Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani

Cotton Research Station, Nanded

N.K. Proteins Innovation Award for Cottonseed and Cottonseed oil Supply Chain

for

Pioneering work on development of long staple *desi* cotton varieties and popular *intra hirsutum* cotton hybrid NHH 44 in BG II version towards Atmanirbhar Bharat

Presented by

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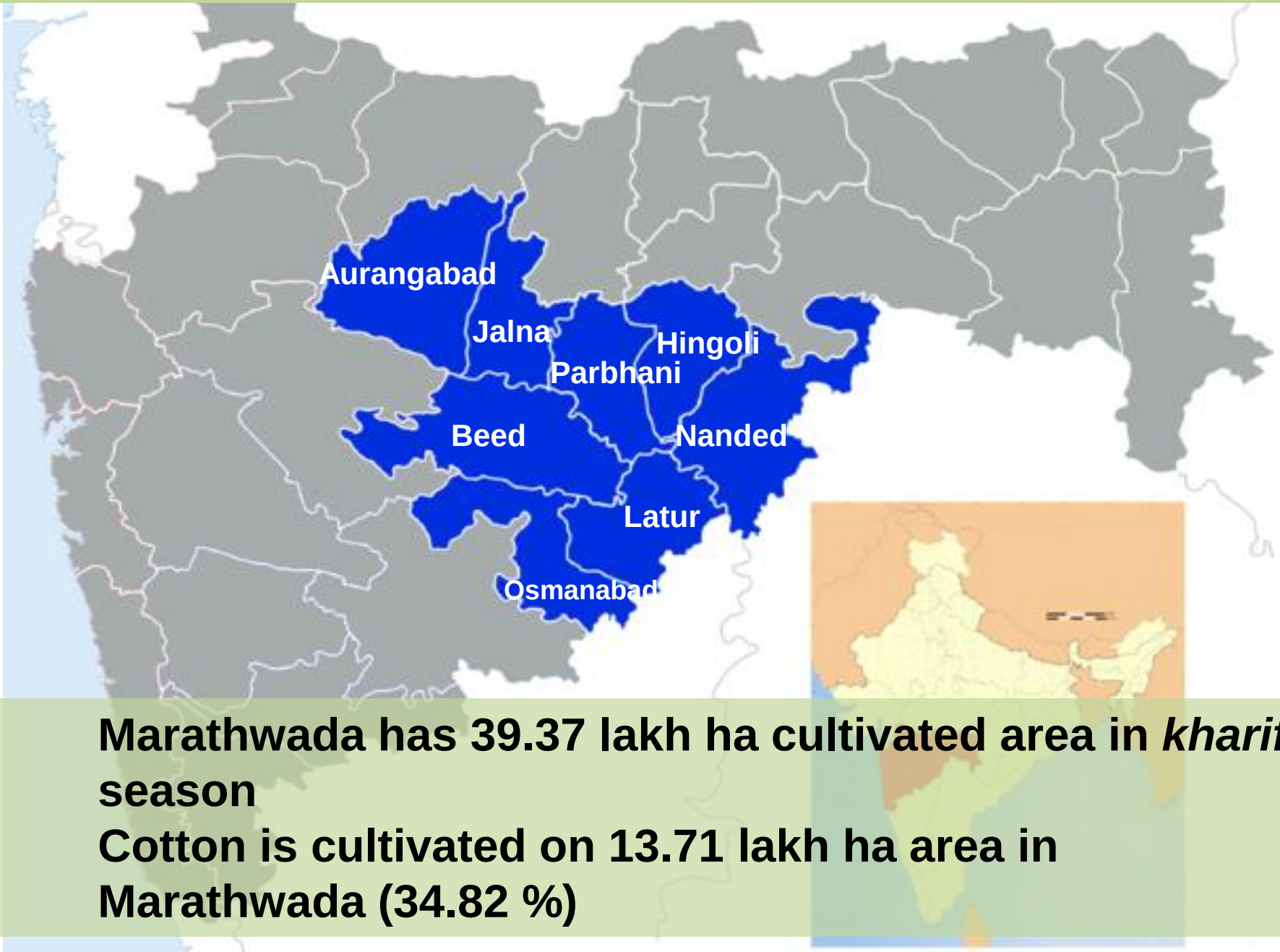
Area, production and productivity of cotton in India

