

Biogeography of Indiana Trichoptera

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Introduction

The caddisflies constitute one of the largest orders of aquatic insects in North America, with approximately 1,200 species recognized North of Mexico. The first Indiana caddisfly records were reported by Banks and Ulmer independently in 1907. From 1907 to the present 89 species were reported by various workers. An additional 101 species records resulted from our study. Collections made principally over the past 11 years by McCafferty and others at Purdue University have provided the bulk of data. Specimens from non-Purdue collections were also examined, most notably from the Illinois Natural History Survey. A checklist of the 190 Indiana species has been prepared by Waltz and McCafferty (in press).

Extralimital Affinities

On a world basis the 58 known Indiana genera are more closely affiliated with the Palearctic fauna than to that of any other outside the Nearctic (Table 1). This supports data earlier presented by others, particularly Ross (7) and Chandler (2).

TABLE 1. *World distribution of Indiana Trichoptera Genera.*

Distribution	No. of Genera
COSMOPOLITAN	9
NEARCTIC EXCLUSIVELY	11
HOLARCTIC (PALEARCTIC & NEARCTIC) EXCLUSIVELY	14
HOLARCTIC & ORIENTAL	7
HOLARCTIC & AFROTROPICAL	1
HOLARCTIC & ORIENTAL & AUSTRALIAN	1
HOLARCTIC & ORIENTAL & AFROTROPICAL	3
HOLARCTIC & ORIENTAL & AFROTROPICAL & AUSTRALIAN	3
HOLARCTIC & ORIENTAL & AFROTROPICAL & NEOTROPICAL	2
NEARCTIC & NEOTROPICAL	5
NEARCTIC & ORIENTAL	2

Within North America, as similarly demonstrated for the Illinois Trichoptera (6), Indiana caddisflies have strong affinities with the northeastern U.S., eastern Canada, central U.S., and, to a lesser extent, the southeastern U.S. (Table 2). It

TABLE 2. *Distributions of Indiana Trichoptera in Other Geographic Regions. (Regions after McCafferty, 4)*

REGION	# SPECIES IN COMMON	% OF INDIANA FAUNA
Central	190/190	100.0
Eastern (Canada)	132/190	69.5
Western (Canada)	33/190	17.4
Southeastern (US)	108/190	56.8
Northeastern (US)	145/190	76.3
Northwestern (US)	46/190	24.2
Southwestern (US)	20/190	10.5

should be noted that of the species occurring in the southwestern U.S. and Indiana, ten are widespread transcontinental species (e.g., *Oecetis avara*, *O. inconspicua*). The Indiana fauna is very distinct from that of western North America. Ross (6,7,8,9,10) provided most of the present information on the origins of North American Trichoptera. He (9) concluded that major elements of Indiana and the Midwest were Tertiary.

We have found three major faunal elements of Trichoptera in Indiana. The first consists of the lotic Temperate Deciduous Forest species restricted to cool, first and second order streams. These species are most abundant in the unglaciated area, characterized as the South-Central Upland (2) from Perry, Crawford, and Harrison counties northward to an apex in Morgan County (Figure 1). This area served as a glacial refugium during the Pleistocene (2,9). Another such area exists in Parke and Montgomery counties (Turkey Run and Shades State Parks, respectively). Other widely scattered, localized areas also are characterized predominantly by this faunal element, which is represented best by the genera *Neophylax*, *Agapetus*, and *Pycnopsyche* (9). Other caddisflies such as *Potamyia flava* and the *Hydropsyche scalaris* complex share the same history of invasion but inhabit larger streams; they tend to be widely distributed and represent some of the most abundantly and commonly collected species in the state.

The second faunal element consists of widespread transcontinental species. Species such as *Oecetis inconspicua*, *O. avara*, and *Helicopsyche borealis* are reported from Mexico and Central America northward into Canada from coast to coast. Their origin is difficult to ascertain. Similar to the *H. scalaris* complex, they often occur in larger streams where they may be a dominant component of the fauna.

The third major trichopteran faunal element consists of Northern Transcontinental species that are more restricted in the state. They are most abundant in the northern third, an area with many glacial lakes and coolwater streams, and are mostly of the family Limnephilidae and Phryganeidae, although members of at least four other families are represented. Several of these species are Holarctic and of unknown origin. Some have disjunct distributions, occurring also in Perry, Harrison and Crawford counties.

Indiana species are comparable in number and composition with those reported from contiguous states (Table 3). These data indicate the presence of a rather homogeneous midwestern fauna of which Indiana is a central element.

Faunal Provinces in Indiana

Chandler (2) redefined the faunal provinces of Indiana and reviewed the earlier works on Indiana (1,3). Species found within each of these faunal provinces (Figure 1, Table 4) were compared using Sorenson's coefficient of similarity (Table 5).

