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PRELIMINARY ANALYSIS OF THE AMERICAN CYPRINID
FISHES, SEVEN NEW, REFERRED TO THE GENUS
HYBOPSIS, SUBGENUS *ERIMYSTAX**

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FOR many years we have studied the eastern North American cyprinid fishes that were recently referred to the genus *Erimystax* Jordan. Earlier, this assortment of species had been included in the genus *Hybopsis*. In the present swing of the pendulum these species are again placed in *Hybopsis*, though they may be retained in *Erimystax* as a subgenus. For several reasons the re-expanded genus *Hybopsis* rests on an unsteady basis, but it is not our purpose to attempt a generic evaluation.

The differential diagnoses to follow are presented in analytical form. The rubrics in the key that pertain to each form may be visualized in the outline of classification that heads the analysis. Thus, for *Hybopsis insignis eristigma* it will be at once apparent that the diagnosis comprises items 1b, 3b, 4b, 5b, 7b, and 9b. In addition, the diagnosis of each form may be taken to include the following features of *Erimystax*, common to all: A single small barbel is developed in the terminal or nearly terminal position (over or behind the end of the gape). The scales lack basal radii. The hooked pharyngeal teeth are uniserial, and number four on each side. The nuptial tubercles are minute or even obsolete on the top of the head (never enlarged as in *Nocomis*). The species are all small (none longer than 100 mm. to caudal) and delicate. Except in *H. harperi*, the barbel is large and consistently developed, sensory papillae are conspicuous about the mouth and on the lower surface of the head, the mouth is nearly horizontal, descending at an angle of less than 20°, the upper lip is included, and the lower lip is much included. The rather large eye is definitely wider than the suborbital. The color is dark (least so in *H. monacha*) and, typically, is more or less banded, speckled, or blotched.

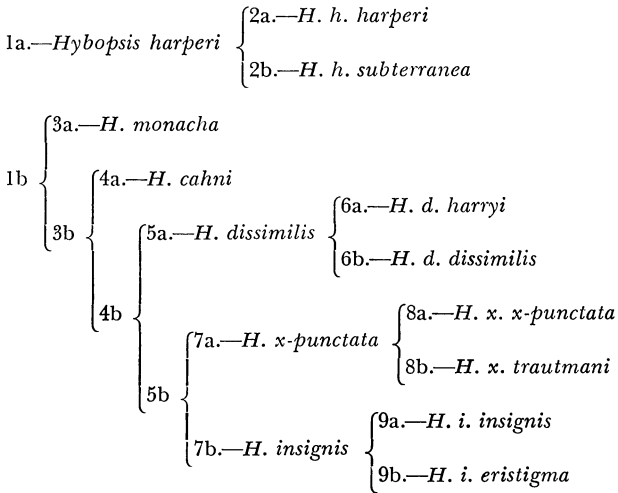
We reserve for our proposed general revision a more extended

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description of each form, figures, distributional maps showing all known record-stations as well as the range in detail, full synonymies, and other pertinent material.

ANALYSIS OF THE SPECIES AND SUBSPECIES OF HYBOPSIS
REFERRED TO THE SUBGENUS ERIMYSTAX
(Constituting differential diagnoses)

Outline of Classification



1.

- a. Scales large, 32 to 38 in lateral line (very rarely 38). Mouth more or less oblique (gape 20° to 44° from horizontal). Sensory papillae very small and inconspicuous on mouth and lower part of head. Barbel generally minute, occasionally lacking on one or both sides. Mandibular rami broad, very narrowly separated medially. Dark lateral band conspicuous on body and head, bounded above by a light streak that passes through the nostrils to form an arc around the muzzle; a lengthwise light streak along mid-line of frontal region. Size smaller (maximum known standard length 55 mm.). Additional characters, contrasting with items 3a and 3b.—Anal rays almost always 8 (rarely 7 or 9). Basicaudal spot small and inconspicuous. Dorsal fin without pigment on interradial membranes. Gill membranes very narrowly conjoined (width of isthmus, between lower ends of gill openings, 9.6 to 23.0 in head). (*H. harperi*.) 2
- b. Scales of moderate to small size, 38 to 62 in lateral line (very rarely 38). Mouth nearly horizontal (angle of gape with horizontal less than 20°). Sensory papillae prominent on mouth and lower surface of head. Barbel almost always well developed. Mandibular rami narrower, separated medially

by a space nearly as wide as, to much wider than, either ramus. No conspicuous dark *lateral band* and no definite *light streaks* on body or head. *Size* larger (maximum known standard length 67 to 97 mm. in different forms; adults typically longer than 55 mm.). 3

