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YIELD AND QUALITY OF MAIZE FODDER AS INFLUENCED BY DIFFERENT STAGES OF HARVESTING AND NITROGEN RATES

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Maiz (Zea mays L.) after wheat and rice is the third important cereal crop in Pakistan. It is also an important kharif fodder [1]. It requires nitrogen in abundence when grown as forage crop [2]. Corn silage showed significant linear increase in dry matter yield as the rates of nitrogen increased at early growth stages, however, it was little affected at maturity stage [3-5]. They further concluded that increased nitrogen increased plant height, number of leaves and diamenter of stalk. The present study was therefore, planned to investigate the best level of nitrogen and stage of harvesting of maiz fodder under irrigated conditions.

The field experiment was conducted on sandy loam in Lyallpur series (Typic camborthids) at the University of Agriculture, Faisalabad during 1986. The composite soil samples (0-30 CM) were collected before seed bed preparation and analyzed for the particle size and free line [8], available phosphorus, available K, total-N organic matter pH and electrical conductivity [10]. The soil contained pHs (8.1), electrical conductivity (1.8 Sdm-1), $CaCO_3$ (5.7%), organic matter (0.49%), total N (0.02%), available phosphorus (6.0ppm), available K (150.0 ppm). The maiz cultivar "Akbar" was sown on August 16, 1986 with single row hand drill in rows 30 cm apart, using a seed rate of 75 Kg/ha. The different dosses of nitrogen (0,56,84,112 kg/ha) in the form of urea and were applied in two splits (half at sowing and half at first irrigation by broadcast). Abasal doses of 15 cart loads of FYM and 50 kg p_20_5/ha in form of SSP was incorporated at seed bed preparation stage. The treatments were arranged in split plot with 4 replication and a met plot size of $36m^2$ (3x12m). The standard crop husbandry practices were adopted to raise the crop. Data were recorded from ten randomly selected plants from each experimental unit. The dry matter yield was estimated on oven dry basis. The protein content in whole plant was determined by method of Yoshida *et. al.* [11]. Data were analyzed using analysis of variance [12] and treatment means were compared by method of [13].

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It was observed from Table 1-i that plant height was significantly affected due to various nitrogen doses and stages of harvest. It increased with increase in nitrogen doses and cropage. The maximum yield was recorded in 112 Kg N/ha and at day 75 from planting treatment. Stalk diameter and number of leaves per plant also differed significantly due to treatments (Table 1-ii, iii). The maximum thicker stalks and number of leaves per plant were recorded in

TABLE 1. INFLUENCE OF DIFFERENT NITROGEN DOSES AND HARVESTING DATES ON VARIOUS PLANT PARAMETERS AND YIELD OF MAIZE FODDER.

Harvesting date (days)	Nitrogen rates 0	56	84	112	Mean
		(i) Plant height (Cm).			
45	71.5	91.7	111.5	147.0	105.0 c
60	114.3	186.3	213.5	266.8	195.0 a
75	148.0	214.00	242.0	302.0	236.0 a
Mean	110.0d	164.0c	189.0b	238.0 a	-
		(ii) Stalk diameter (cm).			
45	3.10	3.75	4.20	5.92	4.24 c
60	4.20	5.25	6.40	8.50	6.09 b
75	4.67	5.42	6.60	8.65	6.33 a
Mean	3.99d	4.81c	5.73b	7.70a	-
		(iii)Number of leaves per plant.			
45	6.6	8.5	9.4	12.1	9.2 c
60	8.8	11.2	12.0	14.6	11.7 b
75	9.3	11.1	12.3	14.9	11.9 a
Mean	9.2d	10.2c	11.2b	13.9 a	-
		(iv)Green weight per plant			
45	121.7	231.2	228.8	375.1	239.2 c
60	170.1	366.6	375.7	611.3	380.9 b
75	202.4	427.8	583.5	767.2	495.2 a
Mean	164.7d	341.9c	396.0b	584.5a	-
		(v) Dry weight per plant			
45	21.8	33.3	34.3	48.3	34.4 c
60	45.2	88.7	84.6	106.8	81.3 b
75	44.7	99.0	138.9	186.7	117.3 a
Mean	34.2d	73.1c	85.9b	113.9a	-
		(vi)Fodder yield (Kg/ha)			
45	24782	32885	36819	41695	34045 c
60	33494	43444	49966	57432	46083 a
75	35374	49025	54809	63148	50589 a
Mean	31216d	41785c	47198b	54092a	-
		(vii) Protein content (%).			
45	6.96	9.88	10.60	12.26	9.92 c
60	5.79	8.43	8.87	9.20	8.07 b
75	3.84	5.13	6.04	7.54	5.63a
Mean	5.53b	7.81c	8.50b	9.66a	-

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112 Kg N/ha and harvesting at day 75 after planting treatment. The green and dry weight per plant, increased significantly due to various nitrogen levels and stage of harvest (Table 1-iv,v). The maximum biological yield production was obtained with 112 KgN/ha and at 75 days after planting. The green fodder yield was also significantly affected by nitrogen rates and stages of harvest (Table 1-vi). There was progress increase in fodder yield due to each increment of nitrogen level and successive growth stages. The increase could be due to more plant height, more number of leaves per plant and greater thickness of stalks. The results are in agreement with those of [2-5]. The quality of fodder in respect of protein content was significantly affected due to nitrogen rates and stage of harvesting. The protein content increased progressively at each increment of nitrogen level, which may be attributed to adequate supply of nitrogen for protein synthesis. However, protein content decreased linearly as the harvesting was delayed. This might be due to excessive development of fibrous tissues as the plants advanced towards maturity. These results corroborate with those of [6,7].

It could be concluded from this study that height of plant, diameter of stalk, number of leaves per plant and green fodder yield of maiz increased significantly by the nitrogen rates and stages of harvesting. The protein content in whole plant increased at each increment of nitrogen addition however, it decreased at each successive harvest stage.

Key words: Zea mays L, Nitrogen rates, Stages of harvest, Green fodder, yield, protein content.

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