

BLOOD PARASITES RECORDED IN ITALIAN BIRDS

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ABSTRACT. During the period 1974-1983 a total of 564 wild birds from Italy (representing 36 species from 16 families) was examined for haematozoan parasites. Species of *Leucocytozoon* and *Haemoproteus* were recorded from 18.1% and 1.4% of the total number of examined birds. *Leucocytozoon macleani*, *L. ziemanni*, *L. berestneffi*, *L. sakharoffi*, *Haemoproteus tinnunculi*, *H. aluci* were identified. *Leucocytozoon* spp. found in Ardeidae, Accipitridae and Falconidae require further taxonomic research. The prevalence of the parasites was compared with published data for Italy and Western Europe.

KEY WORDS: birds / Italy / parasites / taxonomy.

Researches on the haematozoa of Italian birds were mostly carried out at the beginning of the century, by Grassi & Feletti (1980), Celli & Sanfelice (1891), Negri (1911), Galli-Valerio (1919), and Franchini (1923, 1924). Many contributions, particularly on the genus *Plasmodium*, were made by Corradetti (1970). Recently, researches on the genus *Leucocytozoon* were resumed by ourselves (Prigioni *et al.* 1980, Sacchi & Prigioni 1981, 1982, Sacchi *et al.* 1982).

In the study of avian haematozoa an increasing interest is being devoted to the analysis of the prevalence of the parasites in relation to their geographical and seasonal occurrence. The changes in prevalence can be related to differences in density of both avian and vector populations. Comprehensive works on this subject are available for North America (Greiner *et al.* 1975), Eastern and Southern Asia (Mc Clure *et al.* 1978) and Western Europe (Peirce, 1981). In this paper we summarize the data on haematozoa recently found in a total of 564 wild birds from Italy and compare the prevalences of the parasites with those found in other countries.

METHODS

Blood films were obtained from wild birds collected during the period 1974-1983 in various locations in Italy. The films were prepared from blood drawn from the tarsal or brachial veins of live birds and in a few cases (Corvidae) from the heart and liver of dead individuals. Most blood smears of Ardeidae were obtained during May-July from chicks in heronries in Northern Italy, and some smears of Corvidae were taken from chicks aged 15-20 days during May. The other samples were obtained at random from adult birds. Blood films were air-dried, fixed in 100% methanol, stained in Giemsa and examined using a Leitz Orthoplan microscope. We follow the systematic nomenclature of Voous (1973, 1977).

RESULTS

During the period 1974-1983, 564 wild birds (from 36 species and 16 families) were examined for haematozoan parasites (Tab. I). Of these birds, 110 (19.5%) representing 14 species and 6 families were infected with *Leucocytozoon* (18.1%), and *Haemoproteus* (1.4%). In two Tawny Owls a mixed infection with *Leucocytozoon* and *Haemoproteus* was found. Parasite prevalence in adult birds and in chicks was similar.

TABLE I. Prevalence of blood parasites in some Italian birds.

H = *Haemoproteus*, L = *Leucocytozoon*

* Two individuals harboured both parasites.

* * Infected by microfilaria

Family and species	Total birds	Total birds infected with	
		H.	L.
ARDEIDAE			
Bittern	<i>Botaurus stellaris</i>	1	1
Night Heron	<i>Nycticorax nycticorax</i>	187	39
Little Egret	<i>Egretta garzetta</i>	31	10
Grey Heron	<i>Ardea cinerea</i>	8	3
Purple Heron	<i>Ardea purpurea</i>	19	
ANATIDAE			
Teal	<i>Anas crecca</i>	5	
Garganei	<i>Anas querquedula</i>	1	
ACCIPITRIDAE			
Honey Buzzard	<i>Pernis apivorus</i>	11	
Goshawk	<i>Accipiter gentilis</i>	3	
Sparrow Hawk	<i>Accipiter nisus</i>	7	3
Buzzard	<i>Buteo buteo</i>	44	10
Spotted Eagle	<i>Aquila clanga</i>	1	
Hen Harrier	<i>Circus cyaneus</i>	3	1
Montagu's Harrier	<i>Circus pygargus</i>	1	1
Marsh Harrier	<i>Circus aeruginosus</i>	9	
PANDIONIDAE			
Osprey	<i>Pandion haliaetus</i>	2	
FALCONIDAE			
Kestrel	<i>Falco tinnunculus</i>	20	5 1
PHASIANIDAE			
Red-Legged Partridge	<i>Alectoris rufa</i>	5	
Pheasant	<i>Phasianus colchicus</i>	29	7
RALLIDAE			
Moorhen	<i>Gallinula chloropus</i>	5	
SCOLOPACIDAE			
Snipe	<i>Gallinago gallinago</i>	1	

