

## Short notes

## An anomaly within the genital system in a female *Ascaris suum* Goeze

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**ABSTRACT.** The authors describe an individual of the female *Ascaris suum* Goeze with a unique genital system. A female with such an anomaly was found during laboratory classes of Invertebrate Zoology at the Faculty of Biology and Environmental Protection, NCU. The specimen was about 200 mm long, and the total length of the reproductive system was 1970 mm. Further comparative analysis between unchanged and changed individuals revealed differences in the length of individual sections of the studied system, as well as in the diameter of the uterus. The described case is extremely interesting because of the phenomenon of eutely occurring in nematodes. The exact cause and mechanism of abnormalities described in *Ascaris suum* are not known and difficult to explain experimentally because of the extremely small number of these anomalies. Moreover, the interpretation of the anomaly is difficult because of the specific behavior and complex morphogenesis of this endoparasite.

**Key words:** *Ascaris suum*, anomaly, female reproductive system

Experimental teratological studies have shown that some chemicals [1–6], UV radiation [7], X-rays [8–10] and mechanical disruption of embryogenesis, such as centrifugation of embryos [3,11–14], which induces permanent malformation of the embryos, may be the causes of various types of malformations. Some of these teratological factors may induce spontaneous anomalies in the natural environment. There are many reports in contemporary research on different types of distortion in the body composition of invertebrates, inter alia Arthropods. According to recent molecular investigations Nematodes are closely related to the Arthropods [15]. Individuals with a disturbed structure are mostly found in nature during faunistic research: elytra anomalies of *Carabus hortensis* L. [16], deformities of the head and pronotum of *Carabus glabratus* Payk. [17], changes in the structure of elytra *Pterostichus niger* Schall. and *Carabus auratus* [18], deformities of insect legs [19], anomalies in the body of *Myrmica ruginodis* Nyl. [20], distortion in the carapace and abdomen of *Cladocera* [21], abnormalities of the ocular

complex, legs, the male palpal organ and epigyne in different species of spiders [22], anomalies in the body of ticks [23], anomalies in the body and shell of *Helix pomatia* L. [24,25], scorpions with bifurcation of the anterior part of the body [26]. However, spontaneous anomalies have also been observed in the laboratory classes at university.

Wąsowska and Jacuński [27] describe a case of the tapeworm *Moniezia expansa* Rudolphi with changes in the constitution of mature proglottids. There were also a few cases of anomalies in the female reproductive organs of roundworms coming from pigs [28–31]. Female *Ascaris suum* with morphological abnormalities in the reproductive system are rare. So far, these anomalies have consisted mostly of the development of an additional, third and complete reproductive tube (uterus, oviduct, ovary). The mechanism of the development of the additional and relatively large part of the system is not known. A precise determination of which of the branches is additional is not possible either. The fusion of three uteri with a short section of the uterus connected to the vagina

