

A native *Coreopsis* variant competes more strongly against the invasive *Verbena brasiliensis*

Minh Khue Nguyen, G. Scott Clark, Kerri M. Crawford

Department of Biology and Biochemistry, College of Natural Sciences and Mathematics, University of Houston, Houston, TX

Introduction

Invasive plants disrupt native ecosystems and decrease native plant diversity. Under strong selection pressure, native plants sometimes adapt to better compete with an invasive species. My research investigates two variants of the annual forb *Coreopsis* that co-occur with the invasive forb *Verbena brasiliensis*. The objective of my research is to answer three questions: (1) Is an observed phenotypic variant of *Coreopsis* more competitive than the wild type *C. tinctoria*? (2) If so, what traits potentially make it more competitive? (3) Is it an adapted variety of *C. tinctoria* or a closely related species? Whether or not it is a separate species, the existence of a more competitive variant may provide an effective replacement for the wild type *C. tinctoria* in native restoration projects within the range of *V. brasiliensis*.

Methodology

To measure the relative competitiveness of the two *Coreopsis* varieties, I planted each with and without the invasive *V. brasiliensis* in the same pot. The plants were cultivated in a greenhouse under identical conditions for 10 weeks. The number of flowers and height of each plant was recorded weekly. At harvest, I weighed the dry aboveground biomass of each plant and compared their growth with and without *V. brasiliensis*. In addition, I am growing each variety separately in 2L pots to compare phenotypes more closely and to sequence their chloroplast DNA to determine whether they are the same species.



C. tinctoria wild type



C. tinctoria variant

Results

The biomass and flower production of the plants was analyzed using general linear models and post hoc analysis with Tukeys HSD. Fig.1 reflects the fixed effects of *Coreopsis* variety in the presence or absence of *Verbena*. Fig. 2 reflects the fixed effect of *Coreopsis* location, with the variant represented by one location and the wild type represented by three.

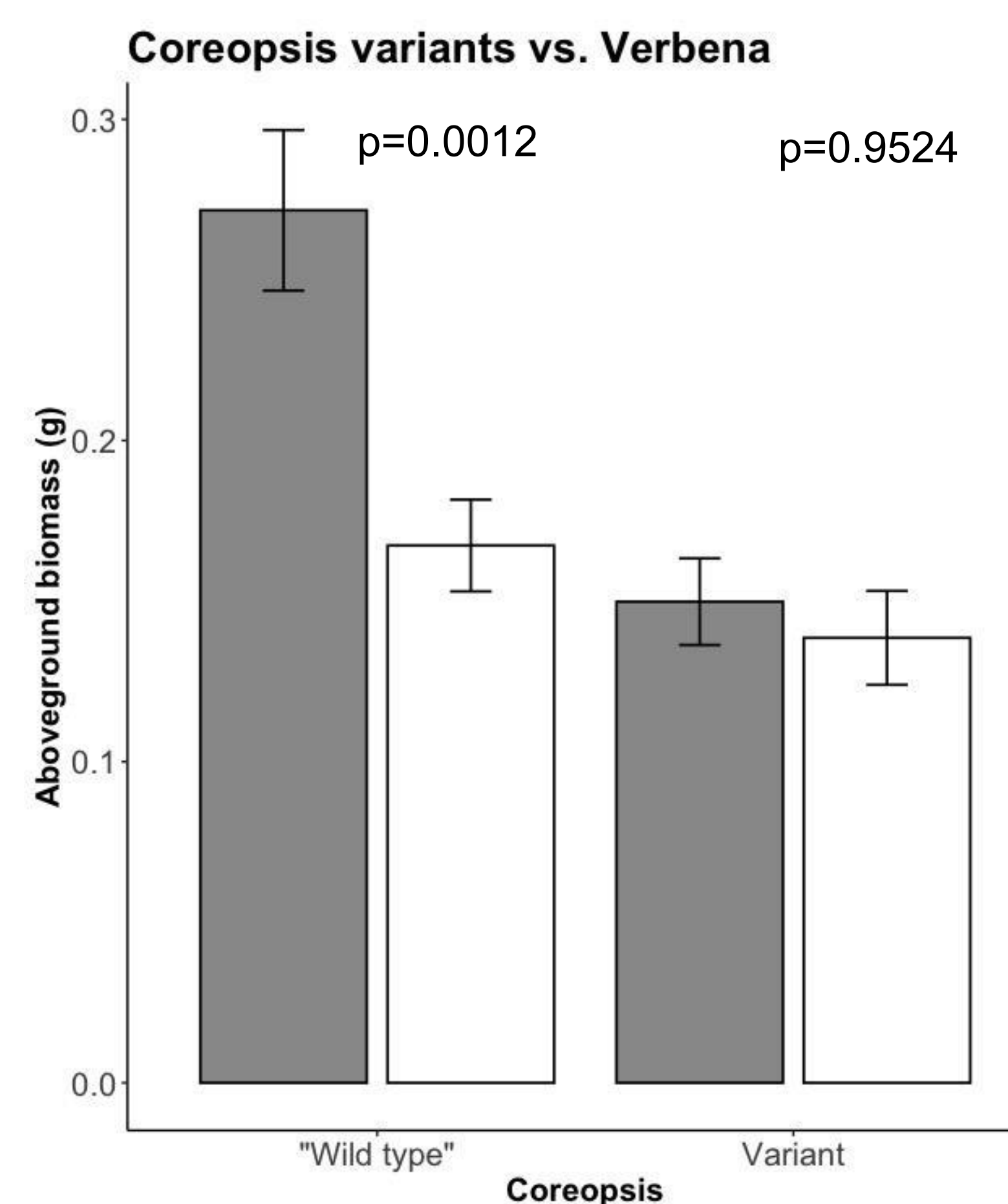


Fig.1

Average biomass decline for wild type *Coreopsis*: 40.4%
Average biomass decline for variant *Coreopsis*: 6.12%