Year	Area (Lakh ha)	Production (Lakh bales)	Productivity (Kg/ha)
2012-13	119.78	370	525
2013-14	119.6	398	566
2014-15	128.46	386	511
2015-16	122.92	300.05	415
2016-17	108.26	325.77	512
2017-18	125.86	328.05	443
2018-19	126.14	280.42	378
2019-20	134.77	360.65	455
2020-21	132.85	352.48	451
2021-22	123.72	311.18	428
2022-23*	**130.49**	**337.23**	**439**
Average (2012-21)	124.24	341.26	467

Area, production and productivity of cotton in Maharashtra

Year	Area (Lakh ha)	Production (Lakh bales)	Productivity (Kg/ha)
2012-13	41.46	81.00	332
2013-14	41.92	84.00	341
2014-15	41.9	78.00	316
2015-16	42.07	75.00	303
2016-17	38.00	106.19	475
2017-18	43.51	60.94	238
2018-19	42.18	65.93	266
2019-20	44.91	66.39	251
2020-21	45.44	101.50	378
2021-22	44.1	82.49	318
2022-23*	**42.29**	**81.85**	**329**
Average (2012-21)	42.55	80.14	320

Cotton: One of the most important crop of Marathwada Region



- ✓ **Marathwada has 39.37 lakh ha cultivated area in *kharif* season**
- ✓ **Cotton is cultivated on 13.71 lakh ha area in Marathwada (34.82 %)**

Introduction:

- Cotton, commonly called as white gold is dominating Indian agriculture scenario since last ten decades.
- Before independence, only two cotton *desi* cotton diploid species *viz., Gossypium arboreum* and *Gossypium herbaceum* were grown predominantly in one or the other states of the country to the extent of 97 %.

Gossypium arboreum L. 97 % *Gossypium herbaceum L.*

Species wise Percentage of Cotton in India

(1947 to 2022-23*)

Species	1947	1980	1990	2000	2008	2018	2022
G.arboreum	65	20	30	17	04	0.6	0.6*
G. herbaceum	32	14	12	11	05	1.4	1.4*
G.hirsutum	03	54	50	69	90	98	98*
G.barbadense	--	12	10	03	01	Negli.	
Total	100	100	100	100	100	100	

** Approximate*

(Source: Cotton Status Paper by DOCD, Nagpur)

Genetic Improvement made in *Desi* cotton at VNMKV.,Parbhani

Name of character	Previous situation (1918-19)	Improvement achieved (2018-19)
Days to maturity (days)	180-200	150-160
Boll size (g)	1.8-2.0	2.8-3.0
Seed cotton yield (kg/ha)	800-1000	1800-2000
Ginning percentage (%)	32-33	39-40
Fibre length (mm)	18-20	30-32
Fibre strength (g/tex)	18-20	30-31
Fibre fineness (µg/inch)	5.5-6.5	4.0-4.4
Spinning counts	20s	40s
Plant height (cm)	200-220	100-120

Significant Achievements...

Development of *desi* cotton varieties

PA 528

- High ginning outturn (39-40%)
- Long staple (27-28 mm)
- Tolerant to sucking pests, bacterial blight and grey mildew
- Tolerant to moisture stress.

