

THE DIETS OF SQUACCO HERONS, LITTLE EGRETS, NIGHT, PURPLE AND GREY HERONS IN THEIR ITALIAN BREEDING RANGES

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The food of the European herons has been studied with the aim of describing their diets (Vasvari, 1935-1938 ; Valverde, 1955 ; Owen & Phillips, 1956 ; Hafner, 1977 ; Ruiz, 1985 ; Laszlo, 1986), of relating breeding success to prey availability (Owen, 1960), and of studying prey selection (De los Santos & Cavanate, 1985 ; Moser, 1986). Each of these studies was conducted on a single sample heronry, or on a few neighbouring sites. Overall, these studies suggest that heron species exploit differing prey types in different regions ; fish prevails in many cases, but in some areas amphibians, crustaceans, aquatic insects, reptiles, mammals and snails are frequently taken (Cramp & Simmons, 1977). Their results are however not fully comparable, because the diets are usually described as frequency of prey items, and the variable size of the items does not allow the evaluation of how much the differing prey categories contribute to the total food intake.

We collected a large sample of prey fed to heron chicks by exploiting their peculiar behaviour of regurgitating when alarmed during our surveys and census operations in heronries. The aim of this paper is to compare the diets of the nestlings of Squacco Herons *Ardeola ralloides*, Little Egrets *Egretta garzetta*, Night Herons *Nycticorax nycticorax*, Purple Herons *Ardea purpurea* and Grey Herons *Ardea cinerea* throughout their Italian breeding ranges, to examine the seasonal and geographical variations of their diets, and to identify which food sources are really relevant in terms of energy contribution to food intake.

STUDY AREA

Prey samples were collected in 29 heronries (Fig. 1), throughout the main breeding range of herons in Italy (the few heronries in Southern Italy and the Islands amount to 2 % only of the breeding populations (Fasola, 1983)). The heronries sampled were (locality and province) : Villarasca (Pavia), Carola (PV), Acqualunga (PV), Gallia (PV), Mede (PV), Vaccarizza (PV), Lardirago (PV), Gropello (PV), Torbida (PV), Portalupa (PV), Verminesca (PV), Garolda (Mantova), Carbonara (MN), Bergantino (MN), Monticchie (Milano), Zelo Buon Persico (MI), Castellazzo (Novara), Morghengo (NO), Oldenico (Vercelli), Trino (VC), Balocco (VC), Tanaro (Asti), Volano (Ferrara), Codigoro (FE), Bertuzzi (FE), Alberete (FE), Maistra (Rovigo), Gorino (RO), Cappellino (RO).

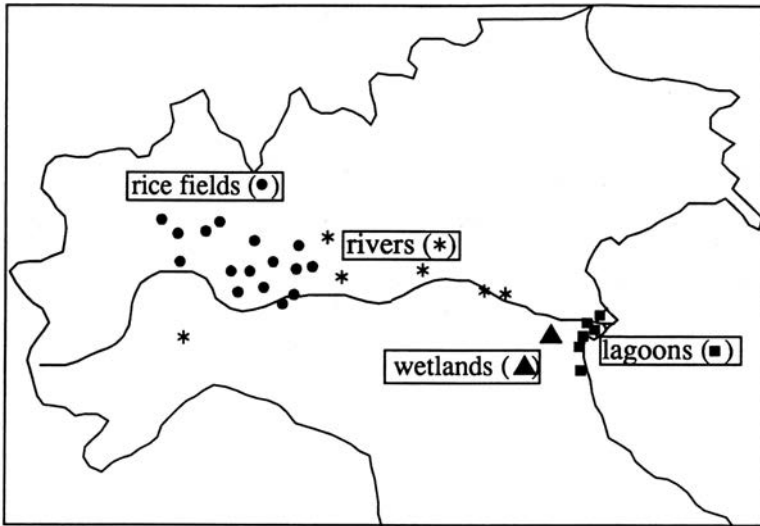


Figure 1. — Heronries in Northern Italy where food samples were collected, grouped on the basis of the main foraging habitats.

