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Supplementary material

Morphology and late embryonic development of the male reproductive tract of an Andean onychophoran (Peripatidae) population

Morfología y desarrollo embrionario tardío del sistema reproductor de los machos de una población de onicóforos andinos (Peripatidae)

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Table of Contents

Figure S1A

Figure S1B, C

Figure S2

Figure S3

Figure S4

Figure S5

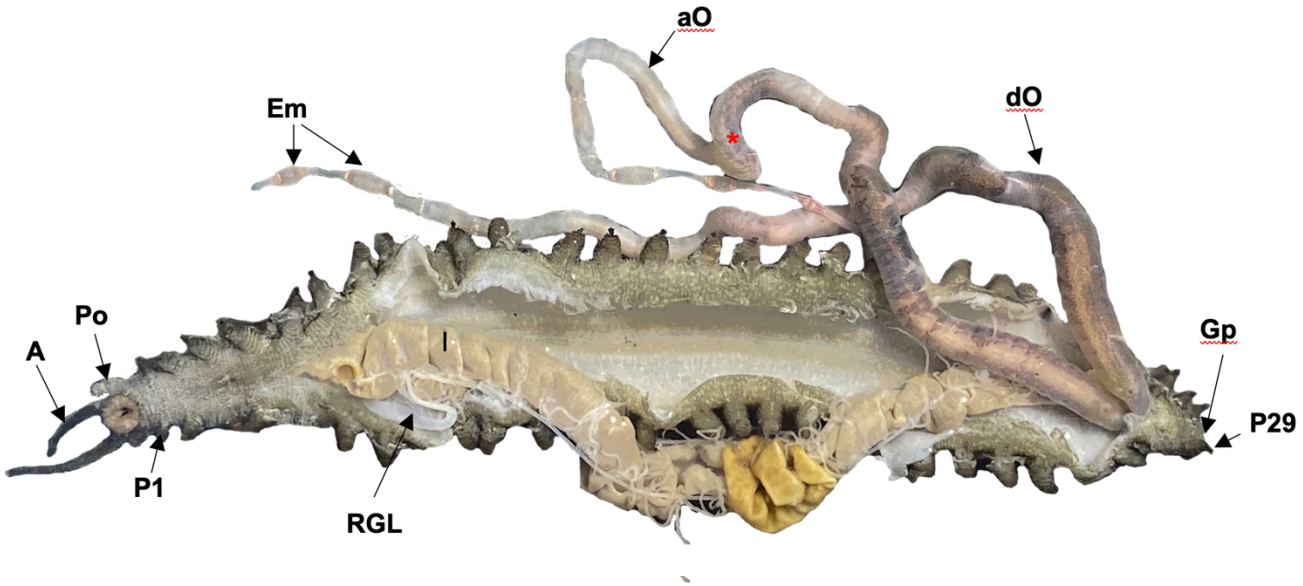


Figure S1A. Dissection of a gravid female; the digestive tract was moved to show the oviducts. Key characteristics of the group are observed, such as the organization of slime glands in rosettes and oviductal chambers containing embryos at different stages of development. A, antenna; aO, ascending oviduct; dO, descending oviduct with advanced embryos; Em, early embryonic chambers; Gp: gonopore; I: intestine; Po: oral papillae; P1, lobopod #1; P29: lobopod #29; RGL**,** reservoir of slime glands. The red asterisk shows the position of the earliest embryo in the oviduct studied here(stage VII of development according to **Walker and Tait,** 2004).

