



Agronomic Evaluation of 16 Forage Sorghum Cultivars (Prevalent in Iran and imported Cultivars)

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ABSTRACT

Agronomic factors and compatibility of prevalent cultivars of sorghum in Iran and new import varieties were evaluated over spring to summer seasons from May to October 2016 at agricultural research center station, Isfahan, Iran. The experiment was designed as randomized complete block, with three replications. The plots were composed of 16 varieties, including 6 Iranian cultivars (Pegah, Speed feed, KFS-2, KFS-18, PSF-21, & PHFS-27) and 10 imported cultivars (ES Athena, CSSH-1, HFS-1, SSH-1 BMR1, SSH-2 BMR, Titan, Silo king, Harmathan, Biomass-150 & Sucrose Photo BMR). Every Plot was contains four line lengths of 5 meters with line spacing of 60 cm, which is the planting density was 250 thousand plants per hectare. When five percent of the plants in each cultivar was in the beginning stages of flowering or the height of plants riche to 1.5 meters harvested. The recorded observations were including plant height, number of tiller, leaf number, stem diameter, fresh mater and dry matter. Based on analysis variance the obtained results indicated that, there are significant differences (at1% levels) between cultivars regarding to all traits. The results showed that cultivars including, biomass150, Silo king and KFS18 respectively were superior to others in terms of fresh forage production whereas in terms of dry matter HFS-1 also was including superiors.

INTRODUCTION

Sorghum (*Sorghum bicolor* L.) a key cereal of the world, is a major food for lots of the poorest people, reliable nutritious fodder for livestock, and real alternative to fossil fuels in all of regions under water crisis (Smith and Frederiksen 2000).

Forage sorghum yield is a function of yield components including plant density per unit area, plant height, number tillers per plant, stem diameter, number of leaves per plant and ultimately number of cutting (Perazzo et al. 2014, Hussain et al. 2007).

One of the criteria for compatibility of forage sorghum cultivars in every region is having high yield performance, which is quality and quantity of forage yield in various environments depends on morphological specifications such as stem diameter, plant height, and number of leaf per plant (Dong et al. 1994).

According to Neumann et al. (2002), comparative studies of genotypes are important to contribute to the breeding programs and to recommend cultivars for producers whose silages have the best production nutritional value ratio. Therefore, it is important to evaluate the genotypes available in the market seeking an appropriate balance between plant components, combined with high biomass productivity and nutritional value.

Objectives of the Study

- To compare prevalent sorghum varieties in Iran with imported varieties from France, United State and Serbia.
- To evaluation of yield and yield component of 16 sorghum cultivars, in order to select superior cultivars, then introduce to pioneer farmers and development at the national level.

ACKNOWLEDGMENT

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MATERIALS AND METHODS

Time and location:

The study is being done at Agricultural Research Center of Kabotarabad, Isfahan, Iran (latitude 32° 31' N, longitude 51° 51' W and altitude 1545 meter), which is located in exactly arid area with average annual rainfall 110 mm. The study soil composition is clay loam and the Ec of irrigation water is around 5.5 ds/m. The experiment carried out over spring to summer seasons from May to October 2016.

Experiment design and treatments:

The experiment was designed as randomized complete block, with three replications. The plots were composed of 16 cultivars, including 6 Iranian cultivars (Pegah, Speed feed, KFS-2, KFS-18, PSF-21, & PHFS-27) and 10 imported cultivars (ES Athena, CSSH-1, HFS-1, SSH-1 BMR1, SSH-2 BMR, Titan, Silo king, Harmathan, Biomass-150 & Sucrose Photo BMR). Every plot was contains four line lengths of 5 meters with line spacing of 60 cm and plant spacing on the line 8 cm, which is the planting density was 250 thousand plants per hectare.

Data collection

To evaluation of yield and components of yield including plant height, number of tiller, number of leaf, stem diameter, fresh forage and dry matter, when five percent of the plants in each plot was in the beginning stages of flowering or the height of plants riche to 1.5 meters, the observation was performed. Harvest carried out by removing tow lateral lines on each plot, from an area of 5 square meters. Harvests were done as multi-cutting, so that the fresh and dry matter obtained based on accumulative harvest.

Data Analysis

Data analyzed by using SAS software and comparison of means test was done by Duncan at 5% level.

RESULTS AND DISCUSSION

I. Obtained results from data analysis indicated that, there are significant differences (at 1% level) between cultivars regarding to traits of height, number of tiller, stem diameter, fresh forage and dry matter (Table 1).

