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Sweet sorghum—a local fodder with great potential

Chanda Nimbkar[†], Nandini Nimbkar and B. V. Nimbkar

Nimbkar Agricultural Research Institute, P.O. Box 23, 415523, Phaltan, Maharashtra, India

Sorghum (*Sorghum bicolor* L. Moench) is the fifth most important cereal crop in acreage and fourth most important in production in the world and is the dietary staple of more than 500 million people in 100 countries, primarily in the developing world. The grain is mainly used as animal feed in the developed world. Sorghum is mostly grown in the semi-arid tropics of the world under dryland conditions with low and erratic rainfall. Though it can survive on about 300 mm rainfall, it responds favourably to irrigation.

As much as 50% of farmers' income from the sorghum crop in semi-arid tropics of India reportedly comes from the sale of the crop residue at urban fodder markets. In 2009 in India grain sorghum was planted on 7.7 million hectares and produced about 7.5 million tonnes of grain, with a low productivity of one-fourth that in the United States of America. Sorghum is also a good source of green fodder due to its quick growth, high yield and good quality. Therefore, grain sorghum is already being used as a dual-purpose crop in most areas of India.

Sorghum with sugar-rich juicy stalks (called sweet sorghum) is emerging as an important biofuel crop. Sweet sorghum has been studied for ethanol production and found to have lower crop production inputs of energy per litre of potential ethanol than sugar beet, fodder beet, corn and sugarcane. Canopy water use efficiency of sweet sorghum has been found to be higher than that of other C₄ crops like maize and grain sorghum under both well-watered and water-stress conditions. However, though it is a well-known crop which can supply food, fodder, fiber and fuel it has not been studied much as a fodder crop.

Sweet sorghum probably differs from grain sorghum by only a few genes that control plant height and the presence of juice in stem and sugar in the juice. Substantial genotype variation has been reported to exist in fodder quantity and quality among different cultivars of sweet sorghum. There is plenty of genetic variation for all the component traits of sugar yield, stalk girth, days to 50% flowering and stalk-stover ratio. Also heritability is high for plant height, flowering time and test weight. Several brown mid-rib mutations have been reported in sweet sorghum which increase the digestibility of the plants by reducing the lignin content. Therefore breeders can manipulate the genes in the sweet sorghum plant to increase animal productivity provided specific breeding objectives are established. Use of molecular markers and quantitative trait loci are expected to enhance the efficiency and effectiveness of sweet sorghum improvement.

Sweet sorghum hybrids have been reported to produce higher sugar yield (21%) and higher grain yield (15%) than non-sweet sorghum hybrids in the rainy season indicating that there is no trade-off between grain and sugar. Even the quality of stover was often the best in genotypes with higher grain yields. The already standardized package of agronomic practices for grain sorghum can be applicable to sweet sorghum. However, improved region-specific agro-technology will have to be developed. Further improvement in sweet sorghum for livestock fodder needs to consider both qualitative and quantitative traits with collaborative work between sorghum breeders and livestock nutritionists.

[†] E-mail: chanda.nimbkar@gmail.com

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Use of *Acacia macrostachya* Reichend. ex DC seeds as a source of protein in the diet of flesh chicken

Valérie Marie Christiane Bougouma-Yaméogo^{1†}, Seydou Ouattara¹, Charles Luanga Ouédraogo² and Aimé Joseph Nianogo³

¹Université polytechnique de Bobo Dioulasso. Institut de Développement Rural 01 BP 1091 Bobo Dioulasso Burkina Faso; ²Programme de Développement de l'Aviculture Villageoise 01 BP 1907 Ouagadougou 01 Burkina Faso; ³Union Mondiale pour la conservation de la nature, 01 BP 3133, Ouagadougou 01 Burkina Faso

Aim

The objective of the study was to determine conditions to use *Acacia macrostachya* seeds in the diet of flesh chicken.

[†] E-mail: bougouma_valerie@hotmail.com

Materials and Methods

Two hundred and forty flesh chicks of the ROSS variety were randomly selected to be parts of 12 lots of 20 each. Ten (10) diets were prepared as different treatments using crude, boiled and grilled *Acacia macrostachya* seeds at a rate 5, 10 or 15% including the control diet or treatment. The nine (9) diets (treatments) using Acacia seed were fed to the lots of chicks respectively, but the control diet was repeated three times, in order to determine the best diet. Two durations of breeding were observed.

Results

At the end of the experiment using 15% boiled seed of *Acacia* in the diet of chicks resulted in the best weight gained as well as the lowest index of consumption and the best economic profit during the time of the breeding. The 10% feed level of boiled seeds was also better than the control. The worst result was the crude seed fed at 10%.

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Grazing sugar cane by cattle during winter

Marcelo Benvenuti[†] and Daniel Pavetti

INTA EEA Cerro Azul, Argentina

Introduction

Sugar cane is an important forage resource during the winter or dry season. It has recently been shown that the weight gain of steers was similar for animals fed on sugar cane in feedlots or grazing sugar cane in the field without affecting the persistence of the plantations (Benvenuti *et al.*, 2005). However, the low protein content of the sugar cane requires the use of protein supplements which are usually expensive. *Axonopus catarinensis* is a grass species that tolerates low temperatures and its use with sugar cane can potentially reduce the cost of beef production during winter. The objective of this study was to evaluate the weight gain of steer grazing sugar cane and *A. catarinensis* simultaneously.

Materials and Methods

The experiment was conducted at INTA Cerro Azul research station, at 27°37'S, 55°26'W from 2 July to 25 September 2008. Thirty steers (220 ± 22 kg) were allocated to the following feeding treatments: T1: chopped sugar cane fed in troughs with protein supplement; T2: grazing sugar cane with protein supplement and T3 sugar cane and *A. catarinensis* grazed simultaneously without protein supplement. The sugar cane of T1 was processed using a chopping machine and there was no evidence of selection by the animals of this chopped material. The protein supplement of T1 and T2 consisted of 700 g of soybean expeller as-fed (89% dry matter) per steer per day. All animals received 120 g of urea per day mixed with 1 kg of chopped sugar cane which allowed good distribution of intake of urea among the herd. All animals had free access to water and mineral supplement which contained sulphur to balance the non-protein N of urea. The fully mature sugar cane of T3 was grown separately from the grass with a global stocking rate of 2 head per hectare. The significance of the difference in weight gain between treatments was determined using ANOVA.

Results and discussion

The animal performance of T1 was similar to the results observed in scientific literature where cattle have been fed chopped sugarcane as a basal diet (Preston 1977). There was no significant difference between T1 and T2 ($P \geq 0.05$) (Table 1). This is in line with previous studies

Table 1 The effect of sugar cane feeding method on the weight gain of steers (\pm SEM). T1: chopped sugar cane fed in troughs with protein supplement; T2: grazing sugar cane with protein supplement and T3 sugar cane and *A. catarinensis* grazed simultaneously without protein supplement. Treatments with different letters differed significantly ($P \leq 0.05$)

	T1	T2	T3
Initial weight (Kg)	216	229	214
Final weight (Kg)	268	284	250
Weight gain (g steer day)	611 ± 27 ^a	647 ± 28 ^a	428 ± 25 ^b

[†] E-mail: Marcelo.Benvenuti@hotmail.com