

Terrestrial Overwintering of Hatchling Turtles in Vermont Nests

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Abstract – Three Snapping Turtle (*Chelydra serpentina* Linnaeus) hatchlings and one Wood Turtle (*Clemmys insculpta* LeConte) hatchling appear to have overwintered in their nests in southwestern Vermont and were detected emerging in the spring of 2002. These species have not been previously reported overwintering terrestrially in Vermont and rarely do so in the northern portion of their range. The dry conditions during 2001, coupled with the mild winter of 2001/2002, may have provided unusual conditions that allowed successful overwintering in the nest.

Introduction

Most North American turtle species oviposit in the spring or summer and hatchlings emerge from nests in late summer or autumn (Ernst et al. 1994). Although overwintering of hatchlings in the nest has been documented for numerous species (Gibbons and Nelson 1978), few accounts exist for Vermont. The Painted Turtle (*Chrysemys picta* Schneider) is the only species that is known to regularly overwinter in the nest in Vermont and no other species has previously been documented to have overwintered terrestrially in Vermont. Three records of Painted Turtle overwintering terrestrially in Vermont have been reported to the Atlas of the Reptiles and Amphibians of Vermont, with live hatchlings reported between 1 April and 1 July (pers. comm., J. Andrews, Middlebury, VT). Christens and Bider (1987) reported that all Painted Turtle hatchlings in southwestern Quebec that survived predation overwintered in the nest even though the September temperatures were higher than the spring temperatures during emergence. Painted Turtles have been detected emerging both spring and fall at a site in southern New Hampshire (pers. comm., D. Carroll, Warner, NH). For most turtle species, overwintering and emerging from the nest in the spring becomes increasingly uncommon at higher latitudes (Costanzo et al. 1995).

Obbard and Brooks (1981) found that only one of 129 overwintered Snapping Turtle clutches examined in central Ontario survived the winter in the nest and this nest contained 16 live young, 11 dead hatchlings, and three infertile eggs. All live young had lost their caruncle (egg tooth), but retained unhealed yolk sac scars. Congdon et

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al. (1987) examined Snapping Turtle hatchlings in southeastern Michigan and they observed that nearly all hatchlings emerged by early October. Only one hatchling captured at a drift fence was believed to have overwintered in a nest or on land from an estimated 212 nests. Seven emergence dates for Snapping Turtle reported to the Atlas of the Reptiles and Amphibians of Vermont vary from 15 August to 4 October (pers. comm., J. Andrews, Middlebury, VT).

Harding (1991) and Ernst et al. (1994) suggested that hatchling Wood Turtles do not overwinter in the nest. Long-term monitoring of a Wood Turtle population in southern New Hampshire has yielded many observations of emerging Wood Turtle hatchlings in the fall, but none in the spring; caruncles were generally lost prior to emergence (pers. comm., D. Carroll, Warner, NH). Farrell and Graham (1991) stated that hatchling Wood Turtles reared in an outdoor pen in New Jersey had completely absorbed their yolk sacs prior to emergence in August and that some had lost their caruncles. Ernst et al. (1994) reported that yolk sacs and caruncles are lost by Wood Turtles prior to emergence or shortly thereafter. In Vermont, an emerging Wood Turtle found in a nest on 30 August had lost its caruncle and absorbed its yolk sac (unpubl. data, S. Parren, Essex, VT). Here we report on some unusual observations of hatchling turtles that appear to have survived the winter in their nests in southwestern Vermont.

Observations

Three Snapping Turtle hatchlings with remnant yolk sacs were observed at 43°04'N, 73°10'W on 17 April 2002. This location was 24 m southeast and 23 m above a large wetland believed to be the source of all turtles nesting at this site. Female Snapping Turtles climb to this sandy site to lay their eggs in areas having good solar exposure. Two Painted Turtle hatchlings were also observed.

On 11 May 2002, one Wood Turtle that appeared to be a recently emerged hatchling was discovered on a sandy mowed lawn at 43°02'N, 73°10' W. This location was about 3 m from a pond formed by the impoundment of a brook known to support adult Wood Turtles. The hatchling was 20 m from the brook channel below a small dam. Its carapace was 35 mm long and 36 mm wide, which falls within the range of hatchling Wood Turtle carapace lengths reported for New Jersey (Farrell and Graham 1991) and southern New Hampshire (Tuttle 1996), but was slightly wider. Its shell was pliant and wrinkled as if it were newly hatched and still unfolding from its containment in the egg. It retained its caruncle until 29 May 2002 while in captivity. The yolk sac was completely absorbed, but the site of attachment was still visible. An emergence hole was not found, so direct evidence of nest emergence is lacking.