2.(1a)

a. *Mouth* less oblique (gape 20° to 38° from horizontal, usually less than 35°). *Snout* longer (3.1 to 3.8 in head, usually 3.2 to 3.4). *Eye* averaging larger (usually 3.2 to 3.6 in head). *Springs and spring-fed creeks in northern Florida and adjacent parts of Georgia and Alabama.* *H. h. harperi*

b. *Mouth* more oblique (gape 33° to 44° from horizontal, usually more than 36°). *Snout* shorter (3.5 to 4.1, usually 3.6 to 3.9). *Eye* averaging smaller (usually 3.5 to 4.1). *Sinks and caves in the Ocala Limestone of Payne Prairie, Florida.* *H. h. subterranea*

3.(1b)

a. *Anal rays* almost always 8 (rarely 7). *Scales* 52 to 62. *Basicaudal spot* large and conspicuous. *Dorsal fin* in adult with dark pigment between last 2 or 3 rays (as in *Notropis whipplei* and relatives). *Gill membranes* narrowly conjoined (width of isthmus, between lower ends of gill openings, 6.5 to 16.0 in head). *Eye* usually 3.9 to 4.7 in head. *Additional characters, contrasting with items 4a and 4b.*—*Coloration* without dark blotches or specklings; sides with a tendency toward a silvery band. *Caudal-peduncle depth* 0.8 to 1.2 in snout. *Tennessee River system, in Tennessee, Virginia, North Carolina, Georgia, and Alabama.* *H. monacha*

b. *Anal rays* typically 7 (rarely 6). *Scales* 38 to 51. *Basicaudal spot* small and inconspicuous. *Dorsal fin* free of pigment on interradial membranes. *Gill membranes* more or less widely conjoined (width of isthmus, 2.6 to 5.5 in head). *Eye* usually 3.3 to 4.0. 4

4.(3b)

a. *Coloration* plain, without dark blotches or specklings; posterior part of body with a median shading produced by a series of dark V's, one on each myomere. *Caudal peduncle* slenderer (its depth 1.4 to 1.7 in snout). *Additional characters, contrasting with items 5a and 5b.*—*Scales* 40 to 46. *Body* slender and not notably terete; *caudal-peduncle depth* 3.3 to 4.0 in head. *Head length* 3.7 to 3.9. *Snout* long (2.3 to 2.6). *Isthmus width* usually 3.3 to 3.9 (range, 3.3 to 4.3). *Lips* moderate. Maximum known *standard length* 69 mm. *Clinch and Powell rivers, upper Tennessee system, in Tennessee.* *H. cahni*

b. *Coloration* variegated with conspicuous dark blotches or specklings; median dark shading usually lacking or weak in adults. *Caudal peduncle* less attenuate (its length 1.0 to 1.4 in snout). 5

5.(4b)

a. *Scales* in lateral line usually 46 to 49 (range, 43 to 51). *Body* typically slenderer and definitely more terete; *caudal-peduncle depth* usually 3.1 to 3.6 (range, 2.3 to 3.9). *Head* averaging shorter (3.7 to 4.6, usually 3.9 to 4.3). *Snout* averaging shorter (2.5 to 3.2 in head, usually 2.7 to 2.9). *Isthmus width*, between lower ends of gill openings, usually 3.6 to 4.6 in head (range, 3.2 to 5.5). *Lips* rather thin. Maximum known *standard length* 97 mm.; adults usually longer than 70 mm. *Additional characters, contrasting with items 7a and 7b.*—*Dark color pattern:* mid-side with a row of oval blotches, generally smaller than the pupil; middorsal line with a row of spots. *Eye* usually 3.5 to 4.0 (range, 3.1 to 4.2). (*H. dissimilis.*) 6

