Forage News

MISSISSIPPI STATE UNIVERSITY EXTENSION
Center for Forage Management and Environmental Stewardship

Annual Ryegrass Performance in Mississippi

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There are over 60 varieties of annual ryegrass commercially available that are grouped in two different types based on their number of chromosomes (ploidy level). These two types include diploid and tetraploid varieties. Diploid varieties have to set of chromosomes (2n = 14) in each cell, their cells are smaller in size with lower water (moisture) content, plant structures (leaves and seed size) are smaller, and the plant tend to produce more tillers. Higher tiller density can provide a denser stand and be more competitive with weeds, sustain production in lower fertility and wetter soils. Diploids also tend to have more a prostrate growth (horizontal) which allows the stand to be more persistent in heavy grazing scenarios. On the other hand, tetraploid varieties have four set of chromosomes (4n = 28) in each cell with larger cell size, larger (wider) leaves, larger seed size, greater content of soluble carbohydrates (sugar and starch) and less fiber content. Tetraploid varieties are developed by treating germinating seed with specific compounds that cause a mutation in the chromosome number. Tetraploids tend to have higher water content in their cells and therefore animals can fill up faster and reduce dry matter intake. Tetraploids have a slower recovery after grazing than diploids because they do not tiller as aggressively and they can also be susceptible to overgrazing because of higher palatability which can lead to overgrazing. Since tetraploids do not tiller vigorously as diploids, they could be good candidates for mixtures with clovers and reduce species competition. In general, tetraploids tend to mature later than some diploids.

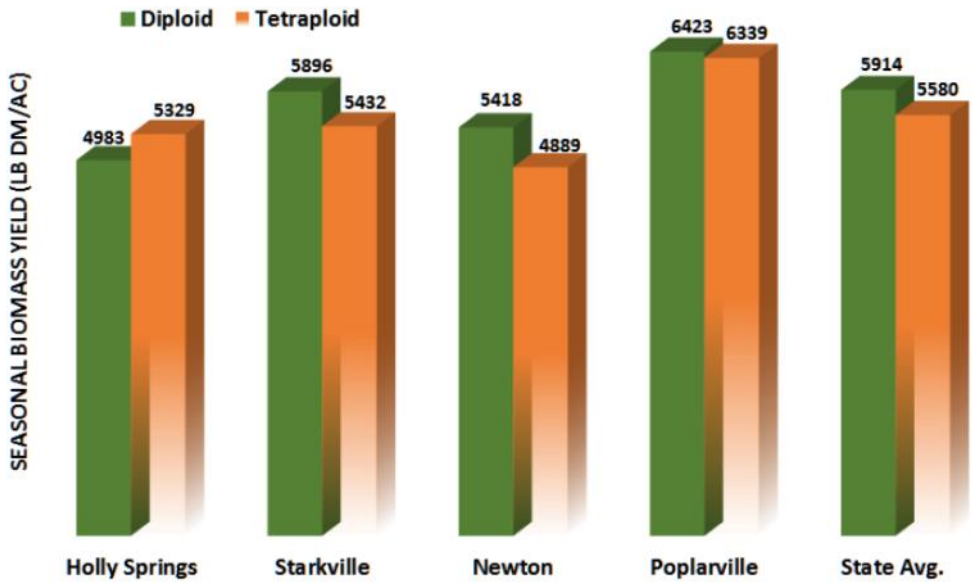

Figure 1. Biomass production of diploid and tetraploid annual ryegrass across different locations in Mississippi. Data summarized over a five-year average yields from 2012 to 2017. Source: White et al., 2013-2017.

Although these differences between annual ryegrass types may not be obvious early in the season, they can become more apparent as the season progresses and grazing pressure is implemented. A five-year summary of annual ryegrass types across locations in Mississippi has indicated that diploids may provide a slightly higher seasonal yield than tetraploids, but the differences are very small from location to location (**Figure 1**). Each annual ryegrass type and variety has its strengths and weakness, make sure that you select one that could provide the greatest advantage for your unique grazing situation. Your management and utilization along with the environment will play big roles in which variety you decide to plant for grazing purposes.

Yield measurements from the variety trial are extremely important in determining the number of acres to plant, the amount of fertilization needed and the number of animals that grazing system can sustain. Knowing average yields will allow forage/livestock producers to better match nutrient applications to minimize costs, maximize fertilizer efficiency and

