ESA2019 LOUISVILLE

7: Phenotypic selection under two contrasting environments in wild and crop-wild hybrid sunflower

Thursday, August 15, 2019
03:40 PM - 04:00 PM
Kentucky International Convention Center - L004

Background/Question/Methods

Hybridization is common in plants and can lead to the introgression of alleles from one population into another, generate new hybrid lineages, or cause species extinction. The environment and genetic background can influence these outcomes since they can affect the fitness of hybrids, thereby increasing or decreasing the chances of introgression. Thus, it is important to understand the context-dependence of introgression of alleles into diverse populations and under multiple ecological environments. Crop-wild hybridization presents an opportunity to explore these dynamics in agroecosystems. To this end, we grew diverse wild and crop-wild hybrid sunflowers (*Helianthus annuus*) from across the northern latitudes of the USA under agricultural conditions in Minnesota with and without wheat competition. We then evaluated them for morphological and phenological traits, as well as fitness components, in order to assess variation in traits and the dynamics of context-dependent selection acting on them.

Results/Conclusions

We found substantial variation due to competition, cross type (wild vs. F1 hybrid), and geographic origin, as well as interactions among these factors, for most traits. Interactions between geographic origin and cross type appeared to affect expression of early traits, while interactions between competition and cross type affected some fitness components. We frequently found cases of directional selection, but also appear to have identified cases of stabilizing and disruptive selection. In general, wild-like values of traits were favored under control conditions, while, under wheat competition, some crop-like values of traits related to fast growth and primary head diameter were favored. These data reaffirm the hypothesis that stressful conditions establish a scenario more suitable for crop introgression and clarify that directional and disruptive selection may be important forces driving this process.

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