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## FINDING OF TWO SPECIES FROM THE TRIBE SYNHIMANTEA (NEMATODA, ACUARIIDAE) IN THE KYIV ZOOLOGICAL PARK

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**Finding of Two Species from the Tribe Synhimantea (Nematoda, Acuariidae) in the Kyiv Zoological Park.** Syrota, Ya. Yu., Kharchenko, V. O., Lyaskivskiy, V. N., Kobylinsky, V. V., Vasylykivska, I. B. — The article presents the description of *Desportesius sagittatus* (Rudolphi, 1809) and *Dispharynx nasuta* (Rudolphi, 1819) based on original studies of the material collected in the Kyiv Zoo. *De. sagittatus* was found in Ukraine for the first time. *Di. nasuta*, found in *Grus grus* Linnaeus, 1758, is uncommon parasite of this host species. Larvae of *Di. nasuta* from the intermediate hosts, woodlice Oniscidea spp., are also described.

Key words: *Desportesius sagittatus*, *Dispharynx nasuta*, crane, stork, Ukraine.

**Находка двух видов трибы Synhimantea (Nematoda, Acuariida) в Киевском зоологическом парке.** Сирота Я. Ю., Харченко В. А., Ляшковской В. Н., Кобылинский В. В., Васильковская И. Б. — В статье приведено описание нематод *Desportesius sagittatus* Rudolphi, 1809 и *Dispharynx nasuta* (Rudolphi, 1819). *De. sagittatus* впервые обнаружен в Украине. *Di. nasuta* — редкий паразит *Grus grus* (Linnaeus, 1758). Также дано описание личинки *Di. nasuta* из промежуточных хозяев — мокриц Oniscidea spp.

Ключевые слова: *Desportesius sagittatus*, *Dispharynx nasuta*, журавль, аист, Украина.

### Introduction

Few records of *Desportesius sagittatus* (Rudolphi, 1809) from Ciconiiformes in the Palearctic are known, namely, from *Ardeapur purea* (Linnaeus, 1766), *Ciconia nigra* (Linnaeus, 1758), and *Nycticorax nycticorax* (Linnaeus, 1758) (Baruš et al., 1978; Sitko et Okulewicz, 2010). This species was also found in birds of prey, in particular, in *Buteo borealis* (Gmelin, 1788) (Skrjabin et al., 1965). This helminth was unknown for the fauna of Ukraine.

*Dispharynx nasuta* (Rudolphi, 1819) is widespread on all continents except for Antarctica. The parasite is typical for Passeriformes, Galliformes and Columbiformes. The species was also found in many other birds (Carreno, 2008). In Ukraine, this species was reported in Galliformes, Passeriformes, Anseriformes, Charadriiformes, and Rheiformes (Smogorzhevskaya, 1990). It was registered in cranes in the USA and Europe (Forrester et al., 1975; Spalding et al., 1996; Fanke, 2010).

These two species were found during helminthological examinations of dead birds from the Kyiv Zoological Park. This is the first record of *De. sagittatus* in Ukraine. This is also the first record of *Di. nasuta* in cranes on the territory of the country.

### Material and methods

Helminthes were collected from gastrointestinal tract of two adult birds: *Ciconia nigra* (Linnaeus, 1758) (Ciconiiformes: Ciconiidae) (in 2015) and *Grus grus* (Linnaeus, 1758) (Gruiformes: Gruidae) (in 2014). The stork was delivered to the zoo from the Ukrainian Polissya in spring of 2014. The crane lived all its life in the zoo. We also examined Oniscidea spp. (Isopoda) collected near aviary of the dead crane, since animals from this group are known as intermediate hosts for *Di. nasuta*. Nematodes were fixed in pre-heated to boiling 70° ethanol and kept in 70° ethanol. Helminth specimens were cleared in lactophenol for examination of their morphology. The microscope Zeiss Axio Imager M1 was used for examination of morphological characters and photography. For metrical characters, we indicated mean values in parentheses after the ranges, if the sample was equal to, or larger than 10.