These heronries may be assigned to 4 geographical regions, distinguished on the basis of the prevailing foraging habitats in their surroundings (Table I). One eastern region with many rice fields has nonetheless been labeled as « wetlands », in order to avoid confusion with the major area of rice cultivation in western Italy. The habitats available within 10 km of the heronries (a range below which all the individuals of our species of herons forage during the nesting season (Custer & Osborn, 1978 ; Van Vessem *et al.*, 1984)) were measured on 1 : 10.000 scale maps around 19 of the 29 colonies sampled.

TABLE I

Foraging habitats available to the herons within 10 km of their colonies, grouped as in Fig. 1.

The figures are percentage surface areas.

	Freshwater canals	Rivers and open ponds	Permanent freshwater, reedbeds	Rice fields	Lagoons, salt pans & sea shores
« rive fields »	0.15	0.76	0.05	9.22	0.00
« rivers »	0.47	4.98	0.02	0.10	0.00
« wetlands »	0.85	0.47	0.00	8.78	1.61
« lagoons »	0.37	3.69	0.43	0.06	23.79

METHODS

A total of 10 517 prey items were collected from 1977 to 1990, between May 7 and July 27. This sample includes the prey of Night Herons and Little Egrets which were preliminarily described by Fasola *et al.* (1981) and are analyzed again in this paper. Prey samples were obtained during surveys and census operations, from the chicks that regurgitated spontaneously when alarmed by humans. When a regurgitated item was encountered, we carefully collected all the others, to avoid bias towards the larger ones.

Adult herons may select prey differing in size in relation to the age of their chicks (Moser, 1986); heron chicks spontaneously regurgitate only when about 15 to 30 days old, and our data therefore describe the diet of the chicks in the middle of their growth period. A possible bias is that prey with a rapid rate of digestion may be under-represented in our samples; however, our observations on foraging adult herons (Fasola, 1986, and unpublished data) indicate that all the prey categories captured by the adults were also found in the diet of the chicks, except for earthworms which are sometimes taken by Night Herons in rice fields, but which were not found in the regurgitates.

Prey were preserved, and were later identified in as much taxonomic detail as possible. Length (Standard Length for fish, Snout-Vent Length for adult Amphibia, and body length without appendages for invertebrates) were recorded for all measurable prey (47 % of the items). The dry weight of each item was estimated by: 1) weighing single items after oven desiccation until a constant weight was reached, for undigested items (35 %); 2) estimating weight from length-weight ratios for items whose digestion had begun, but whose length was still measurable (12 %); length-weight ratios for fish species and amphibians were obtained from various literature sources, or were calculated from the prey items we weighed; 3) assigning the average weight of their category to the non-measurable items (53 %) (categories were distinguished on the basis of prey taxon, species of heron, and region).

The differences in prey categories between regions and between colonies could not simply be estimated from the prey frequencies, because each prey was not an independent sample; tadpoles, insects and other small prey occurred in clumps and were preyed upon in close succession. We therefore calculated the daily percentage occurrence of the prey types in the whole diet; owing to the seasonal variations of the diet, the tests (Mann-Whitney pairs test) were restricted to those samples collected within the same 10 day periods.

The relations between the frequency of each prey category in a heronry and the foraging habitats available within 10 km were tested by the Spearman rank correlation test. In order to avoid biases due to reduced sample sizes, we only included in our analysis the data from those heronries with more than 100 prey items in the diet-habitat correlation (11 colonies for Little Egrets, and 9 colonies for Night Herons).

RESULTS

The diet of the five species of herons studied included many prey taxa, particularly insects and fish (Appendix A), but a few prey types, from 2 to 5 for

each heron species, each accounting for more than 10 % of the items in the diet. These common prey were Crustacea, particularly Decapoda, widespread in salt-water, for Little Egret, or Notostraca, locally abundant in rice fields, for Night heron ; from 1 to 3 common species of fish, particularly Cyprinidae for all the five species of herons, and Cyprinodontidae for the Little Egret ; other frequent prey were Amphibia, particularly tadpoles and adults of the widespread Green frog, for all five herons. All the other prey were occasional, most representing less than 1 % of the diet. Salt-water Crustacea and fish abounded only in the diets of Little Egrets and of Purple Herons, whereas other herons mostly took freshwater prey.

The dietary breadth of Squacco, Purple, and Grey Herons appears in this study to be narrower than that of the other 2 herons, but this finding is due to the fact that the prey sample was much smaller.

