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THE EVOLUTION OF CHEMICAL DEFENSES IN WHITE CLOVER: WHEN AND WHERE DOES CYANOGENESIS MATTER MOST?

Brenda Alvarado

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Cyanogenesis (the production of HCN upon tissue damage), is a polymorphic trait in white clover, with both cyanogenic and acyanogenic types being found in nature. This trait has also been associated with local climatic adaptation in white clover, due to the repeated documentation of clinal patterns worldwide. That is, the proportion of cyanogenic plants found in white clover populations increases dramatically from cooler to warmer climates. The goal of this study was to determine the effects of cyanogenesis variation on white clover fitness at early life stages, specifically germinant and seedling survival. Seeds were collected from 100 female parent seeds from each of three sites across a latitudinal gradient: Duluth, MN, Saint Louis, MO, and Gainesville, FL and were planted at each of the three sites, as well as in the WashU greenhouse as a control. They were left to germinate and grow to the seedling stage in the field, and semi-weekly photographs were used to quantify germination and survival rates at each site. Surviving seedlings were classified according to cyanotype to ask whether the proportion of the locally adaptive cyanotype at each field site increased in frequency relative to the greenhouse control group, which would suggest that the evolution of cyanogenesis clines occurs early in the white clover life cycle.