### *Desportesius sagittatus* (Rudolphi, 1809)

Host: Black stork (*C. nigra*)

Locality: Kyiv, Ukraine

Site of infection: gizzard

Intensity: 11

Small nematodes. Cuticle with transverse striation. Striation most obvious in middle part of body. Two pseudolabia arranged around mouth. Two pairs of cervical cordons beginning at base of each pseudolabia. Straight cordons extending to middle part of muscular esophagus, recurrent anteriorly to anterior end of body and merged at level of posterior edge of nerve ring (fig 1, 1). Cervical papillae bicuspid, posterior to merging of cordons. Two lateral cordons present. Each lateral cordon beginning behind cervical papillae, extending across lateral side of body, finished nearly at level of tail. Buccal capsule relatively long. Esophagus consisted of short anterior muscular part and long posterior glandular part. Nerve ring located at level of anterior end of muscular part of esophagus.

Male (n = 3). Body length 7.4–8.3 mm, maximum width 150–212 µm. Buccal capsule 187–217 µm long. Distance from anterior end of body to nerve ring 205–287 µm, to cervical papilla 287–386 µm, to excretory pore 386 µm. Cordons 692–841 µm in total

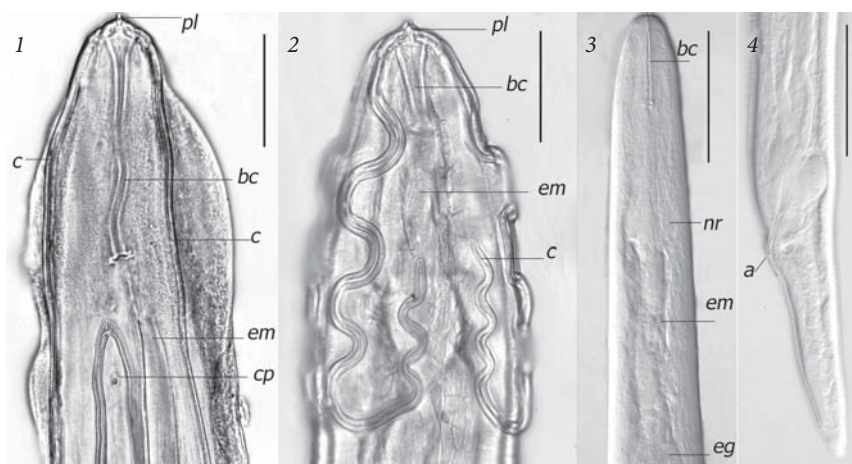


Fig. 1. *De. sagittatus* and *Di. nasuta*: 1 — anterior end of *De. sagittatus*; 2 — anterior end of *Di. nasuta*; 3 — anterior end of the larva *Di. nasuta*; 4 — posterior end of the larva *Di. nasuta*; pl — pseudolabia, bc — buccal capsule, cp — cervical papilla, nr — nerve ring, c — cordons, em — muscular esophagus, eg — glandular esophagus; a — anal pore. Scale bar 100 µm.

length, descending branch 455–574  $\mu\text{m}$  long, recurrent branch 207–267  $\mu\text{m}$  long. Muscular part of esophagus 455–693  $\mu\text{m}$  long, glandular part of esophagus 1.6–2.2 mm long. Well-developed caudal alae present, 657–741  $\mu\text{m}$  long. Caudal papillae: 4 pairs preanal and 5 pairs postanal. Spicules unequal and dissimilar. Left spicule longer than right one, 693–792  $\mu\text{m}$  long. Distal end of left spicule bifurcated. Right spicule canoe shaped, 217–263  $\mu\text{m}$  long. Tail 132–149  $\mu\text{m}$  long.

Female (n = 2). Body length 8.8–11.3 mm. Body width 316–347  $\mu\text{m}$ . Buccal capsule 163–257  $\mu\text{m}$  long. Distance from anterior end of body to nerve ring 238–277  $\mu\text{m}$ , to cervical papilla 346–455  $\mu\text{m}$ . Cordons 940–1030  $\mu\text{m}$  in total length, descending branch 623–693  $\mu\text{m}$  long, recurrent branch 317–336 long. Muscular part of esophagus 455–546  $\mu\text{m}$  long. Distance from posterior end of body to vulva 80–108  $\mu\text{m}$ . Vulva close to anal opening. Tail 33–45  $\mu\text{m}$  long.

