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FORAGE YIELD PRODUCTION OF SUDANGRASS (*SORGHUM VULGARE* VAR. *SUDANENSE*) AS INFLUENCED BY RATES AND SPLIT APPLICATION OF NITROGEN

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ABSTRACT : The study was conducted in Agriculture College farm, Basra University, Karmat Ali location (30° 57′ N lat., 47° 80′ long), during autumnal season - 2020, to study the effects of Nitrogen fertilizer rate s (0, 150, 200 and 250 kg N ha^{-1}) and three treatments of split application of nitrogen fertilizer which are (¼ after two weeks of sowing, + ½ after the first cut + ¼ after the second cut, ½ after two weeks of sowing + ¼ after the first cut + ¼ after the second cut, $^{1}/_{3}$ after two weeks of sowing, + $^{1}/_{3}$ after the first cut + $^{1}/_{3}$ after the second cut), on growth, green and dry forage yield of the hybrid of Sudan grass (FSG 214 BMRG6). The experiment was split-plots in R.C.B.D design with three replicates. Maximum total green and dry forage yield obtained at a rate of 200 kg N ha^{-1} were 169.134 and 48.303t ha^{-1} respectively Sudangrass total green and dry forage yield was significantly higher with application of 200 kg N ha^{-1} ×½ after two weeks of sowing + ¼ after the first cut + ¼ after the second cut, as compared to other treatments.

Key words : Forage yield, Sudangrass, *Sorghum vulgare* var. *sudanense*.

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INTRODUCTION

In recent years, agricultural production has become critical due to decreasing water availability and forcing farmers to grow crops that are highly water-efficient, especially in semi-arid regions of the world (Iqbal *et al,* 2015). Sudan grass (*Sorghum vulgare* var. *Sudanese*) has become increasingly important in animal feed (Lima *et al*, 2017). Forage sorghum species has many characteristics including wide environmental adaptability, heat and drought tolerance, high water use efficiency, rapid growth after grazing or cutting (Glamoclija *et al*, 2011). Sudan grass crop is one of the types of forage sorghum with a plant structure similar to it, except that it gives more branches and has finer stems compared to forage sorghum (Casler *et al*, 2003). In addition, Sudan grass is distinguished from forage sorghum by its ability excellent for growing quickly after harvest and is most suitable for grazing and hay production. One of the processes that increase production efficiency is the use of chemical fertilizers in appropriate quantities, especially nitrogen fertilizer, which is among the essential plant nutrients needed for plant growth (Fageria and Baligar, 2005) and has an important and major role in improving plant growth as one of the major elements that plants need in large quantities And that is through its participation and involvement in the manufacture of proteins, chlorophyll, protoplasm, amino acids, plastids, mitochondria and energy compounds, in addition to its role in encouraging the division, expansion and elongation of living cells. nitrogen fertilizer timing and placement have a significant impact on the efficiency of nitrogen management systems. Nitrogen should be given to a crop at times that minimize massive losses and providing adequate nitrogen when the crop requires it. The date of adding fertilizer is more important than the quantity (Gupta, 2010). That the partitioning of nitrogen fertilizer, it's better than adding all at once and reduces pollution and loss of it. Due to the of a few number of studies about Sudangrass, this study was chosen for the purpose of studying the rate and timing of nitrogen application and its effect in the growth and forage yield of Sudangrass

MATERIALS AND METHODS

This study was performed during autumnal season / 2020 in Research farm, Basrah University, Karmat Ali

Table 2 : Effect of nitrogen rates and split application method on fresh and dry weight of Sudan grass hybrid.

Treatments	Green forage yield (t/ha^{-1})			Total green forage yield (t/ha^{-1})	Dry forage yield (t/ha^{-1})			Total dry forage yield (t/ha^{-1})
(N Fertilizer Rates)	1st cut	2nd cut	3rd cut		1st cut	2nd cut	3rd cut	
N0	38.352	45.076	10.798	94.225	11.353	14.393	5.621	31.366
N1	48.259	72.184	18.233	138.677	13.287	18.399	7.466	39.152
N2	66.196	82.407	20.533	169.134	18.145	20.611	9.548	48.303
N3	61.362	79.144	18.827	159.333	17.061	18.751	8.736	44.584
L.S.D. ($p \leq 0.05$)	4.973	4.138	1.467	7.641	0.754	1.033	0.608	1.469
S1	53.994	69.677	16.367	140.038	15.382	18.317	7.223	40.922
S2	57.382	71.855	16.940	146.177	15.509	18.184	8.246	41.939
S3	49.251	67.577	17.987	134.815	13.994	17.613	8.059	39.666
L.S.D. ($p \leq 0.05$)	2.213	2.588	N.S	3.207	0.624	0.494	0.731	0.974
N0S1	40.143	44.400	11.200	95.743	11.515	14.389	5.387	31.291
N0S2	37.650	46.220	10.313	94.183	11.227	14.172	5.500	30.899
N0S3	37.263	44.607	10.880	92.750	11.316	14.618	5.976	31.910
N1S1	51.100	66.453	15.367	132.920	13.577	17.923	6.791	38.287
N1S2	50.877	80.367	18.267	149.510	14.606	19.065	7.710	41.381
N1S3	42.800	69.733	21.067	133.600	11.681	18.210	7.897	37.788
N2S1	66.567	84.853	20.433	171.843	18.027	20.867	8.471	47.364
N2S2	72.333	82.733	20.167	175.233	19.301	21.034	10.372	50.708
N2S3	59.670	79.633	21.000	160.330	17.107	19.931	9.800	46.837
N3S1	58.177	83.000	18.467	159.643	18.412	20.091	8.244	46.747
N3S2	68.667	78.100	19.013	165.780	16.900	18.469	9.400	44.769
N3S3	57.243	76.333	19.333	152.577	15.871	17.693	8.564	41.128
L.S.D. ($p \leq 0.05$)	4.425	5.176	N.S	6.413	4.425	0.988	N.S	1.948

nitrogen rates × split application was also observed significant ($P < 0.05$). The green forage yield increased with an increase in the rate of nitrogen across the split application in 1st and 2nd cutting, while third cutting showed non-significant effect (Table 2). The maximum green forage yield 72.333, 84.853 t ha^{-1} was produced in the rate of 200 kg N ha^{-1} with S1 and S2 for the 1st and 2nd cuts, respectively. Similarly, sudangrass total green forage yield was significantly higher with application of 200 kg N ha^{-1} × S2 (175.233 t ha^{-1}) as compared to other treatments. On the other hand, the greatest forage dry yield was obtained at interaction of 200 kg N ha^{-1}×S2 about 19.301 and 21.034 t ha^{-1} in the 1st, 2nd cutting respectively, but it was non- significant at the 3rd cutting, also the total dry forage yield had the greater value at the same interaction (50.708 t ha^{-1}).

CONCLUSION

Nitrogen fertilizers are quick available compared to other fertilizers and in order to benefit the crop and reduce the lost quantities of it. The use of split nitrogen fertilizer treatments can improve overall nutrient management. Split nitrogen application can help growers enhance nutrient efficiency, In this research the effect of different levels of nitrogen fertilizer and its split application on yield, Therefore, application of 200 kg N ha^{-1} with split application ½ after two weeks of sowing + ¼ after the first cut + ¼ after the second cut gave the highest green and dry forage yield.

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