Plant Germplasm Registration Notice*

The IX meeting of the Germplasm Registration Committee of Indian Council of Agriculture Research was held on 22nd May 2002. The Committee considered 108 proposals and approved the registration of following 24 germplasm lines/genetic stocks.

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Registration of Paddy Germplasm, Pusa 1121 (INGR No. 02001; IC 296890)

Linear kernel elongation during cooking with minimum lateral swelling is one of the most desirable characters of rice varieties. By selective inter-mating of two kernel elongating advance breeding sister lines (Pusa 614-1- 2 and Pusa 614-2-4-3) of Pusa Basmati 1, followed by pedigree selection, a new breeding line, Pusa 1121-92-8-1-3-3 of paddy (*Oryza sativa*) has been developed at the Division of Genetics, Indian Agricultural Research Institute, New Delhi. The average milled rice kernel length of Basmati 370, Taraori Basmati, and Pusa Basmati 1 is 6.89, 7.15 and 7.30 mm, with elongation ratios of 1.94, 1.90, and 2.02, respectively.

Pusa 1121 has profuse tillering habit and dark green narrow leaves like Pusa Basmati 1. It has slow leaf senescence with leaves remaining green even after maturity. It has straight flag leaf and panicle remain below the leaf level. All plant parts are free from pigmentation. Grains have tip awning. Information on some of the main morpho-agronomic characteristics as compared to other varieties is presented in Table 1.

Pusa 1121 has field tolerance to major rice diseases. Milled rice is highly aromatic, with an alkali spreading score of 7. Unlike traditional Basmati varieties, Pusa 1121 requires less curing time and rice from fresh harvest, elongates well during cooking.

Table 1. Morpho-agronomic characteristics of Pusa 1121

Character	Pusa 1121	Basmati 370	Taraori Basmati	Pusa Basmati 1
Plant height (cm)	110-120	160-175	160-175	95-100
Total duration (days)	140-145	145-150	155-160	130-135
Average yield (t/ha)	4.0	3.0	2.5	5.5
1000-grain weight (g)	27.50	19.50	22.60	20.00

In contrast, Pusa 1121 has a milled rice kernel length of 8 mm and elongation ratio of 2.7 during cooking. Also, Pusa 1121 makes a better parental material for generating mapping populations to identify and locate genes for linear kernel elongation (Singh *et al.*, 2002).

Reference

Singh VP, AK Singh, SS Atwal, M Joseph and T Mohapatra (2002) Pusa 1121: a rice line with exceptionally high cooked kernel elongation and Basmati quality. *IRRN* **27**: 25-26.

* *Communicated by Dr AK Singh, Member Secretary, Plant Germplasm Registration Committee*

Registration of Chakuwa Paddy Germplasm

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The Chakuwa rice (*Oryza sativa*) germplasm collected from various parts of Assam are characterized by semi-glutinous endosperm. They can be used in preparation of instant rice.

Boga Chakuwa (INGR No. 02014; IC 342353)

Boga Chakuwa, a traditional landrace from Assam has high 1000-grain weight with long bold grains with an alkali spreading value of 6.0 and 16.74% of amylose. It was collected from Sibsagar district of Assam. The plant is tall with a height of 137 cm; average tillers/plant are eight and panicles/square meter are 167. It flowers in 120 days with intermediate panicle types, which are well exerted without awning; apiculus colour is purple with 1000-grain weight of 40 g. Kernel colour is white with a length of 6.8, width 3.1 mm and L/B ratio of 2.2. Hulling recovery is 68 and the milling recovery is 60.

Boka Chakuwa – 1 (INGR No. 02015; IC 342354)

Boka Chakuwa possesses red kernel and very low amylose content of 4.69% and alkali spreading value of 6.0. Geographically, it is distributed in Golaghat district. It is a tall type with plant height of 147 cm, an average of seven tillers/plant and 160 panicles/sq. m. It flowers within 120 days with intermediate panicles that are well-exerted and awnless. The apiculus colour is black. The kernel length is 5.56 mm with a width of 2.52 mm and L/B ratio of 2.21. Hulling recovery is 69%, milling recovery 65%, while the head rice recovery is 60%.

Saru Chakuwa (INGR No. 02016; IC 342359)

It is one of the landrace which has long bold grain with low to intermediate alkali spreading value of 3.5 and high amylose content (22.89%). It is a tall type with a plant height of 158 cm and on an average six tillers/plant and 165 panicles/sq. m. It flowers in 120 days with well-exerted intermediate panicles without an awn. The apiculus is purple in colour. The kernels are white with a length of 6.28 mm, width of 2.28 mm, L/B ratio of 2.76 and 1000-grain weight of 16 g. The hulling recovery is 66%, milling recovery 62% and head rice recovery 59%.

Kalamadani Chakuwa (INGR No. 02017; IC 342361)

It is the only long cylinder grain type among Chakuwa rice germplasm with an alkali spreading value of 7.0 and medium amylose content of 14.26%. It is a tall type with a plant height of 157 cm and an average of seven tillers/plant and 170 panicles/sq. m. It flowers in 120 days with well-exerted intermediate panicles without an awn. The apiculus is brown in colour. The kernels are white with a length of 7.44 mm, width of 2.08 mm, L/B ratio of 3.58 and 1000-grain weight of 20 g. The hulling recovery is 65%, milling recovery 60% and head rice recovery 55%.

Misimi Chakuwa (INGR No. 02018; IC 342367)

Misimi Chakuwa has red kernels with very low amylose content of 4.36% and an alkali spreading value of 7.0. It is cultivated in Sibsagar district of Assam. It is a tall type with a plant height of 159 cm and an average of eight tillers/plant and 190 panicles/sq. m. It flowers in 120 days with well-exerted intermediate panicles without an awn. The apiculus is black in colour. The kernels are black with a length of 5.66 mm, width of 2.72 mm, L/B ratio of 2.08 and 1000-grain weight of 28 g. The hulling recovery is 70%, milling recovery 65 per cent and head rice recovery 62%.

