Multi-season production of high quality forage sorghum for ruminants

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Introduction

Forage sorghum is a classic cereal crop, which is strongly adapted to high temperatures. In most cases sorghum is harvested only once, at the end of the summer or the beginning of the fall. Re-growth of sorghum, from sub-soil tillers, following shoot harvest, occur even in the late fall. Survival of these young organs, under mild winter, keeps the potential for an intensive re-growth early in the next spring. The present work studied the possibility of using the multi-season concept under Mediterranean climate.

Material and methods

Forage sorghum was sown in late summer of 2000, in Bet-Dagan, Israel, under Mediterranean climate. The summer is hot and dry, and the winter is moderately cold and wet. Most of the rains fall in the winter. The total amount of sprinklers irrigation, was 300 mm of water. Irrigation was stopped at the end of September and renewed in July. During the non-irrigated period, rainfall was the only source of water to the plants. The irrigation amount in the second dry season was 250 mm of water.

Results and discussion

The development of the sorghum, which was sown in July, was quick. At mid-September the plants flowered. In the beginning of October the plants were in the stage of grains filling (picture1a). First forage harvest, was carried out 85 days after sowing. The plants at harvest yielded 1.28 kg dry matter per meter square (table 1). The plants in late fall were in a state of intensive growth, as expressed by the emergence and growth of new tillers (picture 1b). The percentage of dry matter in the shoot, including the grains, from the first harvest, was high - 30.7% (table 1), a level which is recommended for silage production. The tillers grew strongly even in the early winter (picture 1c), and produced considerable amount of dry matter (table 1). Leaf growth continued even in the coldest period of January (picture 2). We observed total survival of the sorghum plants during the Mediterranean winter. In early spring, the plants have shown intensive growth which was dramatically superior to the growth of young seedlings which emerged from spring sowing (picture 3). The vegetative and reproductive development of the spring phase was early and quick (picture 1d).

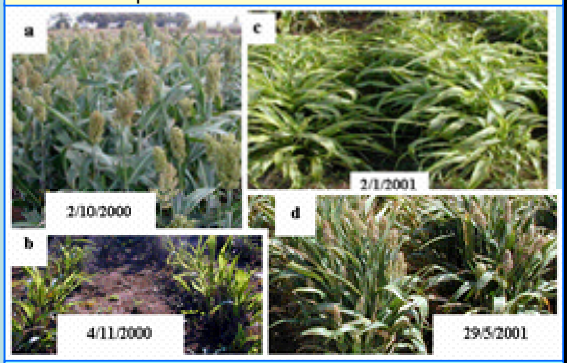
In conclusion, the suggested that multi-season system of forage sorghum is practical, and might be relevant not just for the Mediterranean region, but also to other regions in the world which have moderate climate, especially in the winter.

Table 1: Yield amount and shoot* moisture content (SMC) of late sown** sorghum.

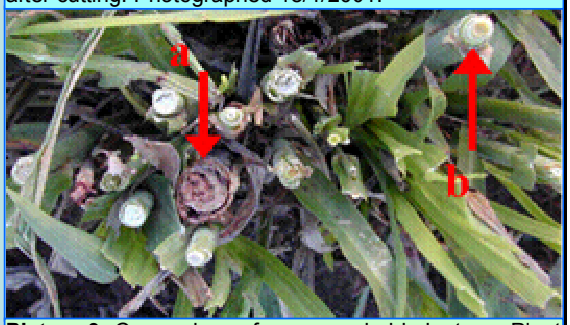
Harvest date	Yield (kg DM/m^2) ± SD	SMC (%) ± SD
23/10/2000	1.28 ± 0.13	30.8 ± 2.22
05/1/2001	0.30 ± 0.04	16.0 ± 1.41
29/5/2001	1.17 ± 0.09	28.8 ± 1.71

* Including grains.
** Sorghum was sown on July 29th 2000.

Picture 1: Growth stages of multi-season sorghum, which was sown on 29/7/2000: a. Fall stage, 3 weeks before harvest. b. Young tillers, which grew after fall harvest. c. Winter stage, one day before harvest. d. Spring stage before harvest. Photographing dates are shown in the pictures.



Picture 2: Growth activity in the winter: a. Old stem. b. Young tiller with growth of the inner leaves, several days after cutting. Photographed 18/1/2001.



Picture 3: Comparison of young and old plants: a. Plant germinated from seed, planting 17/3/2002. b. Spring tillers of a plant that was sawn 18/8/2001 and survived the winter in the field. Photographed 1/4/2002.

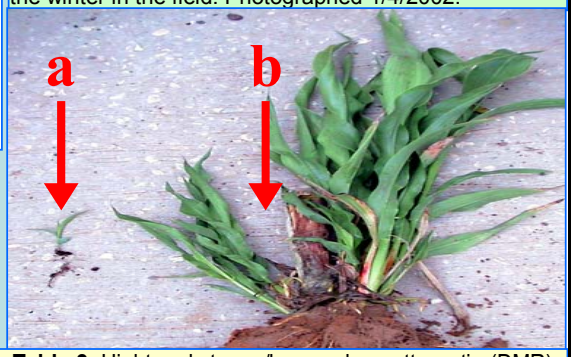


Table 2: Hight and stems /leaves dry matter ratio (DMR) of winter tillers*.

Tillers Hight (cm) ± SD	DMR ± SD
46.0 ± 14.8	1.58 ± 0.43

* Winter tillers were harvested on 5.1.2001, 75 days after the first harvest.