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Plants *Versus* Animals: Do They Deal with Stress in Different Ways? FREE

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Abstract

Both plants and animals respond to stress by using adaptations that help them evade, tolerate, or recover from stress. In a synthetic paper A. D. Bradshaw (1972) noted that basic biological differences between plants and animals will have diverse evolutionary consequences, including those influencing how they deal with stress. For instance, Bradshaw argued that animals, because they have relatively well-developed sensory and locomotor capacities, can often use behavior and movement to evade or ameliorate environmental stresses. In contrast, he predicted that plants will have to emphasize increased physiological tolerance or phenotypic plasticity, and also that plants should suffer stronger selection and show more marked differentiation along environmental gradients. Here we briefly review the importance of behavior in mitigating stress, the behavioral capacities of animals and plants, and examples of plant responses that are functionally similar to behaviors of animals. Next, we try to test some of Bradshaw's predictions. Unfortunately, critical data often proved non-comparable: plant and animal biologists often study different stressors (*e.g.*, water *versus* heat) and measure different traits (photosynthesis *versus* locomotion). Nevertheless, we were able to test some of Bradshaw's predictions and some related ones of our own. As Bradshaw predicted, the phenology of plants is more responsive to climate shifts than is that of animals and the micro-distributions of non-mobile, intertidal invertebrates ("plant" equivalents) are more sensitive to temperature than are those of mobile invertebrates. However, mortality selection is actually weaker for plants than for animals. We hope that our review not only redraws attention to some fascinating issues Bradshaw raised, but also encourages additional tests of his predictions. Such tests should be informative.

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