Nepali Chakuwa (INGR No. 02019; IC 342368)

Nepali Chakuwa is a traditional landrace grown in Assam. It has a high 1000-grain weight of 40 g with alkali spreading value of 7.0 and 13.75% of amylose content. However, the grains are short and bold. Nepali Chakuwa was collected from Golaghat district of Assam. It is a tall type with plant height of 160 cm. On an average, it has six tillers/plant and produces 175 panicles/sq. m. The panicle is of intermediate height, well-exerted without awns. Apiculus is straw coloured. The kernel length is 7.10 mm and the width 2.78 mm. with a L/B ratio of 2.56. The kernels are white in colour. Hulling recovery is 67%, milling recovery 63% and the head rice recovery is 59%.

Registration of a New Wheat Plant Type, DL 1266-5 (INGR No. 02002; IC 296889)

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The genotype DL 1266-5 of wheat (*Triticum aestivum*) represents a new plant type of wheat for increased yield potential. The new plant architecture has been designed through hybridization of released wheat variety Vaishali with local wheat, Sirsa Farm Wheat (SFW) which has characteristic features *viz.*, very few tillers with long and lax spike and spikelet number ranging between 23 to 26 with shrivelled grains. This local germplasm is also susceptible to major wheat diseases.

The new plant type DL-1266-5 possesses dark green broad leaves, thick stem, no unproductive tillers, higher biomass, bold and very long ear heads, high 1000-grain weight, high grain number/ear and genes (*Lr 24/Sr 24*) conferring resistance to leaf and stem rust. It possesses on an average 100 grains/ear with an ear weight of 5.56 g, while 1000-grains weight is 55 g. This indicates that the negative correlation between grain weight and grain number/ear has been broken with optimum tillering capacity. The genotype contains around 13% protein, which further suggests the breakdown of negative correlation between higher grain weight and protein percentage.

Evaluation results indicate that physiological efficiency in terms of post anthesis source-sink relationship in this genotype has been achieved. DL 1266-5 is resistant to leaf and stem rusts, derived from *Agropyron elongatum* (*Lr 24/Sr 24*) of which *Lr 24* is highly effective in the Indian sub-continent.

Registration of Multiple Resistant Barley Germplasm

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CCS Haryana Agricultural University, Hisar-125 004 (Haryana)

BH 462 (INGR No. 02023; IC 335830)

BH 462 is a six-rowed, multiple disease resistant line of spring barley (*Hordeum vulgare*). It was developed at the Chaudhary Charan Singh Haryana Agricultural University, Hisar, through single plant selection in Arizona 5908/ATHS//LIGNEE 640. BH 462 is a multiple resistant line with resistance to yellow rust (*Puccinia striiformis hordei*), brown rust (*Puccinia hordei*), black rust (*Puccinia graminis tritici*) and blights *i.e.* spot blotch (*Pyrenophora sativum*) and net blotch (*Pyrenophora teres*). Tests for resistance to these diseases were conducted in the National Barley Disease Screening Nursery (NBDSN)/ Elite Barley Disease Screening Nursery (EBDSN) under Barley Network Programme during 1998-99 and results are reported in Barley Network Progress Report 1998-99 and Annual Report 1999-2000 of the Directorate of Wheat Research, Karnal.

BH 462 has erect growth habit, medium plant height (90 cm), medium-sized light green leaves, long parallel lax spikes with rough awns, early maturity, light blue hulled oval grains and 1000-grain weight of 38 g.

BH 490 (INGR No. 02024; IC 335831)

BH 490, is another six-rowed, multiple disease resistant line of spring barley (*Hordeum vulgare*) developed at the Chaudhary Charan Singh Haryana Agricultural University, Hisar, through pedigree selection method from single cross BH 87/ Ratna. It has multiple resistance to all the three rusts of barley *i.e.* yellow (*Puccinia striiformis hordei*), brown (*Puccinia hordei*) and black (*Puccinia graminis tritici*). Testing for resistance to rusts was conducted in the National Barley Disease Screening Nursery (NBDSN)/Elite Barley Disease Screening Nursery (EBDSN) under the Barley Network Programme during 1998-99 and results are reported in Barley Network Progress Report 1998-99 and Annual Report 1999-2000 of the Directorate of Wheat Research, Karnal.

BH 490 has semi-erect growth habit, medium plant height (90 cm), narrow, light green leaves, long parallel spikes with smooth awns, medium maturity and yellow hulled elongated grains having 1000-grain weight of 45 g.

References

Anonymous (1999) Barley Network (Indian Council of Agricultural Research) Progress Report 1998-99, Directorate of Wheat Research, Karnal, pp 3, 11,14 &17.

Anonymous (2000) Annual Report, Directorate of Wheat Research, (Indian Council of Agricultural Research) 1999-2000, Karnal, 74p.

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SS Singh, DN Sharma, Nanak Chand and JB Sharma
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BH 462 has erect growth habit, medium plant height (90 cm), medium-sized light green leaves, long parallel lax spikes with rough awns, early maturity, light blue hulled oval grains and 1000-grain weight of 38 g.

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BH 490 has semi-erect growth habit, medium plant height (90 cm), narrow, light green leaves, long parallel spikes with smooth awns, medium maturity and yellow hulled elongated grains having 1000-grain weight of 45 g.

References

Anonymous (1999) Barley Network (Indian Council of Agricultural Research) Progress Report 1998-99, Directorate of Wheat Research, Karnal, pp 3, 11,14 &17.

Anonymous (2000) Annual Report, Directorate of Wheat Research, (Indian Council of Agricultural Research) 1999-2000, Karnal, 74p.

Registration of Sorghum Germplasm (INGR No. 02022; EC No. 434430)

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The sorghum aphid, *Melanaphis sacchari* (Zehntner) is an important pest of sorghum (*Sorghum bicolor*) in several sorghum growing countries like Africa, America, Asia and Europe. Outbreaks of aphid populations are unpredictable and can result in 46 to 78% yield losses where insecticides are not used. The identification of resistant lines was undertaken at National Bureau of Plant Genetic Resources, Regional Station, Hyderabad and International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), Patancheru. Nine accessions of sorghum germplasm imported for a different purpose from Indonesia, Thailand and China were sown in the post-entry quarantine isolation area. At maturity, three entries from Thailand *viz.*, EC 434430, EC 434431 and EC 434432 sown in the middle three blocks between the entries from Indonesia and China were found to be totally free from infestation by the yellow sugarcane aphid, *M. sacchari* and the sooty mould (*Capnodium* sp.). The honeydew secreted by aphids favours the development of sooty mould, which hinders photosynthesis by enveloping the green leaves leading to reduction in fodder quality and grain yield. The thick black sooty mould had completely covered the leaves of the other six entries from China (EC 434433, EC 434434 and EC 434435) and Indonesia (EC 434436, EC 434437 and EC 434438). The affected plants appeared to be burnt up in contrast to the unaffected plants from Thailand.

