Bangladesh J. Sugarcane, **36** : 126-130 *June, 2015*

Productivity of Seven Sugarcane Varieties and their Ratooning Potentiality under Tista Meander Flood Plain Soils

S.M.R. Karim[1], M.N. Kashem[1], S. Islam[2], M.A. Razzak[3] and M.K. Rahman[3]
[1] Training & Technology Transfer Division, [2] Soils and Nutrition Division
[3] Agronomy & Farming Systems Division,
Bangladesh Sugarcrop Research Institute, Ishurdi-6620, Pabna, Bangladesh

ABSTRACT

The experiment was conducted during the cropping season 2012-2013 as plant cane and 2013-2014 as ratoon cane to find out superior sugarcane varieties and their ratooning potentiality of seven selected varieties viz. Isd 34, Isd 35, Isd 36, Isd 37, Isd 38, Isd 39 and Isd 40 at farmers field under Tista Meander Floodplain Soils. The results revealed that Isd 39 showed the highest yield of 125.75 tha^{-1} followed by Isd 37 (120.25 tha^{-1}) as plant cane at Vadsha location and at Ramvadrapur location Isd 37 showed the highest yield of 128.34 tha^{-1} followed by Isd 39 (113.04 tha^{-1}). On the other hand, Isd 39 showed the highest yield of 113.47 tha^{-1} followed by Isd 38 (107.60 tha^{-1}) at Vadsha location and at Ramvadrapur site Isd 39 showed the highest yield of 109.33 tha^{-1} followed by Isd 37 (97.86 tha^{-1}) as ratoon cane among the newly BSRI released varieties under Tista Meander Floodplain soils. From the findings, it might be concluded that Isd 39, Isd 37 and Isd 38 gave highest result as plant and ratoon cane both the cropping season and the authors' recommended these varieties. So, there is a great scope to increase productivity both of plant cane and ratoon cane by using Isd 39, Isd 37 and Isd 38 varieties in farmers' field of this AEZ.

Key words: Sugarcane, productivity, variety, ratooning, potentiality

INTRODUCTION

In Bangladesh, sugarcane is growing under diverse agro-ecological zones on an area of about 0.16 million hectares (BBS, 2005). Success of a variety depends on several factors of which adaptation to agro-ecological conditions of an area is very important. Sugarcane is a relatively risk free cash crop for low rainfall belt of the Ganges River Floodplain as well as low to moderately fertile high lands of Himalayan Piedmont Plain and the Tista Meander Floodplain areas of Bangladesh (Matin *et al.*, 1989). Developed sugarcane varieties by Bangladesh Sugarcrop Research Institute do not perform equally in all Agro-Ecological Zones (Miah *et al.*, 1994). The yield of a particular variety depends upon the heredity potential of the genotype and environment where it is exposed to during the course of its life cycle (Yadava, 1993). The varieties grown in the sugar mill zones of Bangladesh cannot production equally in farmers' field (Paul *et al.*, 1994). Ratooning is a common practice in sugarcane growing area of the world. Sugarcane growing countries generally cover 50-70% of their cane area under ratooning which

* Corresponding author: S.M.R. Karim, Scientific Officer
e-mail: skarim8519@ yahoo.com

produces almost equal yield to that of plant cane. In Bangladesh, only 20% of the cane area is ratooned every year producing in an average 40 tha^{-1} while the potential yield has been found to be around 80 tha^{-1} (BSRI, 2001). In Mauritius five to eight ratoon crop are commonly grown (Ponnappan, 1994). As many as six to eight successive ratoon are raised in Taiwan (Soopramanien and Hunsigi,1996). In India, Research strategies for sugarcane production through ratooning has been undertaken as an aid to cut down production cost (Srivastava *et al.*, 1990). The main advantage of ratoon in sugarcane lies in its reduced crop life and cost of production as well as higher sugar recovery (Verma, 2002). Ratoons are possible because nothing is spent on land preparation, planting operation, seed materials etc. (Yadav, 1986). Rather the yield of ratoon almost as good as those obtained with plant cane if the ratoon cane grown with recommended production and protection practices (Kapoor, 1966 and Mathur, 1986). Ratoon crop often failed to produce satisfactory germination, growth and yield in Bangladesh due to lack of suitable ratooning varieties and proper management practices (Majid and Alam, 1998). It is important to show the maximum yield potential of BSRI released cane varieties both plant cane and ratoon cane to increase cane productivity and economic benefit of the farmers for sustainable sugarcane cultivation. Soil is important to screen out sugarcane varieties suitable for Tista Meander Floodplain soils. The information is needed for sugar industry as well as gur makers. Therefore, this investigation was undertaken to study productivity of seven newly released sugarcane varieties and their ratooning potentiality under Tista Meander Floodplain soils.