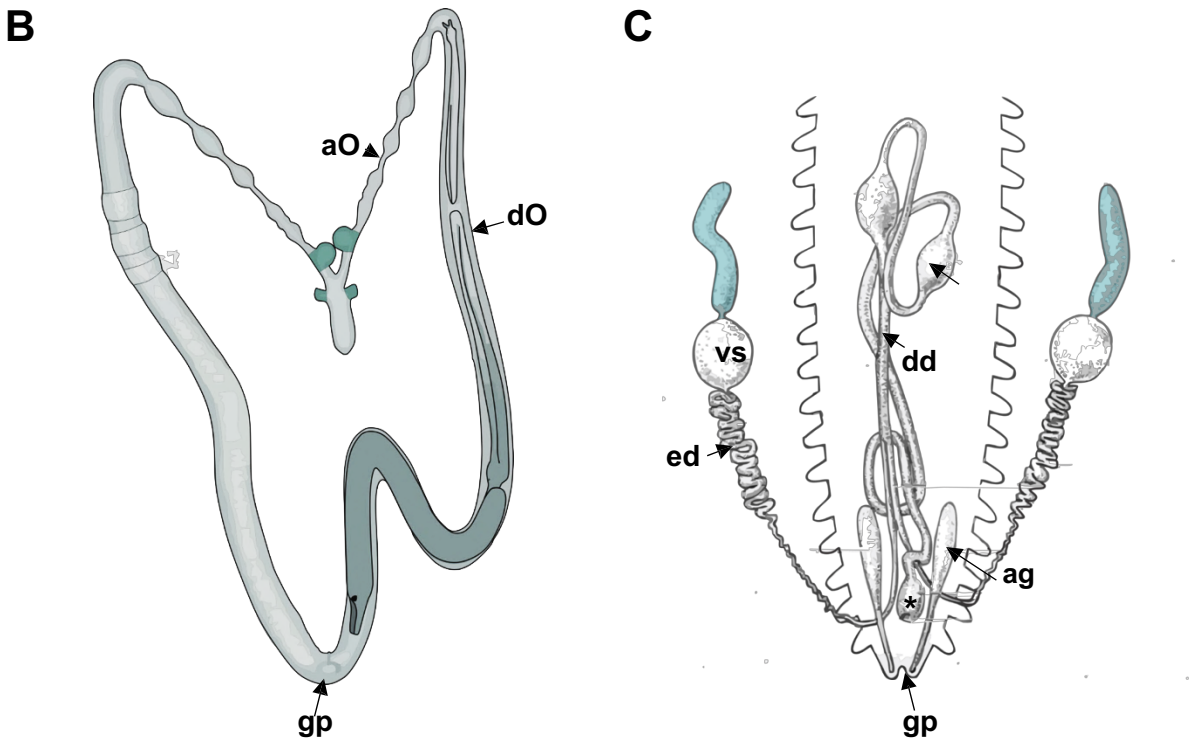


Figure S1. **B.** Schematic representation of the female reproductive tract of a gravid adult female. In blue, the ovaries and seminal receptacles. The oviduct is divided into an ascending oviduct (aO) where the embryonic chambers are located, containing embryos in the first stages of development (I to VII), with those closest to the ovary being the earliest. The descending oviduct (dO) contains the most advanced embryos, partially and fully pigmented. The latter resembles the morphology of the adult; they are in the most distal part of the body towards the gonopore (gp). **C**. Schematic representation of the reproductive tract of adult males, the representation of the testicle is shown in blue, followed by the seminal vesicle (vs), the highly contoured efferent ducts (ed), the very long vas deferens (dd) containing spermatophores (arrow), and the ejaculatory duct (asterisk). The anal glands (ag) that go directly to the gonopore are observed. Schemas adapted from **Hernández** (2014) and **Storch and Ruhberg** (1990), respectively.

