



Development and Evaluation of Back Cross Hybrids Involving *Erianthus Spp*



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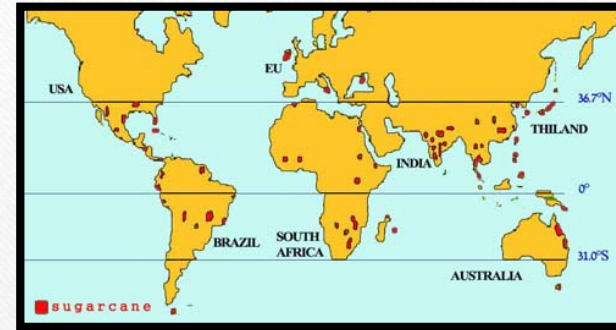


Tropical plant- Cultivated between 30° N and S latitudes

Cultivated in more than 100 countries

80% sugar is from sugarcane

Major countries : Brazil, India, China, Australia



World average productivity of sugarcane is 61 t cane per ha

India

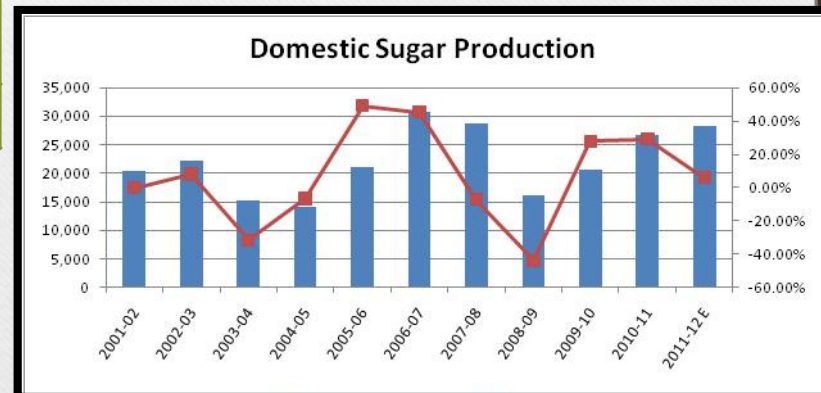
Year	Area Mha	Yield t/ha	Prod mt
2012-13	5.01	66.20	336.00

Sugar Production :

526 sugar mills

2012-13 : 25.14 mt of sugar

**Maharashtra, Uttar Pradesh, Karnataka,
Tamilnadu**



Trends in Area and Productivity of Sugarcane in India



Modern sugarcane cultivars are derived from interspecific hybridisation between the domesticated cane *Saccharum officinarum* and the wild species *S. spontaneum*

Provided major improvements in terms of yield

sugarcane varieties currently under cultivation have a narrow genetic base tracing back to less than 20 *S. officinarum*, two *S. spontaneum* and a couple of *S. barberi* clones

Imposed serious limitations in making a significant improvement in sugarcane productivity in recent years



Saccharum officinarum



S. Spontaneum

Attempts are being made at all cane breeding stations to broaden and diversify the genetic base of sugarcane through the introgression of wild relatives

Traditionally *S. spontaneum* had been used as a source for imparting high productivity and tolerance to biotic and abiotic stresses in sugarcane varieties

In recent years considerable attention is given to use *Erianthus* spp. which has

- ✓ High biomass
- ✓ Vigor
- ✓ Ratoonability
- ✓ Tolerance to drought and water logging
- ✓ Resistance to pests and disease

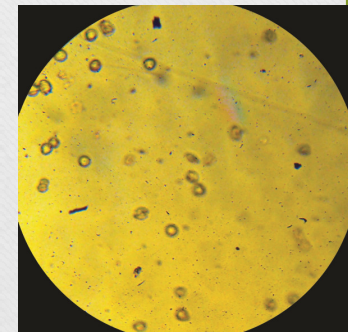


Erianthus arundinaceus

At Sugarcane Breeding Institute, Coimbatore, introgression of *Erianthus* spp. is in progress since 1980's and a number of intergeneric hybrids had been produced over the years

Drawbacks

- ❖ Identification of true hybrids based on morphology
- ❖ Sterility in the hybrids
- ❖ The hybrids though had more productivity lacked some of the agronomic traits including sugar



Intergeneric hybrids involving *Erianthus*

During flowering season 2004, 85 crosses were made using different *Erianthus arundinaceus* clones (Eri 2385, IK 76-93, IK 76-91, IMP 1547) and improved *officinarum*, *robustum* and commercial canes) with various combinations

