Burrowing Activity of the Crayfish, Orconectes propinquus (Girard), in Southern Ontario

ABSTRACT: The crayfish *Orconectes propinquus,* previously described as a fast-water, nonburrowing species, constructed extensive burrow networks in soft-bottomed streams in southern Ontario. The habitat, burrows and burrowing behavior of this crayfish are described, and its burrowing is discussed.

Orconectes propinquus is a crayfish typically found in swift-flowing waters and clear lakes, mainly on rock substrate (Berrill, 1978; Bovbjerg, 1952; Crocker and Barr, 1968). Although construction of extensive burrow networks has not been reported for this species, Crocker and Barr (1968) observed limited burrowing activity of *O. propinquus* in substrate composed of clay and flat stones. These burrows had only one entrance and consisted of shallow cavities under flat rocks.

While collecting crayfish from Grindstone Creek, Burlington, Ontario (18 July 1983), we encountered a segment of the creek, in the Lamb's Hollow Gate Nature Sanctuary of the Royal Botanical Gardens, containing many burrows which were built and inhabited by *Orconectes propinquus.* This shallow 25-m section of the creek was slow-flowing and situated between two riffle areas; the banks were grass-covered and the bottom consisted of clay with algal growth and with few small stones. Maximum depth was 50 cm.

The circular-to-oval burrows were in water 2-50 cm deep (Fig. 1). Many burrow openings were found at or above the water line. Burrow diameters ranged from 0.75-4.5 cm. Density of the burrows reached 40-50 burrows per sq m and the total number of burrows in the area was estimated at 1200. With an average depth of 7 cm, burrows consisted of several horizontal tunnels. A network of burrows was estimated to have between two and 10 openings, often accommodating several crayfish.