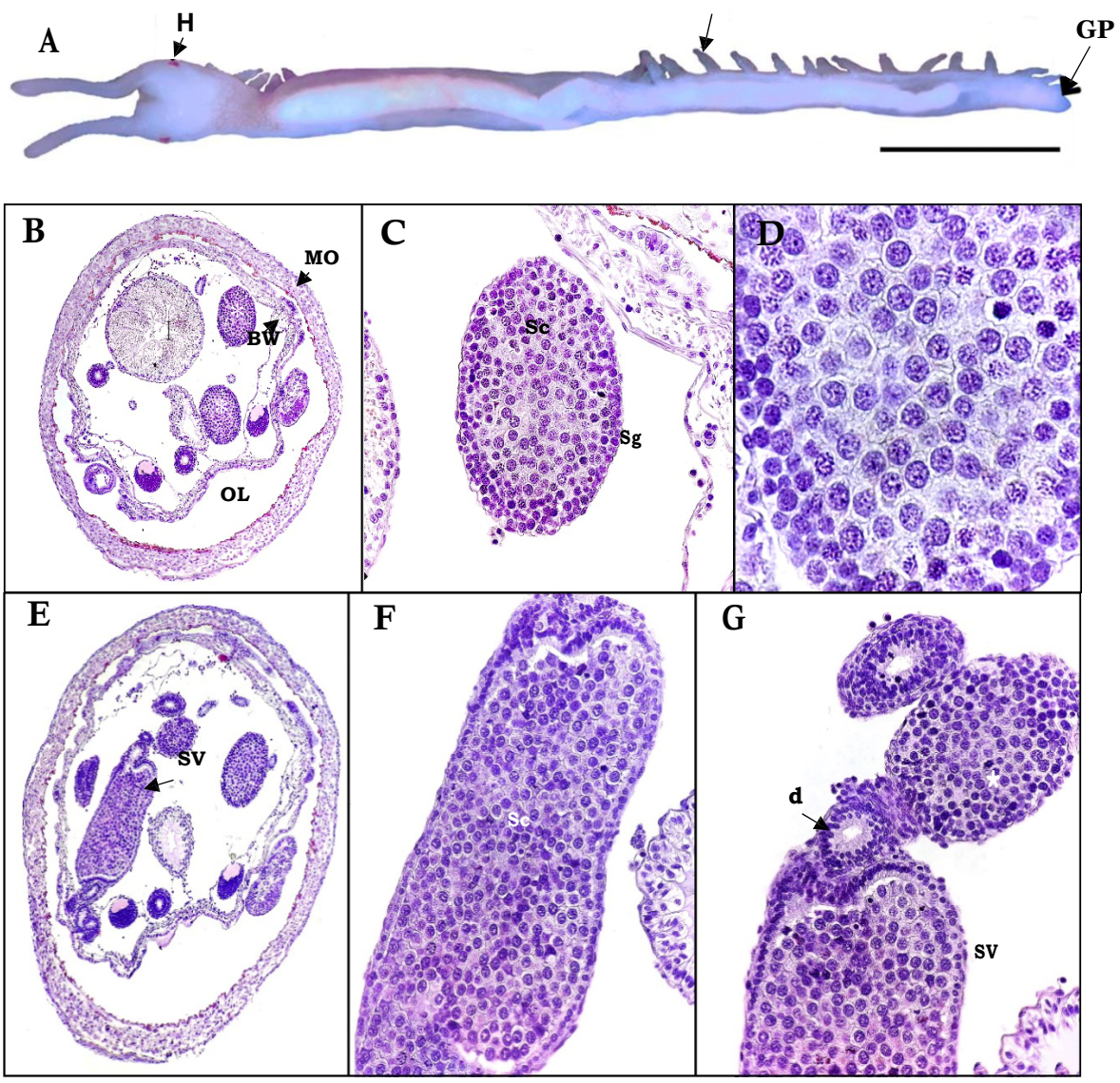


Figure S2. A. Embryo at stage VII of development. H, head; C, claws; GP, gonopore. Scale bar = 1 mm. B. Transverse section of the maternal oviduct containing an embryo at stage VII of development. The embryo is also transversely sectioned. Asterisks indicate the testes, ventrolateral to the intestine (I). MO, maternal oviduct; BW, body wall of the embryo. C. Testis showing spermatocytes (Sc) and spermatogonia (Sg). D. Detail of the cells in the testis. E. Here it is possible to find the seminal vesicle (SV), which is detailed in F, and the duct (d) that connects with the testis in G.