Sl.No	Cross (2004 series)
1	PIO 96-441 x ERI-2385
2	PIO-96-443 x ERI-2385
3	CoC 671 x IK 76-91
4	PIR 00-1188 x IK 76-91
5	CoC-671 x IMP-1547
6	Co 7201 X IK 76-91
7	PIO 98-297 X IK 76-91
8	PIO 98-1115 X IK 76-93
9	PIO 96-436 X IK 76-91
10	IND 90-776 x PIO 96-435



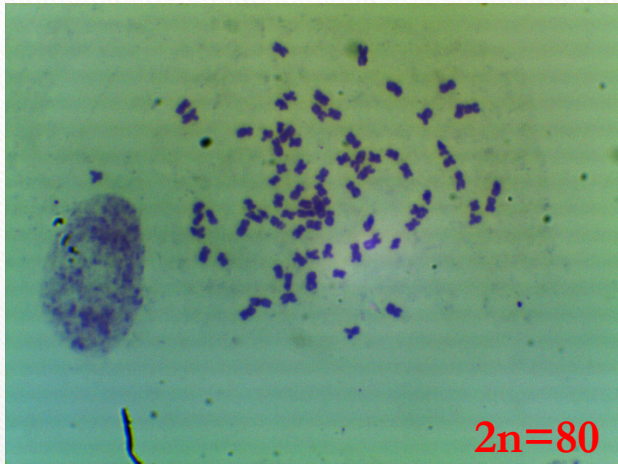
27 confirmed intergeneric hybrids involving *Erianthus*



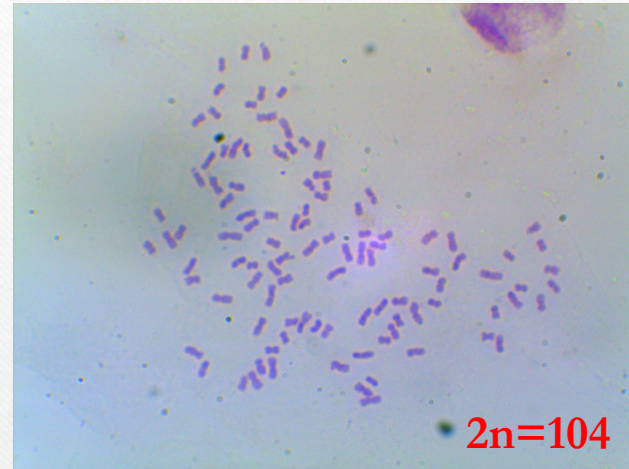
Intergeneric hybrids involving *Erianthus*



