Phenotypic plasticity and inbreeding depression in *Mimulus ringens* (Phrymaceae)

Lydia R. O’Halloran¹ and David E. Carr²

¹Department of Zoology, Oregon State University, Corvallis, Oregon and
²Blandy Experimental Farm, University of Virginia, Boyce, Virginia, USA

ABSTRACT

**Hypothesis:** The mating system (outbred or inbred) a plant utilizes could influence the degree of phenotypic plasticity exhibited by the progeny. We predicted that progeny of outbred parents would display greater phenotypic plasticity when grown under soil moisture stress than progeny of selfed individuals.

**Organisms:** Seventeen families (8 outbred and 9 selfed) of mixed-mating wetland species, *Mimulus ringens*, were grown along a soil moisture gradient in the field and in the greenhouse.

**Times and places:** Field and greenhouse experiments were conducted at the University of Virginia’s Blandy Experimental Farm, Boyce, Virginia, USA.

**Analytical methods:** Both fitness and morphological characters were measured for three soil moisture levels. All data were analysed using mixed-model analysis of variance or analogous accelerated failure time models. Two-way factorial analyses of variance were performed for each character to test for breeding (fixed) and water (fixed) effects individually and for their interactive effect across blocks (random). A difference in levels of plasticity was defined by a significant interaction effect between breeding and water.

**Results:** Inbreeding had little effect on phenotypic plasticity in the field or greenhouse. Plasticity in corolla width showed opposite patterns in inbred and outbred plants and growth rate showed greater plasticity in outbred plants in the greenhouse. There was little evidence of inbreeding depression among inbred or outbred *M. ringens*.

**Keywords:** inbreeding, *Mimulus ringens*, mixed-mating, phenotypic plasticity, water stress.

INTRODUCTION

The sessile nature of plants has made their survival contingent upon the ability to change their phenotype in response to spatial or temporal environmental heterogeneity. When populations are exposed to stressful environmental conditions such as low soil moisture, a reduction in the ability to be plastic could lead to decreased fitness for certain genotypes.

Correspondence: L.R. O’Halloran, Department of Zoology, Oregon State University, Corvallis, OR 97331, USA.
e-mail: riesl@science.oregonstate.edu
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