STRUCTURAL VARIATION IN THE SPERM DUCTS OF
PROCAMBARUS (DECAPODA, CAMBARIDAE)

BY

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INTRODUCTION

Accounts of the anatomy of the male reproductive system of crayfish provide no reference to structural or functional differences between sperm ducts (Black, 1966; Johnson, 1960; Word & Hobbs, 1958; Barton, unpubl.; Faster, 1914). Payne (unpubl.) notes distinct differences in size and shape of right and left ducts of Procambarus hayi (Faxon, 1884), and speculated that the left duct is consistently smaller and does not contain sperm. We examined sperm ducts from selected species of this genus to determine if differences between right and left ducts were apparent, and if so, what the nature of these differences is. In addition, we wished to determine if differences were present in several species, suggesting a characteristic for the genus.

MATERIALS AND METHODS

Specimens of Procambarus acutus acutus (Girard, 1852), Procambarus clarkii (Girard, 1852), and Procambarus viaeiridis (Faxon, 1914) were captured from streams and roadside ditches in Shelby County, Tennessee. Specimens of Procambarus hayi (Faxon, 1884) were seined from ponds in Oktibbeha County, Mississippi. The numbers of specimens examined for each species named above were 12, 10, 10, and 50 respectively. Form I, form II and juvenile males were examined.
Testes were removed with right and left sperm ducts intact, placed on towel-
ing saturated with Van Harreveld's fluid, and oriented for fixation. Standard
histological techniques utilizing hematoxylin and eosin stain were employed,
and 10 μm cross sections were taken from proximal, mesial, and distal sections
of both right and left ducts. Ultrastructure of selected portions of the sperm
ducts of *P. clarkii* and *P. a. acutus* were examined via transmission electron
microscopy. Ducts were fixed, dried with acetone, and stained with osmium
tetroxide. Tissues were then thin sectioned using standard ultramicrotome
techniques.

RESULTS AND DISCUSSION

The right sperm duct was consistently larger, more opaque, and more highly
convoluted than the left in all specimens in all species of *Procambarus* that we
examined (fig. 1). Photomicrographs of cross sections of left and right ducts
are shown in fig. 2. Each duct consists of one layer of columnar epithelium sur-
rounding a central lumen. A muscle layer lies external to the epithelium and
is typically invested with a thin layer of connective tissue.

Spermatozoa were present in large numbers in proximal, mesial, and distal
portions of the right duct, while spermatozoa were absent in the left duct. Sper-
matophore formation was evident in the mesial and distal portions of the right
duct while no spermatophore was present in the left duct. The lumen of the
left duct contained a light staining substance that appeared to be endoplasmic

![](image)

Fig. 1. Line drawing of dorsal view of testis and sperm ducts from *Procambarus clarkii* (Girard),
form I male. (al = anterior lobe of testis, pl = posterior lobe of testis, rd = right duct, ld = left
duct).