Aphid population on the susceptible entries covered the panicles and the tender shoots. While EC 434430, EC 434431 and EC 434432 were highly resistant to the yellow sugarcane aphid. The remaining six entries from China and Indonesia were susceptible or highly susceptible to aphid infestation ranging from 91.9 to 100%. Selections were made from the agronomically better performing entry EC 434430, multiplied for two seasons and the resistance was confirmed both under artificial and field conditions at two locations *viz.*, Patancheru in the Medak district and Rajendranagar in the Ranga Reddy district. The morpho-agronomic features of EC 434430 are listed in Table 1.

Table 1. Chief botanical and morpho-agronomical characters of sorghum germplasm

Character	Resistant entry EC 434430 (Registered)	Susceptible entry EC 434434
Early plant vigour	Good	Good
Total leaves	12	8.6
Leaf length (cm)	71.75	68.5
Leaf width (cm)	6.48	6.8
Leaf colour	Light green	Dark green
Leaf orientation	Drooping	Erect
Number of tillers	6.8	4.8
Earhead compactness	Loose	Compact
Earhead length (cm)	20.8	25.4
Earhead width (cm)	6.0	5.98
Earhead shape	Oblong	Oblong
Glume colour	Straw	Straw
Glume covering	Half grain covered	1/4th grain covered
Plant height (cm)	141.8	98.2
Grain colour	Chalky white	Brownish white
Grain shape	Spherical	Spherical
Grain length/height (mm)	4.5	4.6
Grain breadth/width (mm)	4.3	3.7
Grain thickness (mm)	2.97	2.5
100-seed weight (g)	3.64	3.13
Stay green	Senescence	Non-senescence
Presence of seed sub-coat	Absent	Absent
Biotic stress	Highly resistant to *Melanaphis sacchari*	Highly susceptible to *Melanaphis sacchari*

Distinct variability was observed in morpho-agronomic characters of resistant and susceptible genotypes. Tsumuki *et al.* (1995) reported that although leaf surface wax was similar among all varieties, the total sugar content and the free amino acid concentrations were slightly more in the aphid-resistant, than the susceptible types. Hagio (1992) classified six varieties as highly resistant and reported that resistance in the two varieties (PE 954 177 and Senkinshiro) may be conditioned by a dominant gene. Mote and Shahane (1994) reported that the varieties with greater height, greater distance between 2 leaves; smaller leaf angle and presence of waxy lamina were less susceptible to the aphid. EC 434430 matches with the traits attributed to the aphid resistant lines as described by Mote and Shahane (1994).

References

Hagio T (1992) Host-plant resistance and its inheritance in sorghum (*Sorghum bicolor*) to sugarcane aphid (*Melanaphis*

sacchari Zehntner). *Bulletin of the Chugoku National Agricultural Experiment Station*, pp 17-26.

Mote UN and A K Shahane (1994) Biophysical and biochemical characters of sorghum varieties contributing resistance to delphacid, aphid and leaf sugary exudations. *Indian J. Entomol.* **56**:113-122.

Tsumuki H, K Kanehisa and SS Moharramipour (1995) Sorghum resistance to the sugarcane aphid, *Melanaphis sacchari* Zehntner: Amount of leaf surface wax and nutritional components. *Bulletin of the Research Institute for Bioresources*, Okayama University **3**: 27-34.

Registration of Foxtail Millet Germplasm, GS 1953 (SIC 24) (INGR No. 02010; IC 296900)

A Seetharam, BTS Gowda, VR Shashidhar, BM Ramakrishna, M Krishnappa and KR Vasanth

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The germplasm line, GS 1953 (SIC 24) of foxtail millet (*Setaria italica*) provides a new source of dwarfing gene. The dwarf differs from the normal tall types in having an altered constellation of characters. This unique germplasm was identified from the vast collection maintained at the National Active Germplasm Site for small millets in All India Coordinated Small Millet Improvement Programme, University of Agricultural Science, GKVK, Bangalore. It is a collection from Maharashtra.

One major recessive gene appears to be responsible for the dwarf growth habit (Dinesh Kumar *et al.*, 1992).

GS 1953 is stable over environments (Anon., 1989) and showed superiority for most of the agronomic attributes with performance comparable to any good tall variety. Its high yield and superior morphological frame makes it an ideal parent for hybridization with tall types for further genetic enhancement, particularly in breeding high yielding, non-lodging foxtail millets.

Table 1. Agronomic features of GS 1953 in comparison with standard tall checks

Genotypes	Plant height (cm)	Tillers/ plant	Leaves/ plant	Leaf area/m/ row (dm^2)	Dry matter m. row (kg)	Nodes on main tiller	Internodal length (cm)	Harvest index (%)	Grain yield (q/ha)
GS 1953	77.5	9	64	172.4	0.33	11	4.9	42	53.5
GPUS 9*	126.0	7	61	141.0	0.38	11	11.6	38	56.4
RS 118*	124.6	4	33	121.2	0.31	10	11.8	39	46.6

GS 1953 is significantly distinct in plant height, internode length and tillering potential. The reduced plant height was due to shorter internodal length, but not the number. Tillering potential was significantly higher resulting in more leaves and higher leaf area at anthesis besides enhanced harvest index compared to normal tall types (Table 1). The dwarf was insensitive to GA_3 application indicating that GA_3 synthesis was not impaired.

References

Anonymous (1989) Annual Progress Report (1988-89) All India Coordinated Small Millets Improvement Project, Indian Council of Agricultural Research, New Delhi, 310p.

