

rays; posterior border of extended anal fin usually slightly to moderately falcate. Body shape ranging from slender and terete to deep and compressed. Pharyngeal teeth usually 2,4-4,2 (often only one tooth in one or both minor rows of *N. b. alegendotus*). Cephalic lateral line system tending to be reduced; IO canal most susceptible to reduction, often interrupted at position of dermosphenotic bone. Gut short, simple, "S"-shaped; peritoneum silvery, spotted with light to heavy concentrations of melanophores. Anterior basidorsal spot present or absent; fin interradial membranes with or without deposits of melanin. Nuptial tubercles of males moderately small to moderately large and usually well developed over head (except for some populations of *N. fumeus*) and body (except for *N. ardens* and *N. lirus*). Bright breeding colors usually developed; color usually red, best developed on fins, variously developed on body; breeding colors yellow or gold in *N. fumeus* and in some populations of *N. lirus*. Urogenital papilla of breeding females enlarged and protruding posteriorly to about anal fin origin. Adult size usually less than 60 mm SL, except larger in *N. ardens*.

SPECIES GROUPS.—I consider *Lythrurus* to be composed of four fairly discrete species complexes. The composition and characters of these groups are given in Table 3. The form variously referred to in the literature as *N. fumeus* or *N. fumeus fumeus* from the Ouachita Mountains (called the Ouachita Mountain shiner in my dissertation) requires additional study before it can be assigned to a species group. It seems certain that it will be included within either the *fumeus* or *umbratilis* complex. When this decision is reached, the diagnosis of the appropriate group will need to be expanded accordingly.

RELATIONSHIPS.—The subgenus *Lythrurus* is closely related to the *atherinoides* series of the subgenus *Notropis* (see Snelson, 1968, for a characterization of the latter). The two groups agree in dorsal fin position, high anal ray counts, pharyngeal tooth counts, and general physiognomy. The major features in which *Lythrurus* has diverged from the *atherinoides* series are as follows: (1) development of smaller scales, (2) tendency toward a reduction in squamation on anterior dorsolateral part of the body, (3) development of bright breeding colors, (4) trend toward reduction of the cephalic laterosensory system, (5) tendency toward stronger development of breeding tubercles, (6) development of an enlarged urogenital papilla in breeding females, and (7) more reduced body size. Of these differences, *Lythrurus* species clearly represent the derived or advanced condition in (2) and (4); and substantial arguments could be made for considering *Lythrurus* advanced in all six characters.

N. fumeus comes close to bridging the morphological gap between