

**FORAGE PRODUCTION AND NUTRITIVE VALUE OF  
FOUR PROMISING SORGHUM × SUDANGRASS HYBRID IN KOREA**

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**Abstract**

Sorghum×sudangrass hybrid (*Sorghum bicolor* (L.) Moench) is one of the most important annual grass utilized for supplemental summer forage. There were 14 National Livestock Cooperative Federation (NLCF)'s recommended forage sorghum×sudangrass hybrids in Korea. Among them several hybrids were produced widely, however, they have not been evaluated under same environmental conditions. Therefore, a field experiment was carried out to compare the plant height, forage yield and nutritive value of the NLCF's recommended cultivars at NLRI, Suwon, Korea in 1995. The four promising cultivars of sorghum×sudangrass hybrid used in this study were P 988, TE-Haygrazer, NC+ 855 (heading type), and Jumbo (headless type). The plant height ranged between 220cm (P 988) and 232cm (NC+ 855). NC+ 855 was classified as early-maturing cultivar, and then TE-Haygrazer, P 988. Jumbo was going on vegetative stage in this experiment. The dry matter (DM) yields of sorghum×sudangrass hybrids ranged between 11.26 and 13.40 MT/ha. No significant differences were observed, but the DM yield of NC+ 855 was slightly higher than those of P 988 (11.31MT), TE-Haygrazer (11.77MT), and Jumbo (11.26MT). The nutritive value was very similar among the cultivars. There were no significant differences in contents of crude protein, crude fiber, and crude protein yield. In conclusion, there were no differences of

forage yield and nutritive value among four promising recommended sorghum×sudangrass hybrids, although maturity was different among heading-type hybrids.

**Keywords** : Sorghum×sudangrass hybrid, forage yield, nutritive value, cultivar, summer forage

### **Introduction**

Sorghum×sudangrass hybrid (*Sorghum bicolor* (L.) Moench) is one of the most important annual grasses utilized for supplemental summer forages when cool-season perennials have low production (Kim et al., 1982, 1991; Seo et al., 1999). For better summer forage production, NLCF has recommended new promising varieties, suitable for adaptability and productivity in Korea environmental condition. In Korea there were 14 NLCF's recommended forage sorghum×sudangrass hybrids, but the cultivars have not been evaluated under same environmental conditions, ie. same year, same district and same research institute (Kim et al., 1991; Seo et al., 1999). The objectives of the study, therefore, were to compare the plant height, heading date, forage yield and nutritive value of four widely using cultivars of forage sorghum×sudangrass hybrid in Korea situation.

### **Material and Methods**

The experiment was conducted at the Grassland and Forage Crops Division, National Livestock Research Institute, RDA, Suwon, Korea in 1995, and the cultivars of sorghum×sudangrass hybrid used in this study were P 988, TE-Haygrazer, NC+ 855 (heading type), and Jumbo (headless type). The seeds were sown by drilling 4 rows with 30kg/ha on 21 April. The experiment was arranged as a randomized block design with three replications. The 100kg N, 150kg P<sub>2</sub>O<sub>5</sub> and 100kg/ha K<sub>2</sub>O were applied prior to planting, and 80kg N and

50kg/ha K<sub>2</sub>O were applied after first harvest. The forages were harvested on 5 July (first cut) and 17 August (second cut). The forages harvested in two center rows were dried in the forced air-dryer at 70 °C for 48 hours. The contents of crude protein and crude fiber were analyzed by AOAC (1990).

## **Results and Discussion**

Plant height, first heading date and forage yield of four promising sorghum× sudangrass hybrid are shown in Table 1. Plant height ranged between 213cm (P 988) and 231cm (NC+ 855) at first harvest, and 221cm (Jumbo) and 233cm (TE-Haygrazer and NC+ 855) at second harvest. NC+ 855 was slightly high in plant height, although there was no significant difference among four cultivars. NC+ 855 cultivar among those four sorghum×sudangrass hybrids was classified as the earliest-maturing cultivar (first heading date was 1 July), and then TE-Haygrazer (4 July), and P 988 (12 July). Jumbo was going on vegetative stage through the experimental period (Kim et al., 1991).

The dry matter (DM) yields of four sorghum×sudangrass hybrids ranged between 5.93MT (P 988) and 7.08MT (NC+ 855) at first harvest, and 4.71 MT (Jumbo) and 6.32MT (NC+ 855) at second harvest. The annual forage yield ranged between 11.26 and 13.40 MT/ha. Despite of no significant differences in the DM yield, NC+ 855 (13.40MT) was slightly higher than those of P 988 (11.31MT), TE-Haygrazer (11.77MT) and Jumbo (11.26MT) .

The contents of crude protein (CP) and crude fiber (CF), and crude protein yield (CPY) of four promising sorghum×sudangrass hybrids are shown in Table 2. The nutritive value was very similar among the cultivars (Kim et al., 1991; Seo et al., 1999). The content of CP ranged between 11.4% (NC+ 855) and 12.8% (TE-Haygrazer) as averaged data of first and second harvest, and the content of CF ranged between 28.2% (Jumbo) and 29.5% (NC+ 855). The cultivar of NC+ 855 showed slightly high in CF, and slightly low in CP content. The CPY

ranged between 836kg (P 988) and 913kg/ha (NC+ 855) at first harvest, between 542kg (Jumbo) and 775kg (TE-Haygrazer) at second harvest, and between 1,385kg (P 988) and 1,613kg (TE-Haygrazer) in total CPY.

In conclusion, there were no significant differences in forage yield and nutritive value among four promising recommended sorghum×sudangrass hybrids, although maturity was different among heading-type hybrids (NC+ 855 was classified as the earliest-maturing cultivar among those studied) in Korea.

### References

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**Table 1** – Plant height, first heading date and forage yield of four promising sorghum x sudangrass.

Cultivar	Plant height (cm)			First heading date	Dry matter yield (MT/ha)		
	1st	2nd	Ave.		1st	2nd	Total
P 988	213	227	220	12 July	5.93	5.38	11.31
TE-Haygrazer	219	233	226	4 July	6.30	5.47	11.77
NC+ 855	231	233	232	1 July	7.08	6.32	13.40
Jumbo	220	221	221	-	6.55	4.71	11.26
LSD (0.05)	-	-	NS	-	-	-	NS

NS : not significant

**Table 2** - The contents of crude protein(CP) and crude fiber(CF), and crude protein yield(CPY) of four promising sorghum×sudangrass hybrids.

Cultivar	CP (%)			CF (%)			CPY (kg/ha)		
	1st	2nd*	Ave.	1st	2nd*	Ave.	1st	2nd*	Total
P 988	14.1	10.2	12.2	28.3	29.9	29.1	836	549	1,385
TE-Haygrazer	13.3	12.3	12.8	28.6	28.0	28.3	838	775	1,613
NC+ 855	12.9	9.9	11.4	29.2	29.8	29.5	913	626	1,539
Jumbo	13.4	11.5	12.5	28.3	28.1	28.2	878	542	1,420
LSD (0.05)	NS	-	-	NS	-	-	NS	-	-

NS : not significant, \* The samples within three replications were mixed.