Interspecific variability of the spermatostyles in Carabids (Coleoptera)

Note 14 (Adephaga), released by Luigi De Marzo on January 2013 – About the conjugated sperm in this family. l.demarzo@alice.it www.luigidemarzo.eu

SUBJECTS

- Several terms are applied to the conjugate sperm in the Animal kingdom (Pitnick *et al.*, 2009);
- referring to Insects, they include:
- (I) "spermatozeugma" (etymology: from the Greek, *sperma* = seed and *zeugma* = join), which is defined by Maggenti (2005) as "*united by fusion of two or more spermatozoa*";
- (II) "spermatostyle", which indicates the elongate supporting structure occurring in several beetles of the families Carabidae and Gyrinidae (Breland & Simmons, 1970; Crowson, 1981; Paulian, 1981).
- Interspecific variability of the spermatostyles in Carabidae has been preliminary analyzed elsewhere (De Marzo, 1995).
- Some unpublished micrographs on the same subject are presented here.

MATERIAL AND METHODS

- Examined species are reported in the following chapter.
- Spermatozeugmata were obtained by squashing testes of males killed with ethyl acetate vapours in salt solution (NaCl 0,9%).
- Micrographs at the light-microscope were taken with 40x phase-contrast lens on samples in the above solution.
- Images at the confocal laserscanning microscope were taken on samples mounted on slide in glycerol.

RESULTS

- Spermatozeugmata lacking in spermatostyle were observed in subfamilies/species as follows:

- Bembidiinae, *Asaphidion rossii* (Schaum), *Ocydromus ascendens* (Daniel);
- Brachininae, *Brachinus psophia* Serville;
- Carabinae, *Calosoma sycophanta* (Linnaeus), *Carabus violaceus germarii* Sturm;

- Callistinae, *Chlaenius chrysocephalus* (Rossi).

• Presence of spermatostyle has been recorded in the *taxa* listed in the following table, which reports values of length as well.

Tab. A – Spermatostyles of Carabidae:
length/lengths recorded for each species.

subfamily/species	length (microns)
Amblystominae	
Amblystomus levantinus Reitter	1.500
Harpalinae	
Acinopus picipes (Olivier)	500
Harpalophonus italus (Schaum)	5.000
Harpalus dimidiatus (Rossi)	4.000
Harpalus distinguendus (Duftschmid)	4.000
Ophonus azureus (Fabricius)	600
Pseudophonus rufipes (Degeer)	2.000
Stenolophus mixtus (Herbst)	2.000
Stenolophus proximus Dejean	3.000
Stenolophus teutonus (Schrank)	7.000
Lebiinae	
Cymindis axillaris (Fabricius)	250
Dromius quadrimaculatus (Linnaeus)	700
Licininae	
Licinus silphoides (Rossi)	8.000
Pterostichinae	
Anchomenus dorsalis (Pontoppidan)	100-250
Calathus montivagus Dejean	3.000
Scaritinae	
Scarites buparius (Forster)	50
Clivina collaris (Herbst)	3.000
Dyschirius gibbifrons Apfelbeck	1.000

• Length of spermatostyles ranges from 50 to 8.000 microns and shows its higher value in *Licinus silphoides* (Fig. 1);

• although its usual constancy in any individual, it was found clearly differing in a single male of *Anchomenus dorsalis* (Table A).

• Apexes of each spermatostyle do usually differ to each other in shape, as they can be either rounded or gently narrowed (Fig. 2).

• Usually, spermatozoa were uniformly scattered along one spermatostyle.

• Exceptionally, all spermatozoa of *Clivina fossor* were found to be connected to the enlarged sector of their own spermatostyle (Fig. 3).

