

Crossing the Continental Divide: the Columbia drainage species *Juga hemphilli* is a cryptic member of the eastern North American genus *Elimia* (Cerithioidea: Pleuroceridae)

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Introduction

Pleurocerid diversity is not evenly spread across continental watersheds. Only nine nominal species, placed in the genus *Juga*, occur in drainages west of the Rocky Mountains. *Juga* was expressly erected to house the western taxa, but there are no diagnostic conchological characters to separate them from eastern con-familial and they had previously been regarded as western lineages of *Elimia* (formerly known as *Goniobasis*). Consequently, identification keys have used biogeographic criteria to distinguish *Juga* (west of the Continental Divide) from *Elimia* (east of the Continental Divide) taxa.

Materials and Methods

Eight of our study taxa — *Juga hemphilli dallesensis*, *J. interioris*, *J. plicifera*, *J. silicula*, *Elimia livescens*, *E. virginica*, *Pleurocera pyrenellum* and *Leptoxis dilatata* — were genotyped for the target mt 16S gene fragment and these novel haplotypes were added to 38 GenBank pleurocerid homologous sequences.

Result and Summary

The ML topology generated for our 28S dataset when the east Asian taxa, *Hua praenotata* (Gredler, 1884) and *Semisulcuspira libertina* (Gould, 1859), were employed as outgroups. With one exception, it recovered the expected reciprocal monophyly of eastern genera (*Elimia*/*Pleurocera*/*Leptoxis*/*Io*/*Lithasiopsis*) relative to western *Juga*, found in previous mt rDNA studies. The exception was *Juga hemphilli*. Two individuals typed for the nuclear marker yielded identical genotypes that nested unambiguously within the eastern clade.

Essentially the same primary result was obtained from the mt 16S dataset in that two well-supported reciprocally monophyletic clades were recovered, one exclusively composed of *Juga* nominal species, the other containing the eastern North American taxa with the addition of *J. hemphilli*. Note that all four eastern genera represented by more than one taxon exhibit striking patterns of mt polyphyly and that, although *J. hemphilli* and *E. livescens* clustered polytomously in the same Bayesian clade, this clade was otherwise exclusively composed of *Pleurocera* taxa. This placement however was not well-supported. Mitochondrial polyphyly was not restricted to genera: our novel *P. pyrenellum* mt haplotype was highly divergent from its conspecific GenBank sequence and positioned outside of the *Pleurocera* clade in a very distinct section of tree space.

Both nuclear and mt gene trees suggest that *Juga hemphilli* presents a geographically disjunct lineage of the eastern North American pleurocerid clade.

References

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