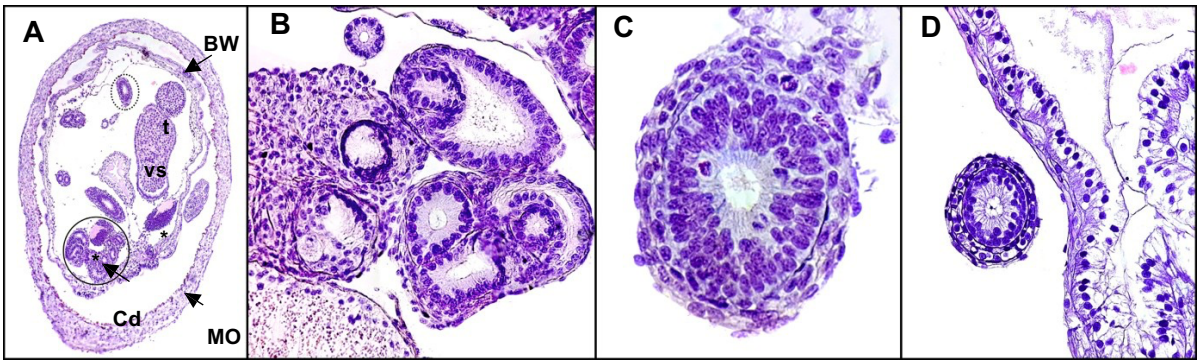


Figure S3. Male reproductive system ducts in a stage VII embryo. A. Transverse section of the embryo within the maternal oviduct showing the position of the ducts (enclosed by a solid-line circle) on one side of the body near one of the ventral nerve cords (asterisks). On the opposite side, the contralateral vas deferens is indicated by a dashed-line circle, appearing less convoluted and located near the testis (t) and seminal vesicle (vs). BW, embryo body wall; MO, maternal oviduct; Cd, deferent duct. B. Detail of a transverse section of the efferent duct, which, being convoluted, appears multiple times in the section. C. Detail of a transverse section of the deferent duct. D. Detail of a transverse section at the most caudal level, showing the ejaculatory duct.

