A SEXUAL MOSAIC WITH INTERNAL EMBRYOGENESIS IN THE DIOECIOUS HORSESHOE CRAB, *LIMULUS POLYPHEMUS*

by

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The chelicerate arthropod *Limulus polyphemus* is a dioecious species, with external fertilization and development, in which the sexes can usually be readily distinguished (Shuster, 1960). In males the genital papillae are pointed, while in females they are blunt. In addition, the first walking leg of the mature male bears a claw-like appendage used for clasping the female during fertilization. Internally the gonads of both sexes are highly branched structures distributed throughout the cephalothorax.

In February of 1972 we obtained an animal from the Woods Hole Marine Biological Laboratory, Woods Hole, Massachusetts, that appeared to be a mature male. The animal was about 17 cm wide across the carapace and possessed male claspers on both sides of the body. Upon dissection, however, the specimen was seen to contain numerous oocytes and embryos in various stages of development. These oocytes and embryos were limited to the left side and anterior mid-region of the animal. Several of the more fully developed embryos were dissected free of the ovarian tissue and placed in sea water at room temperature. Most of these larvae subsequently emerged, and many of them have been reared on brine shrimp in the laboratory for several weeks. Histological studies disclosed the existence of both ovarian and testicular elements on the left side of the animal, but only testes were found on the right side. This dimorphism extended to the genital ducts and papillae. The left papilla was female-like, while the right more closely resembled the normal male structure. The left genital duct contained mature oocytes, while the right did not. We have examined several hundred representatives of this species and have never before observed the above condition. To our knowledge it is the first example of such a mosaic in chelicerate arthropods (Bacci, 1965). Additionally, we know of no other instance in which normal internal embryogenesis has been reported in such a form. We were unable to determine if embryogenesis resulted from internal self-fertilization or parthenogenesis.

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