PA 740

- High ginning outturn (37-38%)
- Long staple (28-29 mm)
- Fine micronaire (4.8 µg/inch)
- Superior fibre strength (28 g/tex)

PA 810

- Long staple (29-30 mm)
- Fine micronaire (4.5 µg/inch)
- Superior fibre strength (28-29 g/tex)
- Short duration (150-160 days)

Development of *desi* cotton varieties

PA 08:

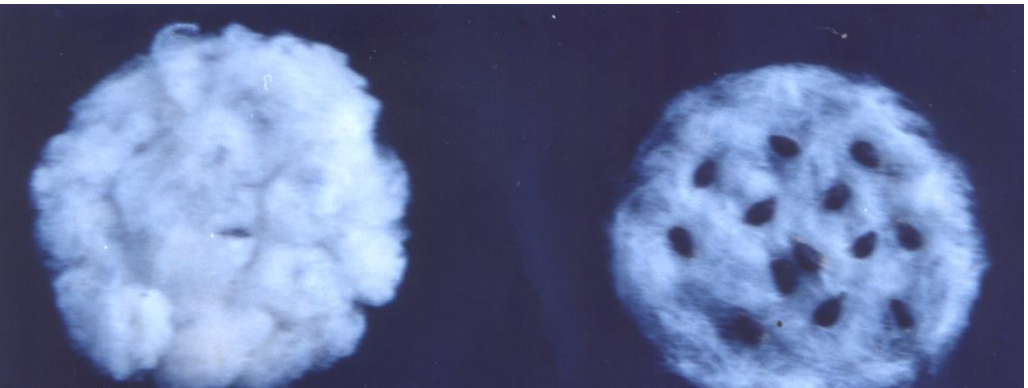
India's First Naked Seeded Variety

Dual purpose (Yield & Oil content)

- Ginning Percentage : 37-38 %
- Duration (days) : 140-150
- Fibre length : 27-28 mm
- Micronaire : 4.8

Special Characters :

- Glandless seeds
- High oil content (21.0%) with



Long Staple Desi Cotton Variety PA 812

- **India's longest staple *desi* cotton variety (30-31 mm)**
- **Superior fibre strength : 29-30 (g/tex)**
- **Micronaire : 4.4**
- **Short duration (days) : 150-160**

It will take 100 years to increase 10 mm staple length i.e 1 mm for 10 years (1918-2018)

