**Assignment 1.** *Interpreting a phylogenetic Tree*

*Name: Connor Guarino*

*Natrix natrix* (Grass snake) OUTGROUP

*Regina grahamii* (Graham’s Crayfish Snake)

*Nerodia rhombifer* (Diamondback Watersnake)

*Nerodia cyclopion* (Mississippi Green Watersnake)

*Regina septemvittata* (Queensnake)

*Nerodia erythrogaster* (Plain-bellied Watersnake)

*Nerodia sipedon* (Northern Watersnake)

*Clonophis kirklandi* (Kirtland’s Snake)

*Regina alleni* (Stripped Crayfish Snake)

Regina rigida (Glossy Crayfish Snake)

*Storeria dekayi* (DeKay’s Brownsnake)

*Storeria occipitomaculata* (Redbelly Snake)

*Thamnophis sirtalis* (Common Gartersnake)

*Thamnophis proximus* (Western Ribbon Snake)

*Thamnophis elegans* (Terrestrial Gartersnake)

*Thamnophis brachystoma* (Shorthead Gartersnake)

*Thamnophis butleri* (Bulter’s Gartersnake)

Figure 1. Phylogeny of the North American Natricine snakes, Thamnophiini. Reduced phylogeny based on McVay et al., 2013 and 2015.

Answer the following questions by referring to the phylogenetic tree in figure 1.

1. What is the tree term we use for the species at the tips of the tree?

Taxa / Taxon

1. What is the tree term we use for the splits indicated by the red circles?

Cladogenesis

1. What is the tree term we use for the lines indicated by the arrows?

Branches

1. What is the term we would use to describe the relationship between *Thamnophis sirtalis* and *Thamnophis proximus*?

Sister Groups

1. What type of grouping (monophyletic, paraphyletic or polyphyletic) do members of the genus Thamnophis belong?

Monophyletic

1. Do members of the genus *Nerodia* belong to a monophyletic group? Explain your answer (2 points).

They do not because to select only the Nerodia group would exclude sister groups that share a common ancestor, meaning it is paraphyletic instead of monophyletic.

1. Members of the genus *Regina* are unique in the Thamnophiini because their main prey is crayfish. This is one of the reasons they were grouped together in the genus *Regina*. Does the above phylogeny support the hypothesis that members of the genus *Regina* belong to a monophyletic group? In not, what type of group do they represent? You will need to explain your answer (2 points).

No, because there is no common ancestor that can be designated that does not exclude sister groups. It is instead polyphyletic because in addition to excluding sister groups, the genus Regina are not sister groups of one another.

1. Based on your answer in question 7, would crayfish eating be considered a homologous or convergent trait?

It would be a convergent trait because it occurred independently in multiple lineages. For it to be a homologous trait, it would need to be a feature found in sister groups.