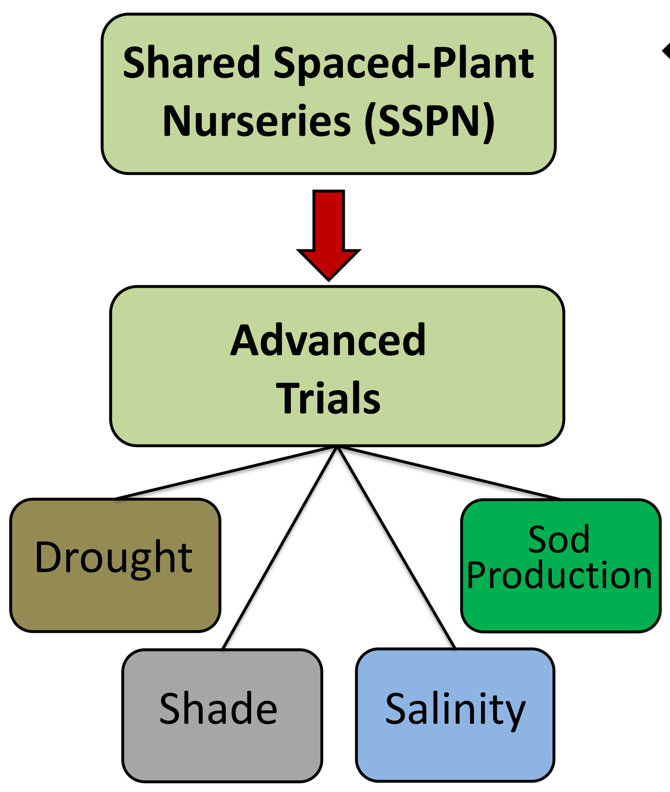
Performance under drought of four warm-season turfgrass species in the Southern US

Beatriz T. Gouveia[1], Brian Schwartz[2], Yanqi Q. Wu[3], Kevin E. Kenworthy[4], Ambika Chandra[5], Paul Raymer[6], Esdras M. Carbajal[1], Susana R. Milla-Lewis[1]

[1]NC State University, Raleigh , NC [2]University of Georgia, Tifton, GA [3]Oklahoma State University, Stillwater, OK [4]University of Florida, Gainesville, FL [5]Texas A&M University, TX [6]University of Georgia, Griffin, GA

Introduction

Specialty Crops Research Initiative project:



- The objective of this study was to evaluate the performance under drought of seashore paspalum. bermuda-, St. Augustine-, and zoysiagrass breeding lines from five breeding programs across the southern United States.

Materials and Methods

- Germplasm: Breeding lines of seashore paspalum (UGA), bermuda- (OSU and UGA), St. Augustine- (NCSU, TAMUS and UF), and zoysiagrasss (TAMUS and UF) were included.
- Field trials were conducted in Dallas-TX and Citra-FL from 2016 to 2019 as randomized complete block designs with three reps.

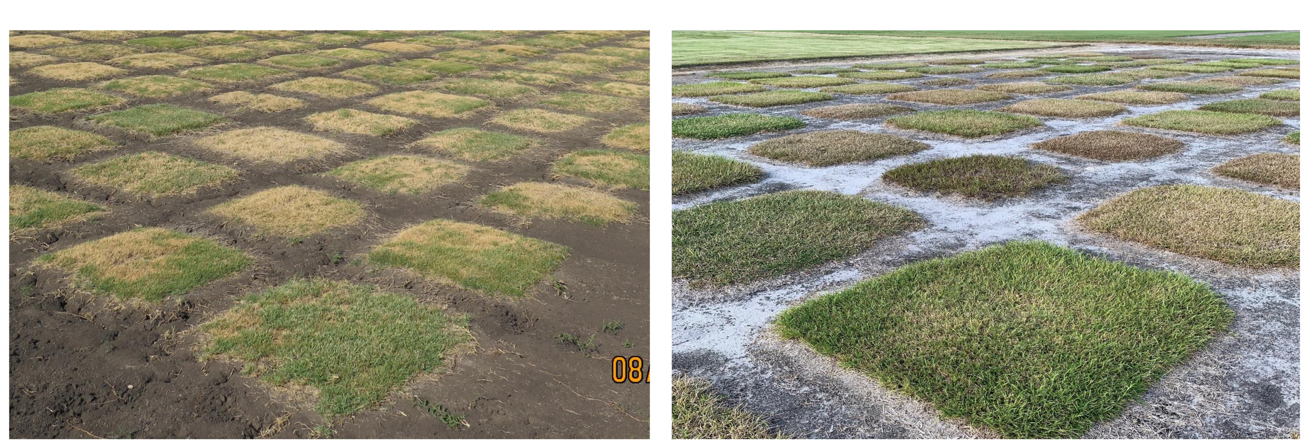


Figure 1. Field trials of zoysiagrass in Dallas, TX (left) and St. Augustinegrass in Citra, FL (right) under drought conditions.

