

Supplementary material 1

Figures S1-S4

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Data type: pdf

Explanation notes: Supplementary figures as referred to in the main text.

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Figure S1. The phylogeny of extant and fossil species of chelid turtle based on 106 morphological characters showing the shared derived characters in support of each node.

Figure S2. Photographs of *Elseya dentata* from the Roper River drainage, NT.

Figure S3. Photographs of *Elseya lavarackorum* from the Roper River drainage, NT.

Figure S4. Photographs of *Elseya lavarackorum* from the Nicholson-Gregory River drainage (Lawn Hill, Qld).

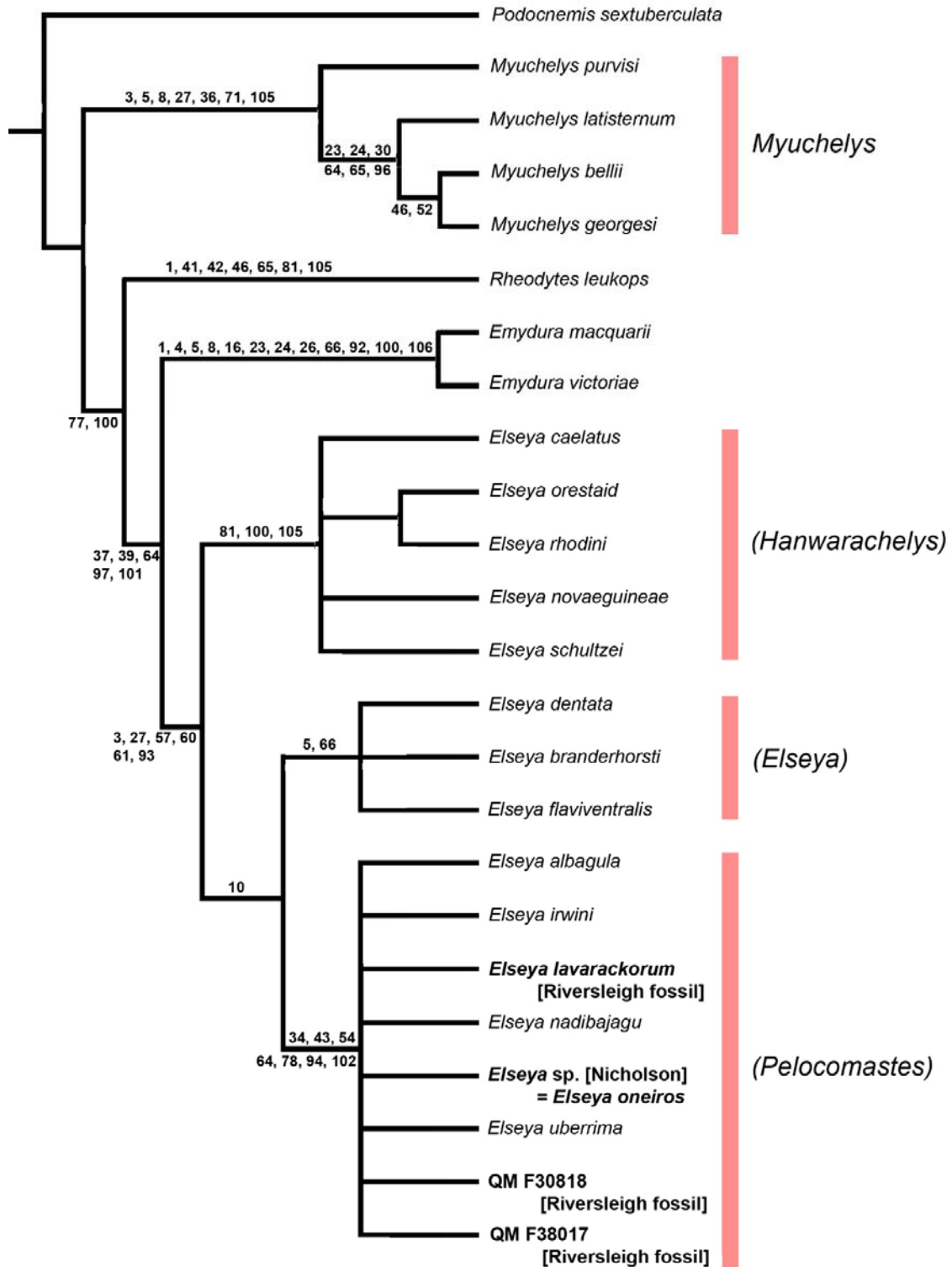


Figure S1. The phylogeny of extant and fossil species of chelid turtle based on 106 morphological characters showing the shared derived characters in support of each node. Character states were assigned to branches using TNT 1.5. Refer also to Fig. 8 in main text.



Figure S2. Photographs of *Elseya dentata* from the Roper River drainage, NT. Intergular scute that penetrates deeply, at least halfway, to almost separate the humerals; low blunt tubercles on the neck typically not arranged in anteroposterior rows; iris distinct; head shield robust covering much of the head including the region between the eyes; ramphotheca of upper jaw uniform in colour, without vertical streaks; no red flushing on the limbs. There are clear differences in the pattern of coloration of the temporal region between *Elseya dentata*, depicted here with cream/yellow dots on each temporal tubercle, and *Elseya lavarackorum* with a reticulated pattern in the temporal and dorsal head regions (Fig. S3); this fades with age. *Elseya dentata* typically has an ovoid carapace (e.g. Fig. 6 in main text) without the progressive development of a nuchal bay with increasing age/size.



Figure S3. Photographs of *Elseyia lavarackorum* from the Roper River drainage, NT. Note; an intergular scute that only moderately penetrates to separate the humerals, at most half way; low blunt tubercles on the neck, if present, arranged in anteroposterior rows; iris not distinct in life (a character not clearly evident in flash photographs); head shield typically petite not covering all of the dorsal surface of the head including the region between the eyes; ramphotheca of upper jaw with vertical streaks, variable in intensity; red flushing on the limbs (fading or absent with age). There are clear differences in the pattern of coloration of the temporal region between *Elseyia dentata* with cream/yellow dots on each temporal tubercle (Fig. S2), and *Elseyia lavarackorum* with a reticulated pattern in the temporal and dorsal head regions (depicted here); this fades with age. *Elseyia lavarackorum* has a carapace showing progressive development of a nuchal bay with increasing age/size, first departing from the classical ovoid shape, squaring off anteriorly, then developing a recessed region associated with marginals M1 and M2 (Fig. 6 in main text).



Figure S4. Photographs of *Elseya lavarackorum* from the Nicholson-Gregory River drainage (Lawn Hill, Qld). Intergular scute that only moderately penetrates to separate the humerals, at most half way; iris not distinct in life (a character not clearly evident in flash photographs); head shield typically petite not covering all of the dorsal surface of the head including the region between the eyes; ramphotheca of upper jaw with vertical streaks, variable in intensity; red flushing on the limbs, (faded or absent with age) (lower left); reticulation pattern in the temporal region (fades with age). Some aged individuals have extensive light blotching of the head and neck (lower right). Note that the leading and trailing spot on the iris is an uncommon variant, found occasionally in the Nicholson-Gregory populations, not yet observed in the Roper River populations. *Elseya lavarackorum* has a carapace showing progressive development of a nuchal bay with increasing age/size, first departing from the classical ovoid shape, squaring off anteriorly, then developing a recessed region associated with marginals M1 and M2 (Fig. 6 in main text). Photos: Alistair Freeman.