Nativegrasses and Groundcovers for Landscapes of the Southwest U.S.A.

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Background

Water use limitations that are imposed on golf courses to conserve irrigation water are indications of an urgency to find appropriate plant materials to satisfy the landscaping needs in the southwest United States. A demand for finding desert-adapted alternative plant materials led to conducting an evaluation of nine native and two non-native plant species as low input and minimum maintenance plant materials in Arizona.

Objectives

1. Evaluate the performance of nativegrasses and alternative groundcovers in the low desert southwest United States as low input turfgrass replacements in non-play areas of golf courses.
2. Generate local research-based information on the feasibility of growing new groundcovers and the nativegrasses.
3. Increase the awareness by turf and landscape managers about the characteristics of nativegrasses and alternative groundcovers for low water use requirements and potential resource saving capacity.

Materials and Methods

Field trials consisting of 11 plant species (Table 1) were initiated in May, 2016 at Camelback Golf Club in Scottsdale, AZ and in June 2017 at Briarwood Country Club in Sun City West, Arizona. Treatment plots measuring 2.8 or 3.3 m^2 were arranged in a randomized complete block design with 3 or 4 replicates. Overhead irrigation varied and was adjusted for summer, fall, winter, and spring. Overall visual quality rating was evaluated each week for greenness, ground cover, and uniformity. The quality ratings from 1 to 9 were (1 = poor and 9 = excellent). Greenness ratings from 1 to 9 were: (1 = brown and 9 = dark green). In this study, nativegrasses and groundcovers with potential qualities were determined as those that showed moderate to high quality (average ratings ≥ 5) across the years and seasons. Visual ground cover ratings from 0 to 10 were measured for plots with almost no vegetative cover (0) and complete coverage of the area with no visible soil (10). Data were analyzed using JMP ver. 13 statistical software and means compared using Student's t-test.

Table 1. Nativegrasses and groundcovers planted for landscapes in the southwest U.S.A.

Common name	Scientific name	Seed rate (kg/ha)
Alkali sacaton	*Sporobolus airoides*	3.36
Alkali muhly	*Muhlenbergia asperifolia*	1.35
Blue grama	*Bouteloua gracilis*	4.48
Buffalograss	*Bouteloua dactyloides*	244.00
Teff	*Eragrostis tef*	5.60
Plains lovegrass	*Eragrostis intermedia*	1.12
Big galleta	*Hilaria rigida*	195.00
Sand dropseed	*Sporobolus cryptandrus.*	1.12
Spike dropseed	*Sporobolus contractus*	1.12
Desert zinnia	*Zinnia acerosa*	2.47
Kurapia	*Lippia nodifora*	17628 (plugs/ha)

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Results and Discussion

Nativegrasses and groundcovers showed variable performance for the overall plant qualities across the 4 seasons and over two locations:

- Amount and uniformity of irrigation markedly affected the establishment, time to cover the area, and growth uniformity;
- Big galleta, blue grama and Kurapia exhibited the best **uniformity** over both locations;
- Kurapia, big galleta and blue grama best **covered** the plot areas at both locations;
- Kurapia, alkali sacaton, blue grama, plains lovegrass, and alkali muhly, remained **green** throughout the year;
- Plant area coverage was significantly correlated to the growth uniformity of the plants;
- Kurapia, plains lovegrass, alkali sacaton, blue grama, big galleta, and alkali muhly performed well for all quality parameters at Scottsdale, AZ;
- Big galleta, blue grama, Kurapia, and sand dropseed performed well in Sun City West, AZ;
- The evaluations and observations at both sites indicated that Kurapia was very aggressive and vigorous as a groundcover.

Time period	Scottsdale 2016 – 2017	Sun City 2017
	mm/day	
June 6 – July 3	8.88	1
July 4 – Sept 8	6.00	0.024
Sept 9 – Sept 24	3.84	0.0024
Sept 25 – Dec 1	3.84	0.0024
Dec 1 – Feb 28	0	0

Figure 1. Amount of irrigation (middle table) for the establishment of nativegrasses and groundcovers under field conditions. Species well-established at optimum irrigation as early as 7 weeks after planting at Scottsdale, AZ, (left). Slower establishment with less water during intense June-July heat at Sun City West, AZ, 14 weeks after planting (right). Note the differences in greenness, coverage and uniformity between the two locations.