- Response variables evaluated: Percent living ground cover (%GC), and turfgrass quality (NTEP ratings from 1 to 9) under drought (TQD) and non-drought (TQND).
- Data were analyzed using a mixed model approach. Generalized measures of heritability, and type-B and type-A genetic correlations were estimated.

Results

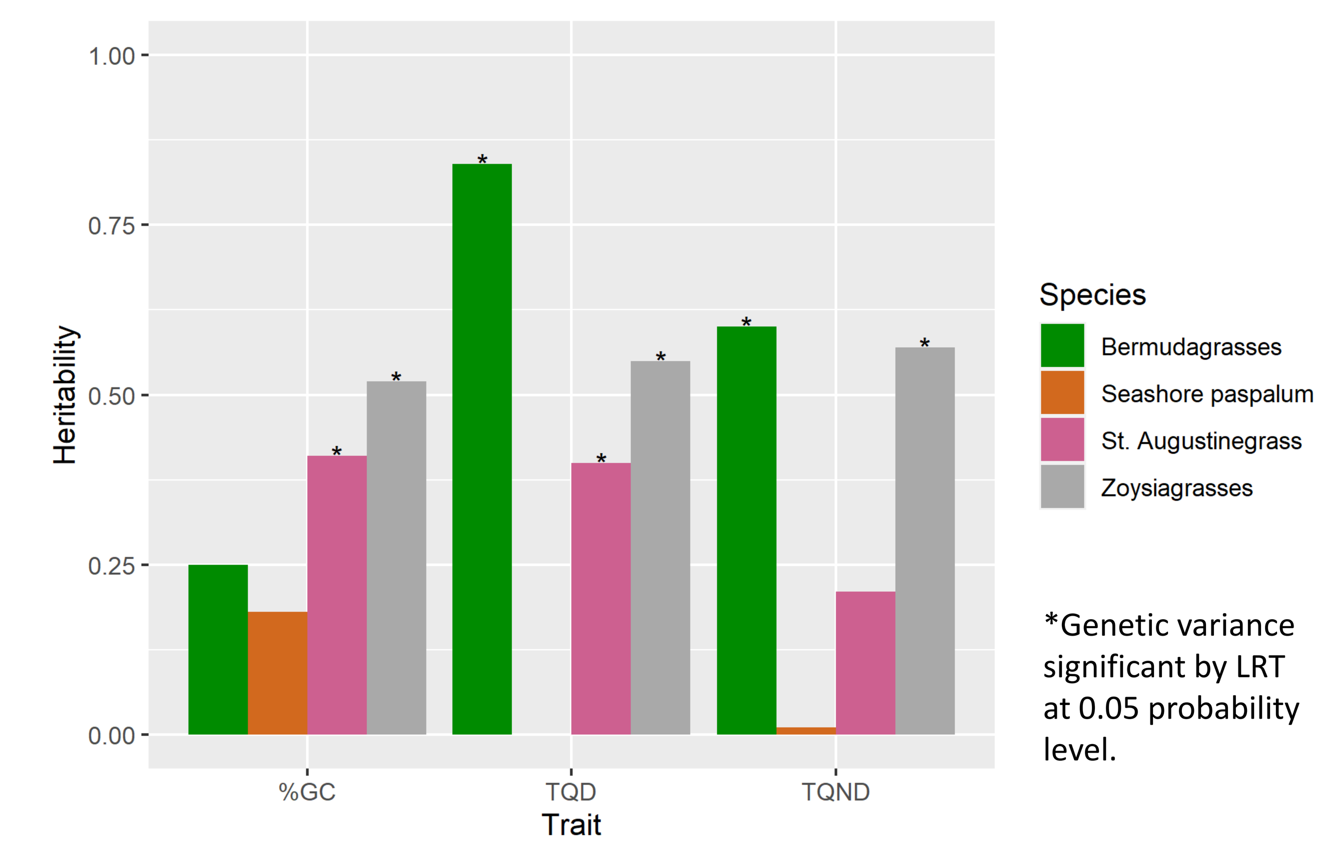


Figure 2. Generalized measures of heritability (H^2) for field trials evaluated for percent living ground cover (%GC), and turf quality under drought (TQD) and non-drought (TQND) conditions in Citra, FL and Dallas, TX.

