

The diet of Honey Buzzards *Pernis apivorus* in Finland

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The paper deals with the food of the Honey Buzzard *Pernis apivorus* in Finland. Food remains were collected from nine nests. A great majority of the prey animals were wasps. Frogs ($n = 23$) were found in six nests and birds ($n = 14$), ranging from small passerines and young thrushes to Jays *Garrulus glandarius* in seven nests. The stomachs of nine Honey Buzzards, killed outside the breeding season included more than 900 prey animals, mostly wasps.

Despite the fact that many, in some cases comprehensive, studies of the food and feeding habits of the Honey Buzzard have been undertaken in several European countries (cf. UTTENDÖRFER 1952, HAGEN & BAKKE 1958), practically no work has been done hitherto on the diet of the Honey Buzzard in Finland. Up to the present study, only two observations had been reported: PIIPARINEN (1953) reports that a Honey Buzzard had eaten three young from the nest of a Golden Oriole *Oriolus oriolus* and LINKOLA (1954) that a Honey Buzzard had eaten two eggs of the Wood Pigeon *Columba palumbus*.

Food remains of the Honey Buzzard were collected from nine nests. In addition, we studied nine crops and gizzards of specimens collected between 1963 and 1971, mostly outside the breeding season. Also, Esko Rajala and Seemi Kärkkäinen made observations of feeding habits during many hours spent photographing the species at nests at Seinäjoki in 1969, and at Pylkönmäki in 1971.

Feeding habits

According to the observations of Rajala and Kärkkäinen, the parents take turns in hunting for food. However, the female often warms small young. The parents bring wasp-combs to the nestlings

fairly regularly every 1—1.5 hrs. When the nestlings are small the parent itself eats the main contents of the comb, placing the larva in the mouth of the young. The young also try to remove larvae from the comb by itself with varying success. Later on, as the nestlings grow rapidly, they eat a whole comb themselves, and both parents hunt continuously.

Food at nest sites

Food remnants were collected from nine nests, which were situated: 1. at Tyrvääntö 1963, 2. Tyrvääntö 1965, 3. Sievi 1965, 4. Haapavesi 1967, 5. Sievi 1968, 6. Seinäjoki 1969, 7. Kuusamo 1970, 8. Kuusamo 1971, and 9. Pylkönmäki 1971.

Prey animals identified in them were as follows:

Nest no.	Wasp-combs	Frogs	Birds
1.	26	1	1
2.	many	—	1
3.	many	5	7
4.	c. 50	4	—
5.	c. 100	9	2
6.	plenty	2	1
7.	c. 10	—	—
8.	c. 55	—	1
9.	plenty	2	1

Invertebrates form the principal part of the diet of the Honey Buzzard in number and apparently in volume, at least when there are plenty available. The wasps were not identified as to species. HAGEN & BAKKE (1958) showed that the Honey Buzzard will eat wasps nesting on the ground and also on the twigs, etc. The Honey Buzzard does not eat every wasp of a comb, but leaves some specimens behind.

Although it cannot be proved from this material, it is very likely that the Honey Buzzard must eat frogs and birds in spring, because the wasps hibernate as imagos (NUORTEVA 1953) and it takes a little while before there are a sufficient number available.

In the Finnish material there are 23 frogs, all of which are probably the Common Frog *Rana temporaria*.

In Denmark, HOLSTEIN (1944) counted 20 frogs in 104 feeding visits made by Honey Buzzards to their nests. In Norwegian material there were 9 frogs (HAGEN & BAKKE 1958). RÖRIG (1903—10) found 15 frogs in 107 Honey Buzzard stomachs, in Germany.

It is rather difficult to ascertain the real number of frogs eaten by a Honey Buzzard, because it does not always swallow the frog, but bites the smooth parts of it and leaves the skeleton almost untouched, so the real number of frogs will certainly be higher.

The present study has revealed 14 birds amongst the Honey Buzzard's prey, 9 *Turdus* sp., 1 *Phylloscopus trochilus* and 2 unidentified small Passerines, all young birds, and one adult and one young Jay *Garrulus glandarius*. Jays represent the heaviest birds the Honey Buzzard catches (HAGEN & BAKKE 1958).

In Denmark, HOLSTEIN (1944) found only 2 small Passerine birds taken to a Honey Buzzard's nest in 104 feeding visits. According to UTTENDÖRFER (1952) avian prey is also fairly rare in Germany and is mostly the result of

nest robbing. A comprehensive study of 35 nests in Germany revealed a total of 20 birds killed, 15 being young birds, including 15 thrushes. RÖRIG (1903—10) and HAGEN & BAKKE (1958) had very similar experiences.