segue

Family and species			Total birds	Total birds infected with	
				H.	L.
LARIDAE	Black-Headed Gull	<i>Larus ridibundus</i>	1		
	Common Tern	<i>Sterna hirundo</i>	14		
TYTONIDAE	Barn Owl	<i>Tyto alba</i>	5		
STRIGIDAE	Long-Eared Owl	<i>Asio otus</i>	6		
	Short-Eared Owl	<i>Asio flammeus</i>	2		1
	Little Owl	<i>Athene noctua</i>	4		
	* Tawny Owl	<i>Strix aluco</i>	10	3	4
TURDIDAE	Blackbird	<i>Turdus merula</i>	2		
PARIDAE	Marsh Tit	<i>Parus palustris</i>	3		
CERTHIIDAE	Short-Toed Tree Creeper	<i>Certhia brachydactyla</i>	1		
CORVIDAE	** Rook	<i>Corvus frugilegus</i>	1		
	Alpine Chough	<i>Pyrrhocorax graculus</i>	1		
	Hooded Crow	<i>Corvus corone cornix</i>	103		20
	Magpie	<i>Pica pica</i>	1		1
PLOCEIDAE	House Sparrow	<i>Passer domesticus italiae</i>	17		
Totals			564	8	102
% Infected				1.4	18.1

The parasite species identified were: *Leucocytozoon macleani* in Pheasants, *L. ziemanni* in Tawny Owl and Short-Eared Owls, *L. berestneffi* in Magpie, *L. sakharoffi* in Hooded Crows, *Haemoproteus tinnunculi* in Kestrels and *H. aluci* in Tawny Owls. The *Leucocytozoon* found in families Ardeidae, Accipitridae and Falconidae (Prigioni *et al.* 1980, Sacchi e Prigioni 1982), require further study before identification can be made. In Accipitridae we recorded for the first time in Europe the Hen Harrier and Montagu's Harrier as host species of *Leucocytozoon*. Most infections with *Leucocytozoon* were of low intensity. During the breeding season the highest level of parasitaemia was observed in a Night Heron (30.0%/. .) and during winter, in a Buzzard (7.3%/. .).

In Tab. II, the overall and *Leucocytozoon* prevalences found in the present study are compared with data for the same host species and family in Western Europe. All

TABLE II. Comparison of overall and *Leucocytozoon* prevalences by some host species and families in Western Europe (Peirce, 1981) and in Italy (present study). Significance (tested by χ^2): ** $p < 0.01$, * $p < 0.05$, without indications not significant.

	WESTERN EUROPE			ITALY		
	examined birds	% infected		examined birds	% infected	
		total	<i>Leucocytozoon</i>		total	<i>Leucocytozoon</i>
ARDEIDAE	35	40.0*	28.6	246	21.5*	21.5
Night heron	14	28.5	28.5	187	20.8	20.8
ACCIPITRIDAE	136	25.7	19.8	79	19.0	19.0
Buzzard	73	5.5*	2.7**	44	22.7*	22.7**
FALCONIDAE	378	48.9	1.0	20	30.0	5.0
Kestrel	346	50.6	0.3	20	30.0	5.0
PHASIANIDAE	457	88.8**	45.1*	34	20.6**	20.6**
Pheasant	121	99.1**	14.8	29	24.1**	24.1
STRIGIDAE	397	49.1	26.9	22	27.3	22.7
Tawny Owl	41	41.5	31.7	10	50.0	40.0
CORVIDAE	1,394	24.0	13.8	106	20.7	19.8
Hooded crow	33	81.8**	78.8**	103	19.4**	19.4**

our bird samples are smaller than those of Western Europe, except for Hooded Crows and Night Herons; for the latter species we have collected the largest sample heretofore examined. Significant differences in overall and *Leucocytozoon* prevalence (Tab. II) are found in the family Phasianidae, in Buzzards and Hooded Crows; Ardeidae and Pheasants showed significant differences in overall prevalence only.

