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DIPLOID VERSUS TETRAPLOID ANNUAL RYEGRASS FORAGE YIELD COMPARISONS IN TEXAS

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Background. Annual ryegrass (*Lolium multiflorum* L.) normally is a diploid (2n) and the species has 14 chromosomes. Tetraploid annual ryegrass (4n) is annual ryegrass in which the chromosome number has been doubled or has 28 chromosomes. This chromosome doubling process is carried out by treating germinating seed with chemicals resulting in a few seedling plants having doubled chromosomes. These plants are then selected and increased to develop the new tetraploids varieties. Cell size in tetraploid plants often is significantly larger, thus leaf width and length may be larger and thus forage yielding potential may be increased. This report will discuss comparisons between diploid and tetraploid ryegrass varieties at Overton and Beaumont, Texas over the past 5 years. In each location we have calculated the mean total season forage yields of the three highest yielding diploid and tetraploid commercially available varieties. These varieties were not the same over years or locations but the top three for an individual year and location.

Results (Table 1) show mean forage yields for the 2n and 4n varieties for each year and the percent increase or decrease for the tetraploid varieties. At Overton, the 4n varieties had a small increase in 4 of the 5 years. Only in the 2001-2002 growing season did 2n varieties produce a higher yield. At Beaumont, the trials were lost due to poor stands in 2 of the 5 years. In each of the years where data were obtained, 4n varieties produced a higher forage yield. This increase resulted in a 12% advantage for the tetraploid varieties. From these data we can draw two tentative conclusions; one is that tetraploids may have a slight advantage for forage yields compared to diploids. Second, the tetraploids seem to have a greater advantage at the southern location of Beaumont than they did at Overton. This second conclusion is supported by unreported data from Louisiana, Mississippi, Alabama and Georgia, where tetraploids have performed better in southern trials than in northern trials in each of these states. A word of caution; however, in the northern locations of each of the above states, diploid varieties were superior to tetraploids. We think this may be due to superior winter hardiness of the diploid varieties. Future trials should provide additional data to better understand this situation. Keep in mind a specific variety might be better adapted to a ranch and ploidy level may not be all that important.

Table 1. Mean season forage yields for highest yielding 3 diploid (2n) and tetraploid ryegrass varieties at Overton and Beaumont, Texas and percent increase or decrease of 4n entries.

Growing Season	Overton			Beaumont		
	Diploid (2n)	Tetraploid	% of 2n	Diploid (2n)	Tetraploid	% of 2n
	-----lb DM/ac-----			-----lb DM/ac-----		
2000-2001	5730	6303	110	-----no data*-----		
2001-2002	9817	9124	93	5350	5951	111
2002-2003	6182	6596	107	-----no data-----		
2003-2004	11387	11667	102	6741	7476	111
2004-2005	7266	7794	107	4463	5109	114
Mean	8076	8297	104	5518	6179	112

*No data were collected in 2000-2001 and 2002-2003 due to poor stands.