reduce potential environmental problems. Yields are also critical as a measuring tool to evaluate new varieties, improve management techniques and allow producers to make more informed decisions concerning feeding practices for their livestock. Knowing the estimated forage for winter grazing would allow producers to buy or sell forage at the time of the year that would be most financially feasible. Due to the number of annual ryegrass types and varieties available in the market, there is some confusion among producers when it comes to choosing the ideal one for a grazing system. Mississippi State University Forage Variety Test Program evaluates a good portion of experimental and commercially available varieties every year to determine how they will perform across different locations. Entries into the variety trial program are submitted voluntarily into the program by seed companies and the number of varieties might vary from year to year. Information from variety trials is used as a third party verification on variety performance that will allow livestock producers to make more informed decisions on what varieties might be more suitable for their area. When available, using data from multiple years as an average might provide a better assessment on varietal performance than a single year, due to changes in weather conditions, especially temperature and precipitation that could affect production from year to year. Data summarized in **Table 1**, provides a better assessment of annual ryegrass production across the state. A six-year yield mean of annual ryegrass yield range from 4,928 pounds per acre in Holly Springs to 6,464 pounds per acre in Poplarville. The state average dry matter yield was 5,649 pounds per acre. The overall yield potential of annual ryegrass was below the state average for Holly Springs and Starkville, while the largest increase in yield potential has been observed in Poplarville. This could be related to temperature and rainfall gradients across these locations during the growing season. Across the state, diploid varieties have a slightly higher biomass production than tetraploid varieties, except for Holly Springs. Performance of varieties across the state also indicated that 73 percent of the tetraploids may have negative relative yield (RY) compared to 33 percent of the diploid varieties. Data from the variety trial at Mississippi State has not reflected the yield advantage of tetraploids in Mississippi as it has been observed in other locations across the southern USA, but this could be management, fertility and environmental conditions dependent. Tetraploids might offer an advantage in forage production early in the spring season, but by March there is a balanced biomass production among the varieties. For more information on Mississippi State Forage Variety Trial visit
http://mafes.msstate.edu/variety-trials/forage.asp

Table 1. Annual Ryegrass Performance in Mississippi: Six-year Yield Summary. Yields are expressed in pounds of dry matter per acre.

Variety	Years	Ploidy Level	Holly Springs	Starkville	Newton	Poplarville	State Avg.	RY (%)
Bulldog Grazer	3	Diploid	4305	5041	5032	5799	**5044**	**-10.9**
Ed	2	Diploid	3309	4611	6237	5897	**5014**	**-11.5**
Flying A	6	Diploid	5432	5242	5671	6570	**5729**	**1.2**
Fria	6	Diploid	5564	4826	5491	6803	**5671**	**0.2**
Jackson	6	Diploid	5309	5315	5600	5675	**5475**	**-3.3**
Lonestar	6	Diploid	5190	5676	5570	6936	**5843**	**3.2**
Marshall	6	Diploid	4496	6158	6528	6450	**5908**	**4.3**
Passarel Plus	2	Diploid	6755	6534	6952	6263	**6626**	**17.0**
Winterhawk	6	Diploid	5428	5805	5573	6777	**5896**	**4.1**
Attain	5	Tetraploid	5486	5618	6219	6975	**6075**	**7.3**
Big Boss	4	Tetraploid	5368	5548	5189	6722	**5707**	**0.8**
Diamond T	5	Tetraploid	4718	6705	6389	7418	**6308**	**11.4**
Earlyploid	3	Tetraploid	3462	5847	7635	5600	**5636**	**-0.5**
Jumbo	6	Tetraploid	4991	5080	5464	6002	**5384**	**-4.9**
Maximus	6	Tetraploid	4618	5601	5686	6693	**5650**	**-0.2**
Meroa	2	Tetraploid	5578	4944	5343	6552	**5604**	**-1.0**
Nelson	6	Tetraploid	4848	5441	5238	7030	**5639**	**-0.4**
Prine	4	Tetraploid	3927	4774	6073	6418	**5298**	**-6.4**
TAMTBO	6	Tetraploid	4950	5006	5032	6669	**5414**	**-4.4**
Tetrastar	6	Tetraploid	4835	4909	5495	6037	**5319**	**-6.1**
Location Avg.			**4928**	**5434**	**5821**	**6464**	**5662**	**--**
Relative Yield (%)			**-13.0**	**-4.0**	**2.8**	**14.2**	**--**	**--**

Note: This summary contains commercial varieties that have been tested in the Mississippi State Forage variety trials for a minimum of two years across all locations from fall of 2011 to spring of 2017 (White et al., 2012-2017). Ploidy level refers to the number of chromosome sets in a biological cell and is often used in characterizing ryegrass varieties as either diploid (2x) or tetraploid (4x). Whether ploidy level is advantageous to a specific variety in regards to performance is more dependent on location. Relative Yield (RY) is the potential of annual ryegrass to perform well at a specific location when compared to the overall state average biomass production. Relative yield (RY) was calculated as the percent increase in yield when comparing the average state performance of a variety to the overall state average, RY = ((Agv. Var - Avg. State)/Avg. State)*100. Source: White et al., 2012-2017.

Upcoming Events

October 27, 2017—North Mississippi Beef Expo, Senatobia, MS

For upcoming forage related events visit: ***http://forages.pss.msstate.edu/events.html***

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