SEASONAL DIFFERENCES

The diets of each species showed considerable and abrupt changes throughout the breeding period (Figs. 2 and 3, data for Squacco Herons were insufficient for a seasonal analysis).

Fish was the basic food exploited throughout the entire breeding period. Other prey were taken in relation to their seasonal availability. In the « rice fields » region, adult frogs were taken by Night Herons, Little Egrets and Grey Herons during early May, when they entered water for reproduction. From mid May until the end of June tadpoles were eaten, when they were numerous in the rice fields, and during June and July many young frogs were preyed upon, when

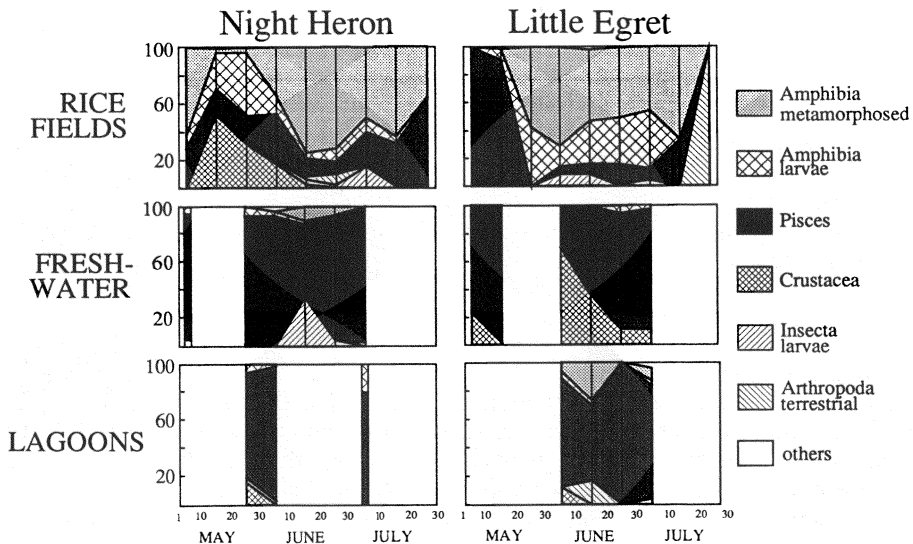


Figure 2. — Variations in the diets of Night Herons and of Little Egrets during the breeding season. The diet is shown only for the 10 day periods with more than 20 prey items for each species and region.

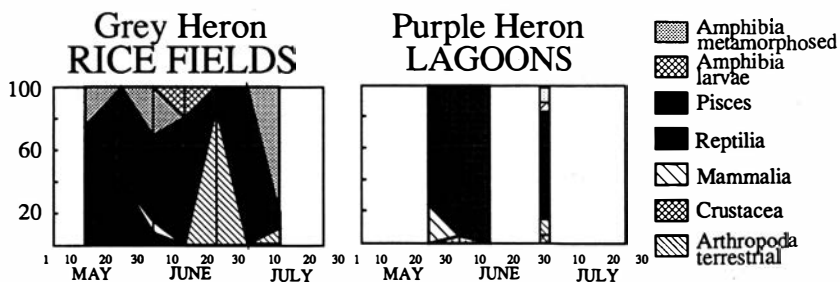


Figure 3. — Variations in the diets of Purple and Grey Herons during the breeding season.

they teemed after metamorphosis. Another prey that was clearly taken in relation to its abundance was *Triops cancriformis*, a crustacean which develops in rice fields in May. Other prey (eg. insect larvae and the salt-water crustaceans taken by Little Egrets in the « wetlands » region) were highly seasonal, and they were presumably taken in relation to their abundance.

GEOGRAPHICAL VARIATION AND RELATIONS WITH FORAGING HABITATS

The frequency of each prey category depicts the composition of the diet, but only the weight proportions indicate the energy contribution of the various prey categories to the total food intake. Considering weights, more than 90 % of the food of Night Herons was fish, and fish plus Amphibia in the « rice fields » region (Table II) ; for Little Egrets it was fish, fish and Crustacea in the « lagoons » region, Amphibia and fish in the « rice fields » region (Table III) ; for Purple Herons and Grey Herons it was fish ; only Squacco Herons had a wider basic diet made up of fish, Amphibia and terrestrial Arthropoda (Table IV). Small prey (among which are all the invertebrates) were in some cases abundant in number, but always made up a negligible contribution to food intake, as each of them did not generally exceed 1 or 2 % of total weight.