Discussion

No previous records of Snapping and Wood Turtles successfully overwintering terrestrially in Vermont have been reported. Fully formed, dead Snapping Turtle hatchlings have been found in their nests in the spring (pers. comm., M. Lyttle, Essex, VT) and fully formed, dead Map Turtle (*Graptemys geographica* LeSueur) hatchlings have been found at a nesting beach in the spring where the nests of the previous year had been uncovered by high spring water (unpubl. data, S. Parren, Essex, VT). Vermont is near the northern end of the range for Snapping and Wood Turtles, although the ranges extend farther north. The state has relatively short summers during which eggs of most turtle species must develop and emerge, or likely die in the nest due to cold temperatures. This is generally believed to be the case for most years, but we hypothesize that during years of unusual weather conditions some areas of Vermont may exhibit conditions that allow successful overwintering of hatchlings in their nests.

The locations of the Snapping and Wood Turtle hatchlings reported here are in the southern portion of the state in the Vermont Valley biophysical region, which is an area of relatively mild climate for Vermont. Both sites were at low elevations, which would also contribute to a mild Vermont winter. The Snapping Turtles were observed at an elevation of 185 m. It is unlikely that hatchlings would have climbed the 23 m to this site in the spring if they had overwintered in the wetland. The presence of remnant yolk sacs was a good indication that these were indeed hatchlings emerging from their nests. The Wood Turtle was observed at an elevation of 230 m. The retention of the caruncle, wrinkled condition of the shell, and presence of the yolk sac scar strongly suggested that this Wood Turtle was also newly emerged from a nest.

The summer of 2001, when the eggs were laid, was unusually dry. NOAA weather data from Burlington, Vermont indicated that precipitation in 2001 was 59.11 cm, which was only 59% of the average for the previous 10 years and 71% of the long-term (118 yr) average. On 14 September 2001, at another southern Vermont location, we found two hatchling Spotted Turtles (*Clemmys guttata* Schneider) in their nest that had lost their caruncles and had empty egg sacs. While not an unusually late nest, we speculate that the dry weather may have contributed to these fully formed hatchlings remaining in their nest; they may have been waiting for rain to moisten their nest and refill their wetland. Dry weather persisted and the wetland was still largely devoid of standing water when visited on 2 December 2001.

In most years, remaining in a nest would likely lead to death by freezing; however, the weather remained unusually mild through the winter of 2001/2002. For example, the average Burlington, VT tempera-

ture in December 2001 was 0.4 °C, compared to the long-term (109 yr) December average of -4.6 °C and was tied for the highest average temperature over the last 30 years. The average monthly temperatures (°C) for early 2002 were January: -2.6, February: -3.3, and March: 0.6, which were, respectively, 5.3, 4.0, and 1.9 °C higher than the long-term average. We believe these relatively mild winter temperatures recorded at 44°28'N, 73°09'W, elevation 105 m, are indicative of mild conditions at the more southerly hatchling sites.

Breitenbach et al. (1984) concluded that snowcover seemed to be a proximate factor that influenced soil temperature and hence hatchling mortality in southeastern Michigan. In our observations, snowcover did not appear to be a factor since the mild winter was relatively snow free. NOAA data for Burlington, Vermont showed the winter of 2001/2002 to have been a light snowfall year with only 74% of the long-term (117 yr) average snowfall. Vermont Department of Fish and Wildlife winter severity data indicated that the winter of 2001/2002 in the Vermont Valley was unusually mild with little snow accumulation, scoring only 1.8 points compared to its long-term (33 yr) average of 25.8 (unpubl. data, J. Buck, Barre, VT). This is consistent with our observations of the nesting areas during the winter of 2001/2002.

Studies by Costanzo et al. (1995) indicate that Snapping Turtles have an ability to withstand temperatures “at least as low as -2 °C.” The combination of dry weather and an unusually mild winter may have provided unique conditions under which hatchling Snapping and Wood Turtles could have remained in the nest during the fall and then survived through the winter until spring emergence. It is possible that the hatchlings did not emerge from their nests in the fall because they were from late nests or perhaps otherwise retarded in their development rather than in response to drought conditions; however, moderately dry conditions may improve cold tolerance in overwintering hatchlings (Costanzo et al. 1995).

Acknowledgements

We wish to thank the landowners who allowed us to visit their property and the many individuals who were concerned about hatchling turtles wandering about in a parking lot. Thanks also to Jim Andrews, David Carroll, and Gordon Ultsch for helpful comments on an earlier draft of this manuscript.

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