**Environmental influence on sexual dimorphism and sex ratio in a dioecious plant**

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Species with separate sexes provide a special opportunity to study features such as sex ratio and sexual dimorphism. Environmental condition plays a critical role in determining the phenotype of an individual, and may influence the expression of sexually dimorphic traits. When resources are limiting, organisms are expected to invest in a trait that maximizes reproductive ability only after they are able to survive. Moreover, stressful conditions may cause sex-biased mortality, influencing the population sex ratio. I investigated the environmental influence on sex ratio and the expression of sexually dimorphic traits in *Rumex rothschildianus*, an annual wind-pollinated flowering plant. Environmental stress affected the expression of vegetative traits, but did not reveal any sexual dimorphism. As environmental conditions became less stressful, flower production became more sexually dimorphic: males increased flower production, while females showed no change. I postulate increasing sexual dimorphism of flower production is due to differential costs of reproduction of the sexes. Females must invest in both flower and seed production, and so do not modify allocation to flowers across environments, but later invest heavily in seed production. An increase in seed production was seen in the low-stress environment, supporting this proposition. In more stressful conditions, the sex ratio became more female-biased, potentially due to male Y-chromosome degeneration increasing male mortality in such environments. Most, if not all, of the literature regarding the influence of environment on sexually dimorphic traits has focused on animals, and such studies will help unify perspectives on sexual dimorphism in plants and animals.