The frequency of the main prey categories, Crustacea, fish, and Amphibia, differed in many instances between the rice field region and other regions, at least in Night Herons and in Little Egrets (Table II, Table III). Other differences, eg. in fish between the « rice fields » and the « rivers » regions, may have been real ; they were not significant however, probably owing to the small sample size for the « rivers » region. No significant difference existed between specific diets in « rivers », « wetlands », and « lagoons » regions. The diets of Night Herons and Little Egrets in the « wetlands » region was more similar to their diets in the two neighbouring districts (« rivers » and « lagoons »), than to those of the « rice fields » area, a distant region with similar foraging habitats.

Dietary differences were related to the foraging habitats available around the heronries (Table V). The presence of rice fields favoured high frequencies of amphibians and insect larvae in diets, and other definite relations were between « rivers » and fish, and between « lagoons » and crustaceans.

TABLE II

Importance of food categories in the diet of Night Herons expressed in frequency of items, and in weight.

Significant differences in frequency: * $P < 0.05$, rice fields vs. rivers; ** $P < 0.05$, rice fields vs. wetlands; *** $P < 0.01$, rice fields vs. lagoons.

	« RICE FIELDS »		« RIVERS »		« WETLANDS »		« LAGOONS »	
	No.	Dry weight	No.	Dry weight	No.	Dry weight	No.	Dry weight
Annelida	0.1	0.01	0.0	0.0	0.0	0.0	0.0	0.0
Crustacea	13.4	1.4	6.5	0.1	0.0	0.0	0.0	0.0
Insecta, larvae	3.3	1.7	0.0	0.0	3.1	0.05	0.0	0.0
Insecta, aquatic adults	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Arthropoda, terrestrial	2.5	0.6	0.0	0.0	0.5	0.03	0.0	0.0
Pisces	20.6	69.8	85.7	90.0*	90.2	97.0**	100.0	100.0***
Amphibia, larvae	42.4	2.5	0.0	0.0*	1.8	0.02**	0.0	0.0***
Amphibia, adults	17.3	21.8	5.2	1.7*	2.6	1.2**	0.0	0.0***
Reptilia	0.1	0.8	0.0	0.0	0.7	0.4	0.0	0.0
Mammalia	0.3	1.5	2.6	8.2	1.1	1.4	0.0	0.0

TABLE III

Importance of food categories in the diet of Little Egrets expressed in frequency of items, and in weight.

Significant differences: * $P < 0.05$, rice fields vs. wetlands; ** $P < 0.005$, rice fields vs. lagoons.

	« RICE FIELDS »		« RIVERS »		« WETLANDS »		« LAGOONS »	
	No.	Dry weight	No.	Dry weight	No.	Dry weight	No.	Dry weight
Mollusca	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.002
Crustacea	0.1	0.1	0.0	0.0	6.5	1.2	39.7	11.0**
Insecta, larvae	4.7	8.0	0.0	0.0	2.1	0.4*	0.0	0.0
Insecta, aquatic adults	1.1	0.1	0.0	0.0	0.2	0.004	0.1	0.001
Arthropoda, terrestrial	0.8	0.5	0.0	0.0	1.6	2.1	0.4	0.2
Pisces	13.6	30.8	100.0	100.0	77.3	90.4	59.5	88.2
Amphibia, larvae	51.6	13.7	0.0	0.0	8.0	1.2	0.1	0.02**
Amphibia, adults	27.9	46.8	0.0	0.0	4.3	4.7	0.2	0.6**
Reptilia	0.1	0.001	0.0	0.0	0.0	0.0	0.0	0.0

TABLE IV

Importance of food categories in the diet of Squacco, Purple, and Grey Herons expressed in frequency of items, and in weight.

