

**Nests, Eggs and Larvae of the Elegant Madtom
Noturus elegans from Barren River Drainage,
Kentucky (Pisces:Ictaluridae)**

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ABSTRACT

Three nests of *Noturus elegans* with eggs or larvae were found 22 June 1980 in Fallen Timber Creek, Barren County, Kentucky, at a water temperature of 20 C. A guardian parent (males in 2 cases) was present with the broods which were found under flat rocks above riffles. A clutch of 25 eggs removed from a nest and incubated at 20 C hatched in about 12 days. Eggs, hatchlings and larvae are briefly described. *N. elegans* has on the average, smaller clutch sizes when compared to most other species of *Noturus*.

INTRODUCTION

The elegant madtom, *Noturus elegans*, occurs commonly at certain localities in the Barren and upper Green River systems in Kentucky and was recently reported from the extreme eastern part of the state in Ruin Creek (Little Sandy River system), Elliott County (Bauer and Branson 1979, Burr 1980, Etnier and Jenkins 1980). Like most other species of *Noturus*, the only available ecological information on *N. elegans* concerns habitat occurrence and associated species (see literature review in Mayden and Burr 1981, Menzel and Raney 1973, Taylor 1969). The purpose of this paper is to report the discovery of nests of *N. elegans* and present some information on development and fecundity.

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REPRODUCTIVE BIOLOGY

Nesting

On 22 June 1980, we discovered 3 nests of *N. elegans* at the type locality, Fallen Timber Creek, 12.8 km SE Glasgow, Barren County, Kentucky. Fallen

Timber Creek was at low-water level, varying in width from 2 to 5 m and in depth from 12 to 40 cm. Bottom materials at the site were mostly gravel interspersed with slab-rock, but there were large expanses of bedrock throughout the stream.

Nests were located in the shade above the first riffle on the north side of the Highway 90 bridge. Water temperature at 1200 hr was 20 C and current was slight. The 3 nests were found under flat rocks that varied in size from 10 to 14 cm long and 12 to 24 cm wide in water about 12 cm deep. Each nest was attended by a guardian parent that had presumably excavated a slight depression in the substrate of about 6 cm; larvae or eggs were found in the depressions.

Upon exposure of the first nest, the guardian parent left immediately and was not captured. This nest contained a brood of about 30 sac fry, 11 of which were collected with the aid of a small-mesh aquarium net. The 11 young ranged in size from 10.6-11.5 mm TL = 10.9). Once the nest was exposed and the parent had left, fantail darters (*Etheostoma flabellare*) moved into the nest site and consumed some of the young.

The second nest contained about 20 young that were attended by a male, 61 mm SL, that remained close to the nest site. The male and 6 larvae with absorbed

yolk sacs were preserved. Larvae ranged in size from 14.0–15.3 mm TL = 14.7). Menzel and Raney (1973) stated that there is no evidence that parent mad-toms care for their broods after hatching. Observations on *N. elegans* and those made on 3 other species of *Noturus* clearly document that the male does attend his brood for several days post-hatching (Burr and Mayden MS, Mayden and Burr 1981, Mayden et al. 1980).

The third nest contained a clutch of 25 eggs and a guardian male, 53 mm SL, that also remained in the nest area. The clutch was removed and transported to the laboratory for further observations. The 2 guardian males captured had empty stomachs, which corroborates other observations that male *Noturus* do not feed while guarding nests (Burr and Mayden MS, Mayden and Burr 1981, Mayden et al. 1980).

Fecundity

The number of mature oocytes in 8 female *N. elegans* collected from Long Branch (Barren River drainage), Allen County (UL 6155) and Green River, Green County (SIUC uncat.), on 8 and 21 June, respectively, was (size of female is in standard length): 44 mm (20 mature oocytes), 48 mm (29), 49 mm (34), 51 mm (27), 52 mm (19), 60 mm (42), 61 mm (35), 64 mm (40); — 30.8.

Counts of ovarian eggs and the number of eggs and larvae in nests indicate that *N. elegans* lays fewer eggs than other species of *Noturus*. For instance, clutch sizes from 16 nests of *N. exilis* averaged 50 (Mayden and Burr 1981); in 1 nest of *N. albater*, clutch size was 42 (Mayden et al. 1980); in 6 nests of *N. miurus*, clutch size averaged 66.2 (Burr and Mayden MS). The small adult size reached by *N. elegans* (largest specimen examined by Taylor (1969) was 64 mm SL) is probably directly related to their smaller clutch sizes. *Noturus leptacanthus* apparently has the smallest clutch size (averaging 17.6 eggs) of the genus even though it reaches nearly 80 mm SL (Clark 1978).

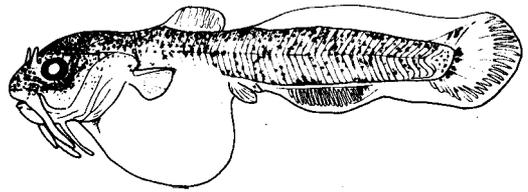


FIG. 1. Larva of *Noturus elegans*, 11.2 mm TL.

EGGS AND DEVELOPMENT

Eggs of *N. elegans* were lemon-yellow in color, spherical and adhered to each other in a mass. Diameters of 5 eggs ranged in size from 4.1–4.4 mm = 4.2; yolk diameters from 2.9–3.0 mm = 2.9). The clutch of 25 eggs was incubated in a 111 mm diameter culture dish at 20 C (the temperature in the stream) and aerated with an air stone. Many of the eggs did not hatch because a power failure in the laboratory shut off the air supply to the culture dish. Movement of the culture dish to another air supply may have broken some chorions resulting in an artificial early hatching at 286.5 hr (about 12 days). The estimate of age is based on developmental stages documented for *N. exilis* raised at 25 C (Mayden and Burr 1981).

Hatchlings averaged 7 mm TL and in all respects were similar in external morphology and appearance to other *Noturus* and *Ictalurus* hatchlings (Armstrong and Child 1962, Mayden and Burr 1981, Mayden et al. 1980).

The sac fry from the first nest, averaging 10.9 mm TL, had melanophores densely concentrated on the head and body, rays developed in the fins, and had 4 pairs of rudimentary barbels. The yolk sac was about one-third the size at hatching and the cephalic lateral-line system had formed (Fig. 1).

The 6 larvae from the second nest, averaging 14.7 mm TL, had a body form, opercular membrane and fin ray and spine complement like that of an adult. The cephalic lateral-line system was well developed, the yolk sac absorbed, and pigmentation well advanced. The barred pigment pattern typical of the adult apparently develops later.

