
**One Year Growth of Subadult
Macrolemys temminckii in a Louisiana Bayou**

J. BRENT HARREL*

*Department of Biology, Northeast Louisiana University
700 University Avenue, Monroe, Louisiana 71209, USA*

CHARLES M. ALLEN

*Department of Biology, Northeast Louisiana University
700 University Avenue, Monroe, Louisiana 71209, USA
e-mail: biallen@alpha.nlu.edu*

STEVE J. HEBERT

*Game Division, Louisiana Department of Wildlife and Fisheries, P.O. Box 915,
Minden, Louisiana 71058, USA*

**Present Address:*

*U.S. Department of Agriculture, National Wildlife Research Center
Mississippi Research Station, P.O. Drawer 6099
Mississippi State, Mississippi 39762, USA
e-mail: jbharrel@netdoor.com*

No data exist concerning growth of subadult alligator snapping turtles (*Macrolemys temminckii*) in a natural environment. Growth is thought to begin in March and continue through July, but seems to slow substantially after 15 years of age (Dobie 1971). According to Drummond and Gordon (1979), captive turtles grew 1 mm in carapace length within the first 11–14 days after hatching and had increased 2.6 g in weight after the first 47–50 days. Allen and Neill (1950) reported carapace lengths of 84 mm and 90 mm and carapace widths of 75 mm for two turtles after five years in captivity. Other researchers have reported *M. temminckii* gaining 500 to 900 g per year (N. H. Douglas, pers. comm.). Although growth data can be collected from captive *M. temminckii*, this is unlikely to be representative of growth in a natural environment. Errors in conservation and management decisions may occur in the absence of accurate growth data for wild populations, particularly if growth time to sexual maturity is underestimated. *Macrolemys temminckii* is singularly important in that this species is classified as a restricted, threatened, or endangered species in most states (Ernst et al. 1994; Pritchard 1989).

We report one year growth data collected from 12 subadult *M. temminckii* in a Louisiana bayou (Harrel et al. 1996). The study site was Bayou Desiard, a slow-flowing bayou located 10 km north of Monroe, Ouachita Parish, Louisiana, USA. Turtles were captured using baited hoopnets, and measured to ensure that they were within our desired size range (Harrel et al. 1996). A 66 g radio transmitter was attached to each turtle's carapace and all were released (within 2 h) at the capture site. The 12 turtles used in the study were recaptured after one year (mean = 371 ± 1.8 days) and re-measured. The turtles were not captured at any other time, appeared healthy, and incurred no mortality. The sex of the turtles was determined laparoscopically at the conclusion of the telemetry study (Wood et al. 1983).

The following straight-line measurements were taken with a Mantax 24-inch steel (vernier) caliper to the nearest 0.1 inch: carapace length (CL) and width (CW), plastron length (PL) and width (PW), head length (HL), and pre-cloacal tail length. Carapace length was measured from the anterior portion of the nuchal to the posterior marginal edge, CW at the widest point (generally between the eighth and ninth marginals), PL along the mid-plastral seam from the anterior portion of the gular to the posterior portion of the anals, PW across the abdominals between the plastron/carapace seam, and HL from anterior to the bony premaxilla to the posterior bony portion of the supraoccipital. The pre-cloa-

TABLE 1. One year's (1992–1993) growth (cm, kg, %) for 12 subadult (3 male, 9 female) *Macrolemys temminckii* in a Louisiana Bayou.

Days of Growth	Carapace Length	Carapace Width	Plastron Length	Plastron Width	Head Length	Weight
Males (N = 3)						
Mean 369.33	1.37 (5.3%)	1.13 (5.0%)	1.00 (5.1%)	1.63 (9.0%)	0.50 (5.5%)	0.15 (4.1%)
± SE 3.30	0.18	0.35	0.17	0.44	0.11	0.13
Range (366–376)	(1.0–1.6)	(0.6–1.8)	(0.7–1.3)	(1.1–2.5)	(0.3–0.7)	(-0.05–0.4)
Females (N = 9)						
Mean 371.33	1.31 (5.2%)	1.13 (5.2%)	1.07 (6.0%)	1.39 (7.8%)	0.38 (4.4%)	0.38 (10.6%)
± SE 2.20	0.27	0.16	0.15	0.31	0.10	0.09
Range (365–383)	(0.1–2.6)	(0.6–2.0)	(0.5–1.8)	(0.5–3.3)	(0.0–0.8)	(0.00–0.8)

cal length (recapture only) was measured from the posterior edge of plastron to the anterior edge of the cloaca. Turtles were weighed to the nearest 0.1 lb on a Hanson 860 scale. English units were converted to metric. Three subadult males had the following mean measurements at time of capture: CL = 26.3 ± 0.23 cm; CW = 22.0 ± 0.31 cm; PL = 19.6 ± 0.30 cm; PW = 17.8 ± 0.81 cm; HL = 9.1 ± 0.00 cm; and weight = 4.2 ± 0.27 kg. The nine females had the following mean measurements at the time of capture: CL = 24.8 ± 0.48 cm; CW = 21.2 ± 0.49 cm; PL = 18.5 ± 0.35 cm; PW = 17.9 ± 0.65 cm; HL = 8.5 ± 0.21 cm; and weight = 3.7 ± 1.23 kg.

Mann-Whitney U-test showed males had significantly longer precloacal lengths (mean = 7.5 ± 0.10 cm) than did females (mean = 5.6 ± 0.08 cm), ($P = 0.014$, $U = 27.000$). The turtles' mean growth was small (Table 1). The Mann-Whitney U-test showed no significant difference in growth between male and female subadults in any measurement ($P > 0.275$, $U \leq 20.000$).

Macrolemys temminckii is the largest North American freshwater turtle, and thus its growth rate may not be comparable to those of other turtle species. Dobie (1971) considered alligator snapping turtles to be sexually mature at carapace length = 37.0 cm for males and 33.0 cm for females. Using our one year's mean growth of 1.37 cm and a current carapace length of 27.67 cm, these male turtles would require approximately seven more years to reach sexual maturity. Female mean carapace length is currently 26.11 cm and with a growth rate of 1.31 cm per year would require approximately five more years to reach sexual maturity. Our predictions assume a constant rate of growth. Obviously, researchers would need to follow growth over several years to test this hypothesis. Only one turtle lost weight during the study. Weight gain (or loss) may be dependent on several factors including time since last meal, time of year, time since defecation, and general quality of health. We concur with other authors that weight is not as reliable an indicator of turtle growth as shell growth (Bjorndal and Bolten 1988).

We anticipated more growth than was recorded for these subadult *M. temminckii* considering that growth was reported to slow substantially after 15 years (Dobie 1971). Our data support the concept that this species is slow growing and that it may take more than a decade to reach sexual maturity. In addition, external morphological differences (longer pre-cloacal lengths) between males and females are evident early in their ontogenetic development and may prove useful for distinguishing sexes without using laparoscopic methods. Turtles used in this study were tagged

and released at their recapture location, and future recapture measurement of these turtles will be reported to determine if the growth rates have changed.

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