Intergeneric hybrids involving *Erianthus*



Gu 04(28)EO-2



PIO 96-435

Improved *S.officinarum*
2n=104

E. arundinaeus
2n=60



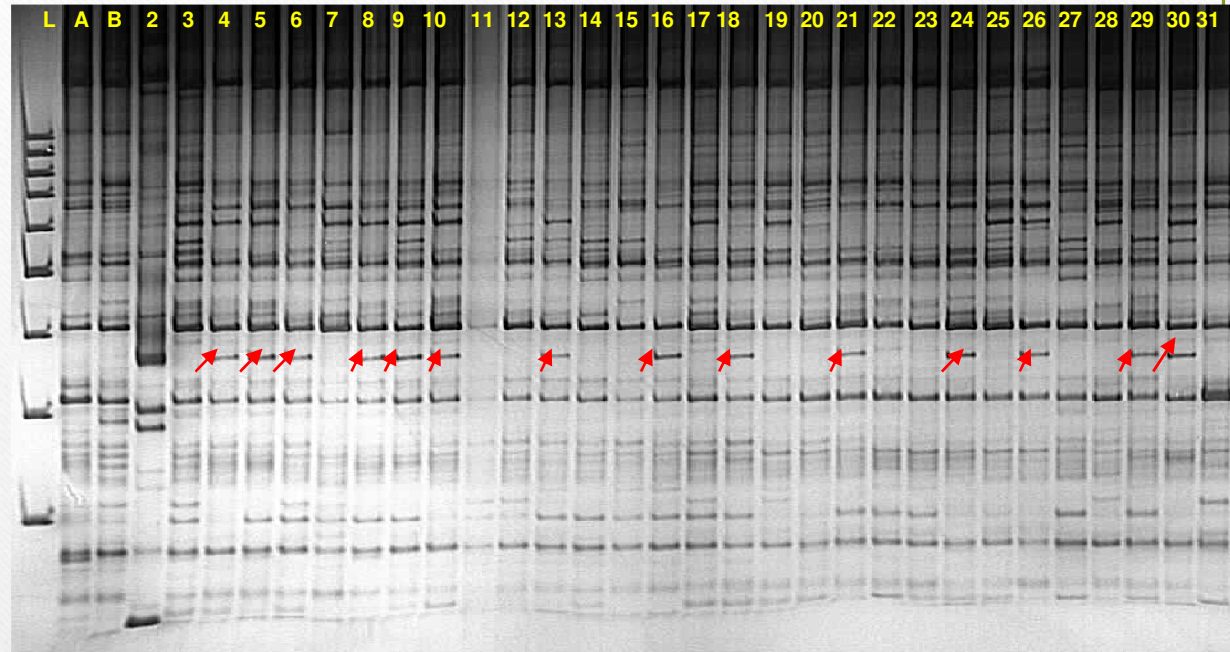