MATERIALS AND METHODS

The experiments were conducted in Tista Mender Floodplain Soils of farmers' field of two location namely Vadsha and Ramvadrapur at Joypurhat District during the cropping season 2012-2013 as plant cane with seven selected varieties viz: Isd 34 (Standard), Isd 35, Isd 36, Isd 37, Isd 38, Isd 39 and Isd 40. After harvest of plant cane, ratoon crops were raised from left over stubble of harvested plant cane in the next cropping season 2013-2014. The experiments were laid out in a Randomized Complete Block (RCB) design with three replication in two locations of this Agro- Ecological Zone. Plantation was done with two budded sett in the end of December, 2012. Plot size was 8m x 8m where row to row distance was maintained one meter. Necessary intercultural operations were done as and when required. Data were collected at different growth stages of crop. Brix reading was taken by hand Refracto Meter from standing cane before harvesting at mature stage of cane. Yield was taken at harvest in December 2013 and 2014. The average values of all parameters were statistically analyzed to compare different varieties under observation.

RESULTS AND DISCUSSION

It was observed from the Table 1 that tested varieties shown significant differences in tiller, millable cane production, yield and brix percent were obtained in different varieties at Vadsha location both of plant cane and ratoon cane. It was further noted that significantly higher tiller was recorded in variety Isd 36 (187.33×10^3 ha^{-1}) followed by Isd 39 (175.58×10^3 ha^{-1}) while the lowest tiller production was obtained in

case of ratoon cane highest number of tiller was found from the variety Isd 36 (288.35 x 10^3 ha^{-1}) followed by Isd 34 (275.85 x 10^3 ha^{-1}) while the lowest tiller production was obtained in variety Isd 35 (186.42 x 10^3 ha^{-1}) which was followed by Isd 40 (186.97 x 10^3 ha^{-1}). In plant cane, the highest number of millable cane was obtained in variety Isd 39 (118.67x 10^3 ha^{-1}) followed by Isd 38 (106.57x 10^3 ha^{-1}) while the lowest millble cane was obtained from the variety Isd 40 (79.93x 10^3 ha^{-1}). In case of ratoon cane the highest number of millable cane was obtained in variety Isd 36 (98.03x 10^3 ha^{-1}) followed by Isd 39 (95.39x 10^3 ha^{-1}) while the lowest millable cane was obtained as same as plant cane from the variety Isd 40 (78.66x 10^3 ha^{-1}). Both of plant and ratoon cane produced the highest cane yield in the variety Isd 39 (125.75 tha^{-1}) and (113.47 tha^{-1}), respectively which was followed by Isd 37 (120.25 tha^{-1}) and Isd 38 (107.60 tha^{-1}) and lowest cane yield was obtained in the variety Isd 40 (78.83 tha^{-1}) and (75.49 tha^{-1}), respectively. From the Table 1 also revealed that brix percent in cane was higher in ratoon cane from that of plant cane. Similar result was reported by Verma in 2002.

Table 1. Comparative productivity of newly released BSRI sugarcane varieties in plant and ratoon cane inTista Meander Floodplain Soils at Vadsha site

Treatment	Plant Cane (2012-2013)				Ratoon Cane (2013-2014)			
	Tillers (10^3 ha^{-1})	Millable cane ($10^3 ha^{-1}$)	Yield (tha^{-1})	Brix (%)	Tillers (10^3 ha^{-1})	Millable cane (10^3 ha^{-1})	Yield (tha^{-1})	Brix (%)
T_1 = Isd 34	154.50bc	94.03c	105.42b	16.55e	275.85ab	90.60ab	101.32b	18.66bcd
T_2 = Isd 35	157.33abc	94.93c	83.17c	17.55d	186.42d	90.95ab	81.92d	18.11d
T_3= Isd 36	187.33a	106.33b	106.92b	20.11a	288.35a	98.03a	89.07c	20.21ab
T_4 = Isd 37	130.00c	93.50c	120.25a	17.77d	206.97cd	85.53ab	105.84b	20.72a
T_5 = Isd 38	159.83abc	106.57b	109.92b	18.78bc	223.91c	89.49ab	107.60b	18.41cd
T_6 = Isd 39	175.58ab	118.67a	125.75a	19.22b	259.54b	95.39a	113.47a	20.33abc
T_7 = Isd 40	161.33ab	79.93d	78.83c	18.33c	186.97d	78.66b	75.49d	21.00a
LSD (0.05)	30.359	6.710	6.850	0.447	27.856	8.431	7.117	0.987