The stork examined also harbored *Dicheilonema ciconiae* (Schrank 1788) and *Chaunocephalus ferox* (Rudolphi 1795). Dragonfly larvae and ostracods (Crustacea) are known as intermediate hosts of other species from genus *Desportesius*, and various fish species may be paratenic hosts of *Desportesius* spp. (Anderson, 2000; Moravec 1994). However, inter-

**Table 1. Comparative measures of the nematode *Di. nasuta***

Features	Zhang, Brooks et al., 2004, $\mu\text{m}$	Our data, $\mu\text{m}$
Males		
N	22	10
L	3.6–6.4(5.0)*	3.1–7.5(6.2)*
W	141–311(243)	237–347(305)
BC	73–125(100)	85(69–99)
CP	200–456(325)	287–475(359)
EP	203–429(318)	327–481(373)
NR	159–289(235)	218–260(239)
C	298–606(505)	304–710(512)
EM	422–740(552)	475–891(632)
EG	1.2–2.0(1.5)*	1.6–2.6(2.0)*
SL	380–589(453)	336–495(409)
SR	133–193(171)	119–188(165)
T	159–333(254)	307–485(377)
Females		
n	29	10
L	3.3–7.8(5.1)*	5.4–7.4(6.7)*
W	252–607(402)	376–650(497)
BC	95–152(125)	89–129(99)
CP	277–585(436)	366–802(529)
EP	266–568(443)	406–733(542)
NR	220–403(313)	198–257(232)
C	441–1051(765)	435–979(813)
EM	444–761(570)	505–772(633)
EG	1.1–2.0(1.6)*	N/A
V	670–1410(1110)	970–1594(1269)
T	114–156(133)	119–217(150)

Abbreviations: L — body length; W — body width; BC — buccal capsule; CP — cervical papilla; EP — excretory pore; NR — nerve ring; C — cordons; EM — muscular esophagus; EG — glandular esophagus; SL — left spicule; SR — right spicule; V — vulva; T — tail.

\* Measurements are given in millimeters.

Table 2. Comparative measures of the larva *Di. nasuta*

Features	Birova, Macko et al., 1974, $\mu\text{m}$	Our data, $\mu\text{m}$
N	8	10
L	2.8–3.7*	3.2–3.6(3.4)*
W	84–104	89–129(113)
BC	48–78	50–69(56)
NR	113–151	89–129(113)
EP	178–221	158–297(216)
EM	226–344	267–317(292)
EG	0.8–1.1*	1.0–1.2(1.1)*
T	121–156	143(129–158)

Abbreviations: L — body length; W — body width; BC — buccal capsule; EP — excretory pore; NR — nerve ring; EM — muscular esophagus; EG — glandular esophagus; T — tail.

\* Measurements are given in millimetres.

mediate host is unknown for *De. sagittatus*. In the Zoo, stork's ration consisted of feedstuffs eliminating possibility of infection by the parasite. So probably the stork has been infected by *De. sagittatus* in nature.

### *Dispharynx nasuta* (Rudolphi, 1819)

Host: Common crane (*G. grus*)

Locality: Kyiv, Ukraine

Site of infection: proventriculus

Intensity: 57

Cuticle with clear transverse striation. Mouth surrounded by two pseudolabia. Two pairs of cordons presented. Convolute cordons beginning at anterior end of body, extending to posterior edge of muscular esophagus, then turning anteriorly and finishing at level of anterior edge of muscular esophagus (fig 1, 2). Recurrent branches of cordons unmerged. In females, cordons more convolute than in males. Bicuspid cervical papillae between recurrent branches of cordons. Nerve ring in the first half of muscular esophagus. Mouth opening into short buccal capsule. Glandular part of esophagus almost three times longer than muscular part. Excretory pore opening approximately at level of cervical papillae.