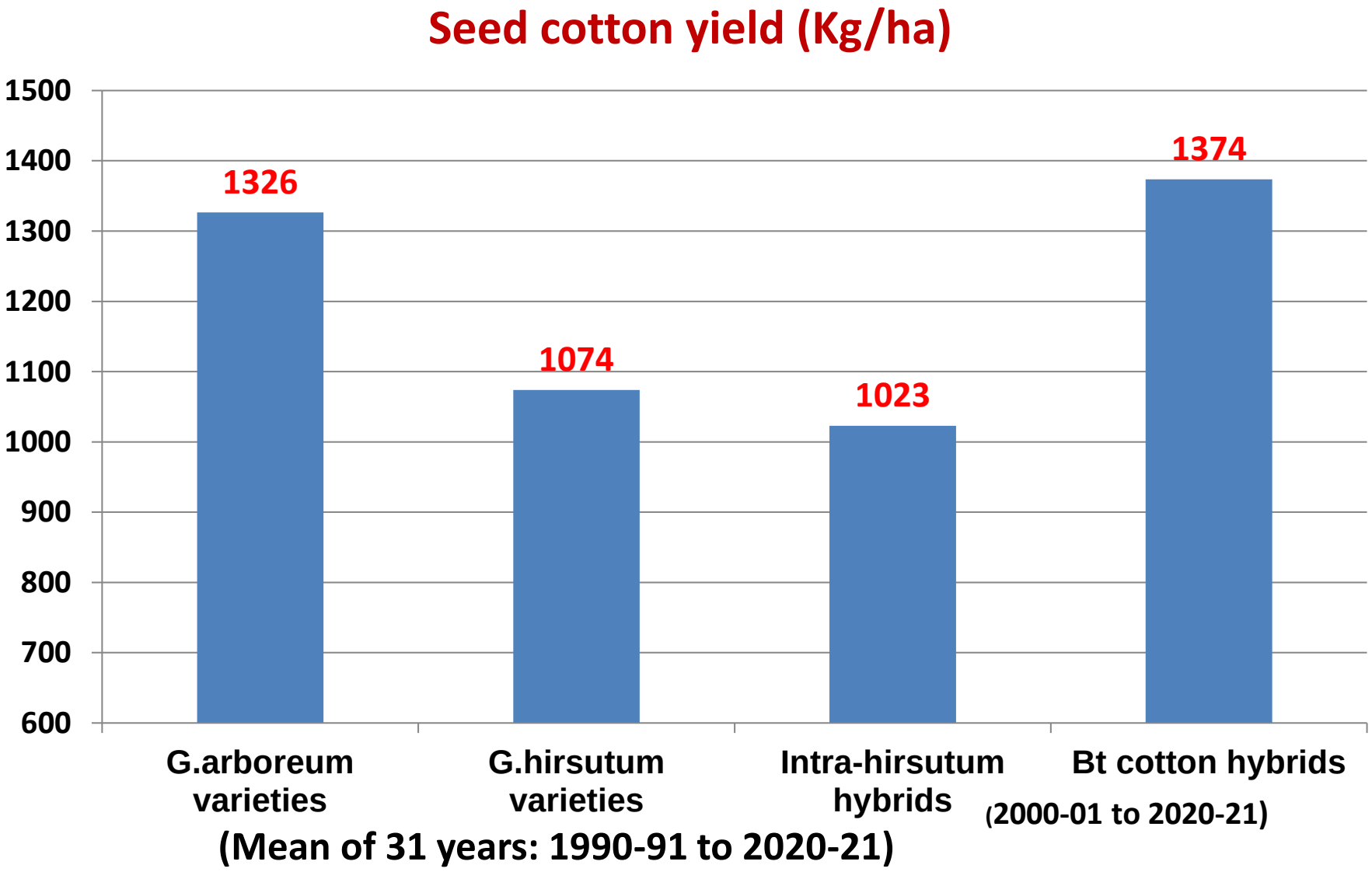
Promising long staple *G.arboreum* genotypes