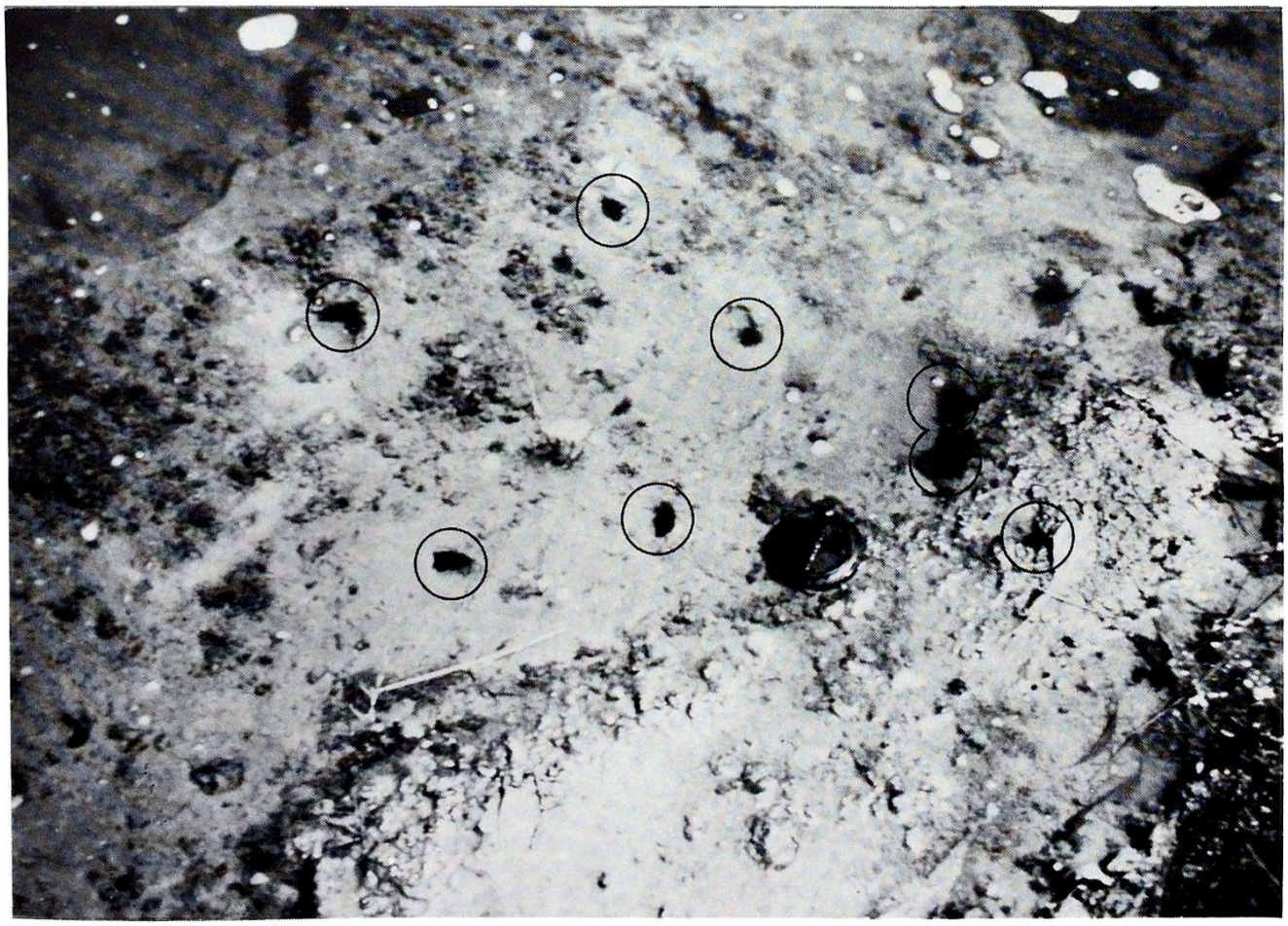

Fig. 1.—Burrows of *Orconectes propinquus* in Grindstone Creek. Circles indicate location of individual burrow openings

Individuals of all sizes were observed burrowing, resting inside the tunnels and foraging at the mouth of the burrows. The crayfish used chela to displace clay from burrows, in a plowlike fashion similar to that described by Crocker and Barr (1968). Crayfish from several burrows were sexed and measured. Nine form II males were found. Carapace lengths ranged from 10-27 mm. Only one female (23 mm carapace length) was found. One molted female exoskeleton (25 mm) was also found within the burrows.

C. Kingsbury (pers. comm.) observed a similar occurrence of burrowing in this species, in Alliston, Ontario. He found a number of burrows at and below the water line in a clay-bottomed stream. Burrows were excavated and a number of crayfish as well as substrate were brought to the laboratory where they were later observed constructing burrows within an aquarium. These individuals were able to survive in noncirculating water within the holding tank and constructed burrows similar to those observed under natural conditions. Apparently the species, previously thought to be a nonburrower (Crocker and Barr, 1968; Hobbs and Hart, 1959) and limited to rocky substrate (Bovbjerg, 1952), inhabits clay-bottomed streams and constructs extensive burrow networks.

Berrill and Chenoweth (1982) demonstrated that all Ontario crayfish species will construct sealed burrows under laboratory conditions when the water table is dropped below them. On the basis of their results, they predicted that the ability to excavate and seal a burrow is a characteristic shared by all crayfish and that a nonburrowing crayfish species does not exist. Our observations seem to support their hypothesis and demonstrate that burrowing in so-called "fast-water" species does not occur solely as a response to lowered water levels. At Grindstone Creek this is emphasized by the presence of burrows in the deepest part of the stream. McManus (1960) observed similar burrowing by another fast-water species, *Cambarus bartoni,* in a swiftly flowing stream in New York state.

Burrowing in permanent streams seems to occur where the substrate is appropriate. Burrows may be particularly important in clay-bottomed creeks where stones or other shelter are unavailable. We propose that crayfish species typically found in swift water and on rocky substrate can successfully inhabit slower-flowing water bodies which have soft substrate and construct extensive burrows serving primarily as shelters.

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