DAMAGE CAUSED BY *SKRJABZNGYLUS NASZCOLA* (LEUCKART, 1842), METASTRONGYLIDAE, TO WEASELS (*MUSTELA NZVALZS* L.) IN NORTH-WESTERN ITALY

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ABSTRACT – The percentage of infestation (incidence) and the degree of damage caused by *Skrjabingylus nasicola* were analysed in 15 fresh skulls of weasels *(Mustela nivalis)* collected in Pavia province (Northern Italy) during 1986-89 and in 79 preserved skulls from the Civic Museum of Natural History of Genoa (Liguria region). The incidence was 66.6% for the first sample of weasels and 54.4% for the second one; the mean degree of damage, asscsscd according King's methods, was 3.7 and 2.6 respectively. Although no significant difference in *Skrjabingylus* prevalence was recorded in relation to sex and age of weasels, a trend of increase in parasite incidence was observed from young to adults in the sample of weasels from the Museum of Genoa. *Apodemus sylvaticus*, which was the staple in the diet of weasels collected in Pavia province, could bc considered the main paratenic host of the skrjabingylosis in northern Italian plain.

Key words: Nematode parasite, *Skrjabingylus nasicola* prcvalcnce, Damage, *Mustela nivalis*, Italy.

RIASSUNTO – *Danni causati da* Skrjabingylus nasicola *(Leuckart, 1942), Metastrongylidae, nella donnola* Mustela nivalis *in Italia nord occidentale* – La percentuale di iiifestazione (incidenza) e l'entità dei danno causato da *Skrjabingylus nasicola* sono state analizzate in 15 donnole *(Mustela nivalis)* reperite in aree coltivate della Provincia di Pavia nel 1986-89 e in 79 esemplari appartenenti alla collezione del Museo Civico di Storia Naturale di Genova. L'incidenza dell'infestazione è risultata del 66,6% per il primo campionc c del 54,4% per il secondo, mentre l'entità media del danno, valutata secondo il metodo proposto da King, è stata di 3,7 c 2,6 rispettivamente. Sebbene non sia stata rilevata nessuna differenza significativa della prevalenza parassitaria in rclazionc al scsso ed all'età delle donnole, è stata evidenziata, per il campione del Museo di Genova, una tendenza all'incremento dell'incidenza dai soggetti giovani a quelli adulti. Il topo selvatico *(Apodenius sylvaticus)*, che rappresenta la preda più consumata dalla donnola in arec coltivate della Provincia di Pavia, potrebbe essere considerato il principale ospite paratenico della skrjabingylosi nella Pianura Padana.

Parole chiave: Nematode parassita, *Skrjabingylus nasicola*, Prevalenza parassitaria, Danni, *Mustela nivalis*, Italia.

INTRODUCTION

Skrjabingylus nasicola is a metastrongylid nematode parasite of the genus *Mustela;* adult worms were recorded in the frontal sinuses in the weasel *M. nivalis*, stoat *M. erminea* and polecat *M. putorius* (e.g., Lewis, 1967; Hansson, 1968; van Soest et al., 1972; King, 1977). This parasite causes swellings and perforations in the supraorbital region of the frontal sinuses and deforms the cranium (Fig. 1). Its pathogenesis has been widely described by Lankester & Anderson (1971) and van Soest et al. (1972).

In this paper, the incidence of *S. nasicola* in weasels collected in agricultural areas of Pavia province (northern Italy) and the degree of distortion of the skull bones are evaluated; in addition, these data are compared with those obtained by examining preserved skulls of weasels from the Civic Museum of Natural History, Genoa (Liguria region).

MATERIALS AND METHODS

During the period 1986-89, 15 weasels (3 females and 12 males found dead and killed by road traffic) were collected in spring (mainly) and winter in Pavia province (Sample 1 hereafter). Nematodes were extracted from 3 skulls and identified according to the description by van Soest et **al.** (1972). Adult and young weasels were classified on the basis of the commonest ageing criteria used in mustelids (see King, 1989). Seventy-nine preserved skulls of weasels (20 females and 59 males) from the collection of the Civic Museum of Natural History of Genoa (Sample 2 hereafter) were examined in order to detect lesions caused by *S. nasicola;* most of these specimens were collected in NW Italy from 1883 to 1959 in all seasons of the year. The degree of damage caused to the weasels' skulls was evaluated according to King's method (1977).