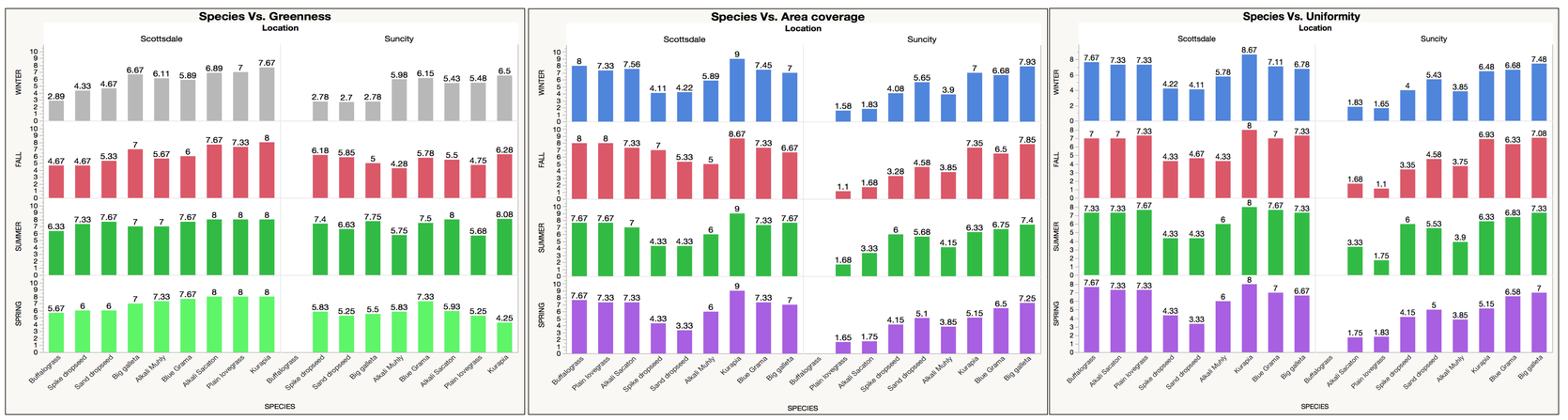

Figure 2. The performance of nativegrasses and groundcovers in greenness (left), ground surface coverage (middle), and uniformity (right) across the four seasons (summer, fall, winter and spring) at Scottsdale and Sun City West, AZ. Note the quality values of ≥ 5 is acceptable quality for each parameter.

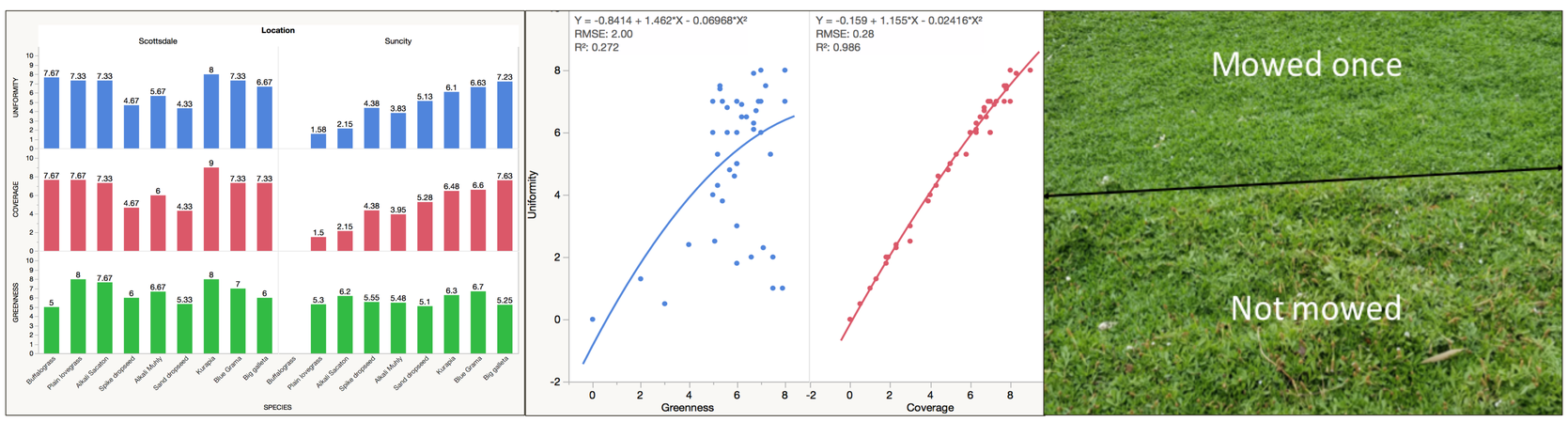

Figure 3. Greenness, area coverage and uniformity of nativegrasses and groundcovers under field conditions of two locations (left). The significant correlation of area coverage to the growth uniformity of species (middle). The beautiful appearance of Kurapia when mowed, and proliferation of flowers when not mowed (right) during the 2017-2018. Note the quality values of ≥ 5 is the acceptable quality for each parameter.

Conclusion

- Nativegrasses and groundcovers exhibited variable performance for the overall plant qualities with low inputs;
- Differential growth between tall and short stature nativegrasses provided information for potential sites where each type of grass could be utilized;
- The establishment period was not the time to withhold water;
- Uniform irrigation is required to obtain even establishment and full area coverage;
- Continued research replicated over locations and seasons are needed to obtain more reliable information about each species desirable growth characteristics, their required inputs, and pest management requirements.