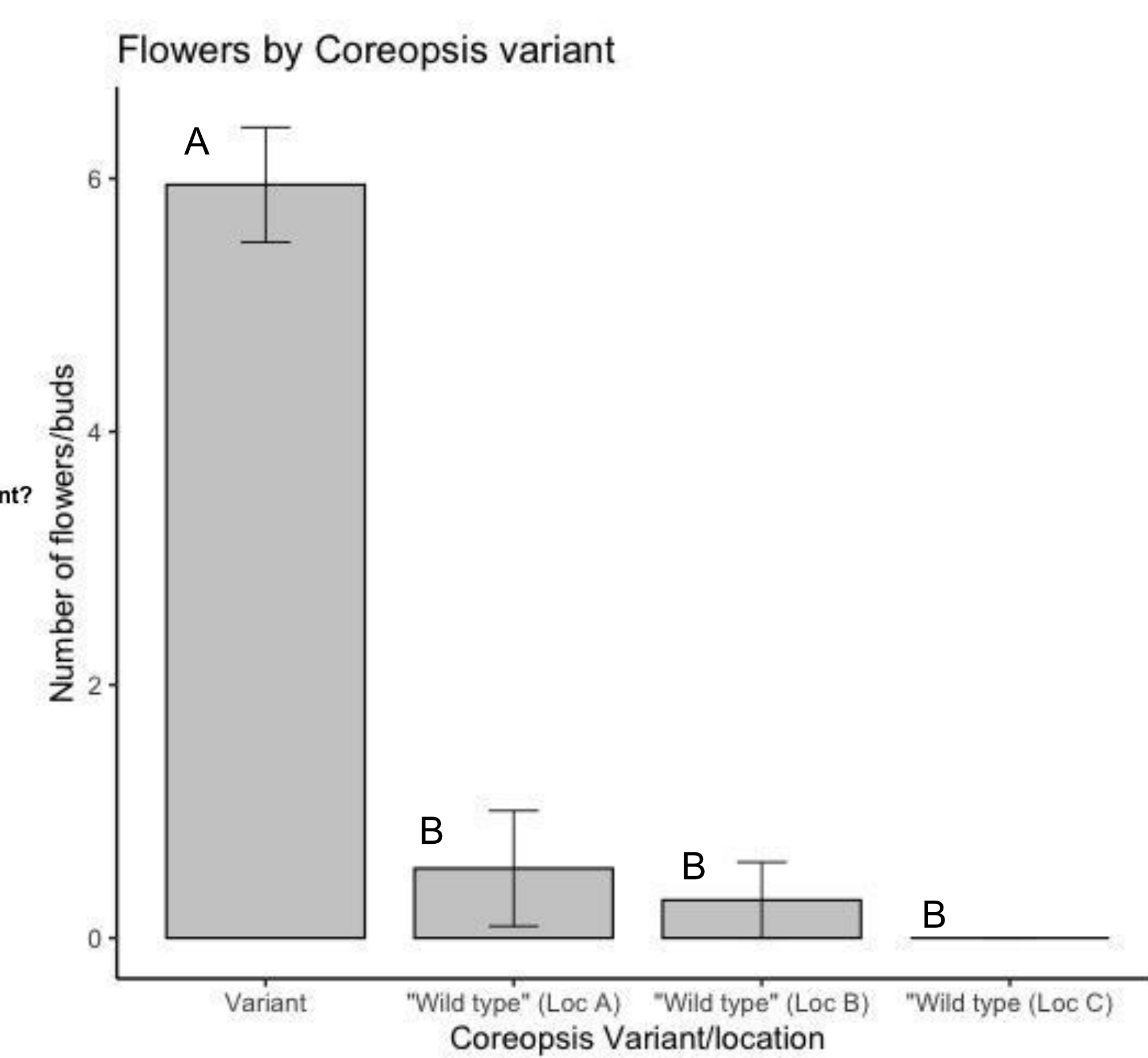


Fig.2

Conclusion

In contrast with the wild type *C. tinctoria*, the invasive *V. brasiliensis* does not significantly suppress the biomass of the *Coreopsis* variant. Furthermore, the *Coreopsis* variant produces significantly more flowers than the wild type suggesting it would be more competitive with the invasive plant than the wild type. The variant tends to grow more quickly vertically and may be less likely to be shaded by the invasive plants. The stark difference in growth habit between two *Coreopsis* varieties suggests the variant may be a closely related species that converges in appearance at maturity. The chloroplast DNA of the variant and the wild type will be sequenced to determine whether they are the same species. Regardless of whether the *Coreopsis* variant is an adapted genotype or a closely related species of *C. tinctoria*, its performance would recommend its use in areas invaded by *V. brasiliensis* to preserve local plant diversity.