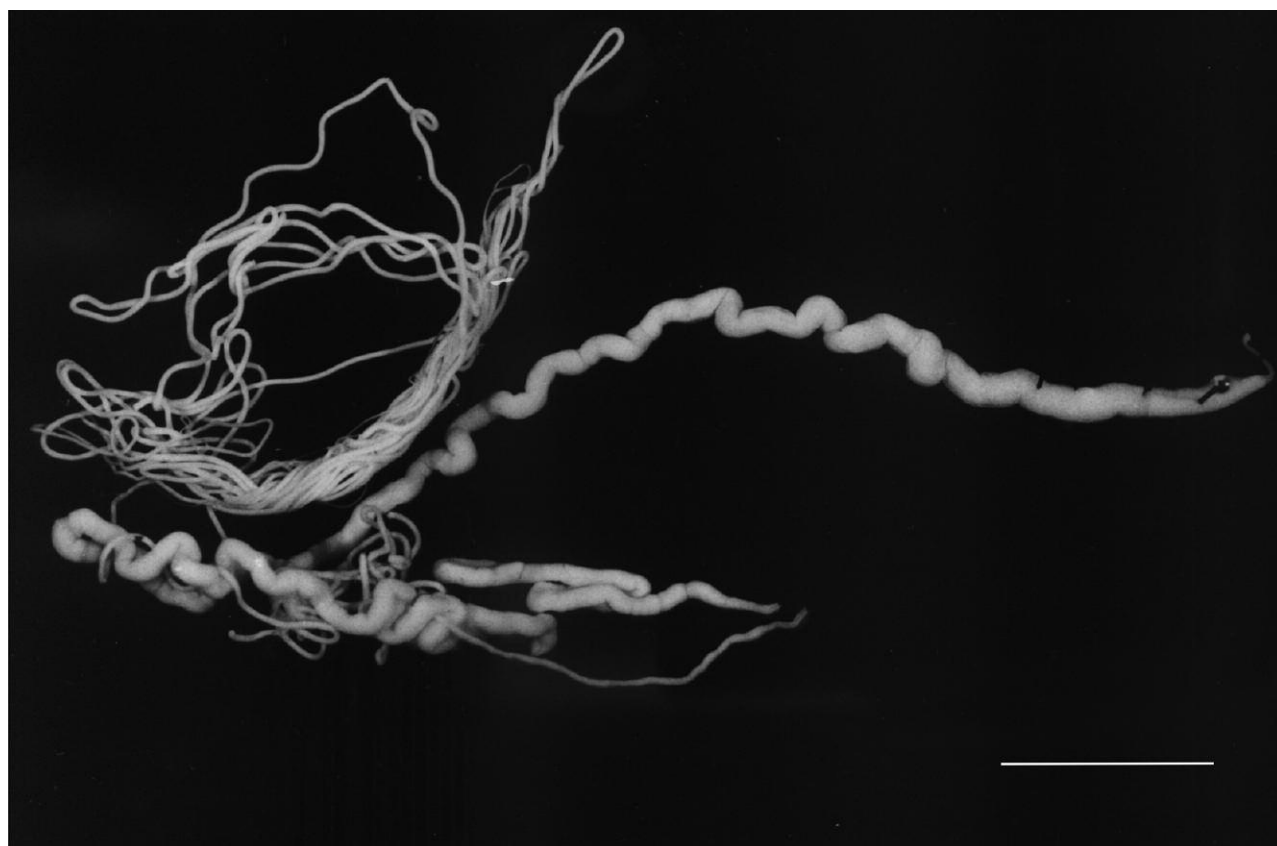


Fig. 1. Deformation of the female reproductive system of *Ascaris suum* Goeze. Scale bar: 13.6 mm.

may occur in the same place (forming a regular delta) [28,31]. Sometimes, however, it happens that one of them connects to the rest of the reproductive system, above or below the uterine bifurcation to form an irregular delta-like structure [29,31]. Another distortion found in the reproductive system of female worms was the splitting and reconnecting of the final part of the oviduct over a distance of 8 mm of the right reproductive duct, while the left one remained unchanged [30]. Finally, a much rarer anomaly in *Ascaris suum* is the formation of only one reproductive duct [29].

A similar anomaly found in this endoparasite was identified during the laboratory classes of Invertebrate Zoology at the Faculty of Biology and Environmental Protection, NCU. This was the only change in the overall structure of the reproductive system encountered in the course of classes conducted in the past 15 years. During that time, about 1000 females of this species were sectioned. The individual with the recognized anomaly was about 200 mm long, and the total length of the reproductive system was 1970 mm (Fig.1,2). By comparison, the total length of the reproductive system of a normal 200 mm female is on average

2077 mm. In both cases, the overall length of the reproductive system tube was nearly 10× greater than the length of the entire body. Further comparative analysis revealed differences in the length of individual sections of the studied system, as well as in the diameter of the uterus. The length of the uterus in the modified specimen was 170 mm, and the diameter 2.04 mm, whereas in normal females of similar size, the length of the uterus is on average 241 mm with a diameter of 1.50 mm. The lengths of the subsequent sections, those being the oviduct and ovary from a modified female were 1420 mm and 380 mm, respectively. For comparison, the average length of these sections in a normally developed female reproductive tract is 1300 mm and 536 mm. In the anomalous development of a single reproductive system, the length of individual sections was found to have increased substantially, as well as the diameter of a single uterine duct. It can be assumed that the elongation of individual sections of the reproductive system is a peculiar tendency of the parasite to produce an adequate number of eggs, which is slightly smaller compared to individuals with a normal structure of the reproductive system. The

