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STATUS REPORT ON A NEW AND THREATENED SPECIES OF PHOXINUS FROM THE UPPER CUMBERLAND DRAINAGE

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and
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A currently undescribed member of the cyprinid genus *Phoxinus* (*Chrosomus* of earlier authors) occurs in the upper Cumberland River drainage of Kentucky and Tennessee. The scientific description is complete and has recently been submitted for publication.

A salient character of the new *Phoxinus*, aside from the typical scarlet and yellow breeding colors, is an intense broad black lateral band, especially in nuptial males (Figure 1).

Because of this character, as well as its upland habitat, the new minnow has been given the common name mountain blackside dace.

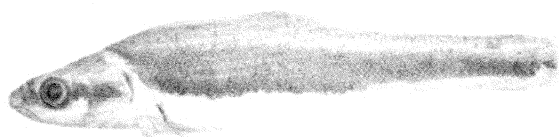


Figure 1. Tuberculate male mountain blackside dace, 55.7 mm standard length.

Due to its restricted range and the threat of widespread strip mining activities throughout the upper Cumberland drainage, the mountain blackside dace has been proposed for the Federal Threatened Species List. At this writing, the new dace is one of 29 species to be published in the Federal Register for proposed listing.

The range of the mountain blackside dace, as presently known, is restricted to the area above Cumberland Falls, except for three populations in small tributaries immediately below the falls (Figure 2). Intensive surveys over the past year have resulted in the discovery of only 12 extant populations. Three additional populations, now extirpated, are known to have occurred in the upper Cumberland. These records are

based on old material which is now deposited at the University of Michigan of Zoology, and on a description in the literature (Jordan and Swain, 1883, Proc. USNM).

The mountain blackside dace is now known from the following streams: Eagle Creek and Dog Slaughter Creek (both below falls); Cane Creek, Archers Creek, Sanders Creek, and Youngs Creek, Whitley County, Kentucky; Hughs Fork (Beaver Creek), McCreary County, Kentucky (below falls); Little Poplar Creek, Knox County, Kentucky; Davis Branch (Cumberland Gap) and Brownies Creek, Bell County, Kentucky; Trammel Branch, Campbell County, Tennessee; and Lawson Branch, Scott County, Tennessee. These populations were located during intensive surveys conducted in the past year with the aid of a travel grant generously provided by the U. S. Forest Service, Atlanta. Many additional streams were examined which yielded no specimens of mountain blackside dace. These streams either offered little or no suitable habitat, or had been ravaged by the effects of strip mining. We anticipate that a very few additional populations will be discovered in future survey efforts, since few unaltered streams remain to be examined.

Based on older material and the literature, *Phoxinus* sp. populations were known to have occurred in Yellow Creek (Cumberland Gap), Clear Fork tributaries (Whitley County, Kentucky), and Jellico Creek (McCreary County, Kentucky). Recent collections have failed to reveal their continued presence in these streams and they are presumed extirpated.

Streams from which the mountain blackside dace has been collected typically are at the higher elevations of the upper Cumberland area. These streams usually are afforded shade by dense riparian growth and water temperatures remain below 20° C much of the year. Stream widths are 1 to 4 m, with depths to 1 m. Substrates are characterized by bedrock and rubble with some areas of silty sand. Current velocities are moderate to sluggish. The new *Phoxinus* is most often encountered in pool areas 0.3 to 1 m in depth, in association with considerable cover, such as undercut banks, roots and brush, or rock slab rubble. The riparian flora is typically characterized by hemlock and mountain laurel. All streams containing substantial populations appear to be relatively pristine.

Preliminary indications are that the breeding season of the mountain blackside dace is May-June, based on nuptial