Dinesh Kumar SP, VR Shashidhar, RL Ravikumar, A Seetharam and BTS Gowda (1992) Identification of true genetic dwarfing sources in foxtail millet (*Setaria italica* Beauv.). *Euphytica* **60**: 207-212.

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Mote UN and A K Shahane (1994) Biophysical and biochemical characters of sorghum varieties contributing resistance to delphacid, aphid and leaf sugary exudations. *Indian J. Entomol.* **56**:113-122.

Tsumuki H, K Kanehisa and SS Moharramipour (1995) Sorghum resistance to the sugarcane aphid, *Melanaphis sacchari* Zehntner: Amount of leaf surface wax and nutritional components. *Bulletin of the Research Institute for Bioresources*, Okayama University **3**: 27-34.

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Dinesh Kumar SP, VR Shashidhar, RL Ravikumar, A Seetharam and BTS Gowda (1992) Identification of true genetic dwarfing sources in foxtail millet (*Setaria italica* Beauv.). *Euphytica* **60**: 207-212.

Registration of Chickpea Germplasm, H 96-99 (INGR No. 02003; IC 296887)

VS Lather[1], RS Waldia[2], Ram Kumar Yadav[1], IS Solanki[1], RK Choudhary[1] and BS Dahiya[1]
[1]*Chaudhary Charan Singh, Haryana Agricultural University, Hisar-125004 (Haryana)*
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The ideotype approach has been suggested to overcome genetic limits of productivity in chickpea (*Cicer arietinum*). Based on this concept, a spontaneous brachytic mutant with erectness and compactness for higher plant density suited to rice-chickpea or cotton-chickpea sequential cropping system has been identified at Chaudhary Charan Singh Haryana Agricultural University, Hisar. The mutants are erect and compact in growth habit (for higher plant density), with strong and reasonably tall stem (for better competition with weeds and resistance to lodging), few but erect secondary and later order branches (for better interception of light). H 96-99 is one of these lines recording comparable seed yield against check varieties at normal density, while showing significant seed yield superiority under high density planting of 50 plants/ m^2 (Table 1). This chickpea ideotype is also found suitable for mechanical harvesting as the fruiting zone starts at about 20 cm from the base.

References

Lather VS (2000) Promising chickpea ideotype for higher plant density. *International Chickpea Newslet.* **7**: 26.

Table 1. Performance of lines developed on ideotype approach for higher density planting

	Genotype				
Character	H96-99	H96-26	C 235 (Ch)	H86-18 (Ch)	CD at 5%
Plant height (cm)	81.13	69.93	46.98	68.87	
Number of primary branches	5.33	5.27	4.07	5.02	
Number of secondary branches	9.98	9,87	14.86	12.72	
Canopy spread (cm)	19.67	16.27	29.89	25.32	
Initiation of fruiting nod (cm)	22.60	23.47	28.87	27.97	
Number of pods/plant	69.92	63.27	58.82	52.56	
Number of seeds/pod	1.26	1.22	1.34	1.28	
Seed yield (kg/ha) normal density	2627.00	2421.00	2659.00	2460.00	261.52
Seed yield (kg/ha) higher density	3843.00	3981.00	3033.00	2870.00	197.48

CD (5%) for comparing seed yield means of plant densities x genotypes: 792.91 kg/ha

Registration of Chickpea Germplasm, E100y (M) (INGR No. 02004; IC 296886)

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Department of Plant Breeding, Chaudhary Charan Singh Haryana Agricultural University, Hisar-125 004(Haryana)

The spontaneous mutant, E100Y (m) in chickpea (*Cicer arietinum*) with compact and erect plant type, resistance to *Ascochyta* blight and Grey mould diseases was identified at the Department of Plant Breeding, Chaudhary Charan Singh Haryana Agricultural University, Hisar.

E100Y (m) is a late germinator and takes 15-16 days for emergence as compared to 7-8 days by the parental line under field conditions. It has a thick and stout stem with thick and bluish green leaflets. Seeds are bold (32 g/100 seeds) and brown in colour. The length of stigma is also reduced compared to the parental line. Inheritance studies showed that a single recessive gene with pleiotropic effect governs the mutation. Other characteristics of E100Y (m) have been summarized in Table 1. This mutant has been found very useful in recombination breeding, particularly for transfer of compact plant type and resistance to *Ascochyta* blight to high yielding but susceptible cultivars, such as H208 and L550. The segregants from these crosses have been advanced to F_5 generation and those from the cross L550 x E100Y (m) having bold Kabuli seeds and resistance to blight, appear promising.

Table 1. Characteristic features of E100Y (m)

Character	E100Y (m)
Height (cm)	40.0
Primary branches	3
Secondary branches	10
Internode length (cm)	2.0
Leaf colour	Bluish green
Leaf area (sq. cm.)	31.8
Leaf surface	Glossy
Pod length (cm)	2.9
Pod breadth (cm)	1.3
Seeds/pod	1.0
Seed colour	Brown

Reference

Dahiya BS, VS Lather, IS Solanki and Ram Kumar (1984) Useful spontaneous mutants in chickpea (*Cicer arietinum* L.). *Curr. Sci.* **53**: 1210-1211.

Registration of Chickpea Germplasm, H 96-99 (INGR No. 02003; IC 296887)

VS Lather[1], RS Waldia[2], Ram Kumar Yadav[1], IS Solanki[1], RK Choudhary[1] and BS Dahiya[1]
[1]*Chaudhary Charan Singh, Haryana Agricultural University, Hisar-125004 (Haryana)*
[2]*KVK Jagdishpur, Sonepat (Haryana)*

The ideotype approach has been suggested to overcome genetic limits of productivity in chickpea (*Cicer arietinum*). Based on this concept, a spontaneous brachytic mutant with erectness and compactness for higher plant density suited to rice-chickpea or cotton-chickpea sequential cropping system has been identified at Chaudhary Charan Singh Haryana Agricultural University, Hisar. The mutants are erect and compact in growth habit (for higher plant density), with strong and reasonably tall stem (for better competition with weeds and resistance to lodging), few but erect secondary and later order branches (for better interception of light). H 96-99 is one of these lines recording comparable seed yield against check varieties at normal density, while showing significant seed yield superiority under high density planting of 50 plants/ m^2 (Table 1). This chickpea ideotype is also found suitable for mechanical harvesting as the fruiting zone starts at about 20 cm from the base.

