Characterization of a protandrous hermaphroditic reproductive system in transitional and female phases of *Norileca indica* — morphological, histological and ultrastructural approach

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Abstract

The present study explores the reproductive system of *Norileca indica* during its transitional and female phase at morphological, histological, ultrastructural and histochemical levels. The paired and symmetrical hermaphroditic reproductive system of *N. indica* in the transitional and female phases lies dorsally in the thorax on either side of the gut, each consisting of a three-lobed testis (with lobes t_1, t_2 and t_3) followed by an ovary and then a vas deferens, which opens into the paired penes located at sternite 7; the oviduct, arising laterally from the ovarian lobe, opens into the gonopore located on the 6th pereonite. In the transitional phase, the gonads show a presence of germ cells at different maturation stages: spermiogenesis in the testes has already halted, while the ovary undergoes active vitellogenesis. Spermatophores are frequently seen in the vas deferens but seldom in the testes; the size of the oocytes then is 250-1200 μm. The gonadosomatic index (GSI) and nucleocytoplasmic index (NCI) range over 0.090-0.198 and 0.46-0.11, respectively. In the female, oocyte size increases to 1500 μm; the GSI ranges 0.019-0.235 and the NCI from 2.40 to 0.09; testes and vas deferens are not prominent. This paper discusses the possible role of protandrous hermaphroditism in the reproductive life of *N. indica*.