Chi-square test was used to compare *S. nasicola* prevalence between the two samples of weasels; the comparison was also made within each sample and between the two samples according to sex and age. Similarly, the Mann-Whitney U test (Siegel, 1956) was applied to evaluate differences in degree of damage's skulls.

RESULTS AND DISCUSSION

The parasite prevalence in weasels did not differ significantly between the two samples (66.6% for Sample 1 vs. 54.4% for Sample 2, Tab. 1). For Sample 1 it did not vary between sexes, while for Sample 2 it was higher in adult females than in young males ($\chi^2 = 3.96$ P = 0.05 d.f = 1) and young females ($\chi^2 = 4.26$ P = 0.04 d.f = 1). Grouping the two samples no difference according to sex and age was recorded. Moreover, the degree of damage of skulls did not vary significantly according to sex and age when the samples were examined separately and together. On the other hand, the degree of distortion recorded in Sample 1 skulls was higher than in Sample 2 ($\bar{x} = 3.7$ vs. $\bar{x} = 2.6$, Z = 2.17 P = 0.03 N = 53). These values are lower than that (mean damage score = 4.3) recorded by King (1977). For Sample i the left side of skulls was more damaged than the right one ($\bar{x} = 2.1$ ■1.5 vs. $\bar{x} = 1.61$ = 1.4), though this difference was not significant. This is in agreement with what was found by Petrov (1927 in King 1977) and King (1977) in Russian and British weasels respectively.

Parasite prevalence recorded in the present study was among the highest ones found in Europe (Tab. 2). However, this comparison should be made with caution, because several factors (e.g., season of collection, age structure of the target population) affect parasite prevalence (King, 1977; Weber, 1986). For the weasels of Sample 2 the differences in *S. nasicola* incidence between adult females, young females and young males could be due to the fact that only 5 adult females were examined. Nevertheless, a trend of increase in parasite incidence was observed from young to adults, as found in other studies (Hill, 1939; Hansson, 1970; van Soest et al., 1972).

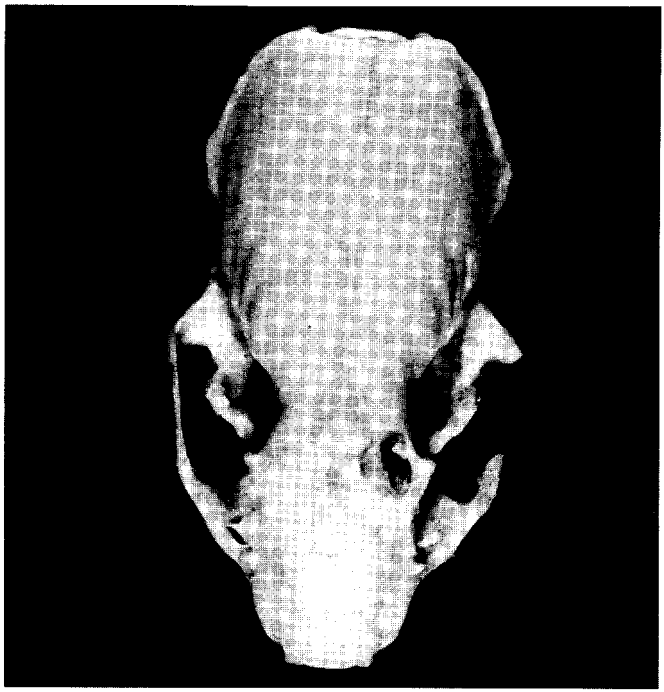

Fig. 1 – Extent damage (degree: 4) caused by *S. nasicola* in a weasel collected in Pavia province.

