

Heterosis of agronomic and Quality Traits in Korean Sorghum Hybrids

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[Introduction]

Specialty food markets are continually interested in food grains with unique attributes and qualities. The objective of this study was to evaluate the relative effects of genotype on the agronomic performance of 10 grain sorghum hybrids, verify the increase of total phenols and flavonoids contents.

[Material and Methods]

To produce 10 F1 hybrids, two cytoplasmic male sterile lines (ATx630, A03017) and five male fertile lines (Sodamchal, Donganme, Jungmo4002, Hwanggeumchal and Nampungchal). The experiments were conducted in Miryang, Korea (35° 29' 31.7" N 128° 44' 31.0" E). Sorghum was planted on 29 June 2016 in a 60cm by 20 cm space (plant density: 87,500 plant/ha) with fertilizer level of 100:70:80 NPK kg/ha. The data were subjected to LSD analysis using R version 3.2.2. Pollinator parent heterosis (PPH) using the equation $HPH = ((X_{\text{hybrid}} - x_j) / 100)$, where X_{hybrid} is the hybrid mean and x_j is the mean of the pollinator inbred yield used to create that hybrid.

[Results and Conclusion]

For every hybrid, the grain yield of hybrid was no less than Pollinator parent. Heterotic responses for quality traits varied greatly. Some sorghum hybrids had positive heterosis for phenols: A03017 x Hwanggeumchal (73.3%) and flavonoids: ATx630 x Nampungchal (18.0%), while A03017 x Donganme had negative heterosis for flavonoids (-53.3%). The study suggests that F1 hybrids have advantage over pure lines for yield except that quality traits concentrations of some F1 hybrids were lower than pure lines. Therefore, contents of quality traits should be the target for sorghum improvement program and higher quality traits is possible in sorghum hybrids with higher yield.

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