**Convergence of odonate body colors and patterns across habitat types**

*The boys are back in town: Coronavirus 1, Yung Gravy 0*

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**Abstract**

Body coloration is an important phenotypic trait for both natural and sexual selection. However, differentiating between the impacts of these selective forces and their interaction on body coloration is a difficult task, or something. However, by combining James’ expertise and the new odonate phenotype database, we can do some really cool things.

**Introduction**

Convergence of body colorations across habitat types is frequent throughout the natural world. Ramble about polar regions and white fur coats, or tropics and green coloration, etc. Explain why these tendencies in phenotypes occur across organisms (i.e., enhanced camouflage from predators, find mates in specious environments (more vibrant colors), aid in physiological processes (darker in tropic climates).

Adult odonates are major predators of aerial and terrestrial invertebrates near waterbodies. Say something about them being super specious or something. Although odonates are highly susceptible to avian predation, they often may exhibit either bright or drab body colorations, as well as complex or simple body patterns. Considering their adult life stage is so short (~1 week), body coloration and pattern types are highly influential for both determining the level of predation risk and ability to find suitable mates.

Habitat type likely plays a pivotal role in determining which of these factors may be more important. For example, ephemeral waterbodies in arid environments often contain relatively high concentrations of predators and prey alike. In addition, these environments are typically smaller, thereby providing less habitat for competing species to co-occur. In comparison, permanent waterbodies generally contain lower concentrations of predators and prey since they are often within ecoregions that contain numerous similar (permanent) waterbodies, which negates the need to concentrate around a limited resource.

Thus, it may be more beneficial for natural selection of body color to prevail in ephemeral waterbodies and sexual selection of body color to prevail in permanent waterbodies.

Previous work has shown that their body colors are important for mate choice.

We propose that these mate choices are a result of species rich environments. To compare this, we calculated species richness estimates across all habitats. There was a relationship with blue and each pattern with species rich environments. In comparison, black color had a relationship with species poor environments. To test this, we created an odonate phylogeny using X, then compared evolutionary rates of body colors and pattern types according to discrete habitat types. To compare these evolutionary rates with species richness, we did something else. **Maybe use the odonate phenotypic database bit on the geographic areas and habitat types for a rough approximation of overlap? Or use the odonate central data for that. Wade might have code (based on yours) to scrap that site. Sure, species richness changes over time and we have no idea what it was like, but it might help, idfk.**

**Materials and Methods**

We used MUSCLE to align X sequences from GenBank (search terms Odonata and coi). Muscle removed X number of iterations due to missing data (coi partial or coii). We then used IQTree to align X sequences.

This phylogeny is comparable to the Odonata supertree database. Find some way to show how similar they are to each other.

We used the Odonate Phenotypic Database to search for phylogenetic signals of body colors and patterns across habitat types.

**Results**

**Discussion**

**Acknowledgements**

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**References**