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The effect of sweet sorghum hybrid on grain yield and juice yield

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Abstract
The present investigation entitled "Studies on yield parameter in sweet sorghum hybrids {*Sorghum bicolor* (L) Moench}" was undertaken to study the effect of sweet sorghum hybrid on grain yield and juice yield. The experiment was conducted at Sorghum Research Station, Vasantrao Naik Marathwada Agricultural University, Parbhani during the *Kharif* season of 2022-2023 under field conditions. The Randomized Block Design with three replications was used for the experiment of 32 genotypes of sweet sorghum hybrids. The results revealed that, Yield and yield components *viz*., 1000-grain weight of genotype AKMS 90A × RSSV 522 (24.00 gm), number of grains per ear head of genotype AKMS 90A × SSV 74 (2114.00 grains), grain yield per plot of genotype 8914A× ICSV17335 (1.12 kg/plot), and harvest index of genotype IIMR15A×11NRL (10.23%) was significantly higher than rest of all other genotypes. Juice yield parameter *viz*., Among the genotypes 2297A×RSSV260 recorded higher juice yield (2.33 l/plot), genotype AKMS 90A×I-7 recorded higher green cane yield (13.75 kg/plot), genotype PMS 42A×RSSV 522 higher juice extraction (50%), genotype 473A×RSSV 522 recorded higher non reducing sugar (11.23%), genotype IIMR 35A×ICSV17472 and 8914A×ICSV17335 recorded high reducing sugar (1.66%) were found significantly higher than rest of all other hybrid genotypes.

Keywords: Sweet sorghum, juice yield, grain yield, genotype, RBD

Introduction

Sweet sorghum (*Sorghum bicolour* (L.) Moench) is similar to grain sorghum except for its maximum juice content. The correct name for the cultivated sorghum is *Sorghum bicolor* (L.) Moench. Juice rich sweet stalk and it is often taller (up to 4 meters). It can be grown successfully in dry land growing areas. It is known as the sugarcane of the desert, a "smart" crop and "camel among crops". Sweet sorghum extracts only one seventh of the water that is used up by sugarcane. Sweet sorghum provides grain for human consumption and stover for fodder and it is also used for industrial biofuel production. It is not often that all three (Food, Fodder and Fuel) requirements can be provided by one crop. It has more total sugars in the juice than sugarcane. Also, sweet sorghum-based ethanol is sulfur-free and cleaner than molasses-based ethanol, when mixed with gasoline. (Mokariya L.K. and Malam K.V. 2020) [11]. In Maharashtra, sorghum crop is grown in area of 15.40 lakh hectare, out of which 2.94 and 12.46 lakh hectare grown in Kharif and Rabi seasons with an average production of 2.72 and 5.15 lakh tons and productivity of 923 and 481 kg per hectare, respectively (maha-agri.org, 2019). The first three largest producing states are Maharashtra, Karnataka, and Madhya Pradesh respectively. (Anonymous, 2019) [3-4].

Sweet sorghum, with its array of adaptive features and low input requirements, is one of the leading candidates for biofuel feedstock. It has potential to solve two major issues. Firstly, it can play a significant role in addressing the growing need for renewable energy to displace fossil fuel-based energy resources. Secondly, instead of competing with food crops for arable land, it will rather help in conservation of marginal lands by converting them to agricultural land. However, Sorghum exhibits huge genetic diversity and resources towards region-specific climatic conditions or changing climatic conditions, and amount of fermentable sugars and grain yields vary considerably in different sweet sorghum cultivars. Therefore, screening and selection of appropriate varieties for each region is critical for optimum results. Also, response of sweet sorghum cultivars towards region-specific climatic conditions or changing climatic conditions is a critical aspect for large-scale cultivation.

Usually, grain yield in sweet sorghum is very low and grains are not suitable for use as human food, Supriya Mathur *et al.*, (2017) [12].

Materials and Methods
Grain and juice yield parameter
Grain yield (kg/ha)
From the net plot (kg/net plot) the grain yield per hectare was worked out.

Grain yield (kg/ha) = Net plot yield (kg) x hectare factor.

$$\text{Hectare factor} = \frac{10{,}000\ m^2}{\text{net plot area } (m^2)}$$

1000 grain weight (g)
Weight of 1000 seed recorded after harvesting of the crop.

No of grain per primary
Total no of grain per primary measure at the time of physiological maturity

No of primaries per earhead
No of primary per earhead measured at the time of physiological maturity

No of grain per earhead
No of grains per earhead measured at the stage of physiological maturity.

