to Northern Harriers *Circus cyaneus*. - Can. J. Zool. 65: 1942-1946.
- Bretagnolle V, De Cournulier T. (2004): Landscape structure, voles and harriers: towards an integrated approach for conservation at the community level. - Intern. Symposium on Ecology and Conservation of Steppe-Land Birds. Abstracts. Lleida, Spain.
- Clarke R. (1996): Montagu's Harrier. Chelmsford: Arlequin Press.
- Clarke R., Bourgonje A., Castelijn H. (1993): Food niches of sympatric Marsh Harrier *Circus aeruginosus* and Hen Harrier *Circus cyaneus* on the Dutch coast in winter. - Ibis. 135: 424-431.
- Cramp S., Simmons K.E.L. (1980): The Birds of the Western Palearctic. Vol. 2. Oxford University Press. Oxford.
- Guix D. (2004): Territory characteristic, home range size, habitat and prey selection of the Montagu's Harrier in NE Spain. - Intern. Symposium on Ecology and Conservation of Steppe-Land Birds. Abstracts. Lleida, Spain.
- Hirald F., Fernandez F., Amores F. (1975): Diet of the Montagu's Harrier *Circus pygargus* in southwestern Spain. - Acta Vertebr. 2 (1): 25-55.
- Kitowski I. (1994): Ekologia okresu post-pisklęcego błotniaka łąkowego *Circus pygargus* na torfowiskach węglanowych koło Chełma. - Ph.D Thesis. Curie-Sklodowska University. Lublin.
- Krogulec J. (1992): Ekologia rozrodu błotniaka łąkowego *Circus pygargus* na torfowiskach węglanowych koło Chełma. - Ph.D. Thesis. Curie-Sklodowska University. Lublin.
- Krogulec J., Leroux A.B.A. (1994): Breeding ecology of Montagu's Harrier *Circus pygargus* on natural and reclaimed marshes in Poland and France. - Raptor Conservation Today. Pica Press. 151-152.
- Redpath S.M. (1992): Behavioural interactions between Hen Harriers and their moorland prey. - Orn. Scand. 23: 73-80.
- Shipper W.J.A. (1973): A comparison of prey selection in sympatric harriers *Circus sp.* in Western Europe. - Gerfaut. 63:117-120.
- Simmons R. (1991): The efficiency and evolution of aerial food passing in harriers. - Gabar. 6 (2): 51-56.
- Thiollay J.M. (1968): La pression de predation estivale du Busard cendre sur les population de *Microtus arvalis* en Vendee. - Rev. Ecol. 22 (3): 321-326.
- Tollan A.M. (1988): Maintenance energy requirements and energy assimilation efficiency of the Australasian Harrier. - Ardea. 76: 181-186.
- Underhill-Day J.C. (1993): The foods and feeding rates of Montagu's Harrier *Circus pygargus* breeding in arable farmland. - Bird Study. 40: 74-80.
- Wiacek J. (1997): The effect of courtship feeding on the duration of pre-laying period in the Montagu's Harrier *Circus pygargus*. - Współczesne kierunki ekologii. Ekologia behawioralna. Lublin: Wydawnictwo UMCS.
- Wiacek J. (1998): Ecology of the pre-laying period in the Montagu's Harrier *Circus pygargus* on the calcareous marshes near Cheim. - Ph.D Thesis. Curie-Sklodowska University. Lublin.
- Wiacek J., Koziół P. (1997): An attempt at verification of partner's fidelity in the Montagu's Harrier *Circus pygargus* with use of DNA fingerprinting. - Not. Orn. 38 (3): 173-182.

В октябре 2006 г. в г. Ростове-на-Дону будет проходить V Всероссийская школа по морской биологии "Методы и теоретические аспекты исследования морских колониальных птиц". Школа будет проходить по секциям: 1) морские птицы – концепция и методы исследований; 2) теоретические аспекты колониальности у птиц. Планируются тематические выступления 8 приглашенных докладчиков. Секретарь оргкомитета конференции – Савицкий Рамиз Мамедович.

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