



MEASURES FOR QUALITY SEED PRODUCTION OF OLDER ONE BY NEWLY RELEASE HIGH SUGARED VARIETIES OF SUGARCANE IN SUB -TROPICAL REGION

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Abstract: *Quality seed decides the germination, early vigour, initial crop establishment and finally the better yield in the crops. While planning for higher production at reasonable cost in sugarcane, production and nearby availability of the quality seed is an important aspect. One of the main reason for low productivity of sugarcane in the sub-tropical region is the non availability of quality seed of commercial sugarcane varieties. Sugarcane is vegetatively propagated crop; approximate 10-12 per cent of the total cane production is used annually as seed material for ensuing crop. Quality seed in Sugarcane holds an important role because the germination of sugarcane setts in sub-tropical region of the country is usually less than 40%, while 60-80% in tropical zone and the cost of seed material itself accounts for 18-20% of the total production cost. Good germination is pre-requisite for good crop production. An internal factor which decides the germination of sugarcane are cane variety, crop age, staling of seed cane, sett moisture, size of seed cane, total reducing sugar content of sett, soluble nitrogen of setts etc. So moisture content, nutrient content, seed health (free from pest and diseases) and age of seed crop affect the germination and modifying these components will help in improving the germination of sugarcane setts. Sugarcane growers are not aware about the technological requirements of seed production of sugarcane. In addition to cost factor, seed transport and its handling during planting operation are cumbersome. Wide gap of 8-10 years between the time of release of a variety and its spread at farmers field, non availability of quality seed in sufficient amount, bulkiness of seed material, transportation from long distance, handling of seed in the field, higher seed cost, non availability of seed at village level. No separate seed nurseries and non participation of government agencies for production and distribution of seed cane at the state and national level are the major bottlenecks for quality seed production and its timely distribution in Sugarcane. Seed treatment by hot water at 50° C for two hrs. after sizing into single or two budded setts, treated with Bavistin (fungicide) 0.1% solution were planted in the well prepared field supplied with integrated nutrient resources at row spacing 90 to 120 cm. in disease free condition. The seed crop was monitored regularly for genetic purity and free from pests and diseases upto 10-12 months in the field, earthing and propping up practices, seed multiplication technique has been recommended to the farmers for pure and faster seed multiplication by Uttar Pradesh Council of Sugarcane Research, Shahjahanpur for quality seed production. Government agencies, progressive farmers, seed suppliers, NGO and KVKs can be approached for production and distribution of quality seed of sugarcane at village level. Seed nurseries in each sugarmill, recommended 25% higher seed cane prices in comparison to cane for crushing purpose and trainings on different aspects of quality seed production to the sugarcane field functionaries and sugarcane growers will certainly improve the seed quality, cane yield and profit of the sugarcane growers in sub-tropical region. Among North Indian states, in U.P. the U.P. Council of Sugarcane Research had been played a important role in fast replacement of high yielding newly released varieties for example Co 0238 covered newly 50% - 60% of total area and sugar recovery has gone to 10.61 percent last year during 2015-16.*

Key words: *Quality Seed, Heat therapy, Breeder seed, Foundation seed, Certified seed, Fungicide, Sugarcane.*

Introduction

Seed is the basic, cheapest and dependable input for increasing agricultural production. Sugarcane seed used in commercial planting is the vegetative part of the stem (cane stalk) called sett. A

sett may contain one, two or three buds. Normally, two or three budded setts are used for planting. The quantity and quality of seed used determine the performance of crop. Only an improved variety with good quality seed cane increase cane yield upto 20 -

25% because good quality seed ensures maximum germination. The quality of seed depends on age of crop, growing conditions, varietal purity, non logging crop habit, no incidence of pests and diseases etc. Poor quality of seed increases seed cost which results in poor germination and consequently less number of millable canes and poor yield are obtained where as a good quality seed from a well maintained seed nursery certainly reduces the seed cost which is about 25% of total cost of sugarcane cultivation.

Since, sugarcane is grown for production of sugar, high sugared varieties of sugarcane needs to be developed. Many diseases of sugarcane are transmitted through seed and are required to be controlled. For this purpose, genetically pure good quality healthy seed of sugar rich varieties of early and mid- maturing are required to be produced regularly for enhancing sugarcane production and management of diseases. Therefore, establishment of seed production chain for sustained sugarcane production with the involvement of U.P. Council of Sugarcane Research three tier seed production programme is advocated to fulfill the requirement of quality seed in sugarcane cultivation. U.P. Council of Sugarcane research is the premier institution in U.P. for quality sugarcane seed production. Breeder seed of improved varieties of sugarcane treated with hot water at 50° C is produced under the supervision of seed production officer and scientists of other disciplines namely, breeding, plant pathology, entomology and agronomy.

In subtropical parts of India, the sugar industry is one of the largest agro- based industries providing employment to 7%-10% of rural population. In comparison to mid-late maturing, early maturing varieties are characterized by relatively quicker progression ripening in terms of juice quality attributes (Srivastava, 1935).