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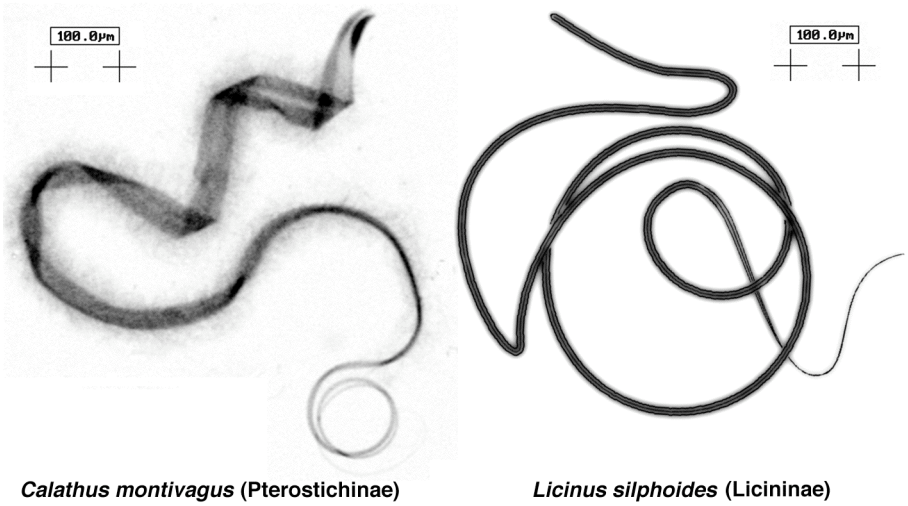

Fig. 1 – Instances of spermatostyles. Micrographs taken by laserscanning microscope.

