Science Societies

How to support trans-species barley embryos

February 21, 2021

Lead author Dr. Abdullah Mohammed placing rescued five-day-old barley embryos onto tissue

Lead author Dr. Abdullah Mohammed placing rescued five-day-old barley embryos onto tissue culture media to allow them to mature into seedlings. Photo by Omar Nazhan Ali.

During barley's 10,000-year history, farmers and breeders selected for yield, reducing its genetic diversity. Now, climate change in the Middle East has decreased rainfall, increasing soil salinity and reducing barley yield on 70% of the cultivated land. Breeding for salinity tolerance is an important goal. Wild barley relatives exist that can provide many traits, including salt tolerance, if they could be crossed into the domestic species. However, most of the embryos of these crosses abort if left on the parent plant.

In a recent *Agrosystems, Geosciences & Environment* study, researchers crossed five domestic diploid barley lines with six wild tetraploid barley lines from the Middle East. Because the wild barley lines had twice as many chromosomes, they also doubled the

chromosome numbers in the domestic lines, making them tetraploids. All embryos had to be rescued three to five days after pollination and were placed on Gamborg's B-5 and Murashige and Skoog media.

Each hybrid embryo had individual media preferences. Doubling domestic barley's chromosome number and then crossing with the wild barley resulted in a small number of additional progeny, and their growth while on media also depended on the specific cross. Three additional experiments using the viable progeny from this research have resulted in viable and fertile offspring with greater salt tolerance than their respective parents.

Dig Deeper

Mohammed, A.H., Morrison, J.I., & Baldwin, B.S. (2020). Interspecific crosses between domestic and wild barley and embryo rescue to overcome sexual incompatibilities. *Agrosystems, Geosciences & Environment*, *3*, e20130. **https://doi.org/10.1002/agg2.20130**

More science articles

Back to issue

Back to home