References

Lather VS (2000) Promising chickpea ideotype for higher plant density. *International Chickpea Newslet.* **7**: 26.

Table 1. Performance of lines developed on ideotype approach for higher density planting

	Genotype				
Character	H96-99	H96-26	C 235 (Ch)	H86-18 (Ch)	CD at 5%
Plant height (cm)	81.13	69.93	46.98	68.87	
Number of primary branches	5.33	5.27	4.07	5.02	
Number of secondary branches	9.98	9,87	14.86	12.72	
Canopy spread (cm)	19.67	16.27	29.89	25.32	
Initiation of fruiting nod (cm)	22.60	23.47	28.87	27.97	
Number of pods/plant	69.92	63.27	58.82	52.56	
Number of seeds/pod	1.26	1.22	1.34	1.28	
Seed yield (kg/ha) normal density	2627.00	2421.00	2659.00	2460.00	261.52
Seed yield (kg/ha) higher density	3843.00	3981.00	3033.00	2870.00	197.48

CD (5%) for comparing seed yield means of plant densities x genotypes: 792.91 kg/ha

Registration of Chickpea Germplasm, E100y (M) (INGR No. 02004; IC 296886)

BS Dahiya, VS Lather, IS Solanki and Ram Kumar
Department of Plant Breeding, Chaudhary Charan Singh Haryana Agricultural University, Hisar-125 004(Haryana)

The spontaneous mutant, E100Y (m) in chickpea (*Cicer arietinum*) with compact and erect plant type, resistance to *Ascochyta* blight and Grey mould diseases was identified at the Department of Plant Breeding, Chaudhary Charan Singh Haryana Agricultural University, Hisar.

E100Y (m) is a late germinator and takes 15-16 days for emergence as compared to 7-8 days by the parental line under field conditions. It has a thick and stout stem with thick and bluish green leaflets. Seeds are bold (32 g/100 seeds) and brown in colour. The length of stigma is also reduced compared to the parental line. Inheritance studies showed that a single recessive gene with pleiotropic effect governs the mutation. Other characteristics of E100Y (m) have been summarized in Table 1. This mutant has been found very useful in recombination breeding, particularly for transfer of compact plant type and resistance to *Ascochyta* blight to high yielding but susceptible cultivars, such as H208 and L550. The segregants from these crosses have been advanced to F_5 generation and those from the cross L550 x E100Y (m) having bold Kabuli seeds and resistance to blight, appear promising.

Table 1. Characteristic features of E100Y (m)

Character	E100Y (m)
Height (cm)	40.0
Primary branches	3
Secondary branches	10
Internode length (cm)	2.0
Leaf colour	Bluish green
Leaf area (sq. cm.)	31.8
Leaf surface	Glossy
Pod length (cm)	2.9
Pod breadth (cm)	1.3
Seeds/pod	1.0
Seed colour	Brown

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Registration of Lentil Germplasm

IS Solanki, RS Waldia and VP Singh
Department of Plant Breeding, Pulse Section, Chaudhary Charan Singh Haryana Agricultural University, Hisar-125 004 (Haryana)

LH 90-54 (INGR No. 02005; IC 296884)

LH-90-54 is a high-yielding, medium maturing, extra bold-seeded and disease resistant line of lentil (*Lens culinaris*) developed from the cross, K75 x L4076 through pedigree method of selection at the Department of Plant Breeding, Pulse Section, Chaudhary Charan Singh Haryana Agricultural University, Hisar. The plants of this line possess bright dark green coloured foliage and pinkish-red stem at the base. Its leaves are larger in size and the stem is thicker and stouter, making it resistant to lodging. It has large seeds that are light pale-green in colour with small black dots. The seeds possess 22.7% protein. Its hydration and swelling capacities are also higher providing better cooking quality.

LH-90-54 was evaluated in 11 coordinated varietal trials from 1993-94 to 1995-96 in North-west Plain Zone, where it recorded yield superiority of 10.9% over L4076 (check). The genotype is resistant to rust, root rot, *Botrytis* grey mould and *Ascochyta* blight, whereas it is tolerant to wilt. It is resistant to both the species of nematode *i.e. Meloidogyne incognita* and *M. javanica* and is tolerant to lentil pod borer. It is recommended for normal sown conditions, *i.e.* from 15 to 30th November for whole Haryana, except for southern districts. It is highly suitable for growing after paddy or cotton. It matures within 136 days.

LH-92-27 (INGR No. 02006; IC 296883)

LH-92-27 is an early maturing and high-yielding genotype of lentil (*Lens culinaris*) possessing multiple resistance to diseases and insect-pests. This genotype was developed from the cross, Ranjan x K75 through pedigree method of selection at the Department of Plant Breeding, Pulse Section, Chaudhary Charan Singh Haryana Agricultural University, Hisar. The plants of this genotype are tall (46 cm), semi-erect, possess dull green foliage and are tolerant to lodging. Its seeds are round with thickness at the centre. LH-92-27 has been evaluated in 12 coordinated varietal trials from 1994-95 to 1996-97 in North-west Plain Zone, recording yield superiority of 7.0% over DPL 15 (the best check), 8.0% over LH-84–8 and 17.0% over L 4076.

LH-92-27 is either at par or better than the existing checks in its reaction to different diseases like, rust, wilt and blight. It is resistant to both the species of nematode, *Meloidogyne incognita* and *M. javanica* and lentil pod borer. It matures in 132 days and may be suitable for growing in cotton/paddy-wheat rotation where its sowing can be done even up to December 15.