Mammals were not observed in the Finnish material. They seem to be taken very rarely by the Honey Buzzard. In Germany RÖRIG (1903—10) found 2 mice and one mole *Talpa europaea* in a total of 107 stomachs examined, and UTTENDÖRFER (1952) and HAGEN & BAKKE (1958) found no mammals at all.

Food outside the breeding season

Analyses were made of the stomach contents of 9 Honey Buzzards from Finland. Of these, one was empty and the results of the remaining 8 are set out in Table 1. The material was provided by Mr. Heikki Kangasperko, M.A., the curator of the Zoological Museum of the University of Oulu. Mr. Kangasperko also took charge of the buzzard specimens and preserved what could be utilized for the purpose of this study.

These eight stomachs contain wasps and larvae not fully identified, but thought to be wasp grubs, as against only two other invertebrate food groups; in other words, close to 100 % were wasps, insofar as the food could be identified. Five of the eight stomachs examined contained plant remnants of some kind (needles, mosses, grasses etc.), which entered the stomachs purely by accident, together with the usual food. Other invertebrates, with the exception of flies, may have been introduced via the stomachs of frogs, since they are identical in condition and composition to those found in the stomach of the Common Frog (ITÄMIES & KOSKELA 1970).

The four flies which were found in the stomach of a Honey Buzzard (1st September 1964, Suomussalmi) repre-

TABLE. 1. Contents of the stomachs of eight Finnish Honey Buzzards.

Prey	Specimen No.								Total
	1	2	3	4	5	6	7	8	
Vespidae, imago	65	—	4	—	25	27	1	6	128
„ , pupa	67	14	12	—	76	40	—	—	209
„ , larva	183	54	71	30	118	127	—	—	583
Formicidae	—	—	—	1	—	—	—	—	1
Coleoptera	—	—	—	12	—	—	—	—	12
Diptera	—	—	—	—	—	4	—	—	4
(Plant material)	(3)	—	—	(35)	(5)	—	(2)	(5)	(50)
(Parasite worms)	—	39	—	—	—	—	—	—	39)

The specimens examined: 1. Virolahti 1.9.1963 juv. ♀, 2., Haukipudas 2.9.1963 ad ♂, 3. Haukipudas 1.9.1963 ad. ♀, 4. Kajaani 19.6.1964 ad. ♀, 5. Suomussalmi 1.10.1964 ad. ♀, 6. Muhos 30.8.1965 ad. ♀, 7. Muhos 20.9.1969 juv. ♂, 8. Haukipudas 30.8.1971 juv. ♀.

sent *Drosophila melanogaster* and *D. funebris* (det. Mr. Kari Vepsäläinen, M.A.), which inhabit buildings for preference (HACKMAN 1954), but may also be found living in plant debris, potatoes and compost. They may in this case have been attracted into the wasp nest or the nest of the Honey Buzzard by honey.

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Selostus: Mehiläishaukan ravinnosta Suomessa.

Mehiläishaukan ruokailutavoista on tehty valokuvauksen yhteydessä havaintoja kahdella pesällä ja saalisjätteitä on tutkittu yhdeksällä eri pesällä. Yleensä mehiläishaukalla molemmat emot ruokkivat poikasiaan melko säännöllisesti 1—1.5 t:n välein, ellei naaras joudu lämmittämään niitä kylmän tai sateisen sään johdosta.

Suurin osa todetusta saaliista oli kaikilla tutkituilla pesillä ampiaisia, mutta jätteisiin sisältyivät myös 23 sammakkoa ja 14 lintua. Yksi linnuista oli pajulintu, kaksi tarkemmin määrittämätöntä varpuslinnun poikasta, yhdeksän rastaan poikasta tai nuorta lintua sekä yksi aikuinen ja yksi nuori närhi. Lisäksi on tutkittu 9 Oulun yliopistolle toimitetun, ensimmäiseen syksyllä vahingossa ammutun mehiläishaukan mahan ja suolen sisältö. Mahoista löytyneet saaliit olivat lähes 100%:sti ampiaisia (taulukko 1). Sammakoiden osuus voi olla liian pieni mahanäytteissä, koska mehiläishaukan on todettu usein syövän sammakoita vain lihat nyppimällä, mistä syystä mahaan ei tule lainkaan luita.

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