TABLE 3. *Similarity of the Trichoptera Fauna of Indiana and Adjoining States.*

TEST	#SPECIES	#GENERA	SPECIES SIMILARITY ¹		GENERIC SIMILARITY ¹	
			Jaccard	Sorenson	Jaccard	Sorenson
IN	190	58	1.0	1.0	1.0	1.0
xMI	181	61	.4220	.5935	.6667	.8000
xKY	175	54	.4622	.6322	.7813	.8772
xIL	184	58	.6860	.8138	.8281	.9059
xOH	192	56	.4920	.6595	.7692	.8695

¹Jaccard's Coefficient: $a/(a + b + c)$; Sorenson's Coefficient: $2a/(2a + b + c)$; Where a = # in common (both states), b = # reported in Indiana only, c = # reported in alternate state only.

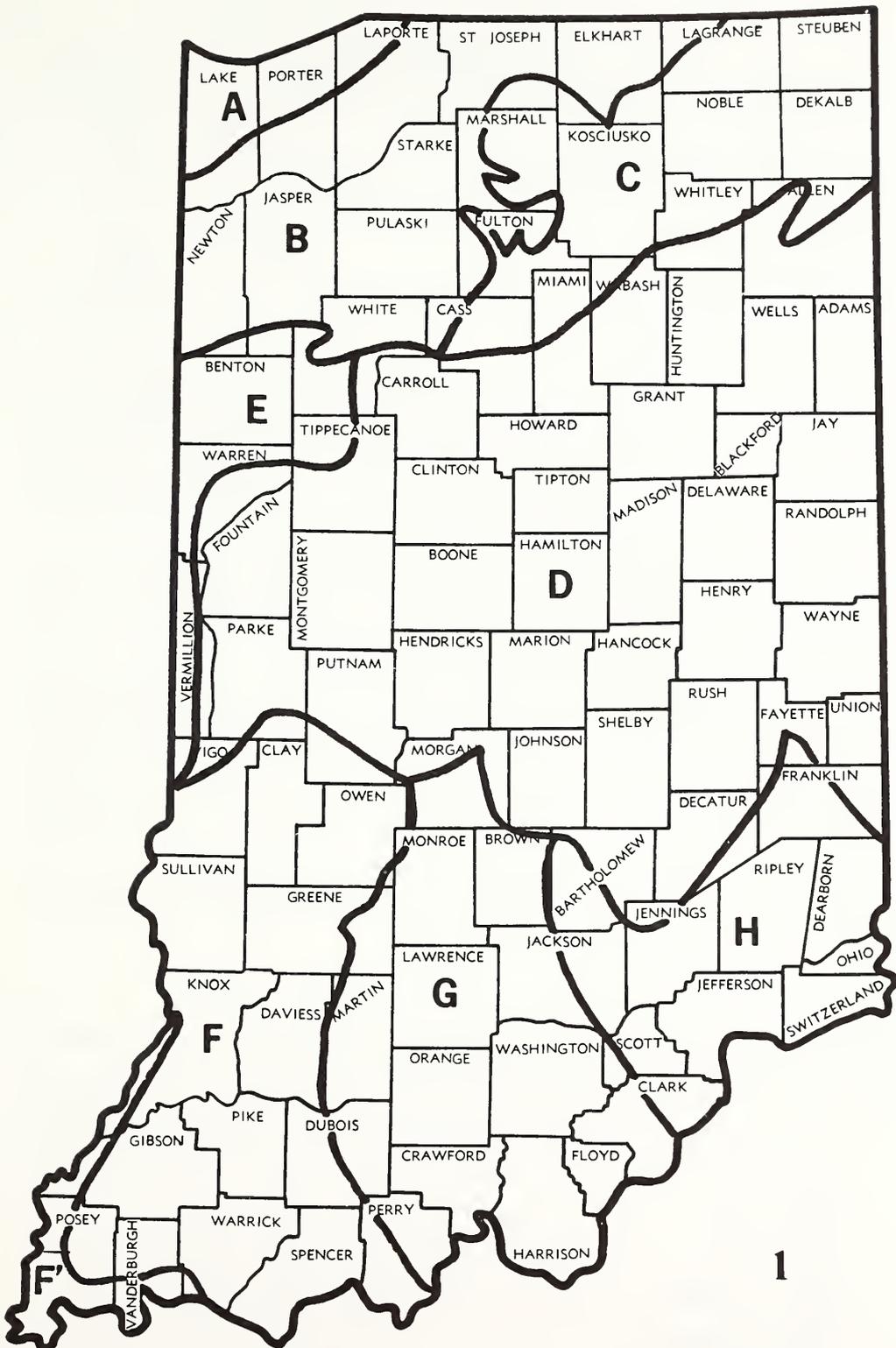


FIGURE 1. Indiana counties and faunal provinces (after Chandler, 2). A. Dunes. B. Kankakee Sand Ridge. C. Northern Lake. D. Tipton Till Plain. E. Prairie. F. Southwestern Plains and Upland. G. South-Central Upland. H. Southeastern Till Plain. F'. Lower Wabash Valley.

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