Harvest index (%)
Harvest index was calculated by the formula given by Donald (1962) [8].

$$\text{Harvest index (\%)} = \frac{\text{Economic yield}}{\text{Biological yield}} 100$$

Table 1 Stay green colour (1 to 9) score at physiological maturity
The stay-green traits can be classified in five different scales as follows (Borrell, *et al*. 1999) [5].

Table 1: Stay green colour (1 to 9) score at physiological maturity

Sr. No	Scale	Greenness type
1	1	Dark green leaf
2	3	Green leaf
3	5	Light green (50%)
4	7	Yellow green (25%)
5	9	100% dry leaves

Millable cane yield/plot (kg)
Sweet sorghum (*Sorghum bicolor*) has the potential to become a multipurpose feedstock for large-scale ethanol production from stem juice, cellulose/hemicellulose from stalks, and starch from grain. Maximizing the feedstock yield is the first step for large-scale production of ethanol. The millable cane yield per plot measured at the time of physiological maturity.

Juice yield parameters
Juice yield (lit/plot)
Juice of five canes were extracted from roller crusher and composite juice was measured in measuring cylinder and can be calculated as,

$$\text{Juice yield (Lit/net plot)} = \frac{\text{Juice from five canes (lit)}}{\text{Number of canes}} \text{x Plant stand at harvest}$$

Brix (%)
The brix value of juice was recorded with help of hand refractometer

Juice extraction (%)
As demand for and production of fuel ethanol increase to unpreceded levels, feedstocks for ethanol production will become more diverse. Sweet sorghum is an ideal feedstock for fuel ethanol production in the southeast and midwest. Sweet sorghum juices usually contain approximately 16–18% fermentable sugar, which can be directly fermented into ethanol by yeast.

$$\text{Juice extraction \%} = \frac{\text{Wt. of five plant pol juice}}{\text{Wt. of five pol cane}}$$

Reducing and non-reducing sugar
A) Reducing sugar (%)
The estimation of reducing sugar in sweet sorghum juice was carried by 3,5, dinitrosalycylic acid method (Miller, 1959) [13].

B) Total sugar (%)
The estimation of total sugars in sweet sorghum juice was carried by phenol sulphuric method (Dubois *et al.*, 1956) [9].

C) Non-Reducing Sugar (%)
Non reducing sugar was estimated by subtracting value of reducing sugar from total soluble sugar.

Results and Discussions
Grain yield parameter
No. of grain /primary
The data on no of grain per primary presented in table 2 the hybrid 2297A × RSSV 260 (56 grain per primary) recorded highest number of grains per primary followed by PMS 71A × AKSV 473R, (54 grain per primary) the lowest no of grain per primary was observed in hybrid 8914A × RSSV 589 and PMS 42A × RSSV 522 (42 grain per primary). Similar result reported by Agha Alikhani *et al.* (2012) [1].

No. of primary per earhead
The data on no of primary per earhead presented in table 2. The hybrid IIMR 15A × RSSV 522 recorded highest no of primary per earhead (41 primary) followed by hybrid 3026A × RSSV 466 (40.67 primary). The lowest no of primary per earhead recorded in hybrid 2297A × RSSV 260 (31.67 primary). Similar result reported by Agha Alikhani *et al.* (2012) [1].

No. of grain per earhead
The data on number of grains per earhead presented in Table 2. The hybrid AKMS 90A× SSV74 recorded highest number of grains per panicle (2114.00 grains) followed by hybrid AKMS 90A ×AKSV 472R (2027.00 grains). The lowest number of grains per earhead was observed in hybrid PMS42A × RSSV522 (1426.00 grains). Similar result reported by Agha Alikhani *et al.* (2012) [1].