Gu 04(28)EO-2
2n=80



GU 04-1736

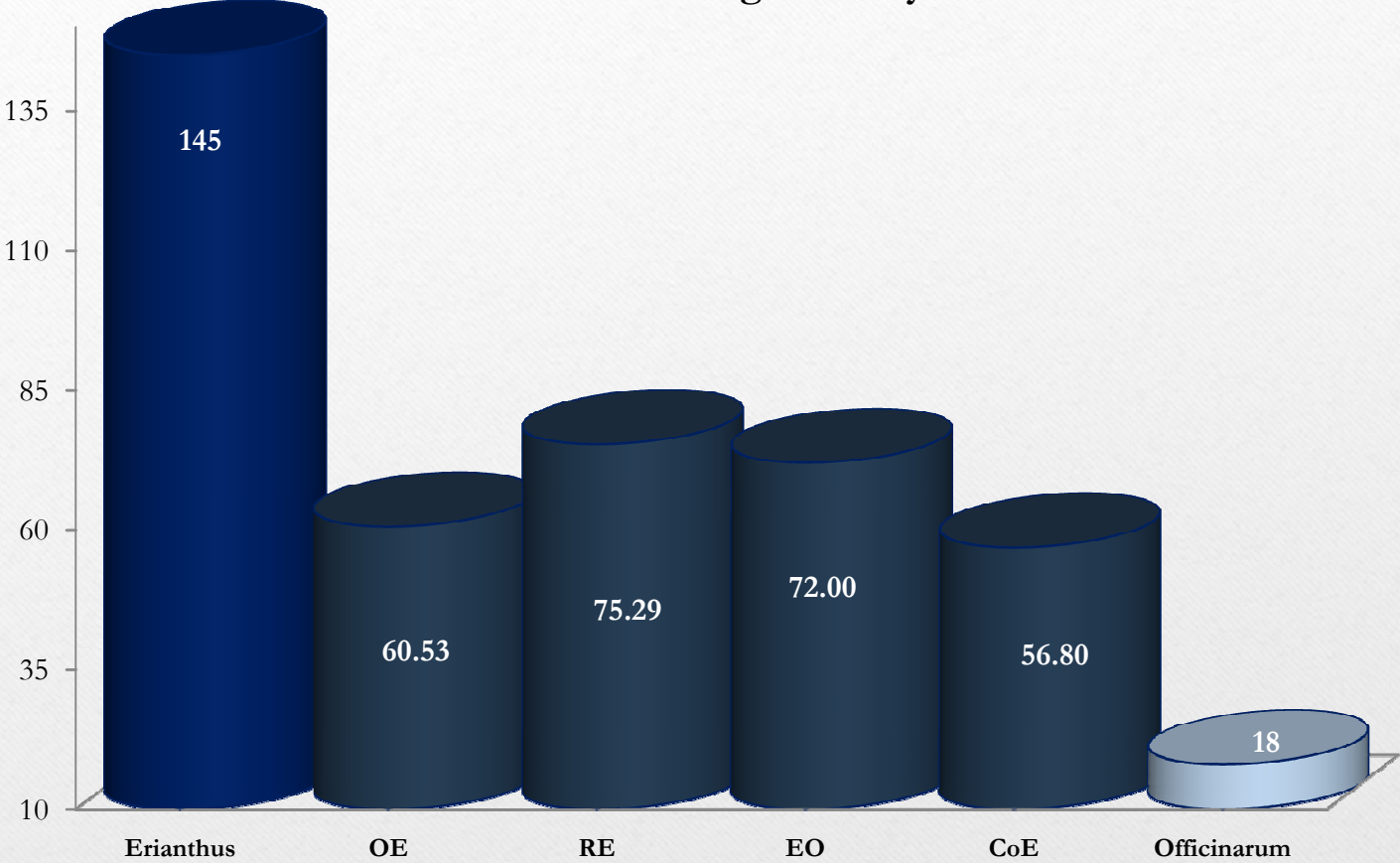
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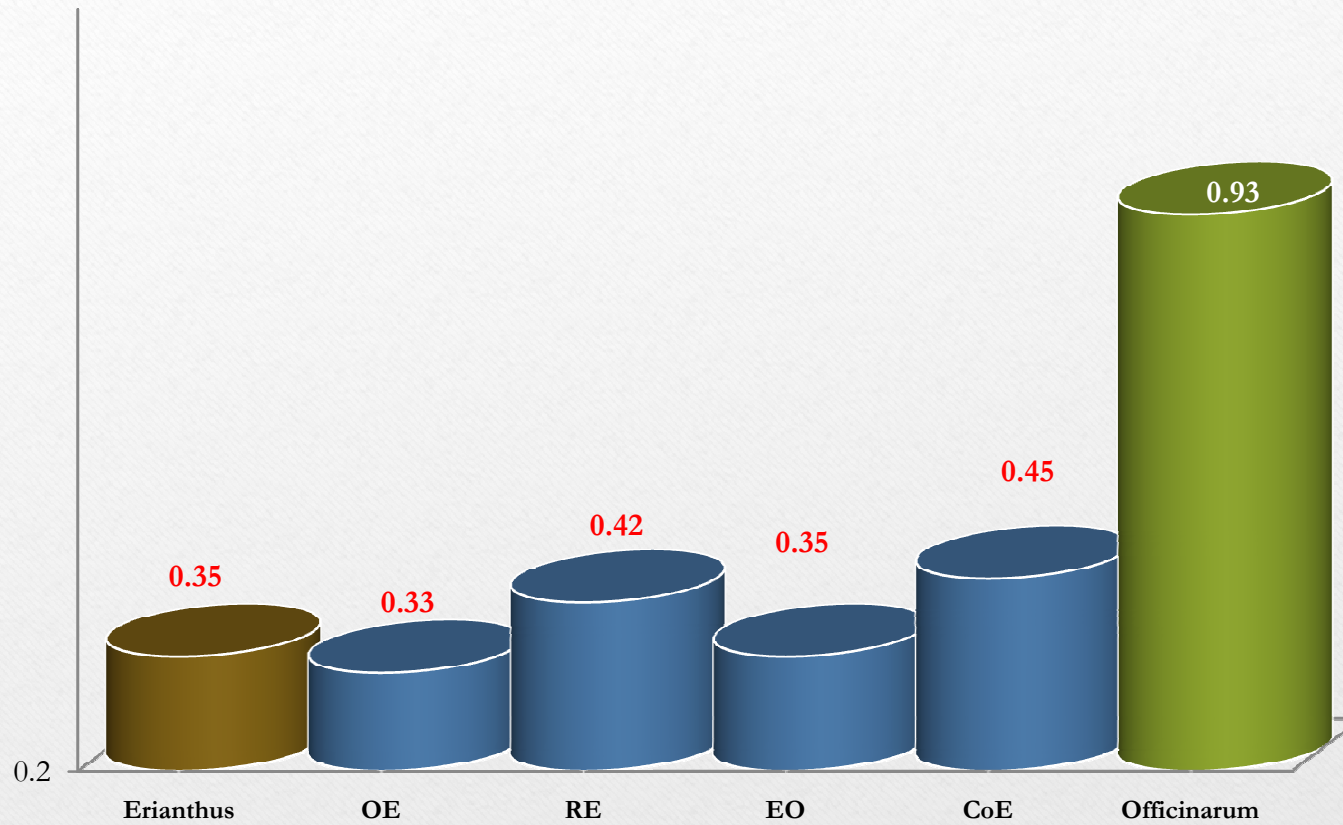