DISCUSSION

The prevalence of haematozoa in birds is influenced by various factors including the different breeding biology and susceptibility of the host species to the parasites, the behaviour of the vectors, the geographical zone and the season. In addition, the collection of samples from birds at different times of the year makes it difficult to compare the prevalences of the parasites. In a recent check-list of the haematozoa of birds in Western Europe, Peirce (1981) found an overall haematozoan prevalence of 25.8% in 1.646 birds collected in Italy from 1890 to 1978 (*Plasmodium* 10.3%, *Haemoproteus* 10.1%, *Leucocytozoon* 5%, *Trypanosoma* 1.1%, other parasites including microfilaria 1.3%). The overall haematozoan prevalence found by us (19.5%) is lower than that indicated by Peirce (1981) for Italy and other European countries, except Switzerland and the United Kingdom, while it was comparable with that found in Portugal. *Leucocytozoon* prevalence was lower than that found in Germany, Sweden and Norway, but about four times higher than that observed previously in Italy (Peirce, 1981). Therefore a comparison of our data with those previously published from Italy suggests an increase of *Leucocytozoon* and a decline of *Haemoproteus* prevalences.

Bennett (1982) suggests that the parasite prevalence in Western Europe has decreased over the past 70-80 years. He associated this decline with the loss of natural habitats due to the intensive agricultural practices and to land reclamation which have reduced the avian and vector population levels. In general this appears to be true for Italy although the increase in *Leucocytozoon* prevalence is probably explained by the fact that in earlier surveys different species or smaller number of susceptible birds were examined.

Unfortunately, in Italy, studies on avian blood parasites are not included in bird-ringing programmes. Thus, easily available material is not utilized and surveys on haematozoan parasites are based on only limited samples of birds.

RIASSUNTO

PARASSITI EMATICI DI UCCELLI IN ITALIA

— Durante il periodo 1974-1983, 564 uccelli di 36 specie e 16 famiglie, raccolti in Italia, sono stati esaminati per la ricerca di parassiti ematici. Di questi, il 18,1% e l'1,4% risultava infetto con *Leucocytozoon* e *Haemoproteus* (Protozoa) rispettivamente.

— I parassiti identificati sono stati: *Leucocytozoon macleani*, *L. ziemanni*, *L. berestneffi*, *L. sakharoffi*, *Haemoproteus tinnunculi*, *H. aluci*.

- Per i *Leucocytozoon* trovati in Ardeidae, Accipitridae e Falconidae sono necessarie ulteriori ricerche per la loro determinazione tassonomica.
- La prevalenza parassitaria osservata è comparata con quelle riscontrate precedentemente in Italia e in Europa occidentale.

TAB. I. Prevalenza dei parassiti ematici nelle specie esaminate.

TAB. II. Paragone della prevalenza totale, in alcune specie, tra Italia ed Europa occidentale.

RESUME'

PARASITES HEMATIQVES D'OISEAUX EN ITALIE

- Dans la période 1974-1983, 564 oiseaux de 36 espèces et 16 familles recueillis en Italie, ont été examinés pour la recherche de parasites hématiques. Parmi eux, 18,1% et 1,4% étaient infectés respectivement par *Leucocytozoon* et *Haemoproteus* (Protozoa).
- Les parasites identifiés ont été: *Leucocytozoon macleani*, *L. ziemanni*, *L. berestneffi*, *L. sakharoffi*, *Haemoproteus tinnunculi*, *H. aluci*.
- Pour les *Leucocytozoon* trouvés dans Ardeidae, Accipitridae et Falconidae sont nécessaires d'ulterieures recherches pour leur détermination taxonomique.
- La pourcentage d'infection observée est comparée à celles relevées précédemment en Italie et dans l'Europe occidentale.

TAB. I. Pourcentage d'infection pour les espèces examinées.

TAB. II. Comparaison du pourcentage d'infection dans quelques espèces, entre Italie et le reste de l'Europe occidentale.

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Ricevuto 10 settembre 1983