From the Table 2 it revealed that the tested varieties shown significant differences in tiller, millable cane production, yield and brix percent were obtained in different varieties at Ramvadrapur site both of plant cane and ratoon cane. The highest number of tiller in plant cane was recorded in variety Isd 39 (191.82 x 10^3 ha^{-1}) followed by Isd 34 (185.16 x 10^3 ha^{-1}) while the lowest tiller production was obtained in variety Isd 37 (145.65 x 10^3 ha^{-1}) which was followed by Isd 40 (151.13 x 10^3 ha^{-1}). In case of ratoon cane the highest number of tiller was found from the variety Isd 34 (177.26 x 10^3 ha^{-1}) followed by Isd 39 (130.86 x 10^3 ha^{-1}) while the lowest tiller production was obtained in variety Isd 38 (110.80 x 10^3 ha^{-1}) which was followed by Isd 40 (119.73 x 10^3 ha^{-1}). In plant cane the highest number of millable cane was obtained in variety Isd 37 (117.67x 10^3 ha^{-1}) followed by Isd 34 (108.00 x 10^3 ha^{-1}) while the lowest millble cane was obtained from the variety Isd 40 (78.06 x 10^3 ha^{-1}) followed by Isd 38 (93.63 x 10^3 ha^{-1}). In case of ratoon cane the highest number of millable cane was obtained in variety Isd 38 (99.13 x 10^3 ha^{-1}) followed by Isd 39 (93.80 x 10^3 ha^{-1}) while the lowest millable cane was obtained in variety Isd 34 (78.33 x 10^3 ha^{-1}) followed by Isd 40 (79.46 x 10^3 ha^{-1}). In plant cane the highest cane yield was obtained in the variety Isd 37 (128.34 tha^{-1}) followed by Isd 39 (113.04 tha^{-1}) and in ratoon cane the highest cane yield was obtained in variety Isd 39

(109.33 tha^{-1}) which was followed by lsd 37(97.86 tha^{-1}). In both plant and ratoon cane the lowest cane yield was found in variety lsd 40 (72.98 tha^{-1}) and (70.94 tha^{-1}) and lsd 35 (76.47 tha^{-1}) and (74.00 tha^{-1}), respectively. From the Table 1 also revealed that in both plant and ratoon cane the highest brix was obtained in variety lsd 36 (20.22%) and (23.03%) followed by lsd 34 (16.78%) and (17.66%) respectively.

Table 2. Comparative productivity of newly released BSRI sugarcane varieties in plant and ratoon cane inTista Meander Floodplain Soils at Ramvadrapur site

Treatment	Plant Cane (2012-2013)				Ratoon Cane (2013-2014)			
	Tillers (10^3 ha^{-1})	Millable cane (10^3 ha^{-1})	Yield (tha^{-1})	Brix (%)	Tillers (10^3 ha^{-1})	Millable cane (10^3 ha^{-1})	Yield (tha^{-1})	Brix (%)
T_1 = lsd 34	185.16ab	108.00b	104.80c	16.78e	177.26a	78.33d	75.46b	17.66b
T_2 = lsd 35	162.94ab	106.67b	76.47e	18.00d	126.33bc	90.20bc	74.00b	19.30ab
T_3= lsd 36	166.60ab	95.00c	96.94d	20.22a	123.60bcd	81.73cd	89.93ab	23.03a
T_4 = lsd 37	145.65b	117.67a	128.34a	17.89d	136.80b	82.46cd	97.86ab	18.89ab
T_5 = lsd 38	153.74ab	93.63c	106.38c	18.89c	110.80d	99.13a	81.80ab	20.47ab
T_6 = lsd 39	191.82a	94.17c	113.04b	19.55b	130.86bc	93.80b	109.33a	20.22ab
T_7 = lsd 40	151.13b	78.60d	72.98e	18.55c	119.73cd	79.46d	70.94c	18.82ab
LSD (0.05)	40.111	3.1686	4.2354	0.3936	34.821	5.978	4.743	0.423