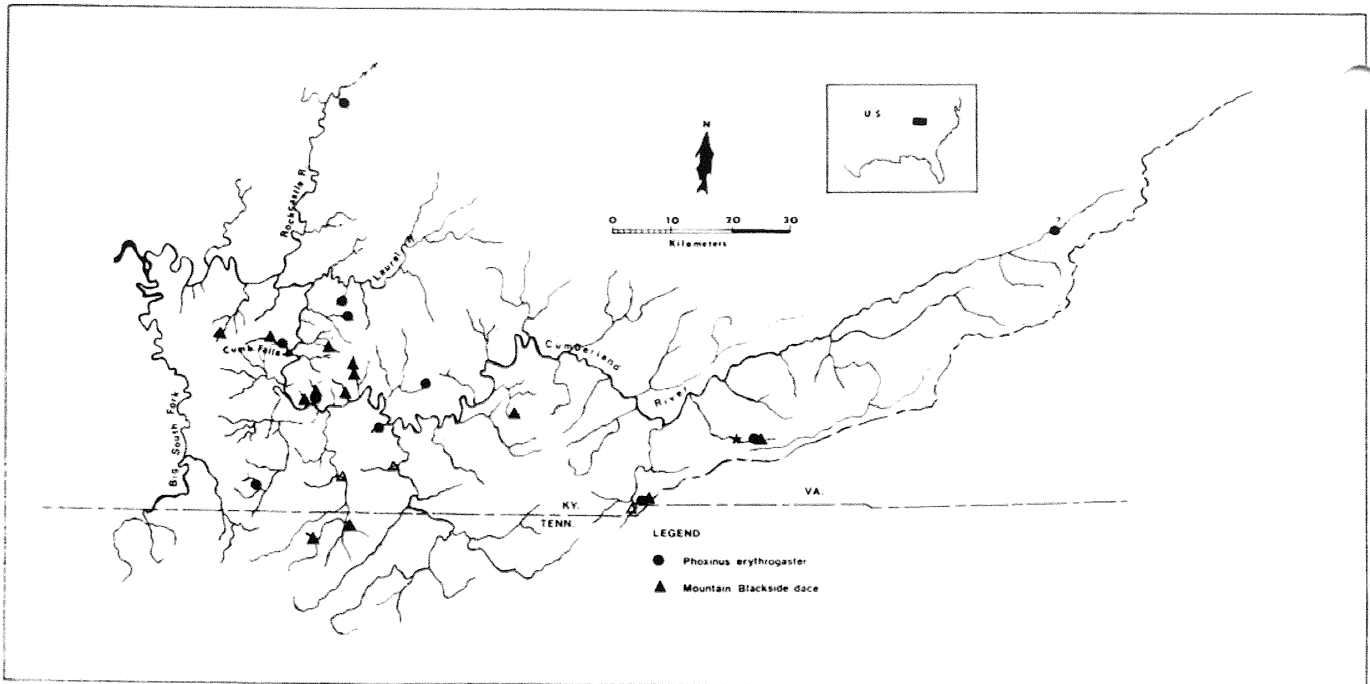


Figure 2. Distribution of the genes *Phoxinus* in the upper Cumberland drainage. Open triangles represent extirpated populations (based on old material).

specimens. The diet is probably largely herbivorous as in other members of the genus *Phoxinus*. Specimens held in aquaria typically exhibit a curious head-downward swimming attitude and often graze algae from vertical surfaces (Figure 3). Perhaps the swimming posture is an adaptation for inspection of these surfaces. With respect to longevity, there are at least three year classes present in recent collections.



Figure 3. Adult mountain blackside dace in typical head-downward swimming attitude. (Photo by Jim Robertson, Tennessee Department of Conservation).

The mountain blackside dace probably has evolved in isolation above Cumberland Falls, possibly after introduction of ancestral stock through headwater exchanges with preglacial Teays River drainage. In more recent times the southern redbelly dace, *Phoxinus erythrogaster*, presumably entered the upper Cumberland through similar exchanges

with the Kentucky or Big Sandy systems. The two *Phoxinus* species are now sympatric and occasionally syntopic above the falls. However, the preferred habitat of the mountain blackside dace is more upland in character than that of *P. erythrogaster* and, where the two occur syntopically, one species usually far outnumbers the other. In adjacent systems, such as the Kentucky drainage, *P. erythrogaster* occurs in more upland situations. Thus it would appear that the mountain blackside dace is able to compete successfully with *P. erythrogaster* and to somewhat exclude it from unaltered upland streams in the upper Cumberland drainage. Neither species seems tolerant of more than moderate amounts of strip mine runoff.

Strip mining activities pervade the upper Cumberland watershed. In addition to ongoing mining operations, many abandoned unreclaimed mines continue to contribute large amounts of runoff to the Cumberland's waters. Many tributary streams have already suffered serious devastation from the resultant siltation and acid mine runoff (Figure 4). The main

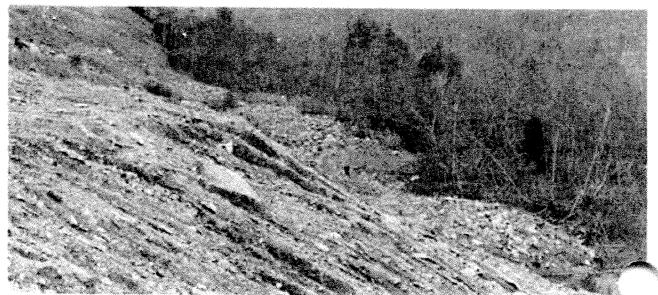


Figure 4. Habitat destruction in a small upper Cumberland tributary.

channel of the Cumberland River has greatly deteriorated with regard to fish habitation due to the continued heavy silt load.

