Breeding under Conventional Conditions Can Be Effective for Organic Farming

Organic agriculture poses other demands on crop characteristics than conventional high-input conditions. The question is whether crop cultivars adapted to low-input organic management can be selected under conventional conditions, or is a selection program under organic conditions more appropriate?

In a recent article published in *Crop Science*, researchers compared the results of selection under conventional management with selection under organic management for two barley progenies derived from parental combinations suitable to serve an organic breeding program. Lines were selected in parallel at both management conditions for several generations. The best lines selected in each separate environment were then compared at all four sites for yield and several agronomic traits relevant to organic farming.

Although the results differed per cross, the authors conclude that direct and indirect selection in early breeding stages are equally suitable for the development of cultivars for organic conditions if care is taken that selection considers yield in combination with other traits important for organic farming.

This result will allow breeders interested in serving the organic market to efficiently integrate the selection for organic varieties in their conventional breeding scheme.


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Society Science

Do More Seeds per Panicle Improve Grain Sorghum Yield?

Both seed number and seed weight are important to grain yield of sorghum, but seed number is often considered the most important yield component. Because sorghum is often grown under water-limiting conditions, the evaluation of water stress on seed number, seed mass, and corresponding grain yield is of fundamental importance.

A recent article in *Crop Science* compares the yields of two grain sorghum lines. One was an experimental mutant line with enhanced seed number (tri-seed) while the other was the parent inbred line with fewer but larger seeds.

Although the tri-seed line had significantly more seeds compared with the parent line, the increased seed number did not adequately compensate for the significantly smaller seed weight. Both lines exhibited similar panicle masses and harvest indices, but the tri-seed averaged 12% less yield. The yield advantage of the parent line was greater at the low irrigation level and was principally attributable to reduced seed number of the tri-seed line under water stress.

If further breeding efforts enhance the tri-seed line’s potential for increased seed mass and yield, expression of these characteristics under water stress is critical for adaptation to dryland and deficit irrigated production.

Adapted from Tolk, J.A., and R.C. Schwartz. 2016. Do more seeds per panicle improve grain sorghum yield? *Crop Sci.* 57. View the full article online at http://dx.doi.org/doi:10.2135/cropsci2016.04.0245

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Barley. Source: Wikimedia/Pam Brophy.

Representative heads from the tri-seed sorghum variety. Source: Judy Tolk.

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