Male ( $n = 10$ ). Body length 3.1–7.5 (6.2) mm, maximum width 237–347 (305)  $\mu\text{m}$ . Buccal capsule 69–99 (85)  $\mu\text{m}$  long. Distance from anterior end of body to nerve ring 218–260 (239)  $\mu\text{m}$ , to cervical papilla 287–475 (359)  $\mu\text{m}$ , to excretory pore 327–481 (373)  $\mu\text{m}$ . Cordons 304–710 (512)  $\mu\text{m}$  in total length, descending branch 205–470 (344)  $\mu\text{m}$  long, recurrent branch 99–240 (168)  $\mu\text{m}$  long. Muscular part of esophagus 475–891 (632)  $\mu\text{m}$  long, glandular part 1.6–2.6 (2.0) mm long. Caudal alae in posterior quarter of body, 504–729  $\mu\text{m}$  long. Nine pairs of caudal papillae: 4 pairs preanal and 5 pairs postanal. Spicules unequal. Left spicule long and thin, spine-shaped, 336–495 (409)  $\mu\text{m}$  long. Right spicule short and wide, canoe-shaped, 119–188 (165)  $\mu\text{m}$ . Tail 307–485 (377)  $\mu\text{m}$  long.

Female ( $n = 10$ ). Body length 5.4–7.4 (6.7) mm, maximum width 376–650 (497)  $\mu\text{m}$ . Buccal capsule 89–129 (99)  $\mu\text{m}$  long. Distance from anterior end of body to nerve ring 198–257 (232)  $\mu\text{m}$ , to cervical papilla 366–802 (529)  $\mu\text{m}$ , to excretory pore 406–733 (542)  $\mu\text{m}$ . Cordons 435–979 (813)  $\mu\text{m}$  in total length, descending branch 315–630 (540)  $\mu\text{m}$  long, recurrent branch 120–449 (272)  $\mu\text{m}$ . Muscular part of esophagus 505–772 (633)  $\mu\text{m}$  long. Vulva opening in posterior quarter of body. Distance from posterior end of body to vulva 0.9–1.6 (1.3) mm. Tail 119–217 (150)  $\mu\text{m}$  long.

The present record is the first finding of this parasite in *G. grus* on the territory of Ukraine. *Di. nasuta* is uncommon for cranes, so the parasite morphology was studied in

detail. We compared original morphometric data on *Di. nasuta* with the information published by other authors (Zhang et al., 2004). Comparison showed that the range of characters' variability agrees with literature data (table 1). However, the mean values of metrical characters in our sample was somewhat larger than those in literature.

Intensity of infection in the bird that lived all its life in the Zoo was rather high. Therefore, we assumed that infection had a local source. Terrestrial isopoda are known as the intermediate host of this parasite. Therefore, individuals of Oniscidea spp. (Isopoda) were collected near aviary of the crane. In the isopods, we determined a high level of intensity (1–10) and prevalence (44 %) of infection by nematode larvae. Our measurements of the larvae collected were compared to the data from literature (table 2). Comparison shows that ranges of variability of metrical characters are similar in both samples. However, minimum and maximum values of some characters differed distinctly. Analysis of quantitative and qualitative characters of collected larvae, host, and presence of adult nematodes close to the place where woodlice were collected allowed us to identify the larvae as *Di. nasuta*.

### ***Dispharynx nasuta* (third-stage larvae)**

Host: Oniscidea spp. (Isopoda)

Locality: Kyiv, Ukraine

Site of infection: body cavity

Morphology (n = 10). Body length 3.2–3.6 (3.4) mm, maximum body width 89–129 (113)  $\mu\text{m}$ . Two pseudolabia on slightly rounded anterior end of body. Four short cordons beginning posterior to pseudolabia. Shape of buccal capsule similar to that in adult nematodes (fig 1, 3). Buccal capsule 50–69 (56)  $\mu\text{m}$  long. Distance from anterior end of body to nerve ring 89–129 (113)  $\mu\text{m}$ , to excretory pore 158–297 (216)  $\mu\text{m}$ . Esophagus divided in two parts: muscular and glandular. Muscular part 267–317 (292)  $\mu\text{m}$  long, glandular part 1.0–1.2 (1.1) mm. Tail 129–158 (143)  $\mu\text{m}$  long (fig. 1, 4).

Microscopic studies were done using the equipment of the Centre of collective use of scientific equipment "Animalia" (Institute of Zoology, NAS of Ukraine). We are sincerely grateful to the Kyiv Zoological Park for materials provided for the study.

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