ABSTRACT

Three production systems were carried out in sandy loam soil to study the effect of farmyard manure (FYM) and nitrogen fertilizer levels (N) on vegetative growth, forage quality traits and yield and yield components of the 1st and 2nd growths of dual-purpose sorghum, grown at Demo experimental farm of the Faculty of Agriculture, Fayoum University, Egypt, during the two successive seasons of 2009 and 2010.

Results revealed that increasing FYM level from 20 to 40 m^3/fed. significantly increased most vegetative growth traits in the 1st and 2nd growth periods under the three production systems except number of green leaves per plant in the 1st growth period and plant height and fresh blades/stem ratio in the 2nd growth period at the1st production system, number of green leaves per plant and stem diameter in the 1st growth and number of tillers per hill and fresh blades/stem ratio in the 2nd growth at the 2nd production system and number of green leaves per plant, stem diameter and fresh blades/stem ratio in the 1st and 2nd growths at the 3rd production system in each season and their combined analysis.

Nitrogen fertilizer levels had a significant effect on all vegetative growth traits in the 1st and 2nd growths at the three production systems except, fresh blades/stem ratio in the 2nd growth period at the 2nd production systems. Applying 90 kg N/fed. in each season and their combined analysis gave the highest mean values of plant height, number of green leaves per plant, number of green leaves per hill, number of tillers per hill, stem diameter, leaves area per plant, fresh weight of plant, fresh weight of vegetative tillers per hill, dry weight of plant, dry weight of tillers per hill and fresh blades/stem ratio except the highest mean values of leaves area per plant and fresh blades/stem ratio in the 1st season in the 1st and 2nd growth periods, respectively, at the 1st production system, also number of green leaves per plant in the 2nd season in the 1st growth period at the 2nd production system increased by applying 60 kg N/fed.

There were significant effects due to the FYM x N interaction on most vegetative growth traits in the 1st and 2nd growth periods at the three production systems except the 1st growth period at the 3rd production system.

Farmyard manure and N fertilizer alone or in combinations had a significant effect on almost forage quality traits viz., dry matter content (DM), crude protein (CP), crude fiber (CF), Ash content, ether extract (EE) and nitrogen free extract (NFE) in blades and stem with sheathes of dual- purpose sorghum plants in the 1st and 2nd growth periods at the three production systems, as well as (CP) content in grains in the 2nd and 1st growths at the 1st and 2nd production

systems, respectively, and also the 1st and 2nd growth periods at the 3rd production system.

Under most circumstances, grain yield components viz., panicle length, panicle diameter, panicle weight, 1000-grain weight, grain yield per plant, harvest index and shelling percentage, also yields i.e. biological yield and grain yield were significantly affected by the application of both FYM and N fertilizer alone or in combinations in the 2nd and 1st growth periods at the 1st and 2nd production systems, respectively, as well as in the 1st and 2nd growth periods in the 3rd production system.

On the other hand, there were significant effects due to application of different rates of FYM or N fertilizer as alone or in combinations on forage and dry yields in the 1st and 2nd growths at the three production systems except for the interaction effect on forage and dry yields in the 1st growth at the 1st and 2nd production system and dry yield in the 2nd growth at the 3rd production system.

Production systems, FYM and nitrogen fertilizer levels had significant effects on biological yield, grain yield, forage yield and dry yield in both seasons. The interaction between production systems x FYM rates also had a significant effect on biological yield and grain yield in both seasons and also forage yield in 2009 season and dry yield in 2010 season.

The interaction between production systems and N fertilizer levels had a significant effect on grain yield in both seasons and on biological yield and forage yield only in 2010 season. But dry yield was not significantly affected by the interaction between production systems x nitrogen fertilizer levels in both seasons.

Grain yield and forage yield were significantly affected by the interaction between FYM rates x nitrogen fertilizer levels in both seasons. However, dry yield and biological yield were significantly affected in 2009 and 2010, respectively.

The three way interaction among production systems, FYM rates and nitrogen fertilizer levels had a significant effect on grain yield in 2009 season and on biological yield and forage yield only in 2010 season, while the three way interaction had no significant effect on dry yield in both seasons.

In general, it may be concluded that under the 2nd production system, applying of 40 m^3 FYM with 90 kg N/fed. at the 1st growth period and 90 kg N/fed. at the 2nd growth period could be recommended for maximizing forage yield and improving most indices of the forage sorghum quality. Also, under the 3rd production system, applying of 20 m^3 FYM with 90 kg N/fed. at the 1st growth period and 90 kg N/fed. at the 2nd growth period may be recommended for maximizing sorghum grain yield. However, using the 3rd production system with applying of 40 m^3 FYM with 90 kg N/fed. for the 1st growth and also 90

kg N/fed. for the 2nd growth may be recommended for maximizing grain and forage yields of dual-purpose sorghum with reduce the total economic cost of yield in all production systems in the newly reclaimed sandy soils under the environmental conditions of Fayoum region.

Key words: ***FYM, mineral nitrogen fertilizer, re-growth, dual-purpose sorghum, grain yield, forage yield, forage quality and new reclaimed soil.***