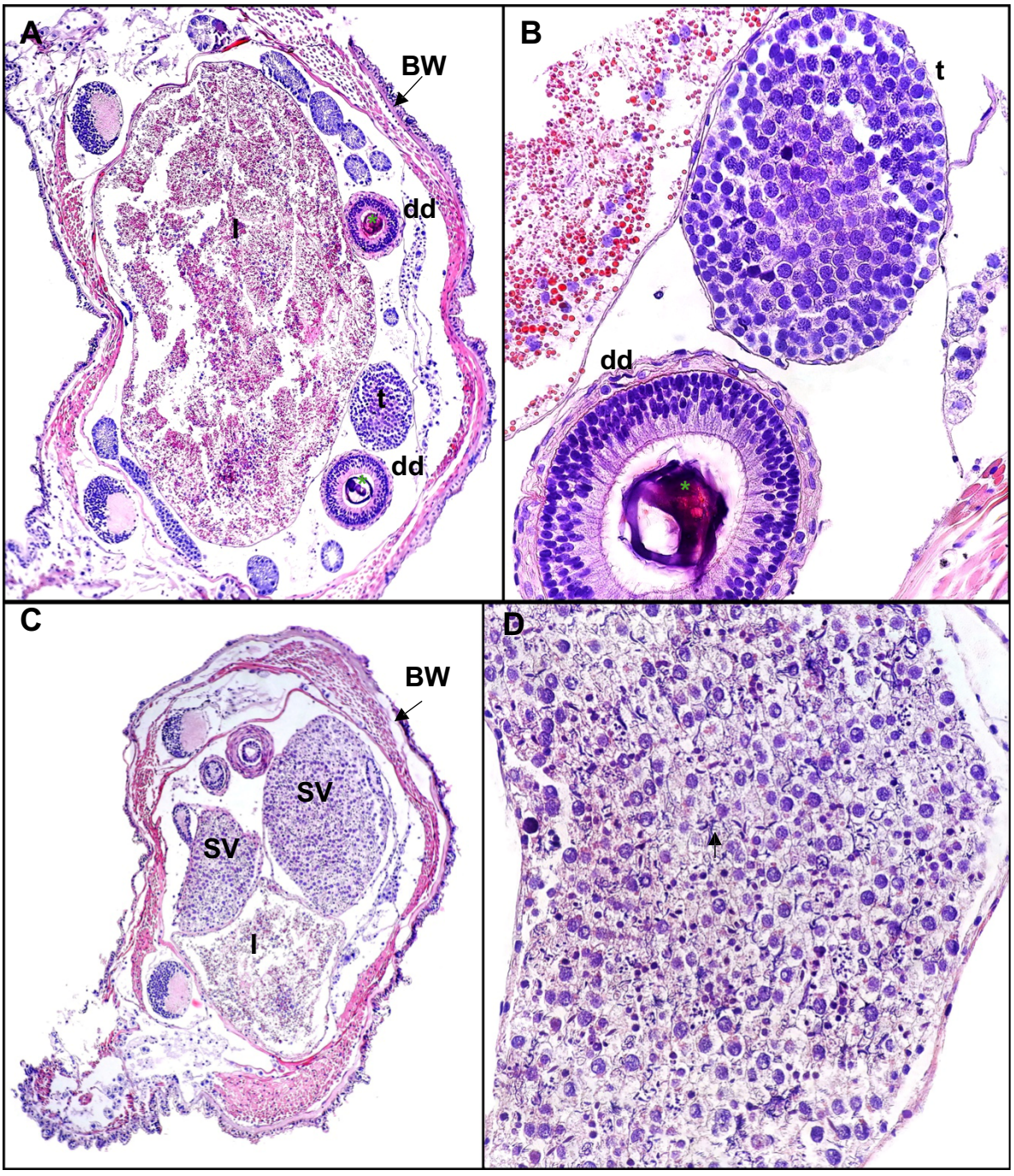


Figure S4. Transverse section of the caudal region of a neonate showing reproductive organs. A. One of the testes (t) and transverse sections of the deferent duct (dd) can be observed, containing eosinophilic material in the lumen corresponding to the spermatophore wall (green asterisk). The deferent duct is convoluted and has an ascending and a descending portion, so it may appear as if it were a paired duct. The section is not completely transverse, and the paired

organs are not entirely symmetrical, which is why only one testis is visible in the section. BW, body wall; I, intestine; ventral nerve cord (white asterisk); e, efferent duct. B. Detail of the testis and vas deferens containing a spermatophore. C. Transverse section of the neonate body at the level of the seminal vesicle (SV). D. Detail of the seminal vesicle showing the cellular types of spermatogenesis and spermiogenesis, including spermatozoa (arrow).

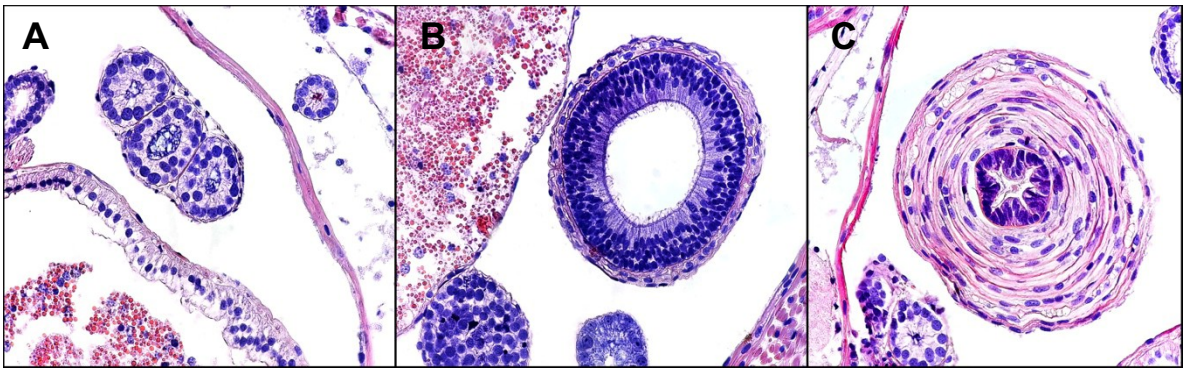


Figure S5. Reproductive ducts in a male neonate. **A.** Transverse section of the efferent duct showing spermatozoa within the lumen. **B.** Transverse section of the deferent duct. **C.** Transverse section of the ejaculatory duct showing the thick muscular layer surrounding the lumen. The presence of spermatozoa in the efferent duct and spermatophores in the deferent duct (Figure S4B) indicates that neonates are already capable of sperm production and spermatophore formation.