PA 785

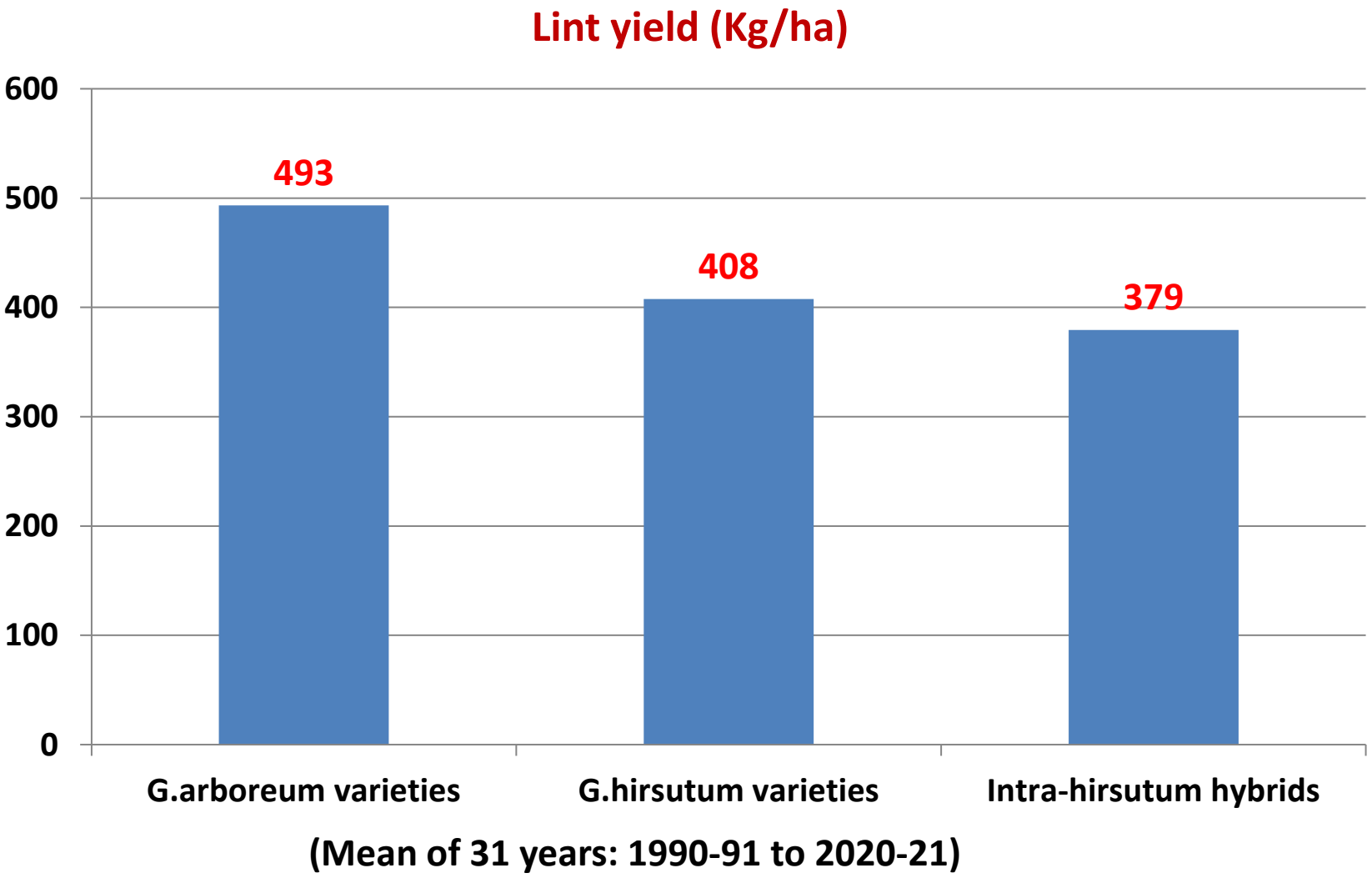
Fibre quality characters :

1) UHML (mm) : 30.6
2) Micronaire(µg/inch) : 4.1
3) Fibre strength (g/tex) : 25.1
4) Duration (Days) : 150-160
5) Yield (Kg/ha) : 15-16 qtl/ha

Comparative performance of *arboreum* varieties, *hirsutum* varieties, intra- *hirsutum* hybrids over the last three decades and *Bt* cotton hybrids over the last two decades