II. Comparison of mean of traits including height, stem diameter and fresh forage for sixteen prevalent and imported sorghum cultivars have shown that there are wide significant differences (at 1% level) between them, so that Biomass-150, Silo king and KFS-18 were superior to others (Figure 1, 3 and 5). Which is seems that there is a positive relationship between height, stem diameter and fresh yield of forage sorghum cultivars

III. There are significant differences between all of sixteen prevalent and imported sorghum cultivars in terms of number of tillers and number leaf per plant, such that Titan, Speed feed and CSSH-1 were superior to others. Based on the genetically information of sorghum cultivars, the grazing cultivars have more tillers than others (Figure 2 and 4).

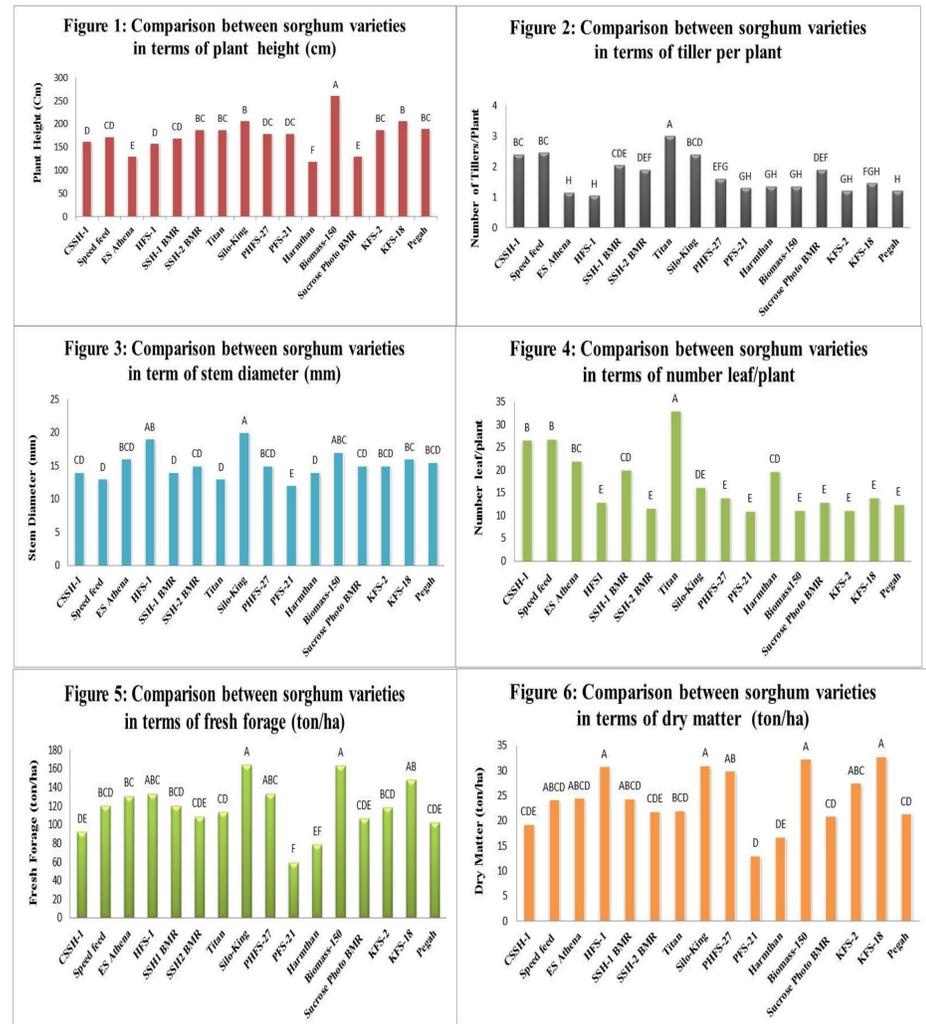
IV. One of the most important traits of silage and biofuel sorghum cultivars is the percent of dry matter; accordingly the cultivars Biomass-150, Silo king, KFS-18 and HFS-1 are suitable for biofuel and silage production (Figure 6). For silage production the sugar content of sorghum cultivars also is very important.

CONCLUSION

It concluded that between prevalent cultivars KFS-18 and Speed feed are comparable with imported cultivars, also between imported cultivars Biomass 150, Silo king and HFS-1 are appropriate for silage production and cultivars Titan and CSSH-1 are suitable for grazing.

Table 1: Analysis variance of yield and yield components of 16 sorghum cultivars

SOV	DF	Height	Tiller	Diameter	Leaf/plant	Fresh Forage	Dry Matter
Rep	2	64.583	3.583	5.770	13.078	1.490	2.171
Cultivar	15	3633.021**	377.105**	8.909**	132.427**	2365.213**	99.620**
Error	30	166.250	21.605	2.326	9.772	315.008	17.996
CV	-	7.2	13.6	10.2	18.2	15	17.3



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