The life cycle of *S. nasicola* in weasels involves a compulsory intermediate host (a pulmonate gastropod) where parasite's larvae parasite encysted in its tissues, and a paratenic host, a shrew or a mouse (King, 1989). The direct transmission of the parasitic nematode from molluscs to weasels is probably rare, because weasels seldom eat molluscs. The diet of this mustelid mainly includes rodents and, in second order, insectivores (King, 1989). The wood mouse *(Apodemus syfvatìcus)* and the common shrew (*Sorex araneus*) were identified as paratenic hosts of *S. nasicola* by Weber & Mermod (1983) and Hansson (1967) respectively.

The food habits of the weasel were studied by scat analysis in a mixed farmland area of the Pavia province (Prigioni, 1993), where 6 weasels were found dead and examined for detecting *S. nasicola*. The wood mouse was the staple in the weasel diet followed by the bank vole *Clethrionomys glareolus*. Also this last species, as pointed out by Weber & Mermod (1983), could be a paratenic host, given its ecological relationship with **A.** *sylvaticus*. In north-west Po plain the wood mouse is the most widespread and common small mammal species, while the bank vole has a scattered distribution and is abundant in residual woodlands (Canova et al., 1991; Canova & Fasola, 1991; Canova, 1992). The diet of these rodents includes gasteropods in very small proportion (L. Canova pers. com.). Nevertheless, this scarce presence, as pointed out by the same author, could be due to the difficulty to find remains of molluscs in stomach contents of small mammals. In the Po plain lugs and snails, such as

Succinea, Limax, Milan and *Cochlicopa,* identified as obligatory intermediate hosts of skrjabingylosis (see King, 1977), are widespread and relatively abundant, because favourable climatic conditions are occurring **(A.** Torelli pers. com.).

Although *S. nasicola* damages often severely the weasel skulls, there is no evidence that it affects negatively its growing pattern (King, 1977). Nevertheless, badly damaged weasels could be easily vulnerable to stress of different origin. For example, during an ecological study on this mustelid (Prigioni in prep.) the only case of dead under anaesthesia was a young weasel severely damaged by *S. nasicola* (damage score = 7).

Tab. 1 – Percentage of infestation (I%) and degree of distortion of the skull bones rccordcd in weasels collected in Pavia province and belonging io the collection of the Civil Museum of Natural History, Genoa (M = male, F = female, ad. = adult, juv. = young, S.D. = Standard Deviation).

SEX/AGE	N. OF EXAMINED ANIMALS	I%	DEGREE OF DISTORTION	
			MEAN (S.D.)	MIN - MAX
		SAMPLE i (PAVIA)		
M ad.	9	66.6	3.5 (0.84)	2-4
M juv.	3	33.3	1.0	1-1
F juv.	3	100.0	5.0 (1.73)	4-7
Total	15	66.6	3.7 (1.57)	1-7
		SAMPLE 2 (GENOVA)		
M ad	38	65.8	2.7 (1.70)	1-7
M juv.	21	38.1	2.2 (1.28)	1-4
F ad.	5	100.0	2.8 (1.64)	1-5
F juv.	15	33.3	2.2 (0.84)	1-3
Total	79	54.4	2.6 (1.51)	1-7

Tab. 2 – Incidence of *Skrjabingylus nasicola* in weasels recorded in some European countries (No = number of examined animals; I% = percentage of infestation).

AUTHORS	COUNTRY	No	I%
VIK, 1955	Norway	48	42.0
LEWIS, 1967	England	147	35.0
HANSSON, 1968	Sweden	55	53.0
HANSSON, 1970	Sweden	137	35.0
HANSSON, 1970	Denmark	171	27.0
HANSSON, 1970	Finland	25	52.0
WALKER, 1972	England	77	42.8
van SOEST et al., 1972	The Netherlands	203	56.1
KING, 1977	United Kingdom	614	81.0
PRESENT STUDY	Pavia	15	66.6
PRESENT STUDY	Genova	79	54.4

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