- b. *Scales* usually 40 to 43 (range, 38 to 46). *Body* typically deeper and less terete; caudal-peduncle depth usually 2.7 to 3.3 (range, 2.4 to 3.6). *Head* averaging longer (3.4 to 4.3, usually 3.7 to 4.1). *Snout* averaging longer (2.2 to 3.1, usually 2.4 to 2.8). *Isthmus width* usually 2.7 to 3.6 (range, 2.6 to 4.1). *Lips* rather thick. Maximum known *standard length* 73 to 76 mm. (in different species); adults seldom longer than 70 mm. 7
- 6.(5a)
- a. *Upper lip* rather shield-shaped: narrow on anterolateral edge, but expanded near mid-line. Lateral *dark blotches* usually smaller, more intense, and more numerous (usually more than 10). *Stepped proportions* usually: head length 4.0 to 4.5; caudal-peduncle depth 2.7 to 3.2; snout 2.5 to 2.7. *Ozark Upland, in southern Missouri and east-central Oklahoma*. *H. dissimilis harryi*
- b. *Upper lip* narrow throughout, horseshoe-shaped. Lateral *dark blotches* usually larger, less intense, and less numerous (usually fewer than 10). *Stepped proportions* usually: head length 3.8 to 4.2; caudal-peduncle depth 3.0 to 3.6; snout 2.8 to 3.0. *Ohio and Tennessee river systems, in Indiana, Ohio, New York, Pennsylvania, West Virginia, Virginia, Kentucky, Tennessee, and North Carolina*. *H. d. dissimilis*
- 7.(5b)
- a. *Dark color pattern*: mid-side without a row of definite blotches, but with numerous scattered irregular X-shaped specklings; middorsal line without a row of definite spots. *Eye* typically smaller, usually 3.3 to 3.8 in head (range, 2.9 to 4.1). *Additional characters, contrasting with items 9a and 9b*.—*Upper lip* moderately expanded at mid-line (the width there 3.5 to 5.0 into upper-jaw length). *Mouth* of moderate size (upper jaw 3.0 to 4.0 in head, usually 3.3 to 3.7). (*H. x-punctata*.) 8
- b. *Dark color pattern*: sides with a median row of large, rather intense, more or less rectangular blotches, mostly larger than the pupil, and with scattered, rounded specks; middorsal line with a more or less evident row of spots. *Eye* typically larger, usually 2.9 to 3.5 (range, 2.9 to 3.8). (*H. insignis*.) 9
- 8.(7a)
- a. *Muzzle* relatively blunt, straight, and short. *Snout* in adult approximately as long as postorbital; in half-grown, definitely shorter than postorbital. *Caudal peduncle* usually deeper (least depth averaging about 0.1 less than snout length). *Ozark Upland, in the northwestern half of Arkansas, northeastern Oklahoma, southeastern Kansas, and the southern half of Missouri; with scattered populations in the Mississippi drainages of Illinois, Wisconsin, Iowa, and southeastern Minnesota*. *H. x. x-punctata*
- b. *Muzzle* relatively pointed, down-curved, and long. *Snout* in adult typically longer than postorbital; in half-grown, about as long as postorbital. *Caudal peduncle* usually slender (least depth averaging about 0.3 less than snout length). *Ohio River basin, in Illinois, Indiana, Ohio, New York, Pennsylvania, and Kentucky (avoiding the Cumberland and Tennessee systems); isolated populations, perhaps now extinct, in Thames River, Ontario, and questionably in the Lake Erie drainage of northern Ohio*. *H. x. trautmani*
- 9.(7b)
- a. *Upper lip* scarcely expanded on the mid-line (the width there 3.7 to 6.5, usually more than 4.0, in upper-jaw length). *Mouth* relatively small (upper-

jaw length 3.5 to 4.3 in head, usually 3.7 to 4.0). *Cumberland River system in Kentucky and Tennessee and lower parts of Tennessee River system from Kentucky through the middle third of Tennessee to northern Alabama.* *H. insignis insignis*

- b. *Upper lip* notably expanded on the mid-line (the width there 2.6 to 4.4, usually less than 4.0, in upper jaw). *Mouth* usually larger (upper-jaw length 2.9 to 3.6 in head, usually 3.2 to 3.4). *Upper parts of Tennessee River system, in the Appalachian Mountains of Tennessee, Georgia, North Carolina, and Virginia; in the Hiwassee, Little Tennessee, French Broad, and Holston drainages.* *H. i. eristigma*

1. *Hybopsis harperi* (Fowler)

Redeye Chub

This very distinct species was described as *Notropis harperi* by Fowler (1941: 231-33, Figs. 6-7). It is divisible into two subspecies.

1a. *Hybopsis harperi harperi* (Fowler)

1b. *Hybopsis harperi subterranea*, new subspecies

The name *Erimystax harperi subterraneus* was published by Bangham (1941: 294, 305) as a *nomen nudum*.

The holotype, UMMZ 133551, 33.8 mm. in standard length, was collected in Jerome Sink, Alachua County, Florida, by Miller, Walker, Marshall, and party from the University of Florida, on April 4, 1941, with 111 other specimens 15 to 41 mm. long. Other collections are from several sinks and caves, which, like the type locality, are in the Ocala Limestone of Payne Prairie, Florida.

2. *Hybopsis monacha* (Cope)

Spotfin Chub

This very distinct species, described as *Ceraticthys monachus* by Cope (1869: 226-27, 240, Pl. 23, Fig. 2), was made the type of a distinct genus, *Erimonax*, by Jordan (1924: 52). Since *Hybopsis* is of feminine gender and since Cope definitely indicated the adjectival form, the specific name is spelled *monacha*. Cope spelled the name *monachus* correctly in the key, in the faunal list, and on the plate, but gave it as *monacus* in the text.