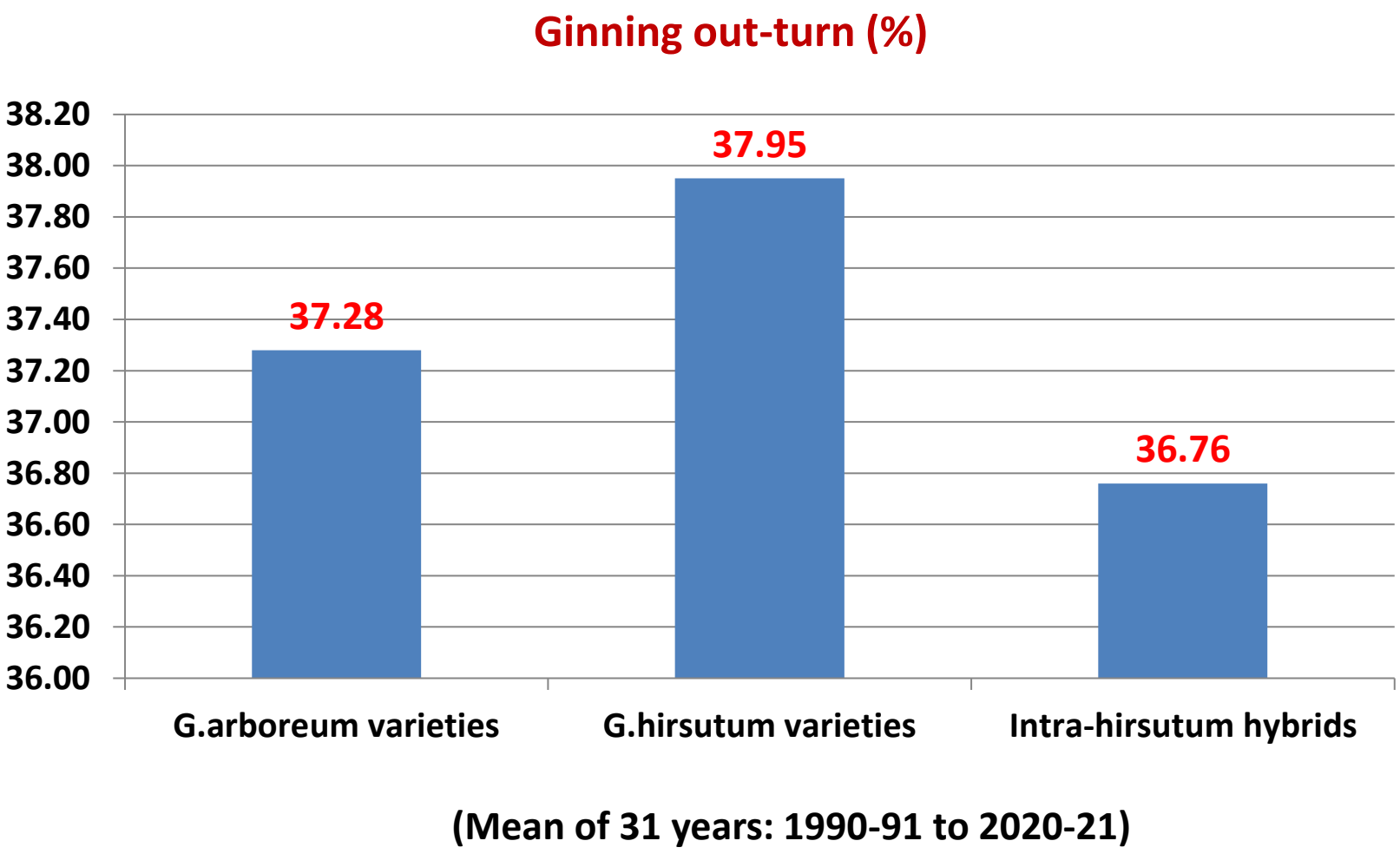


Comparative performance of *arboreum* varieties, *hirsutum* varieties, intra- *hirsutum* hybrids over the last three decades (1990-91 to 2020-21)



(Mean of 31 years: 1990-91 to 2020-21)

V. Comparative performance of *arboreum* varieties, *hirsutum* varieties, intra- *hirsutum* hybrids over the last three decades (1990-91 to 2020-21)



Public sector Bt cotton hybrid – NHH 44 *Bt*

Year of Release	**:**	**2018**
Ginning Percentage (%)	**:**	**37-38**
Fibre length (mm)	**:**	**25-26**
Spinning counts	**:**	**40^S - 60^S**
Special Characters	**:**	

- **Tolerant to drought and sucking pest**
- **Compact plant type suitable for HDPS**
- **Average yield (Qtl/ ha) 20-22 under Rainfed condition**

Intra hirsutum cotton hybrids being converted into BG II version in collaboration with MSSCL, Akola

- **NHH 250**
- **Medium staple (27 mm)**
- **Tolerant to sucking pests**
- **Tolerant to bacterial blight**

