EFFECT OF SOWING DATE AND NITROGEN FERTILIZER ON SORGHUM (*Sorghum bicolor* L. var. Speed Feed) FORAGE PRODUCTION IN A SUMMER INTERCROPPING SYSTEM

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ABSTRACT. To evaluate the interaction effects of planting date and different levels of nitrogen fertilizer on sorghum (*Sorghum bicolor* var. Speed feed) forage production, an experiment was conducted in split plots based on a complete randomized block design in Agricultural Research Station of Khorramabad, Lorestan province, Iran. The experimental treatments comprised of three nitrogen fertilizer levels of control (N0), 100 (N1), and 150 kg per hectare (N2), assigned to main plots and three sowing dates of T1 (June, 10th), T2 (June 26th) and T3 (July 11th) assigned to subplots. Results showed that in sum of two harvests, the yield of hay, forage, leaf and shoot hay weigh in second planting date and N2 and N3 level of fertility was higher than all treatments. In the case of quality treatments the percent of crude protein in first harvest had the most amounts in first and second planting date and N1, N2 and N3 fertility levels. Crude fiber percentage in first harvest of second planting date was highest in N1, N2 and N3 levels of fertility. Treatment interactions had not any significant effect for crude fiber. The most ash percent was observed in first harvest and N1, N2 and N3 fertility level. In second harvest time N2 and N3 fertility levels were superior to the rest. Also, fat percentage in first and second planting date and N1, N2 and N3 increased than the control fertility treatment.

Key words: Crop management; Forage sorghum; Summer intercropping.

INTRODUCTION

Population growth and inability of rangelands to support livestock needs enhance agronomists to pay more attention to develop cultivation of forage plants. Sorghum with good characteristics like high yield y and
tillering potential, rapid growth and high nutrient contents is most considered in arid and semiarid regions of the world (Ayub et al., 2007).

Nitrogen is an important nutrient because of its many functions in the vital processes of plant growth and development. Nitrogen deficiency imposes most limits on crop production compared to other nutrients. With large areas of the arable land in Iran being located in arid and semiarid regions, most of them face low organic matter content as well as nitrogen deficiency. To achieve an economically sound production, nitrogen plays a significant role in these regions.

Sorghum yield and its attributed physiological properties is significantly affected by nitrogen fertility. Nitrogen fertilizer application increases plant yield, forage quality and quantity (Ashiono et al., 2005; Gardner et al., 1994; Jarvis, 1996). Several reports showed that sorghum had severed reaction to nitrogen fertility. Beyart et al. (2005) studied nitrogen fertility on sorghum sudangrass and reported that highest yield was produced by application 125 kg nitrogen per hectare.

Study of sorghum in intercropping system requires identification and development of appropriate genotypes that have low competition with each other. Results of the previous studies recommended more revenue cultivation system such as: sorghum- chickpea, sorghum- bean and sorghum- peanut. Also, results showed that sorghum single planting had lower yield than intercropping (Doughton and Mackenzie, 1984).

To increase the efficacy of crop production, improve soil fertility and environmental protection, an alternative cropping system could be needed (Kiminami et al., 2010). One of the best ways to increase forage production for animal feed is to develop cropping systems that cause balance between crop production and other critical factor of ecosystem (Fales et al., 2007). Development of double cropping system is a suitable way to increase plant hay matter production during the growing season which provides several advantages (Wrather et al., 2008; Arshad et al., 2007). In these systems two crops are harvested in one growing season that include a psychrophilic crop (usually cover crop), harvested in spring, and a thermophilic crop that is planted after cover crop in summer (Snap et al., 2005). Double cropping lead to soil conservation by reducing the soil erosion, because crop plants prolonged more that sole crop in the field. Because of double cropping the life cycle of pests and plant disease is disrupted (Kinoshita et al., 2008). This cultivation system would allow farmers to benefit better economic opportunities, face lower risk of damages and more adaptation to circumstances (Seddiqi et al., 2013). Double planting have high potential in increase land efficiency, labor, irrigation water, equipment and capital and in conclusion increase