

Notes on the Caddisflies of the Kankakee River in Indiana

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Introduction

The Kankakee River in Illinois has long been noted for its remarkable caddisfly (Insecta: Trichoptera) fauna. Ross (6) stated that "of all the rivers in Illinois, the Kankakee is the most unusual from the standpoint of the caddisfly fauna." He noted that the river supported 12 species found nowhere else in the state. More recently Brigham et al. (1) collected a total of 62 species of caddisflies from the river. They counted at least 72 species known from the Illinois segment of the Kankakee and concluded that "the Kankakee River caddisfly fauna remains among the most diverse and unusual in Illinois."

Ross (6) attributed the uniqueness of the river's caddisfly community to the presence of unusual habitat. He observed that the river was clear and cold. Three long, swift rapids over dolomite bedrock were noted to be especially good collecting sites for caddisflies. The Kankakee River in Illinois is also a naturally meandering stream and is essentially unchannelized.

In contrast, almost all of the main channel of the Kankakee and its tributaries in Indiana have been artificially straightened. The drainage basin prior to 1918, when channelization was essentially completed, was mostly wetland. This "Grand Marsh" encompassed 400,000 acres and consisted of numerous oxbow lakes, sloughs, and backwaters gently flowing westward. The huge channelization project shortened and deepened the river channel in Indiana and nearly doubled the average slope. Water velocity increased proportionately. Straight, artificial channels predominate in the Indiana segment of the Kankakee today and very little of the natural character of the Grand Marsh remains.

Macroinvertebrates from two sites in the Kankakee River are collected by biologists from the Indiana State Board of Health (ISBH)¹ for monitoring water quality (2). During the course of these studies, it became apparent that, despite its highly channelized nature, the Kankakee River in Indiana still supports one of the most diverse caddisfly communities in the state. This paper lists the caddisflies collected from the river since 1978, notes their relative abundance, and compares the fauna to that of other similarly monitored rivers in Indiana. Probable reasons for the unusual diversity are noted.

Methods

Macroinvertebrates (including caddisfly larvae) were collected during late summer on Hester-Dendy artificial substrates. The Hester-Dendy samplers resemble the snag habitat which appears to provide the major substrate for colonization by caddisflies in the Kankakee River. These collections, which occurred approximately every other year since 1978, were made at the LaSalle Fish and Wildlife Area at the Indiana-

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¹All references to ISBH now pertain to the Indiana Department of Environmental Management.

Illinois state line (river mile 65) and at the Kingsbury Fish and Wildlife Area (river mile 125). The keys of Ross (6) and Schuster and Etnier (8) were used for identifying the larvae. Voucher specimens are located in the collection at the Indiana State Board of Health in Indianapolis.

The caddisflies collected were grouped into three categories of abundance. Those listed as "abundant" were numerous in every sample at both locations. Those listed as "common" were present in small numbers at both locations in at least three samples. Those listed as "rare" occurred in only one or two samples in small numbers.

Results and Discussion

The caddisflies collected at the two Kankakee River sites and their relative abundance are shown in Table 1. The list includes at least 17 species in four families. Although

TABLE 1. Kankakee River Caddisflies Collected from 1978 to 1984.

A = abundant, C = common, R = rare (see text).

Hydropsychidae

- Potamyia flava*—R
- Macrostemum zebratum*—C
- Cheumatopsyche* spp.—A
- Hydropsyche orris*—A
- Hydropsyche simulans*—A
- Hydropsyche cuanis*—R
- Hydropsyche betteni*—R
- Hydropsyche venularis*—R
- Ceratopsyche sparna*—R
- Ceratopsyche cheilonis* or *bifida*—R
- Ceratopsyche slossonae*—R

Polycentropidae

- Polycentropus remotus*—R
- Polycentropus* sp.—C
- Neureclipsis crepuscularis*—C

Brachycentridae

- Brachycentrus numerosus*—C

Limnephilidae

- Pycnopsyche* sp.—R
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the artificial substrate samplers used in this study do not collect all caddisflies in a river system, similar samples from other rivers provide a basis for comparison. Thus, the 17 species collected from the Kankakee River is much higher than the number collected from the Wabash River (11 species at 5 sites), the St. Joseph River system (8 species at 2 sites), the Maumee River system (7 species at 2 sites) or the White River system (13 species at 5 sites) during the same time period (ISBH, unpublished data). Six species from the Kankakee River (*Hydropsyche cuanis*, *H. venularis*, *Ceratopsyche sparna*, *C. slossonae*, *Polycentropus remotus*, and *Pycnopsyche* sp.) were not

collected on artificial substrates at any other Indiana locality, and one species (*H. venularis*) is a new record for Indiana.

The number of caddisflies present on the samplers ranged from 42 to 3330 m⁻². Average density was about 1200 m⁻², which was lower than the density at most other sites in Indiana and is indicative of low nutrient inputs (2). The most common caddisflies present at both locations on the Kankakee were *Cheumatopsyche* spp., *Hydropsyche simulans*, and *H. orris*. These species also are the dominant caddisflies in medium to large rivers throughout Indiana (12).

The geology of the Kankakee basin in Indiana probably accounts for much of the observed diversity of the caddisfly fauna. The basin is an outwash and lacustrine plain, lying in a low and poorly drained area underlain by sand deposits (7). These features allow groundwater to contribute much of the surface flow of the river and its tributaries. Therefore, the Kankakee has both a higher sustained flow (10) and cooler water temperatures (9) than other Indiana rivers of similar size.

The high sustained flow and lower flow variability provide a relatively stable environment, including a dependable food supply. This is especially important to the filter feeding caddisflies which dominate the fauna (Table 1). The filter feeders probably benefit from this flow stability and have been able to diversify because of it.

The large groundwater contribution to flow also keeps water temperatures relatively low. Water temperatures seldom rise over 22° C at the upstream site or over 24° C at the downstream site (4). Cool water genera such as *Ceratopsyche* (*Symphitopsyche*), *Brachycentrus*, and *Pycnopsyche* (3) can therefore inhabit the Kankakee but are excluded from most other rivers in Indiana, where water temperatures regularly reach or exceed 25° C (9).

There are few significant wastewater dischargers in the watershed and water quality in the Kankakee River is relatively high (5). Good water quality enhances community diversity in streams (13) and helps sustain the diverse caddisfly fauna. Intolerant genera such as *Brachycentrus*, *Pycnopsyche*, and *Ceratopsyche* (especially *C. slossonae*) can exist only where there is little organic pollution or siltation (3).

Finally, the size of the Kankakee River probably enhances its aquatic diversity. The Kankakee is a medium-sized river (fourth order at the upstream site and fifth order at the downstream site). Maximum diversity often occurs in such streams because both large river and small stream species can exist there (11). In the Kankakee, typically large river forms such as *Hydropsyche simulans* and *H. orris* are found together with small stream forms such as *H. betteni* and *Ceratopsyche slossonae*.

In summary, the Kankakee River has been severely channelized during the last hundred years, and agricultural drainage has become an important use of the river. However, the Kankakee is far from being biologically dead. The combination of steady flow, cool temperatures, and good water quality in a medium-size river allows an unusual and diverse caddisfly community to exist there. Thus, the Kankakee River provides an aquatic habitat unlike any other in Indiana.

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