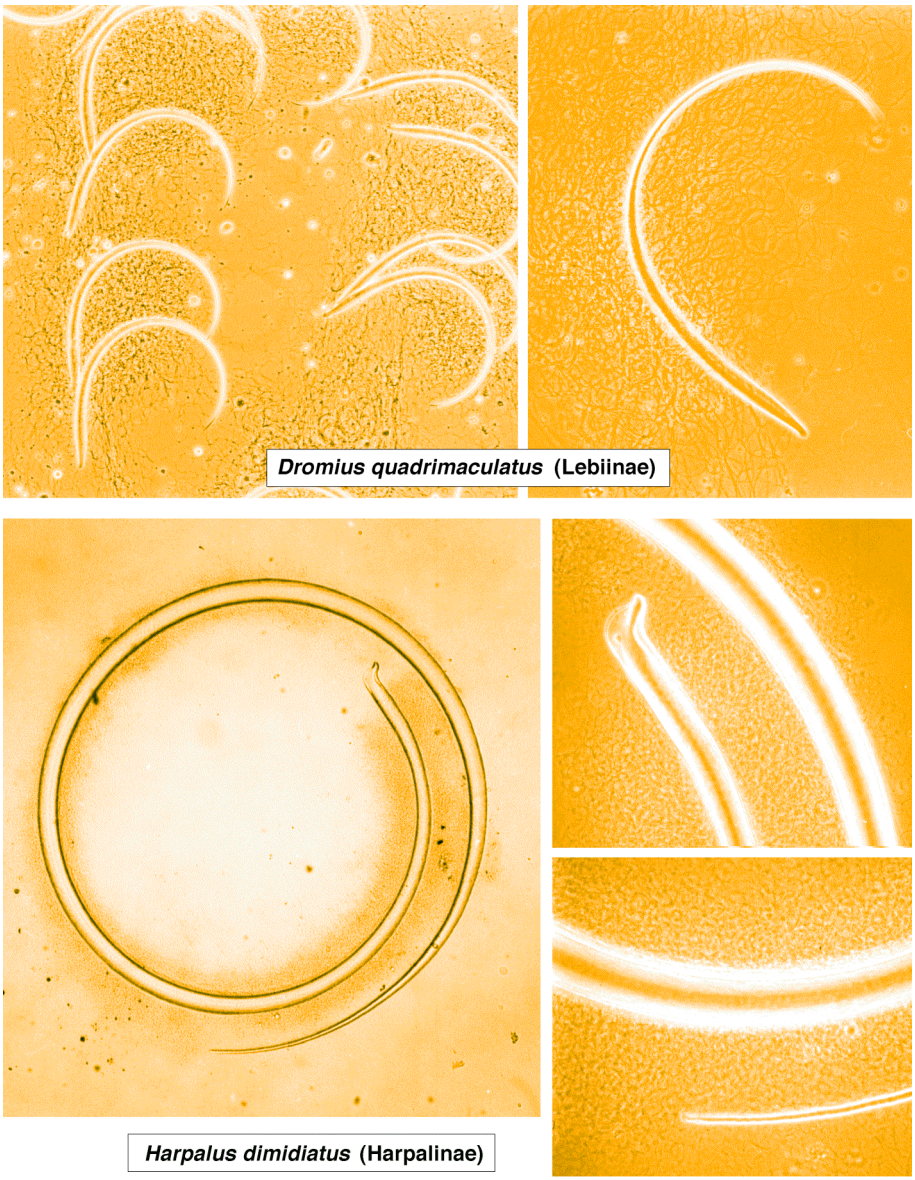

Fig. 2 – Instances of spermatostyles. Micrographs taken by phase-contrast microscope.

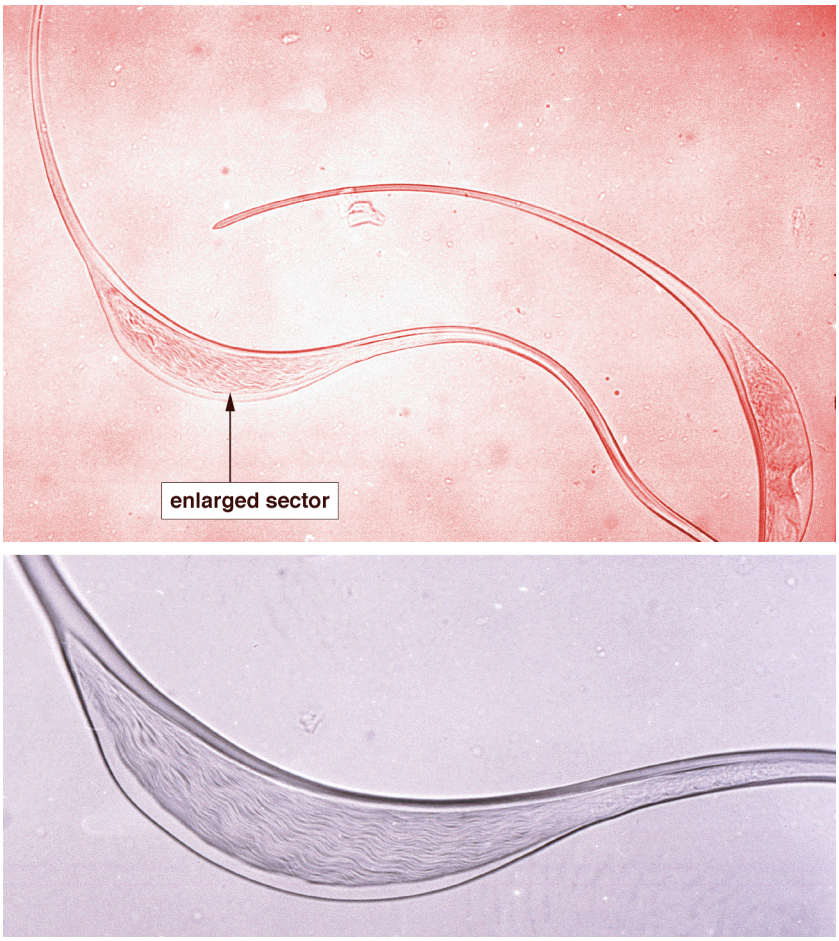

Fig. 3 – Spermatostyles of *Clivina fossor* (Scaritinae). Micrographs taken by phase-contrast microscope.