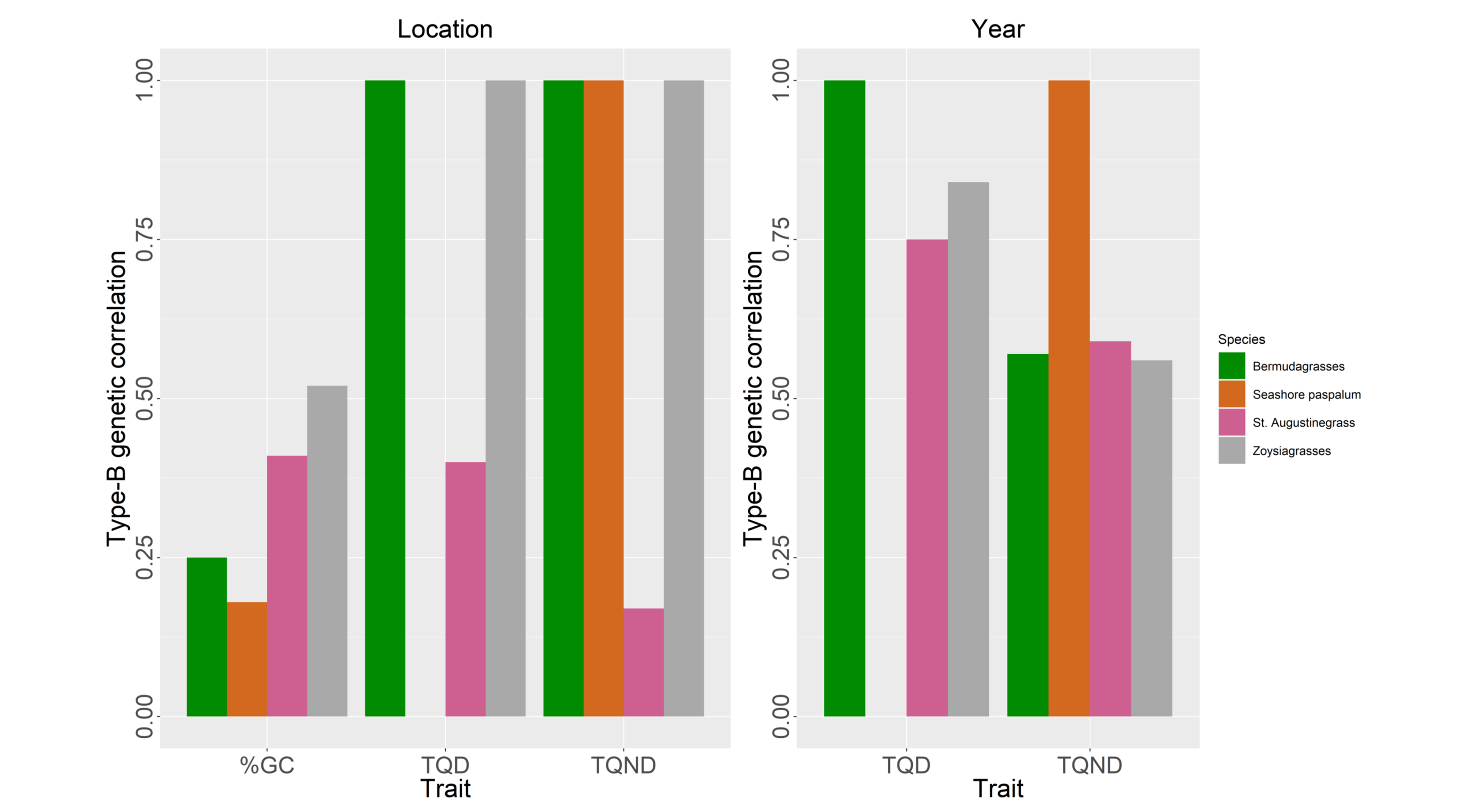


Figure 3. Type-B genetic correlation (r_g) across locations and years for field trials evaluated for percent living ground cover (%GC), and turf quality under drought (TQD) and non-drought (TQND) conditions.