Table 2: Yield contributing parameter as influenced by sweet sorghum hybrid

Genotypes	No of grain/primary	No of primary/earhead	No of grain/earhead
AKMS 30A x RSSV 522	51.67	33.33	1720.00
AKMS 30A x 11 NRL	50.67	35.33	1790.33
AKMS 30A x AKSV 472R	47.67	36.67	1751.33
AKMS 90A x RSSV 522	50.00	33.67	1698.33
AKMS 90A X AKSV 472R	50.33	40.33	2027.67
AKMS 90A x SSV 74	53.67	39.67	2114.00
AKMS 90A x I-7	52.67	38.33	1922.00
PMS 42A x RSSV 522	42.00	34.00	1426.67
PMS- 71A x AKSV 473R	54.00	34.33	1861.00
PMS- 71A x 11 NRL	46.33	34.67	1599.33
RMS 10A x SSR 7	51.33	35.33	1848.00
IIMR 28A x ICSV 18002	48.00	38.00	1813.33
IIMR 33A x ICSV 17472	47.67	33.00	1570.33
IIMR 35A x ICSV 17472	50.67	34.00	1713.67
473A x ICSV 1502-1	50.67	32.67	1654.00
473A x RSSV 522	51.00	34.33	1752.00
2297A x RSSV 260	56.00	31.67	1773.33
3060A x RSSV 260	48.00	34.67	1662.67
3060A x11 NRL	47.67	40.00	1658.67
8914A x ICSV 17335	51.67	38.33	1998.00
8914A x RSSV 589	42.00	39.33	1653.00
8914A x RSSV 260	50.33	35.67	1793.67
IIMR 13A x RSSV 589	50.67	34.67	1756.00
IIMR 15A x RSSV589	43.33	40.67	1747.00
IIMR 15A x RSSV 542	46.33	38.00	1754.00
IIMR 15A x RSSV 522	40.00	41.00	1640.00
IIMR 15A x 11NRL	45.33	39.00	1765.00
3026A x RSSV 466	49.33	40.67	2004.67
296A x ICSV 1502-1	50.67	36.00	1823.33
ICSA 38 x SPV 2074	46.33	37.67	1806.33
185A x 11 NRL	47.33	38.33	1742.67
CSH 22 SS (check)	46.00	38.00	1761.00
GM	50.08	35.62	1767.73
S. E. m. ±	2.10	1.82	78.23
C.D. at 5%	6.00	5.21	224.08
C.V.%	11.43	10	11.5

1000 grain weight (g)

Data from table indicated that there were significant differences amongst the genotypes in respect of mean 1000-grain weight (g). The hybrid AKMS 90A × RSSV 522 (24.00 g) was found to be significantly superior in mean 1000 grain weight followed by IIMR 15A × RSSV 589 (20.00 gm) and 8914A × ICSV 17335 (19.67 gm). The lowest 1000-grain weight was observed in hybrid AKMS 90A × I-7 (14.90 gm).The hybrid AKMS 90A × RSSV 522 followed by IIMR 15A × RSSV589 registered higher 1000-grain weight than rest of the genotypes. Number of grains per earhead and 1000 grain weight has positive association with grain yield. Similar result was reported by Kadam *et al*. (2002) [10].

Grain yield (kg/plot)

Data from table indicated that there was significant difference in grain yield. Grain yield is the economic part of the total dry matter. This is the end product of the plants life cycle and it is of much interest to mankind. Yield is a compound character and is a sum total of the contribution made by a number of physiological characters. It is an ultimate product of the action and interaction of a number of component plant characters. To the plant physiologist, it is net economic gain from the source and sink capacity. In the present investigation, the grain yield per plot was highest in hybrid 8914A× ICSV 17335 (1.12 kg/plot) followed by 3026A × RSSV 466 (1.07kg/plot) and AKMS 90A × AKSV 472R (1.04 kg/plot). The lowest grain yield per plot was observed in hybrid IIMR 33A × ICSV 17472 (0.74 kg/plot). Similar result reported by Miri *et al*., (2012) [14] in sweet sorghum genotype. Nirmal *et al*., (2017) [18] reported that the genotype RSSV-325 recorded highest grain yield (1564 kg/ha), which was superior to RSSV- 350 (1154), CSV-19SS (C) (1032) and RSSV-313 (1197) (t/ha) respectively.