- | | | | | |
|--------------|----------------|----------------|----------------|----------------|
| A)PIO-96-436 | 6)GU-04-1710 | 13) GU-04-1811 | 20) GU-04-1859 | 27) GU-04-1927 |
| B)DB-95-918 | 7) GU-04-1723 | 14) GU-04-1820 | 21) GU-04-1868 | 28) GU-04-1933 |
| 2)IND-99-908 | 8) GU-04-1736 | 15) GU-04-1825 | 22) GU-04-1880 | 29) GU-04-1935 |
| 3)GU-04-1691 | 9) GU-04-1781 | 16) GU-04-1827 | 23) GU-04-1881 | 30) GU-04-1937 |
| 4)GU-04-1695 | 10) GU-04-1790 | 17) GU-04-1836 | 24) GU-04-1893 | 31) GU-04-1948 |
| 5)GU-04-1702 | 11) GU-04-1799 | 18) GU-04-1840 | 25) GU-04-1885 | |
| | 12) GU-04-1808 | 19) GU-04-1849 | 26)GU-04-1915 | |

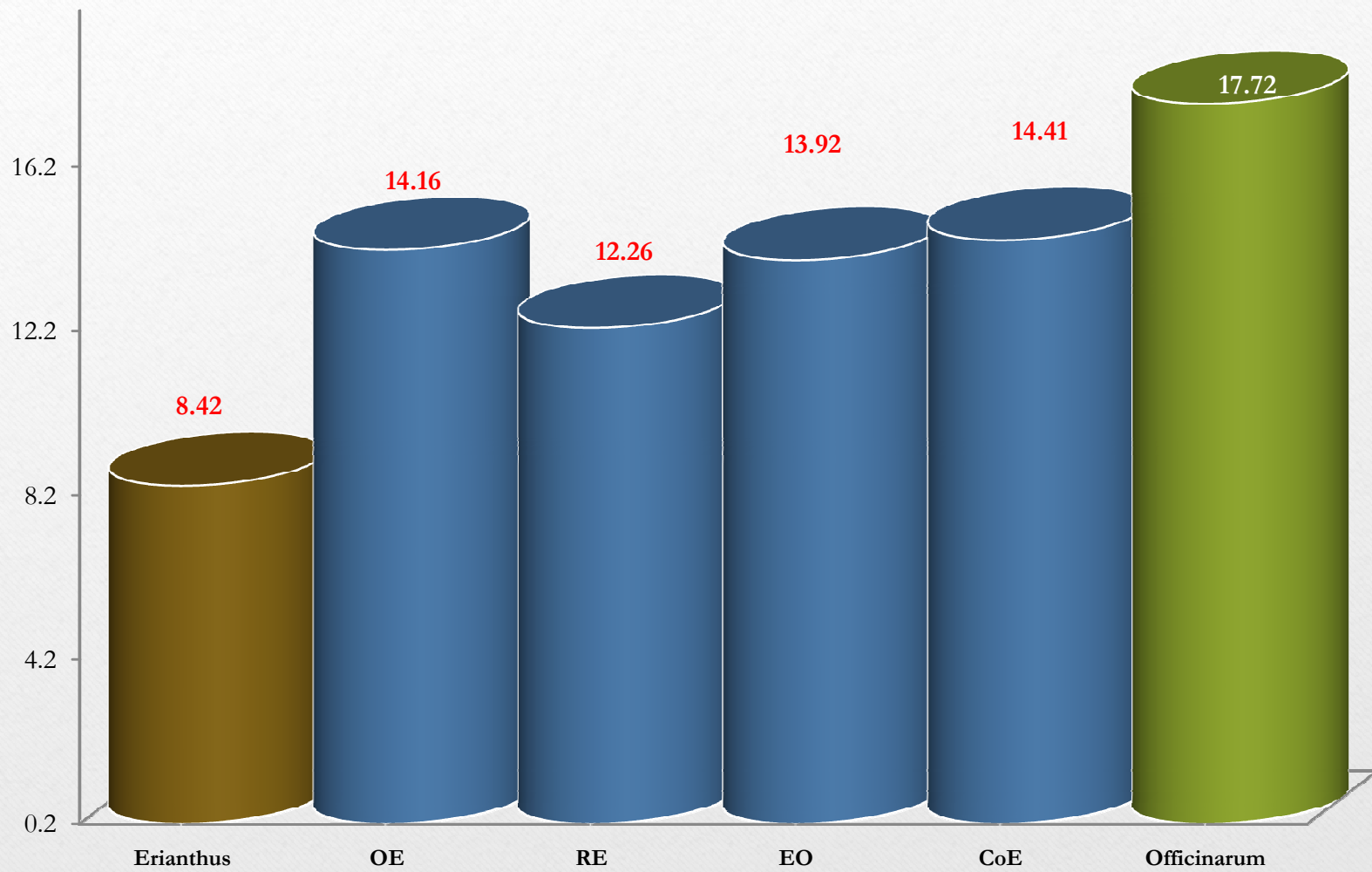
Mean NMC in intergeneric hybrids



Mean single cane weight in intergeneric hybrids



Mean brix% in intergeneric hybrids



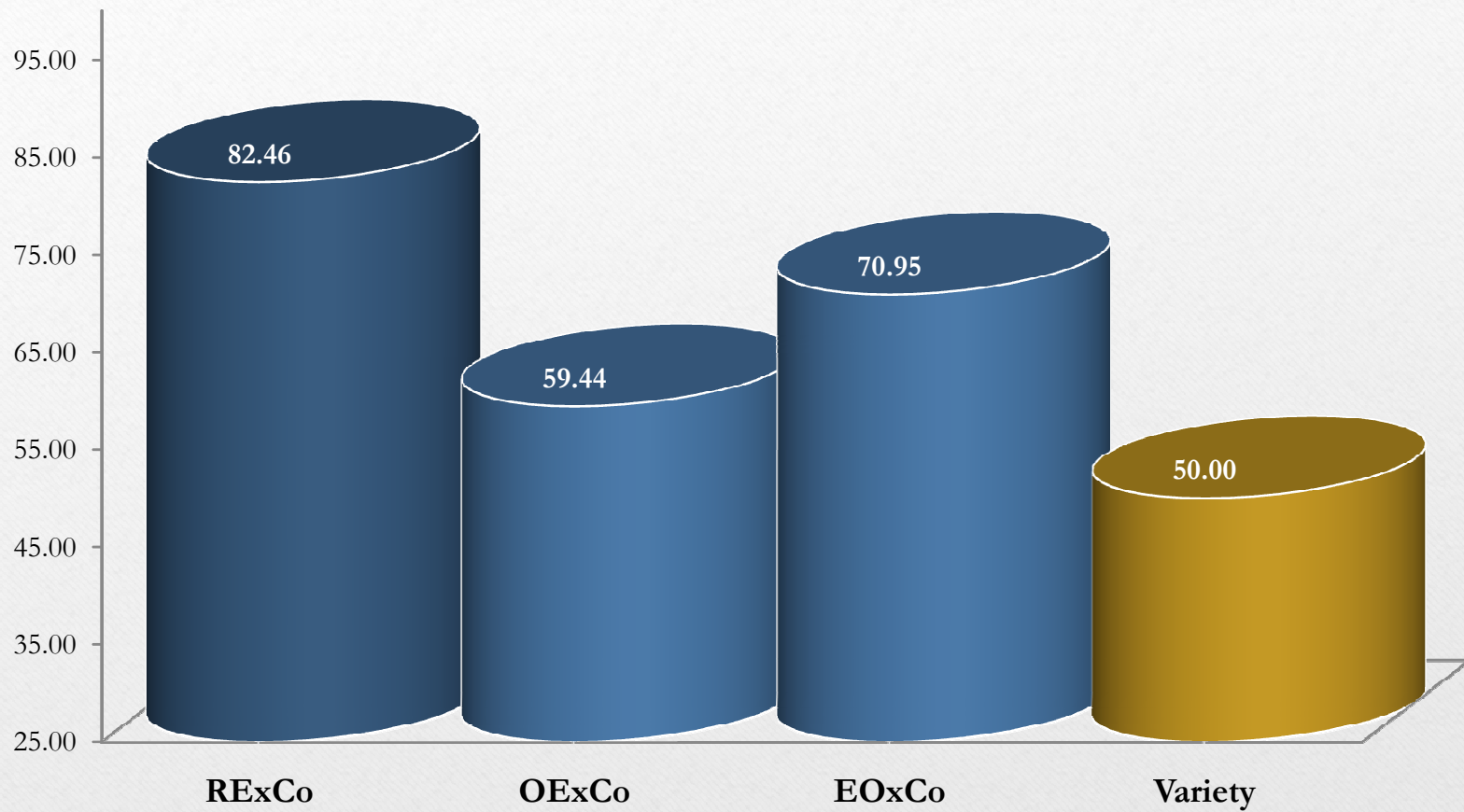
Backcrossing

In 2009, 87 crosses were made using the intergeneric hybrids as one of the parents with commercial canes