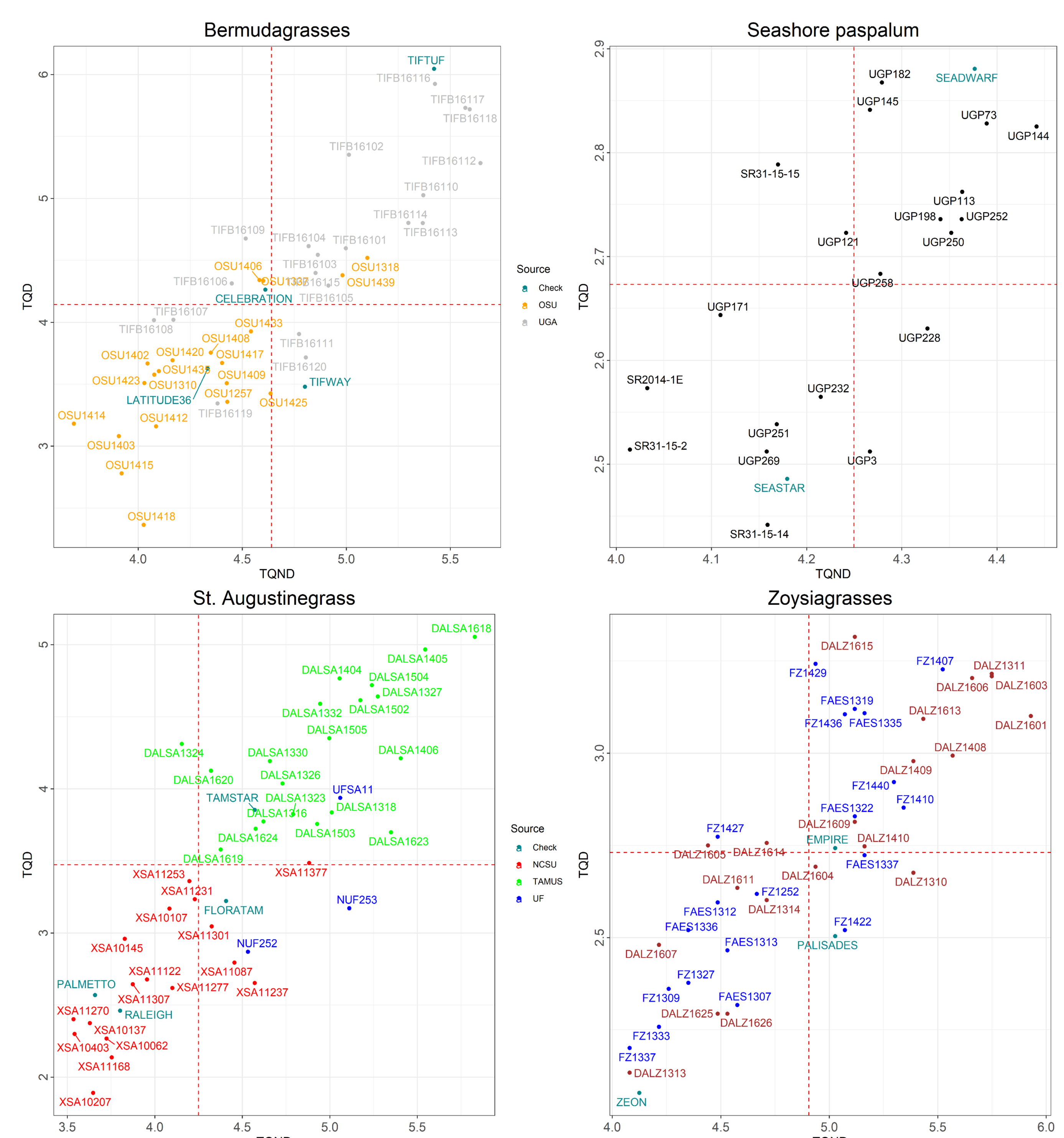


Figure 4. Predicted values for TQD and TQND conditions from breeding lines evaluated in multi-environment trials. The type-A correlation between TQD and TQND was 1 for all species except St. Augustinegrass (0.89) in the multi-environment analysis.