Registration of Wild Horsegram Germplasm (INGR No. 02007; IC 212722)

KS Negi[1], S Yadav[2], S Mandal[2] and DC Bhandari[1]
[1]*National Bureau of Plant Genetic Resources, Regional Station, Bhowali-236 132, Nainital (Uttranchal)*
[2]*National Bureau of Plant Genetic Resources, Pusa Campus, New Delhi-110 012*

Horsegram, (*Macrotyloma uniflorum*) locally known as 'kulath', 'kulthi' or 'gahat' is cultivated in whole of the Uttranchal during rainy season. The related species *Macrotyloma sar-garhwalensis* (IC 212722) investigated in the present study is not yet consumed as a pulse. It grows in tropical and sub-temperate conditions of the Uttranchal on exposed grassy slopes, along the edge of crop fields associated with species of *Desmodium* and *Alysicarpus* as well as other shrubs.

The seeds of this species were procured from Prof. RD Gaur, Head, Department of Botany, HNB Garhwal University, Srinagar, Uttranchal, with collector number of GN-1882. This collection was made from village Sara, District Pauri, Uttranchal, at an altitude of 700 m and was multiplied at NBPGR Regional Station, Bhowali, for further characterization.

The species is an annual, erect, non-twining herb, 50-60 cm tall; leaves imparipinnate, pentafoliate, lanceolate with 6.5 cm long, sessile or sub-sessile and oblong leaflets; stipules large, 4-12 mm long and hairy on both surfaces; inflorescence axillary with short peduncle; flowers 1-2, 6-8 mm long; bracts obovate to lanceolate with acute apex; corolla blue included within the calyx, 5-7 mm long; stamens diadelphous (9+1), 5 mm long; pods compressed, shortly beaked, straw coloured becoming brown on ripening, 3.0-4.7 cm x 0.3 -0.7 cm in size,

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minutely hairy on both sides; 4-5 seeds in each pod, which are compressed, flat, squarish-round, 4 mm long and broad, shining brownish-black, wrinkled and mottled. Flowering and fruiting occurs between August to November. Fifty per cent flowering occurs in 90 days and seeds mature within 175 days. Number of pods/plant is 35-45 and 100-seed weight is 2.63 g. The average seed yield/plant is around 50 g, while grain yield 4-6 q/h.

Seed samples analysed 4-5 times in Ujeltac Auto Analyzer were found with 38.35 ± 1.35 per cent protein content which is more than cultivated check varieties of horsegram, such as SK 2001 (21.09%), VLG-1 (21.06%) and Raipur local (22.80%). Also, it has higher protein content than that (16.87% to 30.36%) recorded in kulthi germplasm (434 accessions) maintained at NBPGR Regional Station, Akola.

Registration of Urdbean Germplasm, Amp 36–13 (INGR No 02008; IC 296878)

Kushal Pal Singh, SK Sharma and RK Yadav

Department of Genetics, Chaudhary Charan Singh Haryana Agricultural University, Hisar-125 004 (Haryana)

Wide hybridization among *Vigna* species has been advocated to broaden the genetic base. Amphidiploids have been produced between *Vigna* species overcoming sterility problem of hybrids. During the last 20 years, inter-specific derivatives involving a large number of amphidiploids from crosses of *V. radiata* x *V. mungo* and different urdbean varieties have been produced at the Department of Genetics, Chaudhary Charan Singh Haryana Agricultural University, Hisar, generating a wide spectrum of genetic variability. The amphidiploids in C2-C3 generation reverted back to parental types, with high frequency towards mungbean, but with some genomic exchange. In subsequent generations, the progenies segregated into mungbean and urdbean types on the basis of grain colour and other features. These progenies were evaluated in two separate experiments for three years resulting in identification of three urdbean promising lines, Amp 36, Amp 56 and Amp 62 (Singh *et al.*, 1986; Singh *et al.*, 1988). The genotype, Amp 36 of urdbean (*Vigna mungo*) was also involved in inter-specific hybridization and was found to be a good donor for plant and seed traits (Singh and Singh, 1998). However, cryptic genomic variability was released in advance generations for morphological and seed traits. Therefore, selections from such cryptic variations were made in populations of Amp 36, Amp 56 and Amp 62. Selected progenies were evaluated for variability in morphological and grain traits (Sharma and Singh, 2002). From Amp 36 population of inter-specific hybrid, K 851 X MCK-2, Amp 36-13 expressing novel morphological characters and good agronomic traits was isolated.

Amp 36-13 is dwarf and erect type with compact growth habit, determinate growth pattern, short peduncle length, erect attachment of pods to peduncle, more number of pods per plant and high grain yield. Some distinct morphological and agronomical features compared to the check are listed in Table 1.

Table 1. Distinct morphological and agronomical features of Amp 36-13

Character	Genotype	
	Amp 36-13	**T-9**
Growth habit	Erect compact	Semi-erect
Growth pattern	Determinate	Indeterminate
Petiole length	Short	Long
1st pod bearing node	2nd	4th
Peduncle length	Short (2-3cm.)	Long
Raceme position	Intermediate	Pods not visible
Attachment of mature pod to peduncle	Erect	Sub-erect
Position of pods with axil	Compressed along axil	Loose on peduncle
No. of pods/plant	65.1	46.4
100-seed weight (g)	4.53	4.80
Yield/plant (g)	12.73	9.50
Protein content (%)	23.2	22.6
Plant height (cm)	43.3	68.4

References

Sharma Hem Lata and KP Singh (2002) Variability studies in selected polymorphs of amphidiploid derivative of *Vigna radiata* x *Vigna mungo*. Proc. Second International Conference on Sustainable Agriculture for Food, Energy and Industry, Sept 8-13, 2002, Institute of Botany, Chinese Academy of Sciences, Beijing, pp 788-791.

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Registration of Cytoplasmic Male Sterile Line in Cotton (INGR No. 02011; IC No. 296907)

SS Mehetre, PP Surana and VR Patil
Cotton Improvement Project, Mahatma Phule Krishi Vidyapeeth, Rahuri-413 722 (Maharashtra)

Several cytoplasmic and genetic male sterile genotypes have been identified in cotton (*Gossypium hirsutum*) ranging from partial to complete male sterility (Meyer, 1969; Bowman *et al.*, 1978). At the Cotton Improvement Project, Mahatma Phule Krishi Vidyapeeth, Rahuri, a cytoplasmic male sterile line (CMS) along with its fertility restorer line was identified from a survey of germplasm of *G. hirsutum.*

In the summer of 1976 in the germplasm accession GH: 572/76, a peculiar plant was noticed. The plant was okra-leaved in an otherwise entire-leaved *G. hirsutum* line. It produced non-dehiscent anthers without any pollen. Cytological studies indicated that pollen mother cells (PMCs) are not formed due to persistent tapetum layer, which was confirmed by histological studies, where cross sections of 8-12 mm thickness of anthers stained with Heidenhain's iron-alum haematoxyline showed that anther wall remained intact without degeneration of tapetal cells. In the male sterile anthers extensive vacuolation was observed resulting in empty anther sac.