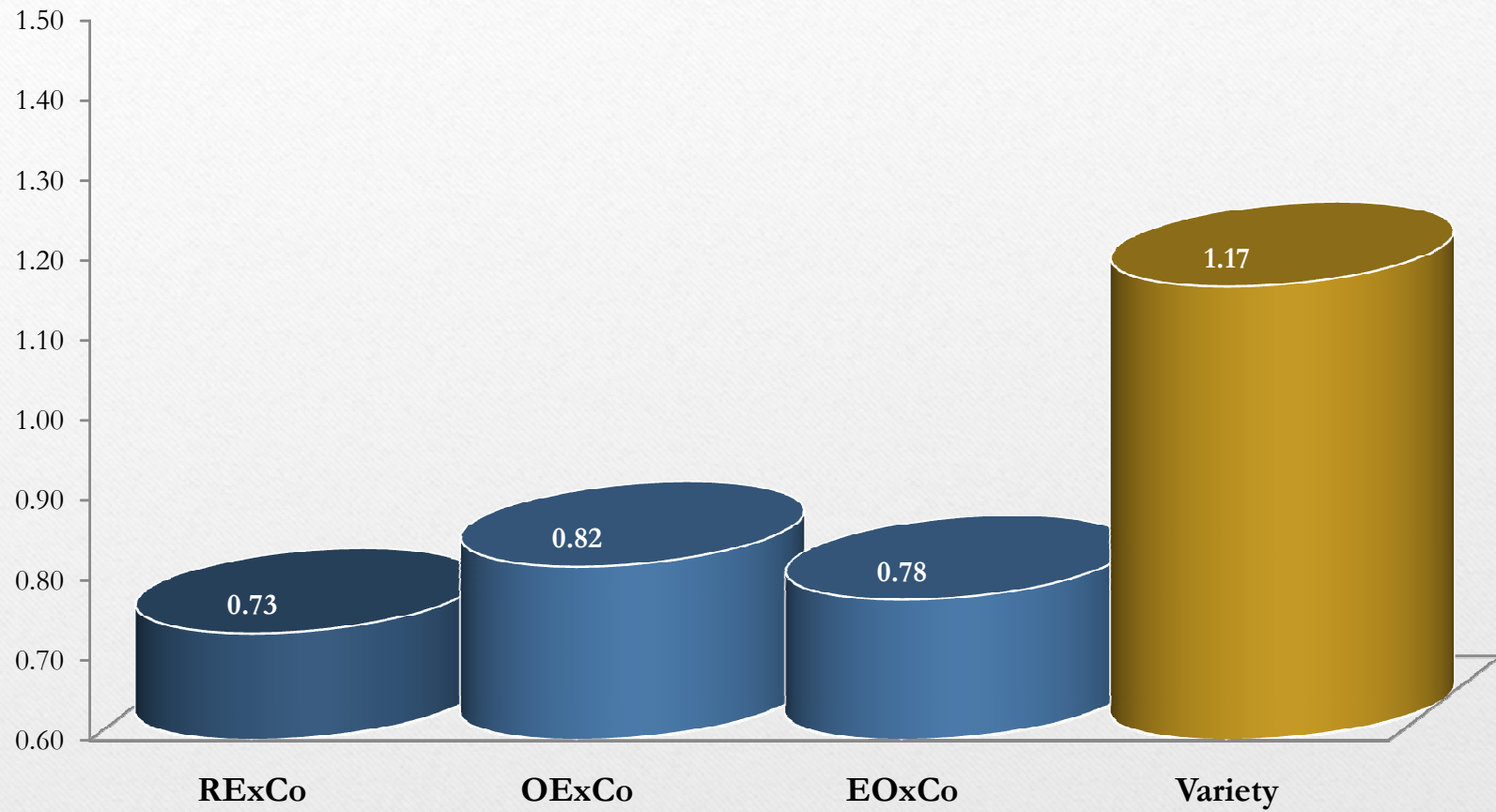
Sl No.	Cross	No. of progenies
1	(R x E) x Commercials	465
2	(O x E) x commercials	132
3	(E x O) x commercials	45
	Total	642

188 back cross progenies of intergeneric hybrids involving *Erianthus* were evaluated clonally for juice quality and cane yield traits at 300 and 360 days during 2010