- **NHH 715**
- **Medium staple (28-29 mm)**
- **Tolerant to sucking pests**
- **Boll size (3.9 g)**

G.hirsutum Bt variety NH 1901 Bt

Salient features

- **17 % higher seed cotton yield over zonal Bt check**
- **High ginning out turn (35.32 %)**
- **Boll size (3.3-3.7 g)**
- **UHML – 25.23 mm**
- **Fibre strength- 25.47 g/tex**
- **Tolerant to Bacterial blight and Alternaria disease**

G.hirsutum Bt variety NH 1902 Bt

Salient features

- **20 % higher seed cotton yield over zonal Bt check**
- **High ginning out turn (**36.32%**)**
- **Boll size (3.5-3.7 g)**
- **UHML – 24.90 mm**
- **Fibre strength- 25.17 g/tex**
- **Tolerant to Bacterial blight and Alternaria disease**

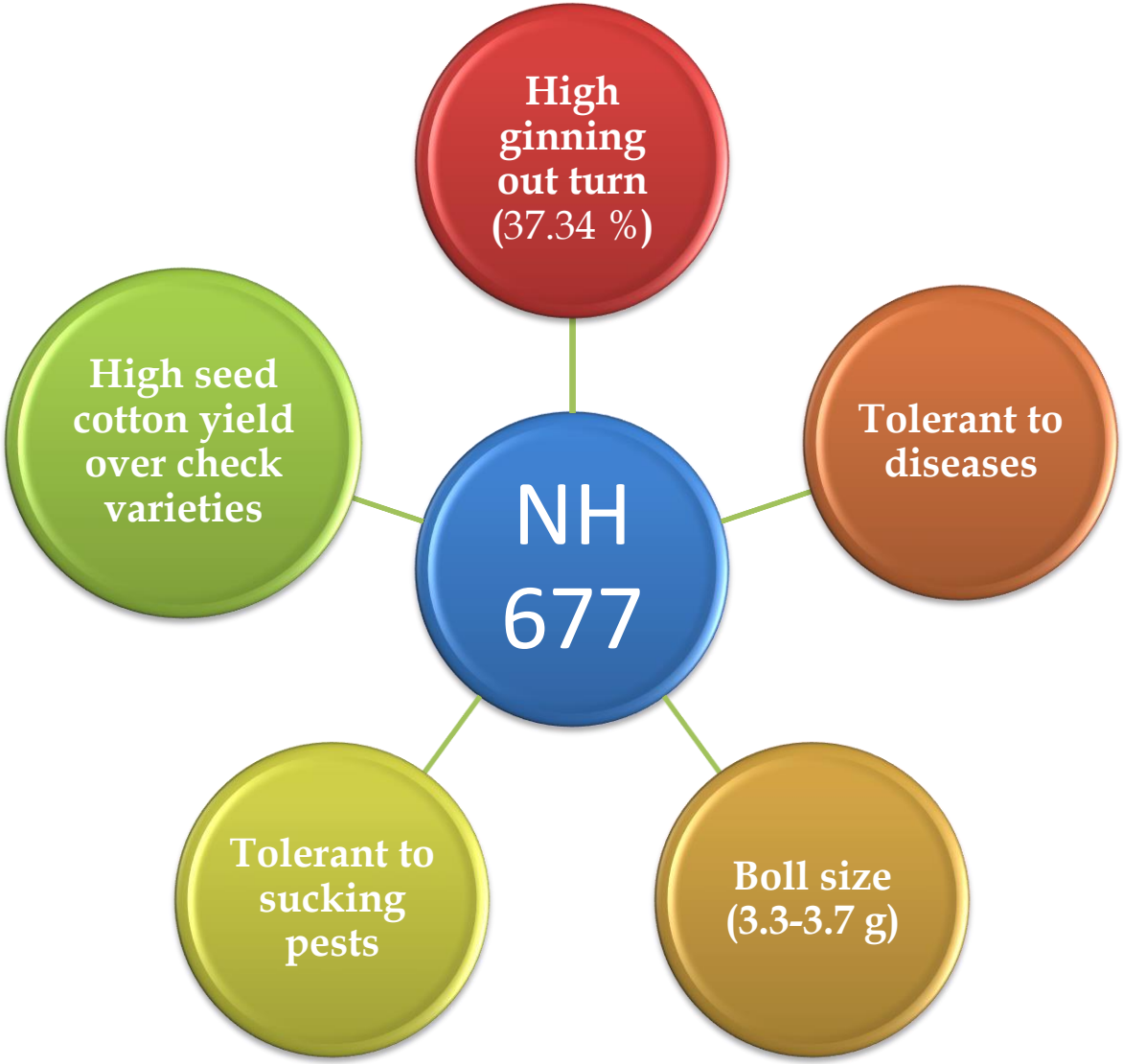
G.hirsutum Bt variety NH 1904 Bt

Salient features

- **10 % higher seed cotton yield over zonal Bt check**
- **High ginning out turn (**36.17%**)**
- **Boll size (3.5-3.7 g)**
- **UHML – 25.77 mm**
- **Fibre strength- 25.97 g/tex**
- **Tolerant to Bacterial blight and Alternaria disease**

Recently Released American Cotton Variety NHH 677 during 2023

Salient features of NH 677



Summary yield data of NH 677

Year of testing	No. of trials	Proposed variety NH 677	NH 545	NH 615	PH 348	AKH 8828	Phule 0688	AKH 9916
Station trial								
2016-17	01	1255	--	810	776	--	--	--
University multilocation trial								
2017-18	02	731	--	613	608	--	--	--
State Multilocation trial								
2018-19	11	1400	1253	1255	--	1152	1084	--
2019-20	8	1173	1035	993	--	1068	1210	1051
2020-21	9	863	784	769	--	720	744	693
Weighted Mean		**1167.87**	**1040.46**	**990.51**	**664**	**989.14**	**1003.33**	**861.82**
% INCREASE OVER NH 677			12.24	17.90	75.88	18.06	16.39	35.51

Single plant view of NH 677

Field view of NH 677