CMS nature of this plant was confirmed on the basis of similar observation made by Murthi and Weaver (1974) who observed the male sterile line with *G. harknessii* cytoplasm. On this plant a large number of bolls were set through natural cross-pollination. Later pollen from 15 different cotton varieties were transferred to this male sterile plant during the same crop season. The boll and seed setting was about 70% indicating considerable female fertility. One of the 15 pollinators produced fertile segregates from a known genetic male sterile source. These fertile segregates produced normal PMCs and good fertile pollen. These fertile segregates were selfed and also mated with their male sterile sibs.

The cytoplasmic male sterility from this line has been successfully transferred into several lines, such as CMS Laxmi, CMS LRA-5166, CMS 76 IH-20, CMS SRT-1, which have been found to be highly promising female parents. This has also led to development of CMS-based hybrids, MSRHH 23, MSRHH 25, MSRHH 28 (Mehetre *et al.*, 1996).

Reference

Bowman DT, JB (Jr) Weaver and DB Walker (1978) Analysis of a dominant male sterile character in upland cotton. I. Cytological studies. *Crop. Sci.* **18:** 730-736.

Mehetre SS, PP Surana and MD Yadav (1996) Promising intra *G. hirsutum* hybrid based on cytoplasmic male sterility. *Hybrid Cotton Newslet. 5* **No. 1.**

Meyer VG (1969) Some effects of gene, cytoplasm and environments on male sterility of cotton (*Gossypium*). *Crop Sci.* **9:** 237-242.

Murthi AN and JR Weaver (1974) Histological studies on five male sterile strains of upland cotton. *Crop Sci.* **14:** 658-663.

Registration of Genetic Male Sterile Line of Cotton, LRA 5166 GMS (INGR No 02012; IC 296905)

Suman Bala Singh, Jyoti Hebbar and Shine John
Central Institute for Cotton Research, Post Bag No. 2, Shankarnagar P. O., Nagpur-440 010 (Maharashtra)

In cotton (*Gossypium hirsutum)* both genetic and cytoplasmic genic male sterility have been used in hybrid breeding. The pollen sterility, which is caused by nuclear genes, is referred to as genetic male sterility. The first case of GMS was reported by Justus and Lienweber (1960) in upland cotton (*G. hirsutum*). Both recessive and dominant genes have been reported to govern male sterility. In all, 16 genes in tetraploid and two genes in diploid cotton have been identified. The Gregg male sterile lines governed by two recessive genes (ms_5, ms_6) are the most stable and commonly used in breeding programme. In order to generate variability for male sterility, a released variety LRA 5166 from Central Institute for Cotton Research (CICR), Regional Station, Coimbatore, was selected. This variety is a three way cross derivative, Laxmi x (Reba B 50 x AC 122) and has wider adaptability, higher yield and good fibre properties. LRA 5166 GMS line (*Gossypium hirsutum*) was developed using exotic Gregg as male sterility source in backcross breeding programme.

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Central Institute for Cotton Research, Post Bag No. 2, Shankarnagar P. O., Nagpur-440 010 (Maharashtra)

In cotton (*Gossypium hirsutum)* both genetic and cytoplasmic genic male sterility have been used in hybrid breeding. The pollen sterility, which is caused by nuclear genes, is referred to as genetic male sterility. The first case of GMS was reported by Justus and Lienweber (1960) in upland cotton (*G. hirsutum*). Both recessive and dominant genes have been reported to govern male sterility. In all, 16 genes in tetraploid and two genes in diploid cotton have been identified. The Gregg male sterile lines governed by two recessive genes (ms_5, ms_6) are the most stable and commonly used in breeding programme. In order to generate variability for male sterility, a released variety LRA 5166 from Central Institute for Cotton Research (CICR), Regional Station, Coimbatore, was selected. This variety is a three way cross derivative, Laxmi x (Reba B 50 x AC 122) and has wider adaptability, higher yield and good fibre properties. LRA 5166 GMS line (*Gossypium hirsutum*) was developed using exotic Gregg as male sterility source in backcross breeding programme.

The newly developed GMS line has plant height ranging from 100 to 120 cm with short internodes and open canopy. Leaves are light green in colour, medium in size and possess one-nectar gland on mid rib. Flowers are creamy with light yellow claw and nectaries at the base of all the five petals, but nectaries are absent on the calyx. Three bracts with deep or medium deep notch surround corolla. Bracteoles may or may not contain nectaries. In general, 0-3 nectaries were recorded. They possess 8-10 serrations and are separated by U-shaped notch. Stamen number varies from 75-102 with yellow pollen colour and staminal length of 0.95 cm. Total ovary length is 0.8 cm, which is oval-shaped and medium in size. Boll weight is 4 to 4.5 g. LRA 5166 GMS line has desirable fibre properties (24.4 mm, 2.5% span length with bundle strength 20.5 g/tex 1/ 8 mm gauge), uniformity ratio of 48 and micronaire value of 3.2 (10^{-6} g/in). The line has good general combining ability and it is expected to produce high heterotic potential hybrids. The converted lines have been put to use in hybrid development programme.

Reference

Justus NJ and CL Lienweber (1960) A heritable partial male sterile character in cotton. *J. Heredity* **51:** 191-192.

