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Evaluating recent taxonomic changes for alligator snapping turtles (Testudines: Chelydridae)

BRIAN FOLT & CRAIG GUYER
Department of Biological Sciences and Auburn University Museum of Natural History, Auburn University, Alabama 36849 USA.
E-mail: brian.folt@gmail.com, guyercr@auburn.edu

The Alligator Snapping Turtle (*Macrochelys temminckii* Troost *in* Harlan 1835, sensu lato) has been historically treated as a single, wide-ranging species, until a recently published paper by Thomas *et al*. (2014; hereafter Thomas *et al.*) analyzed variation in morphology and mitochondrial DNA sequence data to describe two new species of *Macrochelys*: the Apalachicola Alligator Snapping Turtle (*Macrochelys apalachicolae* Thomas, Granatosky, Bourque, Krysko, Moler, Gamble, Suarez, Leone & Roman 2014) and the Suwannee Alligator Snapping Turtle (*Macrochelys suwanniensis* Thomas, Granatosky, Bourque, Krysko, Moler, Gamble, Suarez, Leone & Roman 2014). The specific epithet *temminckii* was retained for populations in drainages from the Yellow River in Alabama and Florida west to the San Antonio River, Texas. Because populations of *Macrochelys* have been historically exploited by humans (Pritchard 1989) and the life-history strategies of large, long-lived turtles make them susceptible to declines from harvest (Congdon *et al*. 1994), a sound understanding of species delimitation and richness is critical for the conservation of alligator snapping turtles, especially if the acceptance of a widely distributed species disguises the presence of multiple, smaller-ranged species.

In this correspondence, we review the population phylogenetic knowledge of *Macrochelys* and evaluate the morphological and molecular data presented to reclassify *M. temminckii* (sensu lato) as three species. We argue that the morphological analyses presented by Thomas *et al*. do not provide evidence differentiating *M. apalachicolae* populations from *M. temminckii* (sensu stricto) and that this newly described species is not diagnosable. This stance is supported by a recently published analysis of cranial shape variation among *Macrochelys* populations (Murray *et al*. 2014). We also note that Thomas *et al*. do not provide evidence resolving nuclear-mitochondrial discordance from Echelle *et al*. (2010) that questions the reciprocal monophyly of *M. apalachicolae* and *M. temminckii* (sensu stricto). Given the arguments presented here, we conclude with recommendations for a revised taxonomy and provide a key to the species of the genus *Macrochelys*.

Macrochelys phylogenetics

Geographic variation in *Macrochelys* morphology has been described among populations (e.g., number of supramarginal scutes, skull shape; Pritchard 1989), but populations have historically been treated as comprising a single, wide-ranging species. However, because other highly aquatic organisms in Gulf Coastal drainages exhibit patterns of drainage-specific endemism (e.g., *Graptemys*; Ennen *et al*. 2010), two studies in the last 16 years have explored population genetic structure of *Macrochelys* and systematic implications of that structure.

Roman *et al*. (1999; hereafter 'Roman *et al*.') sequenced two partial genes of the mitochondrial genome ($tRNA^{PRO}$, 5' end of the control region) and found populations to exhibit drainage-specific haplotypes; a gene tree generated from these data recovered three major clades of *Macrochelys temminckii* (sensu lato): a western clade including populations from the Trinity River to the drainages of Pensacola Bay, a central clade from the Choctawhatchee River to the Ochlockonee River, and an eastern clade restricted to the Suwannee River. In this hypothesis, the Eastern (Suwannee) population (hereafter referred to as the Eastern (Suwannee) assemblage, for consistency with literature) was basal and sister to a well-supported monophyletic group comprising populations from the central and western distribution (hereafter, central and western assemblages, respectively). However, because mtDNA is maternally inherited and fails to detect male-mediated dispersal, Echelle *et al*. (2010; hereafter Echelle *et al*.) analyzed microsatellites from the nuclear genome to further test for population genetic structure, compare phylogeographic patterns between nuclear and mtDNA, and test for past population bottlenecks. Comparison of a neighbor-joining tree summarizing microsatellite variation (F_{ST}

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alligator snapping turtles should be recognized: the Alligator Snapping Turtle (*Macrochelys temminckii* Troost *in* Harlan 1835), a broadly-distributed taxon in Gulf Coastal drainages from the San Antonio River east to the Ochlockonee River, and the Suwannee Alligator Snapping Turtle (*Macrochelys suwanniensis* Thomas *et al*. 2014), a narrow-ranged endemic taxon in the Suwannee River. Given the perspective presented here, we provide a key to the species of *Macrochelys*:

Key to the species of the genus *Macrochelys*

1a. Distance between distal tips of right and left 12th marginal scutes wider than distance between distal tips of 11th and 12th marginal scutes on either side .... *Macrochelys suwanniensis*

1b. Distance between distal tips of right and left 12th marginal scutes equal to or narrower than distance between distal tips of 11th and 12th marginal scutes on either side .... *Macrochelys temminckii*

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