

EVOLUTION OF THE *roseipinnis* SPECIES COMPLEX

The closest relatives of the *roseipinnis* complex appear to be forms of the *umbratilis* complex, specifically *N. umbratilis cyanocephalus*. These two groups are similar in tuberculation, number of vertebrae, general physiognomy, the presence of fin interradial pigment, breeding colors, and other secondary sexual features (Table 3). The primary features distinguishing the *roseipinnis* complex from the *umbratilis* complex are lack of the anterior basidorsal spot, larger scales, and more specific and seasonally constant patterns of fin pigmentation. In all these differentiating characters, the character states of the *umbratilis* complex are assumed to be primitive, those of the *roseipinnis* complex derived.

These two groups have undergone their evolution allopatrically, the *umbratilis* complex in the Mississippi Valley, the *roseipinnis* complex in Gulf Coastal streams east of the Mississippi River. Thus, the *roseipinnis* complex probably arose after a stock similar to *N. u. cyanocephalus* invaded the eastern Gulf slope, possibly through a Tennessee-Alabama River connection.

In many respects—fin pigmentation, physiognomy, secondary sexual characters, and anterior dorsolateral scale reduction—*N. b. bellus* has diverged the least from *N. u. cyanocephalus* and is assumed to be the most primitive member of the *roseipinnis* complex. Perhaps the habit of spawning over the nests of sunfish (*Lepomis*) also was acquired from its ancestor.

During the course of its evolution in the Mobile Bay basin, a stock of *N. b. bellus* gave rise to *N. b. alegnotus* above the Fall Line in the Black Warrior system. Some of the characters (e.g., reduced lateral line system and reduced fin pigmentation) of *N. b. alegnotus* could be accounted for by neoteny, but others (e.g., pigment characters, proportional characters, and meristic characters) probably could not. On the whole, *N. b. alegnotus* is the most divergent member of the *roseipinnis* complex. Although its present taxonomic position is questionable, it is assumed to have interbred with *N. b. bellus* at some time past to produce intermediate populations at the Fall Line. Other possibilities are considered above under the account of Intergrades.

Nothing concrete can be said about the evolution of *N. roseipinnis* and *N. atrapiculus* because of their uncertain phylogenetic relationships to one another and to *N. b. bellus*. The reduced and highly specific fin pigmentation of *N. roseipinnis* is clearly an advanced condition; but the species varies so much in other characters (e.g., body shape and anterior dorsolateral body squamation) that its overall divergence is difficult to assess. In morphology, *N. atrapiculus* is intermediate between eastern