Table 3: Yield contributing parameters as influenced by sweet sorghum hybrid

Genotypes	1000 grain weight (g)	Grain yield (kg/plot)	Harvest index (%)
AKMS 30A x RSSV 522	17.33	0.82	7.97
AKMS 30A x 11 NRL	18.13	0.91	9.03
AKMS 30A x AKSV 472R	15.03	0.79	7.73
AKMS 90A x RSSV 522	24.00	0.85	8.27
AKMS 90A X AKSV 472R	17.80	1.04	9.67
AKMS 90A x SSV 74	17.83	1.00	9.97
AKMS 90A x I-7	14.90	0.94	9.33
PMS 42A x RSSV 522	16.60	0.80	8.00
PMS- 71A x AKSV 473R	15.73	0.89	8.53
PMS- 71A x 11 NRL	15.93	0.78	7.73
RMS 10A x SSR 7	17.13	0.93	8.80
IIMR 28A x ICSV 18002	16.83	1.00	9.63
IIMR 33A x ICSV 17472	15.40	0.74	6.97
IIMR 35A x ICSV 17472	16.37	0.77	6.83
473A x ICSV 1502-1	16.33	0.81	8.03
473A x RSSV 522	15.67	0.87	8.67
2297A x RSSV 260	17.17	0.90	8.70
3060A x RSSV 260	16.70	0.82	8.30
3060A x 11 NRL	17.97	0.85	8.14
8914A x ICSV 17335	19.67	1.12	9.97
8914A x RSSV 589	17.90	0.78	7.87
8914A x RSSV 260	17.40	0.85	8.40
IIMR 13A x RSSV 589	15.10	0.79	7.87
IIMR 15A x RSSV589	20.00	0.81	8.23
IIMR 15A x RSSV 542	17.30	0.96	9.43
IIMR 15A x RSSV 522	19.00	0.85	8.33
IIMR 15A x 11NRL	17.30	1.01	10.23
3026A x RSSV 466	15.83	1.07	9.80
296A x ICSV 1502-1	16.53	0.90	9.27
ICSA 38 x SPV 2074	16.56	0.95	7.67
185A x 11 NRL	16.34	0.90	9.00
CSH 22 SS (check)	16.32	0.81	7.80
GM	17.12	0.88	8.51
S. E. m. ±	0.92	0.08	0.71
C.D. at 5%	2.63	0.23	2.03
C.V. %	9.3	15.85	14.43

Harvest index (%)

Data on harvest index % presented table. The harvest index (%) ranged from 6.83 to 10.23% with a mean of 8.51%. The hybrid IIMR 15A × 11NRL recorded significantly highest harvest index (10.23%) which was at par with AKMS 90A × RSSV 522, 3060A×11NRL, 3060A × RSSV 260 and IIMR 15A × RSSV 522. The hybrid IIMR 35A × ICSV 17472 recorded significantly the lowest harvest index (6.83%). Similar result reported by Pinjari and Shinde (1995) [15]. The results revealed that, higher yield of hybrid was mainly due to harvest index (HI). Shinde *et al.*, (1998) [19] reported that the important physiological traits *viz.* biological yield, harvest index, stem dry matter, panicle dry matter, leaf area index and biomass productivity, water use efficiency, relative water content and yield attributes were significantly correlated with grain yield in sorghum.

Juice yield parameter

Juice yield (lit/plot)

Data on mean juice yield (lit/plot) is presented in table. The mean juice yield ranged from 1.73 to 2.33 with a mean of (2.15l/plot) at harvesting stage. The hybrid 2297A × RSSV 260 recorded highest juice yield (2.33 l/plot).

Followed by hybrid 296A × ICSV 1502-1 (2.30 l/plot). The hybrid IIMR15A × RSSV 542 recorded significantly the lowest juice yield (1.73 l/plot). Similar result reported Broadhead (1972) [6] in sweet sorghum hybrid.

Millable cane yield (kg/plot)

Data on mean millable cane yield presented in table. The mean millable cane yield ranged from 11.00 to 13.75 with a mean of (12.59 kg/plot). The hybrid AKMS 90A × I-7 recorded significantly highest green cane yield (13.75 kg/plot) which was at par with AKMS 30A × 11NRL and IIMR 28A × ICSV 18002. The hybrid IIMR 33A × ICSV 17472 recorded significantly lowest millable cane yield (11.00 kg/plot). Rono *et al.*, (2018) [16] also reported on cane yield and juice volume determine ethanol yield in sweet sorghum and reported that range of green cane yield was (16.1 to 27.4 t/ha).

Table 4: Juice yield contributing parameter as influenced by sweet sorghum hybrid

