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COMPETITIVE EXCLUSION OF THE ENDANGERED
SHENANDOAH SALAMANDER:
FIELD AND LABORATORY
TESTS OF THE HYPOTHESIS

A Thesis
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The Graduate Faculty of
The University of Southwestern Louisiana
In Partial Fulfillment of the
Requirements for the Degree
Master of Science

Martha Riddering Griffis

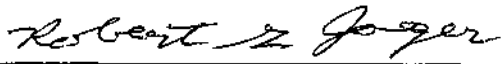
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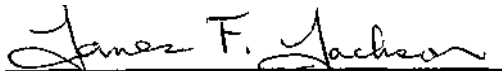
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Martha Riddering Griffis

APPROVED:


Robert G. Jaeger, Chairman
Professor of Biology


Raymond T. Bauer
Research Associate Professor
of Biology


James F. Jackson
Associate Professor
of Biology


Bruce H. Pugesek
Adjunct Assistant Professor
of Biology


Joan T. Cain
Dean, Graduate School

THESIS ABSTRACT

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The Shenandoah salamander, *Plethodon shenandoah*, occurs only on the north-facing talus of three mountains in Shenandoah National Park, Virginia. Earlier studies indicated that the Shenandoah salamander was restricted to this dry, sub-optimal habitat through competition with a wide-spread sibling species, *P. cinereus*. My study was designed to test the hypothesis that interspecific territoriality is the mechanism of competitive exclusion of *P. shenandoah* by *P. cinereus*.

I conducted a competitive release experiment to determine whether *P. cinereus* excludes *P. shenandoah* in the natural environment through territorial defense of rocks and logs. I also conducted laboratory behavioral interactions in an attempt to identify the specific behavioral mechanism of the competitive exclusion seen in the forest.

The results of the competitive release study suggest that *P. cinereus* does defend territories interspecifically against *P. shenandoah* in the forest. Individuals of *P. shenandoah* were less likely to invade cover objects occupied by *P. cinereus* than those where the resident *P. cinereus* had been

removed. The small number of *P. shenandoah* normally found outside the talus suggests that those individuals that invaded the cover objects in the competitive release experiment moved out of the talus immediately prior to invading the unoccupied territories.

The behavioral interactions in the laboratory revealed few differences between the two species in either aggressive and submissive posturing, or in the amount of biting. Males of *P. shenandoah* tended to spend more time in aggressive postures than females.

Based on these results, I conclude that *P. cinereus* does defend territories in the forest against the Shenandoah salamander. However, the Shenandoah salamander is not less aggressive than *P. cinereus* in the laboratory. Because *P. cinereus* is less tolerant to dehydration, individuals of this species may seek refuge under cover objects before individuals of *P. shenandoah* do, leading to the exclusion of *P. shenandoah* from these cover objects, and thus from the deep soil habitat outside of the talus.