While the upper Cumberland fish fauna is relatively depauperate, some additional restricted and interesting species are threatened along with the mountain blackside dace. These are the arrow darter, *Etheostoma sagitta*; a supposed subspecies of johnny darter, *E. nigrum susanae* (Jordan and Swain) (previously known only from types; Cole; C.F., 1958; unpub. dissert.); and an undescribed darter of the subgenus *Ulocentra*. Presently, *E. sagitta* appears to be doing quite well in several streams containing *Phoxinus* populations as well as some additional streams which have not undergone drastic alteration. Only seven additional specimens of *Etheostoma nigrum* (the first collected in the upper Cumberland since Jordan and Swain's types, 1883) were collected in the course of the *Phoxinus* survey, indicating their extreme rarity. The undescribed *Ulocentra* apparently inhabits streams of larger proportions than those surveyed for *Phoxinus*, and none have been encountered thus far. However, virtually all streams of these proportions are receiving large amounts of strip mine runoff.

On a stream-by-stream basis, the status of the mountain blackside dace is reasonably clear. Good populations now exist in some streams (Eagle Creek, Archers Creek, Sanders Creek, and Youngs Creek) within the Daniel Boone National Forest, Kentucky. The Brownies Creek locality (Bell County, Kentucky) now appears to be undergoing considerable perturbation from strip mine activities. Other localities listed were based on one or two specimens apparently representing marginal populations. In Tennessee for example, three hours of intensive collecting effort were necessary to obtain a single specimen from Trammel Branch.

The Daniel Boone National Forest area will be proposed as critical habitat and serve as a refugium for the new *Phoxinus* in order to insure its survival. The political atmosphere highly favors the coal mining industry of the upper Cumberland area, and there is little chance that mining activities can be curtailed for any reason in those areas not federally restricted. President

Carter's recent strip mine reclamation bill may help curb some of the long-range effects of strip mining on aquatic ecosystems, but it remains to be seen whether these laws will be enforced.

Outside the national forest, a few populations of *Phoxinus* could persist in small isolated tributaries whose watersheds do not contain readily accessible coal-bearing strata. However, most populations potentially face extirpation within the coming years. Were it not for the existence of those populations within the confines of Daniel Boone National Forest, the mountain blackside dace would be proposed for the endangered category.

Therefore, we make these recommendations with regard to the future preservation of the mountain blackside dace:

1. Restrictions against strip mining in Daniel Boone National Forest should continue.
2. Prudent watershed management should be employed to safeguard the quality of habitat streams, including careful attention to timber cutting practices. Those practices which have, in the past, been consistent with trout management in certain national forest streams should suffice.
3. Any future trout management activities in national forest streams should be conducted with the welfare of the native fish fauna as foremost concern. Thus, poisoning surveys or other massive killing techniques should be strictly avoided in streams harboring the mountain blackside dace.

At this writing, only a little is known of the life history of the new *Phoxinus* of the upper Cumberland, and only tentative conclusions can be made about its ecological requirements. A study of the life history and ecology of the mountain blackside dace has been initiated in recent months by the authors with travel aid from a Forest Service grant. Perhaps, as a result of the findings of this study, further recommendations can be forthcoming to aid in the preservation of this beautiful and striking new minnow.

News Notes

SFC SUPPORTS PRESIDENT'S REVIEW OF WATER PROJECTS

The following letter was sent to President Carter on behalf of the Council:

At its annual meeting in Gainesville, Florida on June 19, 1977, the Southeastern Fishes Council unanimously passed a resolution in support of your critical assessment of various federally-funded waterway projects.

The Southeastern Fishes Council is a new and rapidly growing organization composed of fish biologists, ichthyologists, fish and wildlife agency personnel, and other concerned individuals from throughout the United States. Its membership includes a large percentage of those professionals recognized as authorities on the fishes and other aquatic organisms of the country. The council is dedicated to

the preservation of native fishes in the United States, especially the southeastern area. It seeks to halt the decline of environmental quality and promotes the research and management necessary to insure our heritage of bountiful aquatic resources for future generations.

The Southeastern Fishes Council strongly endorses your policy of reappraising the need for environmentally destructive and economically wasteful waterway projects. Your recent actions represent meaningful steps in the direction of environmental preservation. You have awakened the hope that long-ignored environmental concerns may finally take precedence in decisions concerning imprudent alterations of natural stream systems. Our organization encourages you to continue to critically review proposed waterway projects.

Thank you for your interest and concern.