Genotype	Juice yield (lit/plot)	Millable cane yield (kg/plot)	Fresh biomass (kg/plot)
AKMS 30A x RSSV 522	2.17	12.22	17.80
AKMS 30A x 11 NRL	1.91	11.14	15.49
AKMS 30A x AKSV 472R	1.79	12.16	16.43
AKMS 90A x RSSV 522	2.22	12.21	17.44
AKMS 90A X AKSV 472R	2.55	13.71	18.66
AKMS 90A x SSV 74	2.22	12.92	17.21
AKMS 90A x I-7	2.30	13.75	17.69
PMS 42A x RSSV 522	2.06	12.81	15.03
PMS- 71A x AKSV 473R	2.12	12.37	16.15
PMS- 71A x11 NRL	2.03	13.39	16.76
RMS 10A x SSR 7	2.09	13.18	17.14
IIMR 28A x ICSV 18002	1.95	11.50	18.23
IIMR 33A x ICSV 17472	2.19	11.00	17.92
IIMR 35A x ICSV 17472	2.22	13.14	19.10
473A x ICSV 1502-1	2.11	13.42	16.17
473A x RSSV 522	2.43	12.43	18.05
2297A x RSSV 260	2.33	12.58	19.43
3060A x RSSV 260	1.99	11.86	17.74
3060A x 11 NRL	1.96	12.61	15.52
8914A x ICSV 17335	2.27	13.43	18.06
8914A x RSSV 589	1.81	12.41	18.99
8914A x RSSV 260	2.07	11.73	16.87
IIMR 13A x RSSV 589	2.09	12.94	17.93
IIMR 15A x RSSV589	1.80	12.74	15.27
IIMR 15A x RSSV 542	1.73	12.14	18.04
IIMR 15A x RSSV 522	1.93	12.56	18.42
IIMR 15A x 11NRL	2.06	12.82	18.78
3026A x RSSV 466	2.16	13.64	18.30
296A x ICSV 1502-1	2.33	13.02	15.57
ICSA 38 x SPV 2074	2.13	12.77	18.23
185A x 11 NRL	2.11	14.50	18.38
CSH 22 SS (check)	1.97	13.10	18.37
GM	2.15	12.59	17.30
S.E m. ±	0.14	0.85	0.84
C.D. at 5%	0.40	2.44	2.40
C.V. %	11.14	11.7	8.39

Fresh biomass (kg/plot)

Data on fresh biomass (kg/plot) is presented in table The mean fresh biomass yield at harvest stage ranged from 15.03 to 18.99 with mean of (17.30 kg/plot). The hybrid 8914A × RSSV 589 recorded significantly highest fresh biomass (18.99 kg/plot) which was at par with PMS 71A × 11 NRL and AKMS 30A × AKSV 472R. The hybrid PMS 42A × RSSV 522 recorded significantly lowest fresh biomass (15.03 kg/pot). Rao *et al*., (2013) [20] also reported that the Significant ($p \leq 0.05$) differences were observed for stalk and sugar related traits. Fresh biomass varied from 39.0 to 67.0 t ha^{-1}.

Brix (%)

The data on mean brix (%) is presented in table The mean brix ranged from 19.67 to 21.0 with a mean of (20.56%) at physiological maturity. The hybrid AKMS 90A × AKSV 472R, AKMS 90A × I-7, 2297A × RSSV 260, 3060A × RSSV 260, 8914A × ICSV 17335 and 3026A × RSSV 466 recorded the highest brix (21%). The genotypes AKMS 30A × RSSV 522 and AKMS 90A×SSV 74 were recorded the lowest (19.67%) than the rest of the hybrids. Chavan *et al*., (2009) [7] also reported that there were many variations in the brix at physiological maturity in the sweet sorghum. It was ranged from 18 to 20.5 per cent. They also reported that as the harvesting period increases the brix also increases in the sweet sorghum genotypes. Gadakh *et al*., (2013) reported that Urja genotype recorded highest brix (16.3%) among the genotypes studied.

Juice extraction (%)

Data on mean juice extraction (%) presented in table The mean ranged of juice extraction from 34.41% to 50% with the mean of 42.56% the hybrid PMS 42A×RSSV522 recorded significantly highest juice extraction (50%) which is at par with the hybrid 3060A×11NRL and 8914A × RSSV 589. The hybrid IIMR 15A × RSSV 522 recorded significantly lowest juice extraction percent than the rest of hybrid.