3. *Hybopsis cahni*, new species
Slender Chub

The holotype, UMMZ 157708, an adult 62.3 mm. in standard length, was collected with 4 specimens 49 to 51 mm. long, by Reeve M. and Marion K. Bailey on September 8, 1939, in Powell River, 3 miles southeast of Harrogate at U. S. Highway 25E, Claiborne County, Tennessee. Four other examples, UMMZ 103462-63, 57 to 69 mm. long, were collected by A. R. Cahn, for whom the species is named, on March 10, 1936, in Clinch River below Norris Dam, Anderson County, Tennessee. Five other specimens, USNM 70580, 56 to 60 mm. long, were collected in 1893 at Walkers Ford, 12 miles southwest of Tazewell, Tennessee, by Barton Warren Evermann; these were reported as *Hybopsis monaca* by Evermann and Hildebrand (1916: 445). These are apparently the only known specimens of the species.

4. *Hybopsis dissimilis* (Kirtland)
Streamline Chub

This is obviously the species that Kirtland (1841: 341-42, Pl. 4, Fig. 2) described as *Luxilus dissimilis*, though this name has usually been misapplied to the gravel chub, herein named *H. x-punctata*. The streamline chub has usually been called *Hybopsis watauga* Jordan and Evermann. This species, like *x-punctata*, has become differentiated into a western and an eastern subspecies.

4a. *Hybopsis dissimilis harryi*, new subspecies

The holotype, UMMZ 167083, an adult 81.5 mm. in standard length, was collected on August 7, 1940, by G. V. Harry and Mitro Pellock in White River, 3 miles southeast of Mano, Barry County, Missouri, with a 73-mm. specimen (No. 151368). The other examples examined include one probably wrongly listed as from Sallisaw, Oklahoma, collected by S. E. Meek (USNM 73591), and numerous specimens from northern Arkansas and southern Missouri.

This subspecies is named for George V. Harry, in recognition of his extensive survey of the fishes of Missouri.

4b. *Hybopsis dissimilis dissimilis* (Kirtland)

5. *Hybopsis x-punctata*, new species
Gravel Chub

Two subspecies, with ranges indicated in the key, are distinguishable.

5a. *Hybopsis x-punctata x-punctata*, new subspecies

Holotype (of species and subspecies), UMMZ 152359, an adult 67.7 mm. in standard length, was collected on August 28, 1940, by Harry and Pellock in Starks Fork of Gasconade River, 8 miles south of Richland, Pulaski County, Missouri. We have studied numerous other specimens from Missouri, Arkansas, Oklahoma, Kansas, Iowa, and Minnesota, in which states the characters of the subspecies are essentially constant and distinctive. Referred material from Illinois and southern Wisconsin should be subjected to study of possible intergradation with the following subspecies.

5b. *Hybopsis x-punctata trautmani*, new subspecies

Holotype, UMMZ 177278, an adult 70 mm. long, was collected by Milton B. Trautman and Edward L. Wickliff on October 20, 1939, in Waldoning River, Newcastle Township, Coshocton County, Ohio, with 6 other specimens (UMMZ 177279). Many other examples, also in the Museum of Zoology of the University of Michigan, are from the Big Wabash River at St. Francisville, Lawrence County, Illinois (UMMZ 167084) and from numerous other localities in the Ohio River drainage, in Indiana and Ohio. Additional material is from Thames River, Ontario, and from the Ohio River drainage in Pennsylvania and Kentucky. Dr. E. C. Raney informs us that it also occurs in New York.

This subspecies is named in honor of Milton B. Trautman of Ohio State University, in recognition of his life-long thorough investigation of the fishes of Ohio.

6. *Hybopsis insignis*, new species
Blotched Chub

In this species also two subspecies are distinguishable.

6a. *Hybopsis insignis insignis*, new subspecies

Holotype (of species and subspecies), UMMZ 157702, an adult 59 mm. long, from Tennessee River at head of Blood River Island, Callo-way County, Kentucky, was collected by Tarzwell and Howell on

October 22, 1942, on a survey by the Tennessee Valley Authority. Other specimens in the Museum of Zoology of the University of Michigan and in the United States National Museum are from various localities in the Cumberland and Duck river drainages and in the Tennessee River system as far upstream as northern Alabama and the Sequatchie River in Tennessee.

Specimens from the Powell and Clinch rivers in Tennessee and Virginia are nicely intermediate between the two subspecies and are, therefore, identified as intergrades.

6b. *Hybopsis insignis eristigma*, new subspecies

Holotype, UMMZ 129320, an adult specimen 62 mm. in standard length, was collected with 2 other specimens 41 and 62 mm. long (UMMZ 177282), on August 31, 1937, by Carl L. Hubbs and party, in West Prong of Little Pigeon River, about halfway between Gatlinburg and Sevierville, Sevier County, Tennessee, at Highway 71, crossing 2 miles below Pigeon Forge, at an elevation of 1,000 feet. Other specimens are from various localities in the Appalachian Mountains on the east side of the Tennessee River drainage basin, in Tennessee, Georgia, North Carolina, and Virginia.

The subspecific name is proposed as a substantive.

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