

NOTE

Ovacystis-like condition in the eastern oyster *Crassostrea virginica* from the northeastern Gulf of Mexico

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ABSTRACT: Histological examination of the eastern oyster *Crassostrea virginica* from a study in Pensacola Bay, Florida, revealed 2 cases of abnormally large, basophilic ova that resembled cells characteristic of ovacystis disease previously reported in oysters from Maine and Long Island. The hypertrophied gametes measured up to 250 μm in diameter, had scant cytoplasm and contained granular nuclear-masses of Feulgen-positive material. Electron microscopy of reclaimed tissue revealed these masses to consist of virus-like particles (average 46 nm) similar to those reported in cases of ovacystis.

KEY WORDS: *Crassostrea virginica* · Ovacystis · Ova · Virus-like

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Ovacystis is a germinal papilloma virus-like disease reported in the eastern oyster, *Crassostrea virginica*, from the Piscataqua River, Maine (Farley 1976, 1978), and from Long Island, New York (Meyers 1981). The disease is characterized by extensive hypertrophy of ova in which are found dense masses of basophilic, Feulgen-positive material in the nuclei of the infected cells. Transmission electron microscopy (TEM) of this material reveals non-enveloped, 5- and 6-sided (in section) viral particles averaging 53 nm in diameter (Sparks 1985). The condition appears to have little pathologic significance in the affected individuals (Meyers 1981). Farley (pers. comm.) has observed similar large basophilic cells in gonadal tissue of *C. virginica* from Mobile Bay, Alabama; however, no TEM was performed to confirm viral bodies in these cases.

Gametogenic lesions similar to those described in *Crassostrea virginica* have been observed in other oyster species including *C. gigas*, *Saccostrea glomerata* (formerly *S. commercialis*), *Ostrea lurida* and *O. edulis* (Farley 1978). Furthermore, Feulgen-positive, intranuclear inclusions have been reported in connective tissues, hemocytes and gill epithelium of *Mya arenaria*. These inclusions were associated with non-enveloped,

icosahedral virions (40 to 45 nm), resembling *Polyomavirus* (Farley 1978, Harshbarger et al. 1979). In this note, we report the occurrence of a ovacystis-like condition in *C. virginica* from the northeastern Gulf of Mexico.

Materials and methods. In 1996 and 1997, oysters obtained from Apalachicola Bay, Florida, were used for a caged-oyster study in Pensacola Bay, Florida. Over a 5 mo period, 160 animals were sampled for routine histological evaluation to assess potential biomarkers of stress induced by pollution. These examinations revealed 2 cases (1.3%) of oysters with abnormally large, basophilic ova reaching up to 250 μm in diameter (Fig. 1). In contrast, normal ova attain a maximum size of approximately 75 μm (Galtsoff 1964). The hypertrophied ova had scant cytoplasm, and their

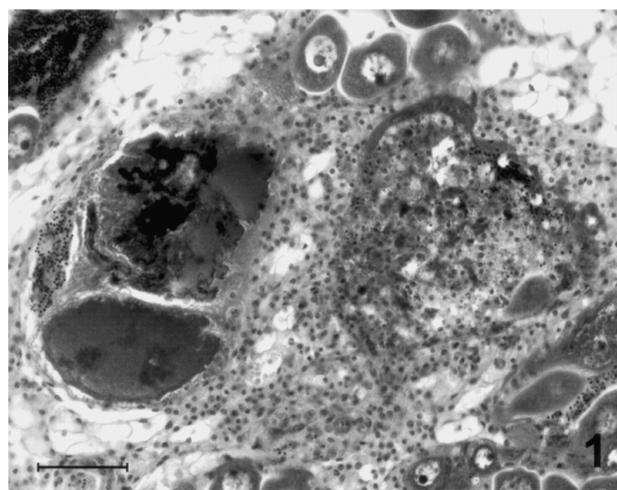


Fig. 1. *Crassostrea virginica*. Light micrograph showing normal and virus-infected hypertrophied ova from the gonad. Note extensive hemocytic infiltration responding to lysed ova. Scale bar = 50 μm

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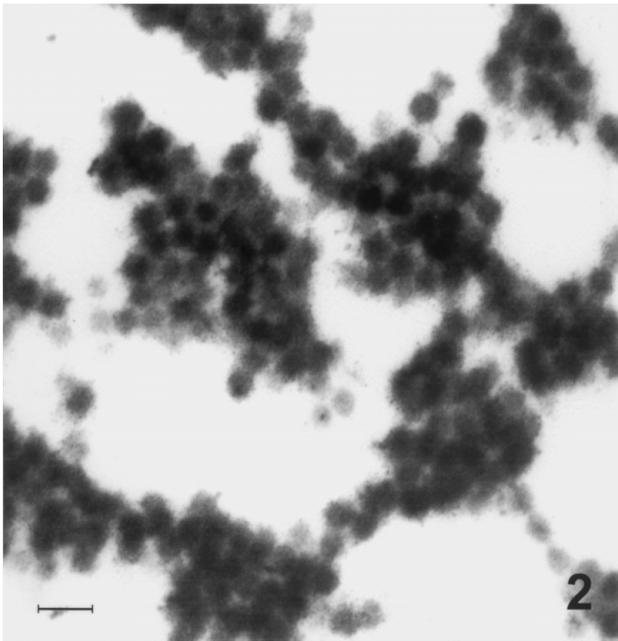


Fig. 2. *Crassostrea virginica*. Transmission electron microscopy (TEM) of reclaimed, paraffin-embedded tissue showing non-enveloped, 6-sided viral-like particles within the granular nuclear inclusion in hypertrophied ova. Scale bar = 100 nm

nuclei contained large granular masses, which stained Feulgen-positive, thereby indicating high concentrations of DNA. Electron microscopy of reclaimed paraffin-embedded tissue from these lesions showed the granular masses to consist of a homogeneous amalgamation of 6-sided (in section), virus-like particles (Fig. 2) ranging in size from 43 to 52 nm (average 46 nm). Based on the quality of the reclaimed TEM material, these particles appeared similar to the non-enveloped particles reported by Sparks (1985). Pathologic response to the condition was limited to a light to moderate hemocytic infiltration (Fig. 1) that could be in response to lysis of affected ova.

Discussion. Whether the oysters were infected in Apalachicola Bay or became infected after introduction into the Pensacola sites some 220 km west of

Apalachicola is not known. However, histological examination of 130 oysters by Fisher et al. (1996) from the same sampling sites in Apalachicola Bay a year prior to this report detected no such hypertrophied cells.

The consistencies observed in the lesions described here, compared with those reported from *Crassostrea virginica* from the northeastern United States, strongly suggest these cases to be ovacystis. If ovacystis, the infections in the Gulf of Mexico would represent a significant extension of the range of the disease. Although higher quality TEM should aid in this determination, obtaining good TEM results is difficult because of the low prevalence of the condition and inability for one to identify its presence and location within the host without histological examination. Nevertheless, the reclaimed material provided reasonable evidence of an agent identical to that previously reported by Farley (1976).

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