

Spermatozoan morphology of the Argentinean surf clam *Donax hanleyanus* (Bivalvia: Donacidae)

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Introduction:

Among molluscs on a worldwide basis, the 64 species of the genus *Donax* constitute the most dominant group inhabiting exposed sandy beaches. An intensive study on different biological aspects of Donacidae, including the morphology of the gametes has been carried out. Sperm structure provides a very successfully tool for taxonomic investigations. Therefore several studies focussed on this aspect including the ultrastructure of spermatozoa from South African *D. madagascariensis*, *D. sordidus* and *D. serra*, from Brazilian *D. striatus* and from Portuguese *D. trunculus*. Sperm structure of Bivalvia species from Argentina were not analysed yet.

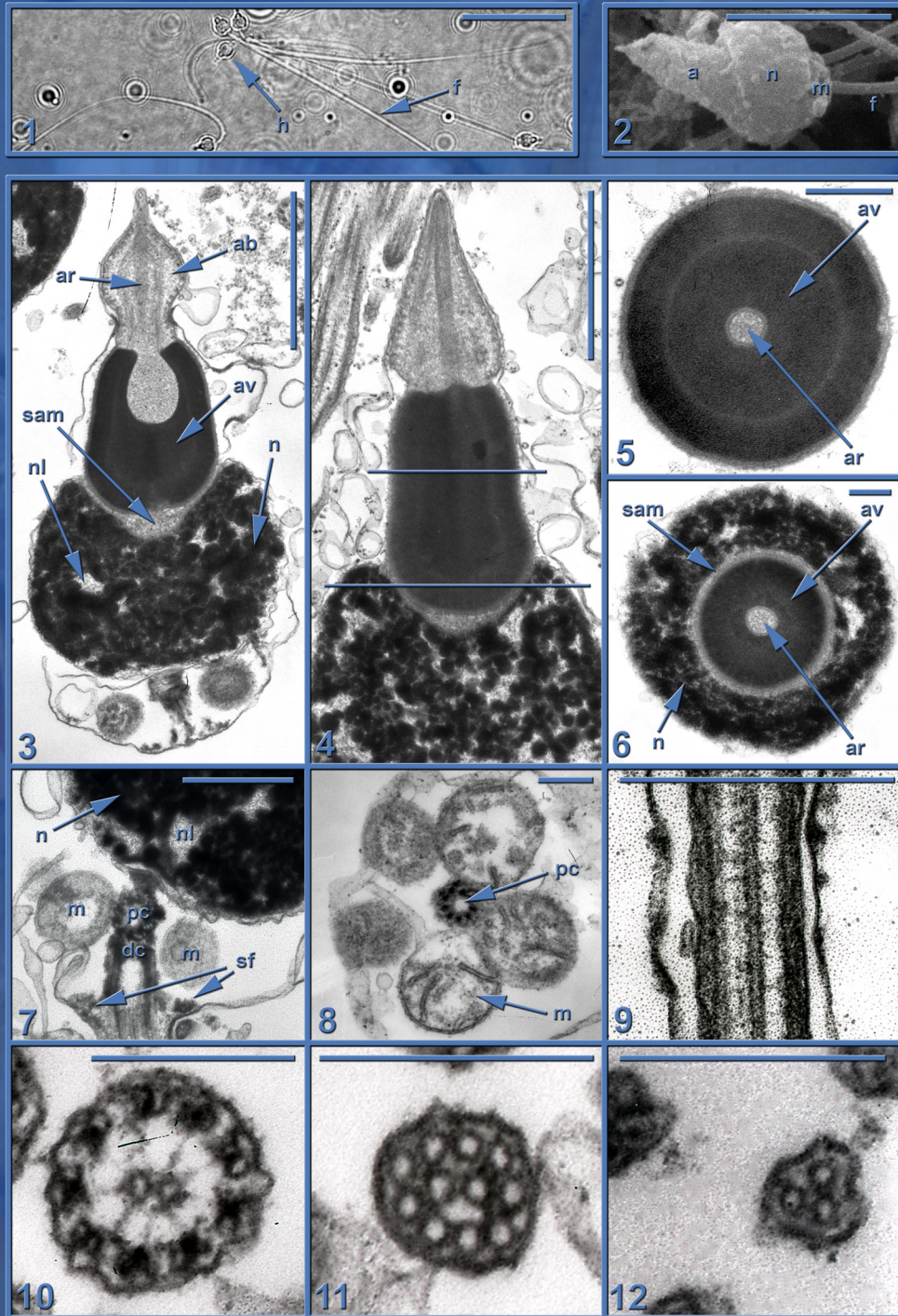


Fig. 1: Alive spermatozoa. Fig. 2: SEM picture of spermatozoa. Fig. 3-12: TEM pictures from longitudinal sections (LS) and transverse sections (TS). Fig. 3, 4: LS of acrosomal complex and nucleus. Fig. 5: TS of middle part of acrosomal vesicle. Fig. 6: TS of acrosomal vesicle in the apical depression of the nucleus. Fig. 7 (LS) and Fig. 8, (TS): midpiece region. Fig. 9: LS of flagellum. Fig. 10, 11: TS of flagellum. Fig. 12: TS of end of the tail. a: acrosomal complex. ab: apical bleb. ar: axial rod material. av: acrosomal vesicle. dc: distal centriole. f: flagellum. h: head. m: mitochondria. n: nucleus. nl: nuclear lacuna. pc: proximal centriole. sam: subacrosomal material. sf: satellite fibres. Bars: 1µm (Fig. 3, 4), 0.5µm (Fig. 7, 9), 0.25µm (Fig. 5, 6, 8, 10-12).

Material & Methods:

Specimens of Argentinean *D. hanleyanus* were collected at the exposed sandy beach Faro Querandí, Province of Buenos Aires (37°29,92'S, 57°07,91'WO). We used light microscopy, scanning electron microscopy (SEM) and a transmission electron microscope (TEM) to describe the spermatozoon morphology. Testis pieces were dissected-out and fixed with 4 % glutaraldehyde buffered with 0.1 M disodium phosphate buffer (pH 7.4) for 4 h at 4 °C followed by thoroughly rinsing in phosphate buffer.

Results:

The cylindrical acrosomal complex consist of a membrane of subacrosomal material (sam). The acrosomal vesicle (av) appears in the basal part of the complex and consist of differentiated regions, which are a highly electron-dense outer layer and a less electron-dense inner layer (Fig. 3-5). A perforated structure as axial road is extended from the basal part of the acrosomal vesicle until the apex of the acrosomal complex (Fig. 6). The midpiece (Fig. 3, 7, 8) shows five spherical mitochondria grouped in a ring around the distal centriole. The flagellum is composed of a typical associated and dissociated 9+2 axoneme (Fig. 10 and 11 respectively).

Conclusions:

As most veneroid spermatozoa and other members of the genus, *D. hanleyanus* shares the typical features: 1) conical acrosome, 2) short nucleus, 3) midpiece with 4-5 mitochondria, 4) presence of satellite fibres close to the distal centriole and 5) simple flagellum (9+2 axoneme). Most morphological differences between veneroid spermatozoa are found in the shape of the acrosomal vesicle. As shown in Figure 3 and 4 spermatozoa of *D. hanleyanus* can be identified by a tall acrosomal complex with respect to the nucleus. The presence of an apical bleb in the upper part of the acrosome is conspicuous and was not described in other studies from the same genus yet.

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