

Application for a Research Permit for The BNP

Permit 2006-006

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Title of Research: **Does Plasticity in the Web Building Behavior of the Western Black Widow Spider, *Latrodectus hesperus*, Affect Foraging and Defense?**

Briefly describe the research to be conducted at the BNP in non-technical language (this paragraph will be used in describing your research to the public).

This project will test the hypothesis that spiders control the shapes of their webs to maximize foraging or defense based upon changes in their environment. Black widow spiders spin two different types of webs when they are fed or fasted. We will test how well these different webs protect the spiders from a common predator of spiders, mud-dauber wasps. For this experiment, spiders will be placed in outdoor screen tents that contain predatory mud-dauber wasps and we will observe and videotape their predatory interactions.

Briefly describe the goals of the proposed research.

The goal of this research is to determine if behavioral plasticity in the three-dimensional web building of theridiid spiders alters the effectiveness of the webs in preventing predation of spiders.

On which research areas of the preserve will your research occur? **The Martin Field Station Grounds.**

What are the GPS coordinates or locations of your proposed research? **The grassy area east of the Martin Field Center.**

Does your proposal involve areas that are not part of the designated research areas? **No_____**

(if yes, this permit will require approval from the Bath Trustees – this can only be sought four times a year, and so approval of your permit may take up to several months). Talk with the BNP Committee for more details.

What is the expected duration of your proposed research? **June thru September 2006**

What is the Web address of your research outline?

<http://www3.uakron.edu/biology/blackledge/tab.htm>

Briefly outline of methods to be used. Be sure to include outlines of the equipment to be used (if any) in the research.

Two spiders, one from each treatment group (fed and fasted) and their webs will be placed in a 12' x 10' x 88" screen tent containing a mud-dauber wasp collected from the wild (four replicate tents total). We will videotape predation attempts on the spiders until the first spider is caught or up to a maximum of two daylight hours per pair of spiders. This will allow us to

record two data points per spider pair- which spider the wasp successfully attacks first and the amount of time required for capture of the first spider.

Each trial will be conducted with 20 webs each, spun by fed and fasted spiders. In trial 1 the spiders will be on their own webs, then in trial 2 new spiders will be fed and fasted and placed on the opposite group's webs to control for effects that might be due to the hunger level of the spider such as increased predation risk tolerance, slower escape speed and greater aggression. A total of four tents will be setup with sources of mud and nest sites for the wasps. Individual mud-daubers from the local area (collected off the BNP) will be placed within the tents and tests will begin once the wasps are acclimated to hunting within the tents.

Outline the use of markers/cages/fences/etc. for your research. Note: in receiving a research permit, you must agree to remove all such research tools at the completion of your study.

Four screen tents will be set up to house the wasp predators for this study. Several adult female *C. caeruleum* mud-dauber wasps will be placed in each tent. *C. caeruleum* do not build their own nests but instead use abandoned *Sceliphron caementarium* nests, so empty *S. caementarium* nests will be placed on boards near the top corners of the tent to encourage their use by *C. caeruleum*. Mud from the location where the wasps are collected will be placed in plastic pans that are partially filled with water and tilted so the wasps have a choice of mud consistency similar to that found naturally. Nutrition for the wasps will be provided by including a hummingbird feeder filled with a 1:1 mixture of honey to water in each tent. The tents will be maintained in place for the entire experiment and removed in autumn.

What is the potential impact of your research on nature preserve?

This is a low impact study – once the tents are removed all evidence of the research should quickly diminish. The spiders that are not killed by the wasps will be returned to the University. Some common spiders from the Martin Field Center grounds will be added to the tents as prey for the wasps but this is unlikely to impact the population densities of these species due to their high reproductive capacities.

Have you looked at the listings and web sites of the research being conducted at BNP?

<http://www3.uakron.edu/biology/bath/active.html> Yes No

Are there any potential conflicts of your research with others at BNP? Yes No

Explain: No. Our research will be conducted near the fish microcosms (Permit # 2005-012), but there is plenty of room in the field for both projects).

To be granted a research permit for work at the BNP, you must agree to the following terms:

- Researchers are responsible for obtaining the appropriate state or federal permits for the conduct of their research on the BNP (e.g., when working with regulated species).
- Researchers are responsible for removing all markers, etc. from their research plots when the research is completed.
- Researchers must build a web site (immediately after being granted a permit) outlining their research at the BNP so that other researchers can avoid the proposed research site(s). Therefore, the web site must clearly outline, using one or more maps, the exact location(s) of the proposed research.
- Researchers will file an annual (due in yearly increments based on the date of the permit) and final report. Such reports will include: user days on the BNP, a summary of results of the project(s), a list of data generated and contact information for those interested in the data, and a list of publications resulting from the project(s).
- Any publications resulting from research conducted at the BNP must acknowledge the use of the preserve by referencing the BNP permit number. A copy of any such publication should be filed with the BNP committee.
- To abide by the rules and regulations of the BNP in any and all conduct of research at the BNP.

By signing the request for a BNP research permit below, I agree to the above terms and state that all of the above information is correct to the best of my knowledge. I also agree to amend my above permit request if my research plans change such that they are no longer well represented in the information supplied in this permit request. If I fail to notify the BNP oversight committee of significant changes in my research, or if I do not follow the rules of the BNP, I realize that the BNP

oversight committee can revoke my research permit, and disallow any further work by me, research or otherwise, at the BNP.

Signature: _____ Date: _____ 8-April-2006 _____

Print Name: _____ Todd Blackledge _____

Signature: _____ Date: _____ 8-April-2006 _____

Print Name: _____ Jacquelyn Zevenbergen _____

Approved, University of Akron April 20 2006