Improving Curly-Mesquite (*Hilaria belangeri*) for Winter-Hardiness and Turf-Type Characteristics

James R. Underwood¹, Dennis L. Martin¹, Justin Quetone Moss¹, and Yanqi Wu²

**Background**

- Curly-mesquite (*Hilaria belangeri* (Steud) Nash) is a warm-season perennial short grass native to Mexico, as well as to the semi-arid and arid areas of Texas, New Mexico, and Arizona in the United States (USDA-NRCS, 2016).
- It has been mixed with buffalograss (*Bouteloua dactyloides* (Nutt.) J.T. Columbus; or *Buchloë dactyloides* (Nutt.) Engelm.), as well as, blue grama (*Bouteloua gracilis* (Willd. Ex Kunth) Lag. ex Griffiths) to create more diverse turfgrass mixes for lawns in warm semi-arid and arid climates. Example: Habiturf® (LJWC, 2016).
- Curly-mesquite was grown in an identification plot (Figures 1 and 2) and has regularly winter-killed at Stillwater, OK (J. Underwood, unpublished) and herbarium specimens from USDA cold hardiness zone 7a are rare (USDA-NRCS, 2016).
- No cultivars of curly-mesquite have been released to the public.

**Long-term Goal:**

- To produce a seeded cultivar of curly-mesquite having improved winter-hardiness, herbicide-tolerance, and tolerance to lawn conditions that is useful in mixing with buffalograss for low-maintenance lawns in the colder and drier areas of the Southern/Central Great Plains region of the United States.

**Short-term Goals:**

1. Generate vegetative plugs of 1,012 individuals germinated from seed of a broad-based genetic population (Figure 5) [curly-mesquite seed was donated by Turner Seeds of Breckenridge, TX].
2. Establish a non-replicated single space plant nursery of 1,012 individuals via vegetative means in spring for an initial first-year establishment rate, mowing quality (5 cm), and winter-hardiness screening at Stillwater, OK (Figure 4).
3. Following spring green-up, select advanced lines from Goal 2 screening for intensive turf-type performance and winter-hardiness screening based on the mowing quality ratings, establishment ratings, and winter-hardiness ratings, and plug the 25 best performing entries into new two replication single space nursery (Figure 5). Advanced lines to be rated for turf-type characteristics and winter-hardiness (Figures 6 and 7).
4. Superior lines from Goal 3 single space nursery allowed to cross-pollinate and set seed under non-mowed conditions* (Figures 8 - 11). *Seed to be hand collected from plants periodically throughout summer and fall [current progress].
5. Test for seed set and seed germination of F1 generation from advanced single space nursery (Goal 4), vegetative expansion of F1 individuals to a new single space plant nursery following spring. Evaluation of the new single space plant nursery for mowing quality and winter-tolerance.
6. Repeat steps 3 – 5 (Goals 3-5) to enhance population tolerance to mowing, zone 7a winters, common native lawn maintenance, herbicide tolerance, while maintaining fertility.

*Advanced trial single spaced nursery was mistakenly mowed at 12.7 cm in August 2018 (Figures 9 and 10).

**Achievements:**

- Initial planting of 1012 individual plants was reduced to 25 improved plants through selecting for the characteristics of first-year winter-hardiness, mowing quality, and rate of establishment.
- Improved plants where moved to a single advanced trial containing two replications (25 entries) in summer of 2016.
- After summer of 2017 only 21/25 entries were found to survive under mowed conditions (11/25 had survival in both replications).
- After summer of 2018 only 15/25 plants alive (only 1 entry had survival in both replications), no plants in original 2016 planting survived past spring of 2018.
- In 2018, seed was harvested from 13/15 surviving entries, two entries were too weak after the summer to produce a seed crop.

**References**


**Acknowledgements**

- Turner Seeds (Breckenridge, TX) for their donation of curly-mesquite seed.
- Dr. David Kopec at the University of Arizona for his suggested management practices of curly-mesquite.
- Oklahoma Agriculture Experiment Station (OAES) and specifically Field Research Service Unit of the OAES.
- Mr. Bart Frie Station Superintendent, Dan Valdez, and the student crew for their work in research plot preparation and maintenance.
- Clayton Hurst, Lydia Callhoun, and Oklahoma State University turfgrass graduate students and student employees for their assistance.