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Biological Diversity of Plummers Island, Maryland: The Crayfishes and Their Entocytherid Ostracod Associates

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Abstract.—A review of the crayfishes and entocytherid ostracods occurring in the vicinity of Plummers Island, Maryland revealed that four species of crayfishes and four species of ostracods were present. One of the crayfish is exotic and appears to be spreading throughout the Potomac River drainage. Three of the ostracods are common in Maryland, but one is known only from Plummers Island and a single locality in Indiana.

Key words.—Inventory, Potomac River, aquatic invertebrates, exotic species, Chesapeake and Ohio Canal National Historical Park.

Crayfish and entocytherid ostracods were observed incidental to other invertebrate survey work conducted in the vicinity of Plummers Island, Maryland between 1996 and the spring of 2006. Plummers Island sits along the Maryland bank of the Potomac River in Montgomery County, Maryland, 14.5 km northwest of central Washington, D.C. The 20.5 hectare study area generally includes the Island and the adjacent portion of the Chesapeake and Ohio (C&O) Canal National Historical Park bordered by the Capital Beltway (I-495) to the west, the C&O Canal to the north, and Rock Run to the east. Prior to acquisition by the National Park Service in 1958, the property was owned by the Washington Biologists' Field Club, and the Club continues to support biological research in the area. Although observations of crayfish and entocytherid ostracods were made in all water bodies within the study area, the main stem of the Potomac River was not sampled.

Species Accounts

Crayfishes

(Crustacea: Malacostraca: Decapoda: Cambaridae)

Cambarus bartonii (Fabricius)

This crayfish was found under rocks in Rock Run. Individuals found beneath rocks tended to be juveniles or small adults. During a night visit a number of large adults were observed in the pool at the outfall of the tunnel that carries the stream beneath the C&O Canal.

Cambarus diogenes Girard

This species is a primary burrower but also may be found in open water. Numerous burrows were present in and along a seasonal wetland beside the river

access road from Lock 10 of the C&O Canal. These characteristic burrows were not observed elsewhere in the study area even though a wetland near Lock 12 appeared to provide suitable habitat. Hobbs (1967) and Hart (1964) both reported *C. diogenes* from Plummers Island when they recorded it as the host of new entocytherid ostracods. The collection of the National Museum of Natural History (USNM) has specimens of this species taken at Plummers Island by W. Hay sometime before 1912 (Karen Reed, pers. comm.).

Orconectes limosus (Rafinesque)

Orconectes limosus was common under flat rocks in the C&O Canal between Locks 10 and 11. Occasional individuals also were found under rocks in Rock Run, and during the summer of 2001 a molted exoskeleton was found in the channel between Plummers Island and the mainland near the east end of the Island.

Orconectes virilis Hagen

This large, aggressive species is not native to Maryland but now occurs widely throughout the central portion of the state (Kazak et al. 2005). It was not found in either the canal or Rock Run, but during the summer of 2004 the molted exoskeleton of a large male was found in the river near the crossing point at the east end of the Island.

Entocytherid Ostracods

(Crustacea: Ostracoda: Podocopa: Entocytheridae)

Ankylocythere tridentata Hart

Plummers Island is the type locality for this interesting ostracod. Hart (1964) based his description on

a single specimen recovered from the burrowing crayfish, *C. diogenes*. *Ankylocythere tridentata* has been reported only from one other locality in Martin County, Indiana, where it occurred on *Orconectes immunis* Hagen (Hart & Hart 1974). Since this may be a truly rare species with a very restricted range, no attempt was made to recover additional ostracods from *C. diogenes* within the study area.

Dactylocythere jeanae Hobbs

When Horton Hobbs (1967) described *D. jeanae* he listed a number of localities, including “. . . Plummers Island, Potomac River, Montgomery Co., Md . . .” Those specimens were recovered from *Cambarus diogenes*.

Donnaldsoncythere donnaldsonensis (Klie)

Several specimens of this species were recovered from *Cambarus bartonii* from Rock Run.

Okriocythere cheia Hart

Plummers Island is the type locality for this species (Hart 1964). As with *A. tridentata* and *D. jeanae*, it was recovered from *C. diogenes*.

Discussion

The four species of crayfish found in the vicinity of Plummers Island represent 40% of the documented Maryland fauna of ten species. Three of the four (i.e., *C. bartonii*, *C. diogenes*, and *O. limosus*) are native to Maryland. *Orconectes virilis* is native to the Mississippi Valley and the western Great Lakes but was found in Maryland's Patapsco River system in 1960 (Meredith & Schwartz 1960). It was widespread and abundant in that drainage three years later (Schwartz et al. 1963). Since then it has spread throughout the central portion of the state (Kazak et al. 2005). Its spread from the Patapsco is interesting, especially to the drainages to the south (Patuxent and Potomac River systems) since it is not known to range near the brackish water mouth of either river. It is possible that it moved across headwater divides or via “bait-bucket” introductions. However it arrived, it can be expected to impact some of the native species present in the area. For instance, if *O. virilis* should gain entry into the C&O Canal, it likely will quickly extirpate the native *O. limosus*. I do not anticipate that it would seriously impact *C. diogenes*, and *C. bartonii* should continue to persist in small headwater streams, as it still does in the Patapsco drainage (pers. obs.).