Table 5: Juice yield parameter as influenced by sweet sorghum hybrid

Genotypes	Brix (%)	Juice extraction (%)	Non reducing sugar (%)	Reducing sugar (%)
AKMS 30A x RSSV 522	19.67	42.00	11.07	1.56
AKMS 30A x 11 NRL	20.67	41.54	10.99	1.30
AKMS 30A x AKSV 472R	20.33	35.17	10.27	1.50
AKMS 90A x RSSV 522	20.33	40	11.02	1.25
AKMS 90A x AKSV 472R	21.00	46.04	11.10	1.40
AKMS 90A x SSV 74	19.67	48.00	10.78	1.55
AKMS 90A x I-7	21.00	44.32	11.15	1.27
PMS 42A x RSSV 522	20.67	50.00	10.23	1.54
PMS- 71A x AKSV 473R	21.00	40.65	10.23	1.45
PMS- 71A x11 NRL	20.67	41.16	10.28	1.60
RMS 10A x SSR 7	20.67	42.33	10.64	1.59
IIMR 28A x ICSV 18002	20.67	42.73	10.40	1.39
IIMR 33A x ICSV 17472	20.33	40.61	10.44	1.50
IIMR 35A x ICSV 17472	20.33	37.32	10.43	1.66
473A x ICSV 1502-1	20.67	38.22	10.23	1.58
473A x RSSV 522	20.67	37.60	11.23	1.30
2297A x RSSV 260	21.00	47.33	10.45	1.51
3060A x RSSV 260	21.00	47.67	10.58	1.48
3060A x11 NRL	20.00	43.46	11.05	1.17
8914A x ICSV 17335	21.00	42.00	10.98	1.66
8914A x RSSV 589	20.67	43.08	9.87	1.58
8914A x RSSV 260	20.67	35.23	11.01	1.52
IIMR 13A x RSSV 589	20.33	41.60	10.77	1.67
IIMR 15A x RSSV 542	20.33	42.04	10.19	1.21
IIMR 15A x RSSV 522	20.67	34.41	10.77	1.51
IIMR 15A x 11NRL	20.33	45.00	10.61	1.43
3026A x RSSV 466	21.00	40.96	10.81	1.47
296A x ICSV 1502-1	20.67	42.33	10.74	1.60
ICSA 38 x SPV 2074	20.67	41.68	10.82	1.53
185A x 11 NRL	20.67	46.33	10.77	1.51
CSH 22 SS (check)	20.33	39.18	10.57	1.58
GM	20.56	42.56	10.67	1.46
S. E. m ±	0.44	2.08	0.88	0.10
C.D. at 5%	1.25	5.96	1.20	0.28
C.V. %	3.69	8.47	14.2	11.47

Non-reducing sugar (%)

Rao, (2013) [20] was also reported the effect of different crushing treatments on juice extraction and sugar quality traits of sweet sorghum cultivars grown in different seasons. The data on non-reducing sugar (%) is present in table. The mean non reducing sugars ranged between 9.87and 11.23 at physiological maturity with a mean of 10.67%. The hybrid 473A × RSSV 522 exhibited significantly highest non reducing sugar (11.23%) which is followed by AKMS 90A × I-7 (11.15%), and AKMS 90A × AKSV 472R (11.10%). The hybrid 8914A × RSSV 589 recorded lowest non reducing sugars (9.87%). Almodares *et al*., (2013) [2] also reported same result on mean sucrose content from 9 to 10.5% in different sweet sorghum genotypes. Almodares *et al.*, (1997) [2] observed the wide range of variability for brix (13 to 24%) sucrose.

Reducing sugar (%)

Data on reducing sugar (%) presented in table. The mean reducing sugar varied from 1.21 to 1.66 with a mean of 1.46% at physiological maturity. The hybrid IIMR 35A × ICSV 17472 and 8914A × ICSV 17335 recorded significantly the highest reducing sugar (1.66%) which was at par with AKMS 90A × AKSV 472R, IIMR 28A × ICSV 18002 and IIMR 15A × 11 NRL. The hybrid IIMR 15A × RSSV 542 recorded significantly lowest reducing sugar (1.21%). Chavan *et al*., (2009) [7] was also reported that reducing sugar ranges from 0.69 to 1.79% in different sweet sorghum genotypes in *kharif* season. Samarth *et al.*, (2018) [17] also reported that that sweet sorghum is significantly higher in reducing sugar (3.61%) and total sugar (4.24%) imparting its sweet taste.

Conclusions

The main objective of sweet sorghum cultivation being higher juice production of better quality rather than the grain production. The Genotype 8914A × ICSV 17335 is good grain yielder than other genotypes. Considering all these juice quality parameters it can be concluded that the genotype 2297A × RSSV 260 found as the most promising for jaggery Preparation. These can be further used for developing improved plant types with good quality juice. The dynamics of sugar content in stalk revealed that the maximum sugar was observed at physiological maturity However, harvesting of sweet sorghum could be done at physiological maturity stage. The genotype AKMS 90A × AKSV 472R showed higher brix. From a quality perspective, these genotypes could be used in a breeding program.

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