	Squacco Heron		Purple Heron			Grey Heron		
	« WETLANDS »		« RICE FIELDS »		« LAGOONS »	« RICE FIELDS »		
	No.	Dry weight	No.	Dry weight	No.	Dry weight	No.	Dry weight
Crustacea	0.0	0.0	0.0	0.0	2.9	0.0	0.0	0.0
Insecta, larvae	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0
Arthropoda, terrestrial	14.3	14.1	0.0	0.0	2.9	0.0	10.7	0.4
Pisces	52.6	65.0	64.0	94.7	88.2	99.0	50.0	93.7
Amphibia, larvae	30.6	15.5	32.0	4.7	2.9	0.004	4.8	0.0
Amphibia, adults	1.5	2.3	4.0	0.6	1.5	0.5	26.2	0.9
Reptilia	0.0	0.0	0.0	0.0	0.0	0.0	7.1	4.5
Mammalia	0.5	3.1	0.0	0.0	1.5	0.4	1.2	0.5
Total no. prey items	196		50		68		84	

TABLE V

Relations between the frequencies of the prey categories and the surface areas of foraging habitats around the heronries.

The values are correlation coefficients and the associated probabilities. Italics refer to Night Herons (n = 9), and roman figures to Little Egrets (n = 11).

	Crustacea	Insecta larvae	Pisces	Amphibia metamorphosed	Amphibia larvae
Rivers			.69, P < .05		
Rice fields		.76, P < .05		.77, P < .05	.76, P < .05
Lagoons	.85, P < .01				.69, P < .05

DIFFERENCES BETWEEN COLONIES

Inter-heronry differences in diet within a region were tested only for Night Herons and Little Egrets within the « rice fields » region, for which data were sufficient. The heronry sample had been reduced by the need to avoid a seasonal bias ; only the prey collected within the same 10 day periods in a pair of heronries were compared. Significantly different frequencies emerged (Table VI, Table VII)

TABLE VI

Inter-heronry differences in frequencies of the main categories of prey of Night Herons.

Only the significantly different categories and heronries are shown. * $P < 0.05$; ** $P < 0.0005$; NS = differences not significant in either category.

	VILLARASCA	CAROLA	VACCARIZZA	LARDIRAGO	GROPELLO
CAROLA	> Amphibia adults*				
VACCARIZZA	N.S.	> Pisces* < Amphibia adults**			
LARDIRAGO	N.S.	< Amphibia adults*	N.S.		
GROPELLO	< mammalia*	< Amphibia adults**	< Amphibia adults*		N.S.
MEDE	N.S.	< Amphibia adults*	< Insect larvae**		N.S.

TABLE VII

Inter-heronry differences in frequencies of the main categories of prey of Little Egrets.

Only the significantly different categories and heronries are shown. * $P < 0.05$; ** $P < 0.0005$; NS = differences not significant in either category.

	VILLARASCA	MORGHENGO
MORGHENGO	N.S.	
MEDE	< Amphibia adults* < Mammalia*	N.S.

for some prey categories (out of the ten in Table III) and for some of the heronries tested (our data allowed the testing of only 5 heronries out of the 19 sampled in the « rice fields » region).

DISCUSSION

Our results show marked seasonal variation in the diet of heron chicks, as previously observed in the diet of adult Cattle Egrets *Bubulcus ibis* (Siegfried, 1972; Ruiz, 1985). Other variations exist between regions, as in Cattle Egret nestlings (Jenni, 1973), and between colonies, as shown for Grey Heron chicks (Owen, 1960) and Purple Herons (De Los Santos & Cavanate, 1985). Therefore

we can consider our five species of herons to be opportunistic predators, taking differing prey in relation to their availability in their foraging habitats, as most vertebrate predators do.

Despite these variations, and the fact that herons may occasionally prey upon a large variety of aquatic animals, most of their food intake comes in most cases from only one or two prey categories for each species and each region within the Italian breeding range. These staple prey were fish for the Little Egret in the « rivers », « wetlands » and « lagoons » regions, and for the Grey Heron and the Purple Heron, or fish and amphibians for the Night Heron and Little Egret in the « rice fields » region, and arthropods, fish and amphibians for the Squacco Heron. Other studies of the diet of the European herons seldom report the weight composition of the diet. In most of the cases studied, large prey like fish and amphibians are numerically predominant, and there is no doubt that these prey provide most of the food intake, as is the case for Night Herons in USSR (Skokova, 1960 in Voisin, 1978), in Yugoslavia (Laszlo, 1986) and in Hungary (Vasvari, 1935-1938), for Purple Herons in Yugoslavia (Laszlo, 1986), in Spain (De los Santos & Cavanate, 1985) and in Holland (Owen & Phillips, 1956), and for Grey Herons in England (Owen, 1960) and France (Moser, 1986). The Squacco Heron is the only one to feed mostly on fish and insects (our data, and Laszlo, 1986 in Yugoslavia). During their breeding season all the heron species therefore depend on a few categories of aquatic vertebrate prey, throughout their range.