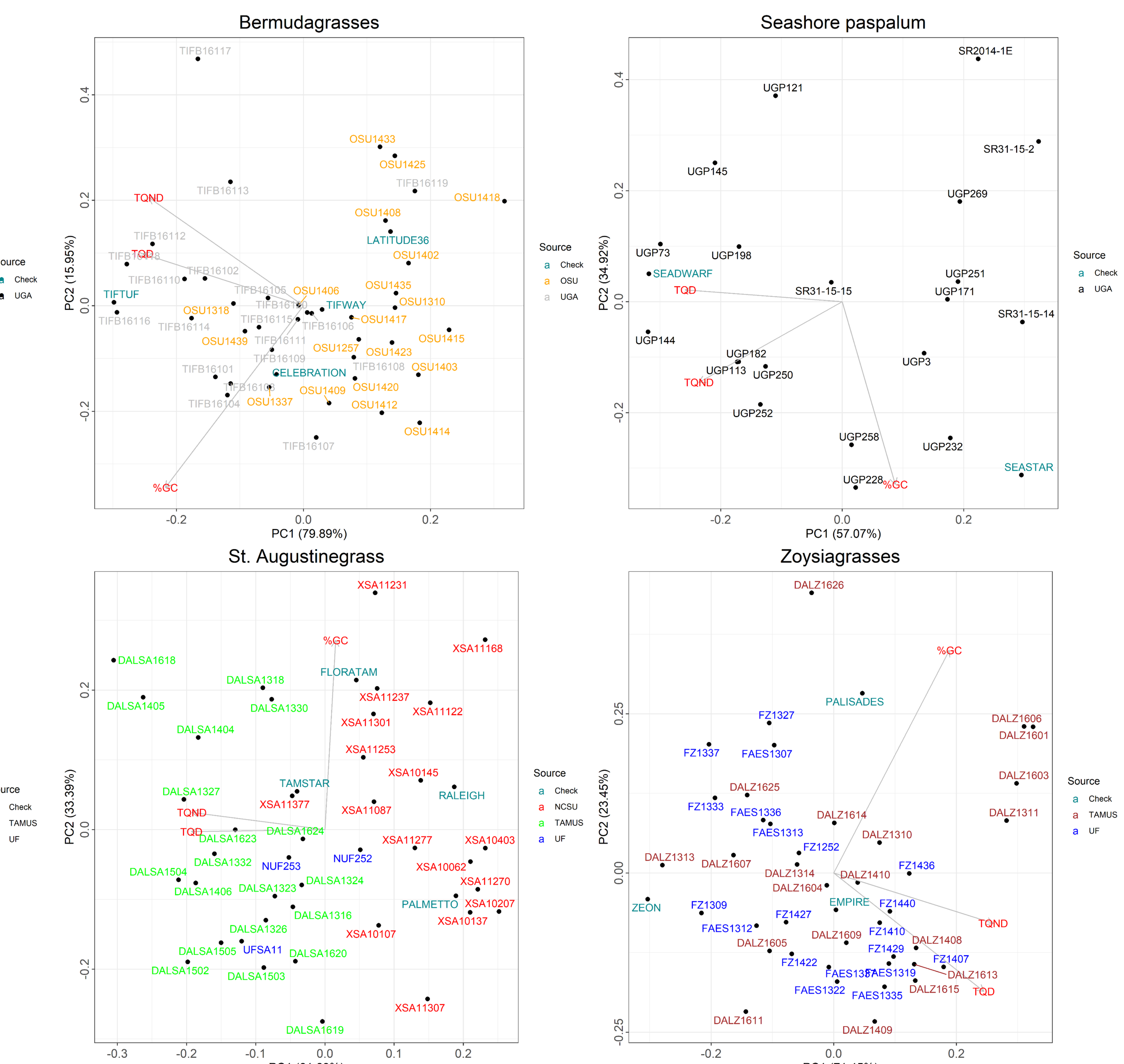


Figure 5. Multi-trait principal component analysis using the predicted values for %GC, TQD and TQND from breeding lines evaluated in multi-environment field trials. The correlation between %GC and TQD, and %GC and TQND were low in all species.

Conclusions

- Genetic variability was observed for TQ in all species, except seashore paspalum.
- Indirect selection can be an effective method to select drought resistant genotypes.

Acknowledgements

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