Mean NMC in Backcrosses of intergeneric hybrids

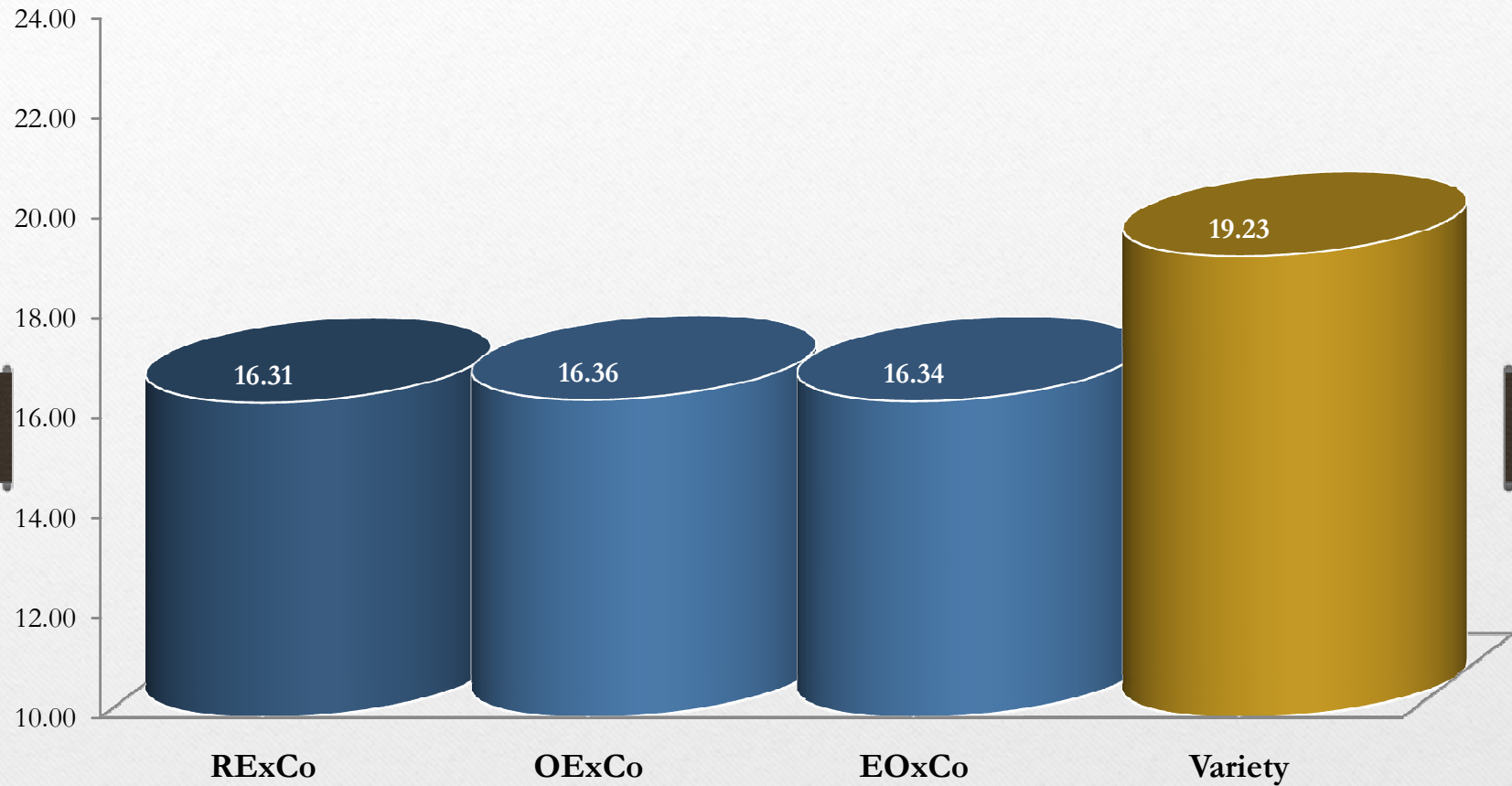


Mean Scwt in Backcrosses of intergeneric hybrids



0.33 to 0.45 kgs in F1 hybrids

Mean juice brix % in Backcrosses of intergeneric hybrids



12.26 to 14.41% in F1 hybrids

Variability in backcross hybrids involving *Erianthus*



F1

BC1 Progenies

Commercial

Yield and juice quality of BC1 hybrids

Clone	Stalk ht (cm)	S.girth (cm)	SCW (kg)	Yield t/ha
BC1 mean	190.50	2.17	0.73	91.65
Co 86032	180.00	2.70	1.20	108.02

53 hybrids had shown better yield than the standard Co 86032

Only one clone **GU 07-5403** had both higher yield and juice quality

Seven clones *viz.*, GU 07-5403, GU 07-127, GU 07-5512, GU 07-5585, GU 07-5388, GU 07-5536 and GU 07-1740 recorded more than 19% Sucrose @ 360 days.



Further backcrossing/intercrossing with the commercial canes is required to develop agronomically superior sugarcane varieties with *Erianthus* genetic base

Thank You

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