SUMMARY

Previous studies of the diet of European herons concerned single heronries, and their results do not allow to assess how different prey types contribute to the total food intake. Overall, these studies suggest that heron species exploit differing prey types in different regions ; fish prevails in many cases, but in some regions amphibians, crustaceans, aquatic insects, reptiles, mammals, and snails are frequently taken. We collected a large sample (10 517 items) of the prey fed to the nestlings of Squacco Herons *Ardeola ralloides*, Little Egrets *Egretta garzetta*, Night Herons *Nycticorax nycticorax*, Purple Herons *Ardea purpurea* and Grey Herons *Ardea cinerea* in 29 heronries throughout these species' Italian breeding ranges. Our aim was to compare their diets, to examine their seasonal and geographical variations, and to identify which food sources are relevant in terms of energy contribution to food intake. The heronries may be assigned to four geographical regions, distinguished on the basis of the prevailing foraging habitats. The diet of the herons included many prey taxa ; however only a few prey categories, from 2 to 5 for each heron species, accounted for more than 10 % of the items in the diet. These frequent prey were Crustacea, from 1 to 3 common species of fish, and Amphibia. All the other prey were occasional, most prey contributing to less than 1 % of the diet. The diets of each species showed considerable and abrupt changes throughout the breeding period. Dietary differences between regions were related to the foraging habitats available around the heronries. Other differences occurred between heronries within the same region. Despite these variations, an overwhelming contribution to the food intake (> 90 % in dry weight) came from only one or two prey types in most cases (fish for every heron species, amphibians and arthropods in a few cases) for every region within the Italian breeding range. During breeding all the heron species depend on a few types of aquatic vertebrate prey, throughout their ranges.

RÉSUMÉ

Les auteurs ont étudié le régime alimentaire des cinq espèces de hérons nichant dans le nord de l'Italie, par identification des proies régurgitées par les poussins lors de dénombrements de héronnières (n = 29), effectués entre le 7 mai et le 27 juillet, de 1977 à 1990. Au total, 10 517 *items* alimentaires ont été collectés et identifiés. Les colonies ont été réparties en quatre régions caractérisées chacune par des milieux de gagnage différents (rizières, cours d'eau, zones humides et lagunes).

Les proies animales capturées sont nombreuses, mais 2 à 5 catégories de proies seulement représentent chacune plus de 10 % des *items* consommés par chacune des espèces de hérons. Les proies principales sont des crustacés (*Triops* ou *Palaemon*), de 1 à 3 espèces communes de poissons, et des amphibiens (têtards et adultes de *Rana*) ; toutes les autres proies ne représentent en général que moins de 1 % du régime.

Ce régime se modifie de façon considérable et abrupte au cours de la période de nidification (Figs. 1 et 2). Il varie également, pour chaque espèce, en fonction de la disponibilité des proies dans les différentes zones de gagnage (Tab. I à V). Il peut même y avoir des différences entre colonies d'une même espèce à l'intérieur d'une même région.

Au total, plus de 90 % de la nourriture ingérée par les jeunes hérons sont, dans chaque espèce, constitués par seulement un ou deux types de proies aquatiques.

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APPENDIX A

Diet of the 5 heron species, expressed as frequency per 1 000 items. Insects and Anura are adult individuals, if not otherwise specified.