Today, *C. diogenes* is not present on Plummers Island but is present in good numbers in a wetland on the adjacent mainland. Since USNM specimens collected on the original Washington Biologists'

Field Club property sometimes were labeled as “Plummers Island” even if they came from the mainland, it is impossible to determine whether Hay's original specimens came from the Island or the adjacent mainland property. A map (ca. 1930) provided by Erwin (1981) shows a wetland on the floodplain along the channel side of the Island that is not present today, so it is possible that a population of *C. diogenes* was present on the Island but was extirpated when that wetland disappeared.

The current distribution of *C. diogenes* in Maryland is interesting. It is widespread in the mid-west where it extends eastward into western Garrett County, then loops south around the Appalachians to come up along the Atlantic Coast where it is common on the Maryland portion of the Atlantic Coastal Plain (Hobbs 1969). The western and eastern populations in Maryland are not in contact, although the coastal plain population extends up along the major rivers for some miles. As shown by Hart (1964), Hobbs (1967), Hart & Hart (1974), and Norden & Norden (1985), the western and eastern populations of *C. diogenes* in Maryland support different species of entocytherids.

Three of the four species of entocytherid ostracods known from the study area were recovered from a collection of *C. diogenes* made by W. Hay sometime prior to 1912 (USNM crayfish collection 43761). Surveys of entocytherid ostracods elsewhere in Maryland (Norden, unpublished data) show that eastern Maryland *C. diogenes* are typically inhabited by *Ankylocythere tiphophila* (Crawford), *Dactylocythere jeanae*, *Okriocythere cheia*, and *Ornithocythere waltonae* Hobbs. It seems likely that if a larger population sample was available from the Plummers Island *C. diogenes* colony, *A. tiphophila* and *O. waltonae* also would be found there. Little can be said at this time about the occurrence of *A. tridentata* at Plummers Island. It is known only from *C. diogenes* at the Island and *Orconectes immunis* Hagen from one site in Indiana (Hart & Hart 1974). Based on that information, it should be searched for in *C. diogenes* colonies elsewhere in the middle Potomac River drainage and in Potomac River populations of native *Orconectes* (*O. limosus* and *O. obscurus*). From my experience, entocytherids are rare on local *Orconectes*, although *Uncinocythere stubbsi* Hobbs and Walton occurs on *O. obscurus* in the Potomac tributaries of western Maryland. Based on current data, *A. tridentata* must be considered a globally rare species since it is known from only two widely disjunct localities.

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Literature Cited

- Erwin, T. 1981. Natural History of Plummers Island, Maryland. XXVI. The ground beetles of a temperate forest site (Coleoptera: Carabidae): An analysis of fauna in relation to size, habitat, seasonality, and extinction.—Bulletin of the Biological Society of Washington 5:105–224.
- Hart, C. 1964. Two new entocytherid ostracods from the vicinity of Washington, D.C.—Proceedings of the Biological Society of Washington 77:243–246.
- Hart, D., & C. Hart. 1974. The ostracod family Entocytheridae. Academy of Natural Sciences of Philadelphia, Monograph 19, 239 pp.
- Hobbs, H., Jr. 1967. A new genus and three new species of ostracods with a key to the genus *Dactylocythere* (Ostracoda: Entocytheridae).—Proceedings of the United States National Museum 122 (3587), 10 pp.
- . 1969. On the distribution and phylogeny of the crayfish genus *Cambarus*. Pp. 93–178, in P. Holt, ed., The distributional history of the biota of the Southern Appalachians. Part I: Invertebrates. Research Monograph 1. Virginia Polytechnic Institute and State University, Blacksburg.
- Kazak, P., J. Kilian, S. Stranko, M. Hurd, D. Boward, C. Millard, & A. Schenk. 2005. Maryland Biological Stream Survey 2000–2004, volume 9: stream and riverine biodiversity. PUB # DNR 12–1305–0106. Maryland Department of Natural Resources, Annapolis.
- Meredith, W., & F. Schwartz. 1960. Maryland Crayfishes. Maryland Department of Research and Education, Educational Series Number 46, 32 pp.
- Norden, A., & B. Norden. 1985. A new entocytherid ostracod of the genus *Dactylocythere*.—Proceedings of the Biological Society of Washington 98:627–629.
- Schwartz, F., B. Rubelmann, & J. Allison. 1963. Ecological population expansion of the introduced crayfish, *Orconectes virilis*.—Ohio Journal Science 63(6):266–273.