Cotton cultivation policy in India during next two decades (2021-2041)

- Area under *desi* (*Gossypium arboreum* L.) cotton straight varieties should be increased upto 30 per cent in next twenty years and may be promoted in low rainfall zones with medium type of soils.
- Straight varieties of American cotton (*Gossypium hirsutum* L.) may be transformed in BG I and BG II background and promoted under HDPS mainly on medium type of soils to the extent of 30 per cent under rainfed condition.
- *Intrahirsutum* cotton hybrid with BG I and BG II background should be promoted under irrigated condition on medium to heavy soil and in assured rainfall zone on heavy soils under rainfed condition to the extent of 40 per cent in coming two decades.

- Research work on development of non Bt intra-*hirsutum* hybrid may be restricted to research station only for identification of best hybrid combinations for further conversion in BG I and BG II version.
- Overall, there is need to formulate breeding strategies to increase ginning outturn in *desi*/American species to the extent of 40-42 per cent.
- Still no categorization or norms is available for this trait in the country.
- There is need to pay premium price for high ginning outturn varieties and hybrids by the Government.
- Development of strains of American cotton (BG I and BG II) showing tolerance for sucking pests with big boll size (around 4 to 5 g) suitable for rainfed condition.

NHH 44 (BG II) Plot visited by Hon'ble Ex-DG, ICAR, New Delhi

Hybrids in Pipeline with BG II in Collaboration with MSSC.Ltd Akola

Non Bt varieties of Desi Cotton NH 615 and NH 635: Suitable for HDPS under rainfed Condition

Glimpses of Sillod *Krishi Mahotsav*


Thanks.....