	Squacco Heron	Little Egret	Night Heron	Purple Heron	Grey Heron
Total number of items	223	4 415	5 674	118	87
Annelidae Hirudinea <i>Hirudo</i>			0.9		
Mollusca Gasteropoda <i>Planorbis</i>		0.2			
Crustacea Isopoda <i>Asellus</i>		0.2			
Amphipoda <i>Gammarus</i>		0.9			
Decapoda <i>Palaemon</i>		184.4	0.2	16.9	
Notostraca <i>Triops cancriformis</i>		0.9	114.9		
Insecta undetermined			1.3		
larvae undetermined		0.7	1.4		
Odonata undetermined, Lestidae, Libellulidae		11.7	2.0		
larvae undetermined	53.8	0.2	0.2		
Dytiscidae			0.7		
Hydrophilidae <i>Hydrous piceus</i>			1.4		
Carabidae			1.9		
Orthoptera undetermined		0.2			
Gryllotalpidae <i>Gryllotalpa</i>	62.8	4.5	1.6		69.0
Hemiptera			0.4		
Gerridae <i>Gerris</i>		0.5			
Naucoridae <i>Ilyocoris</i> , <i>Naucoris</i>		1.3			
Notonectidae <i>Notonecta</i>		2.0			
Corixidae		0.5			
Hymenoptera			0.2		
Mecoptera <i>Panorpa</i>		0.2			
Lepidoptera larvae		4.5			
Diptera larvae			1.4		
Dytiscidae larvae	4.5	3.2	7.6		
Hydrophilidae larvae	13.5	3.2	35.0	16.9	34.5
Pisces undetermined	35.9	22.4	11.5	59.3	23.0
Syngnathidae <i>Syngnathus</i>		0.7			
Poecillidae <i>Gambusia</i>	4.5	14.3			
Mugillidae, <i>Liza</i> , <i>Mugil</i>		7.0		16.9	
Cyprinidae undetermined		1.1	6.3	42.4	80.5
<i>Scardinius erythrophthalmus</i>	4.5	5.4	17.8	67.8	
<i>Cyprinus carpio</i>	4.5	6.6	5.8	16.9	11.5
<i>Carassius auratus</i>	367.7	147.2	115.5	355.9	34.5
<i>Chondrostoma soetta</i>			3.5		
<i>Chondrostoma genei</i>		0.5	6.2		172.4
<i>Leuciscus souffia</i>	4.5		3.2		
<i>Leuciscus cephalus</i>		1.1	4.8	8.5	34.5
<i>Barbus barbus</i>			0.7	8.5	34.5
<i>Rutilus rubilio</i>		0.9	14.3	16.9	11.5
<i>Tinca tinca</i>		0.9	14.1	59.3	80.5
<i>Alburnus alburnella</i>	53.8	110.5	78.4	25.4	11.5
Ictaluridae <i>Ictalurus melas</i>		0.2	1.6	33.9	23.0
Centrarchidae <i>Lepomis gibbosus</i>	40.4	3.2	12.3	42.4	
<i>Micropterus salmoides</i>			1.1		
Cyprinodontidae <i>Aphanius</i>		140.7	0.9		
Clupeidae <i>Alosa fallax</i>		0.7			
Cottidae <i>Cottus gobio</i>		0.2	0.4		

	Squacco Heron	Little Egret	Night Heron	Purple Heron	Grey Heron
Gobiidae undetermined				16.9	
<i>Zoosterisserops ophiocephalus</i>	1.8				
<i>Knipowitschia panizzai</i>		17.7			
<i>Potamoschisthus</i>		3.0			
Callionymidae <i>Callionymus</i>		1.6			
Atherinidae <i>Atherina boyeri</i>		4.3			
Anguillidae <i>Anguilla anguilla</i>		0.5	0.4	8.5	
Salmonidae <i>Salmo trutta</i>			0.4		
Thymallidae <i>Thymallus thymallus</i>			0.2		
Esocidae <i>Esox lucius</i>			0.2		
Cobitidae <i>Cobitis tenia</i>		0.9	12.2		
Amphibia Ranidae <i>Rana esculenta</i>	71.7	80.4	145.4	25.4	69.0
<i>R. esculenta</i> (tadpoles)	273.6	206.0	365.0	152.5	229.9
Hylidae <i>Hyla arborea</i>		0.2	0.4		
Salamandridae <i>Triturus cristatus</i>		0.2	1.1		
Reptilia Colubridae undetermined, <i>Natrix</i>		0.2	1.5	0.4	69.0
Mammalia undetermined	4.5		1.6		
Talpidae <i>Talpa europaea</i>			0.4		
Soricidae <i>Sorex araneus</i>			3.5		
Microtidae and Muridae <i>Mycromys minutus</i> , <i>M. savii</i> , <i>Arvicola terrestris</i> , <i>Apodemus sylvaticus</i>		1.9	8.5	11.5	