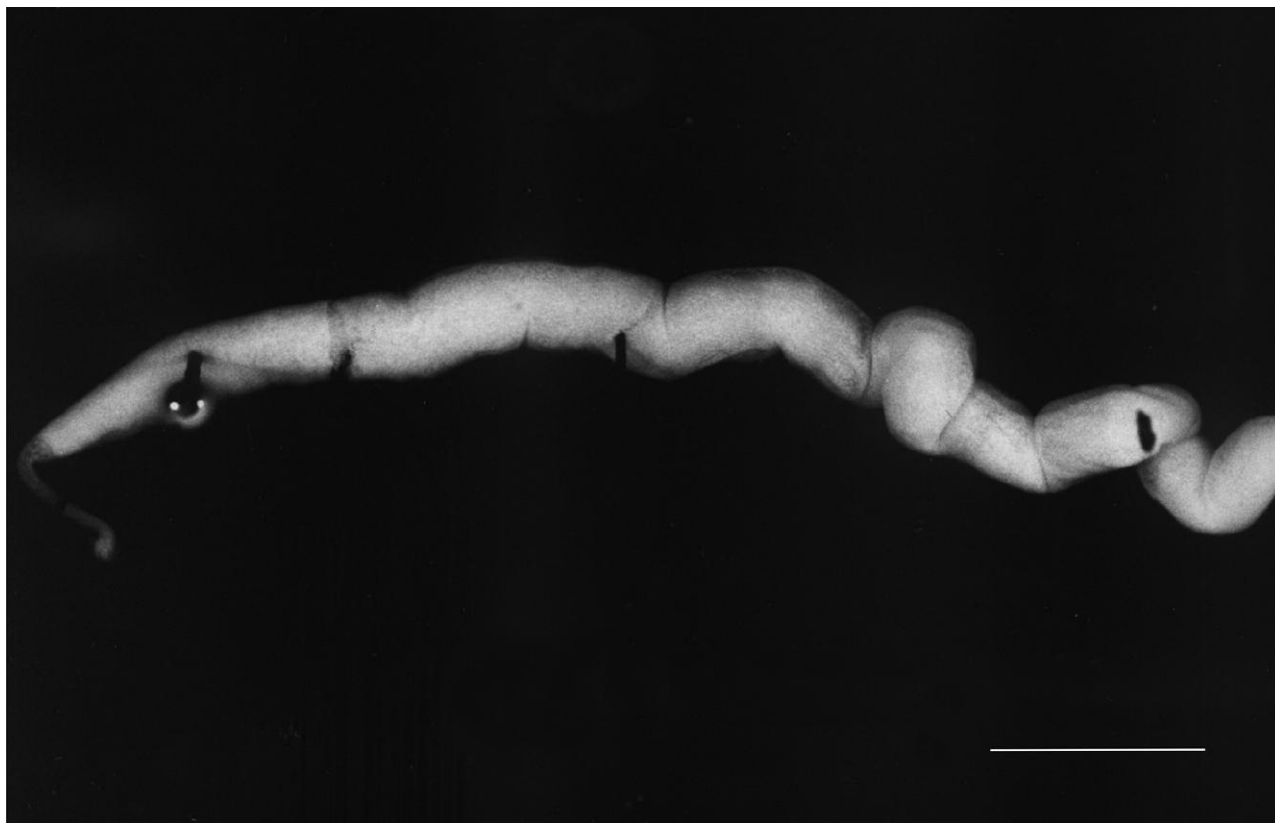


Fig. 2. The front section of the changed reproductive system of *Ascaris suum* Goeze. Scale bar: 5.1 mm.

described case of anomaly in the female genital system of the pig roundworm is extremely interesting because of the phenomenon of eutely occurring in nematodes, which involves the presence of a constant number of somatic cells after maturity [32]. The fact that a large part of the reproductive system was not developed implies that there were disturbances at the molecular level. The exact cause and mechanism of abnormalities described in *Ascaris suum* are not known and difficult to explain experimentally because of the extremely small number of these anomalies. Moreover, the interpretation of the anomaly is difficult because of the specific behavior and complex morphogenesis of this endoparasite.

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Received 23 July 2012

Accepted 20 August 2012