Materials and Methods

Setts from well maintained seed nurseries are treated with hot water at 50° C for two hour. After treatment, the setts are soaked in fungicide solution (0.1% Bavistin) for 05 to 10 minutes and planted in a well prepared field, wherein sugarcane

was not grown during the previous year. The field should be well prepared and organic manures such as Farm Yard Manure or sulphinated press mud cake should be applied @ of 10 ton or 05 t/ha respectively before planting. Spacing of 90 cm between row to row is recommended. Trench method of planting is also in use to produce breeder seed with spacing of 4 feet in a double row and 90 : 30 : 90 in paired row planting systems. A slightly higher seed rate of 75,000 setts/ha (two budded setts) is recommended for raising breeder's seed to compensate germination loss due to heat therapy.

Results and Conclusions

All recommended agronomical practices are followed, varietal multiplication was carried out as per the demand of sugar factories as well sugarcane growers of concerned area. Seed production practices were followed as per the recommendation of soil testing; plant protection and post monsoon irrigation were adopted. Breeder seed production is carried out day by day in the supervision of breeder, pathologist, entomologist and agronomist. The breeder seed cane of newly released varieties was utilized for raising foundation seed nurseries through trench method. Under this programme it was proposed to replace area under old varieties with newly released early and mid- late maturing varieties. UPCR has been producing sugarcane breeder seed from 1975-76. Total 2560163.96 qt sugarcane breeder seed cane from 1975-76 to 2015-2016 (During 1975-76, 13658.19 qt and during 2015-16, 231733.21 qt) had been produced by U.P.C.S.R. During 2014-15 under RKVY, a total of 43.71 ha (27.56 Early and 16.15 Mid-late) at research farms of UPCR, Shahjahanpur and 3.86 ha (1.12 Early and 2.74 Mid-late) at farmers' fields was raised in autumn, 2014. In spring 2015, 237.84 ha (123.46 Early and 114.38 Mid-late) at different research farms and 98.59 ha (48.38 Early and 50.21 Mid-late) at farmers' fields was raised under breeder seed-cane nurseries of approved varieties. Thus, during 2015-16, total 231733.21 qt (127195.43 qt early and 104537.78 qt of mid-late) breeder seed was produced out of which 79073.05 qt was produced at research farms and

152660.16 q at institutes/sugar mills / farmers' fields. (Table 1, 2 and 3)

There is need to spread early high sugar varieties because they require lesser nitrogen for Optimal yield (Mohan Rao and Narsimham, 1951), and also early build up of storage component of dry matter (Srivastava *et.al.*, 1994). Stevenson (1965) has

also emphasized that the early maturing varieties differ in their optimum time of maturity, in their capacity to stand to the end of a long dry crop season without appreciable loss in juice quality and in several other respects which are of importance commercially should be given preference over the other mid-late and late maturing ones.

References

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Table1: Distribution of Breeder Seed Cane by U.P.C.S.R. (2005-2006 to 2015-16)

S.No.	Year	Area (ha.)	Quantity (q)
1	2005-06	-	131917.30
2	2006-07	268.85	126132.49
3	2007-08	286.01	96271.43
4	2008-09	260.51	119261.99
5	2009-10	261.65	126579.03
6	2010-11	249.71	107490.00
7	2011-12	243.75	130246.19
8	2012-13	281.29	150431.60
9	2013-14	373.89	195205.06
10	2014-15	360.15	210753.13
11	2015-16	384.00	231733.21
	Total	2969.81	1626021.43

Table 2: Impact of Breeder Seed Cane on Area of Early and Mid Late Varieties in U.P.

S.NO.	YEAR	AREA OF EARLY VARIETIES (%)	AREA OF MID LATE VARIETIES (%)	AREA OF REJECTED VARIETIES (%)
1	2010-11	8.93	78.54	12.53
2	2011-12	9.23	76.08	14.67
3	2012-13	14.70	70.21	15.09
4	2013-14	21.35	63.71	14.94
5	2014-15	34.47	40.14	25-38 CoSe 92423 (14.57%)
6	2015-16	50.00	50.00	-

Table 3: Impact of Breeder Seed Cane on Productivity, Production and Recovery in U.P.

S.NO.	YEAR	CANE PRODUCTIVITY (t/ha)	TOTAL CANE PRODUCTION (Lac ton)	SUGAR RECOVERY (%)	TOTAL SUGAR PRODUCTION (Lac/ton)
1	2010-11	56.34	-	9.14	58.87
2	2011-12	59.35	1335.72	9.07	69.74
3	2012-13	61.63	1493.98	9.18	74.85
4	2013-14	62.72	1480.93	9.26	64.95
5	2014-15	65.14	1389.02	9.55	71.00
6	2015-16	66.46	1363.75	10.62	68.55