Haque *et al.* (2009) reported that the plant cane of lsd 2/54, lsd 16, lsd 21, lsd 32, lsd 33, lsd 34, lsd 35 and lsd 36 gave yield of 75.90, 101.8, 108.9, 125.1, 126.7, 90.77, 90.23 and 86.27 tha^{-1} at Chuadanga; 77.53, 102.0, 108.1, 124.4, 125.9, 88.22, 91.53 and 83.53 tha^{-1} at Jhenaidha, respectively. Ahmed *et al.* (2008) reported that the ratoon cane of lsd 31, lsd 32, lsd 33, lsd 34, lsd 35 and lsd 36 give yield of 111.81, 93.41, 80.35, 85.21, 91.67 and 99.17 tha^{-1} at Vadsha; 118.63, 69.85, 89.53, 70.16. 89.12 and 93.03 tha^{-1} at Mongalbari and 85.71, 83.33, 85.71, 87.02, 94.05 and 87.14 tha^{-1} at Ramvadrapur, respectively. So, it may be concluded that lsd 39, lsd 37 and lsd 38 perform better as plant and ratoon cane among all other tested varieties. Thus it can be suggested to cultivate these sugarcane varieties both plant and ratoon cane. It is also observed that plant cane and ratoon cane gave higher yield compared to national average 46.00 tha^{-1} (BBS, 2014) and there is a great scope to improve cane production in plant cane as well as ratoon cane in the Tista Meander Floodplain Soils by using newly released BSRI varieties thereby benefiting the country through increasing national average yield of sugarcane.

REFERENCES

Ahmed,T.; Basher, M.K.; Abdullah, M. and Begum, M. 2008. Ratooning potentiality of selected sugarcane varieties in farmers field condition. *Bangladesh J. Sugarcane*, **30**: 35-38.

Anonymous. 2001. Annual report, Bangladesh Sugarcane Research Institute, Ishurdi, Pabna. pp: 46-47

Anonymous. 2014. Statistical Yearbook of Bangladesh, Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, Government of Peoples' Republic of Bangladesh, Dhaka.

Anonymous. 2005. Statistical Yearbook of Bangladesh, Bangladesh Bureau of Statistics, Statistics Division, Ministry of Planning, Government of Peoples' Republic of Bangladesh, Dhaka.

Haque, M.A.; Basher, M.K.; Podder, B.P.; Alam, M.J. and Hossain, G.M.A. 2009. Performance of newly released sugarcane varieties in High Ganges River Floodplain soils of Bangladesh. *Bangladesh J. Sugarcane*, **31**: 101-103.

Kapoor, G.P. 1966. Suggestion for increasing the acre yield of sugarcane in up. All Indian symposium on sugarcane development, April 1966. Indian Sugar Mills Association. New Delhi. pp: 204-209.

Majid, M.A. and Alam, F. 1998. Fertilizer management for sugarcane ratooning. *Bangladesh J. Sugarcane*, **18-20**: 75-79.

Matin, M.A.; Rahman, A.B.M.M. and Ali, M.Y. 1989. Performance of three varieties as transplant and ratoon cane under rain fed condition. *Bangladesh J. Sugarcane*, **11**: 32-36.

Mathur, P.S. 1986. Practical approach to improving sugarcane ratoon management under cultivators' condition. *Co-operative Sugar*, **17** (9): 695-699.

Miah, M.A.; Awal, A.; Nahar, S.M.N.; Mannan, Sk.A. and Ali, M.Y. 1994. Performance of some promising clones and released varieties of sugarcane in Himalayan Piedmont Plain soils. *Bangladesh J. Sugarcane*, **16**: 116-119.

Paul, G.C.; Rahman, M.K.; Hossain, A.H.M.D. and Alam, M.J. 1994. Performance of some newly released sugarcane varieties in growers field under Tista Meander Floodplain soils. *Bangladesh J. Sugarcane*, **16**: 131-133

Ponnappan, S. 1994. Cane cultivation in Mauritius Island. South Indian Sugarcane and Sugar Technologist Association (SISTA). *Sugar Journal*, **20** (1): 37-41.

Srivastava, S.C.; Yadav, R.L.; Chandra, J. and Shukla, V.S. 1990. Research strategies for sugar and sugarcane production by 2000 A.D.: 1-24.

Soopramanien, G.C. and Hunsigi, G. 1996. Ratooning nutrition and environment; An overview. *Co-operative Sugar*, **22** (11): 831-849.

Verma, R.S. 2002. Sugarcane ratoon management, Ratooning in general. pp: 2-3

Yadava, R.L. 1993. Agronomy of Sugarcane. International Book Distributing Co.; Lucknow. pp: 375.

Yadav, R.L. 1986. Bumper ratoon from winter harvest sugarcane. *Indian Farming*, **36** (6): 21-22.