Registration of Cotton Germplasm, 30838 (INGR No. 02020; IC 296857)

Punit Mohan, PM Mukewar, VV Singh and CD Mayee

Central Institute for Cotton Research, Post Bag No. 2, Shankar Nagar, P.O. Nagpur-440 010 (Maharashtra)

The grey mildew/areolate mildew disease of cotton caused by *Ramularia areola* Atk., has become a very important disease in India affecting cultivation of all the four commercially cultivated *Gossypium* species. The disease has been recorded in epidemic form in Central India during the years 1958, 1988 and 1993 (Mukewar *et al.*, 1994). The yield losses have been recorded up to 68% under epidemic disease conditions in Maharashtra. Considering the great economic importance of the disease, a screening programme was initiated. A total of 1592 *Gossypium arboreum* germplasm lines available with Central Institute for Cotton Research (CICR), Nagpur were evaluated during the years 1985 to 1989. This resulted in identification of seven immune lines, Bangladesh, G-135-49 belonging to *Gossypium arboreum* race *bengalense* and 30305, 30814, 30826, 30838 and 30856 belonging to *Gossypium arboreum* race *cernuum* (Mukewar *et al.*, 1995). The resistance potential was further confirmed by subjecting to immunity performance in glasshouse and field conditions with artificial inoculations during 1989 to 1992. The basis of resistance among these lines was studied by conducting morphological and anatomical studies (Punit Mohan *et al.*, 1997) and biochemical analysis of factors governing resistance (Chakrabarty *et al.*, 2002). For assessment of commercial value, these lines were evaluated for fibre characteristics and other economic parameters (Punit Mohan *et al.*, 2001).

Of these lines, line 30838 is being registered for immunity against grey mildew/areolate mildew disease of cotton. It has five-lobed narrow elongated leaf with long stalk (up to 8 inches long), reticulate and palmate divergent venation and sparsely hairy surface. Flowers are yellow with long pedicle, short claw, and petal blotch red, anthers yellow with long filaments. It has three-large and broad bracteoles with serrated margin at apex and 2-3 teeth. Capsules are big, trilocular and elongated with tapering ends with long peduncle. Capsule surface is densely pitted. Staple length is 20.3 mm at 2.5% span length, uniformity ratio of 50%, fineness-micronaire above scale at 10^{-6} g/m micronaire, bundle strength 16.6 at bundle tenacity g/tex 3.2 mm, ginning outturn- 42.15% and seed-cotton yield/plant 44.59 g.

Reference

Chakrabarty PK, PM Mukewar, S Raj and V Sravan Kumar (2002) Biochemical factors governing resistance in diploid cotton against grey mildew. *Indian Phytopath.* **55:** 140-146.

Punit Mohan, PM Mukewar, S Raj and VV Singh (1997) Anatomy of *Gossypium arboreum* lines immune to grey mildew disease. *J. Cotton Res. Dev.* **11:** 191-195.

Punit Mohan, VV Singh and PM Mukewar (2001) Morphological and fibre characteristics of *Gossypium arboreum* L. germplasm lines immune to grey mildew (*Ramularia areola* Atk.) disease of cotton. *Indian J. Plant Genet. Resour.* **14:** 81-84.

Mukewar PM, S Raj and PK Chakrabarty (1994) Epidemic occurrence of grey mildew disease of cotton in Central India, *J. Indian Soc. Cotton Improv.* **10:** 170-172.

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Registration of Cotton Germplasm Line, CNH 123 (INGR No. 02021; IC 325211)

VV Singh
Division of Crop Improvement, Central Institute for Cotton Research, Post Bag No. 2, Shankar Nagar P.O., Nagpur-440 010 (Maharashtra)

CNH 123, an upland cotton (*Gossypium hirsutum*) germplasm line was identified at Central Institute for Cotton Research, Nagpur, with resistance to Cotton Leaf Curl Virus during 2002, using mutation breeding. This is a mutant of SRT 1.

Description of morpho-agronomic characters of CNH 123 along with information on its multi-location performance for yield and yield components are summarized in Table 1.

CNH 123 has higher level of Bollworm resistance and tolerance to sucking pests. It is tolerant to moisture stress (performed well under rain-fed condition).

References

All India Coordinated Cotton Improvement Project – Annual Report for (1997-98) (North Zone) presented at Annual Workshop of AICCIP, April 26-27, 1998, held at CICR, Regional Station, Coimbatore.

Annual Report (1997-98) Natural Resource Management Central Institute for Cotton Research, Nagpur.

Table 1. Morpho-agronomic characters of CNH 123

Character	Details	Character	Details
Growth habit		**Flower characters**	
Plant type	Lanky	Bracts	Normal
Plant height (cm)	84.5	Petal colour	Cream
Monopodia/plant	2.6	Pollen colour	Cream
Sympodia/plant	21.1	Petal spot	Absent
Stem characters		**Fruit/capsule (boll) characters**	
Hairiness	Hairy	Bearing habit	Normal
Colour	Green purple	Size	Medium
Internode length (cm)	5.1-10	Shape	Round-oval
Leaf characters	Surface	Densely pitted	
Size	Small	Gossypol glands	Dense
Shape	Palmate	Capsule bearing	Normal
Lobing	Broad	Loculi/capsule	3-5
Colour	Green	**Seed characters**	
Surface	Hairy	Seeds/locule	7-9
Gossypol glands	Dense	Fuzz colour	White
Nectary/leaf	One	Seed index (g)	7.0
Yield attributes		**Fibre quality attributes**	
Capsules (boll)/plant	21.2	2.5% Span length (mm)	23.6
Seed-cotton yield/boll (g)	3.3	Uniformity ratio (%)	43.7
Seed-cotton yield/plant (g)	33.2	Micronaire value 10^{-6} g/in	3.8
Ginning outturn (%)	39.8	Maturity coefficient (%)	0.8
Lint index (G)	4.6	Tenacity (g/tex) (3.2 mm)	16.3

Registration of Sugarcane Germplasm, Co A 89085 (85 A 261) (INGR No. 02013; IC 296832)

JVR Bhupal Rao, NV Naidu, K Prasada Rao, V Rajabapa Rao, K Baghavan Dora, C Ramana Reddy, M Jayaprakash, J Papa Rao, Y Satyanarayana, A Padma Raju, LVV Prasada Rao, VSP Lalitha, KK Prasada Rao and MA Rama Rao
Regional Agricultural Research Station, Anakapalle-531 001, Visakhapatnam (Andhra Pradesh)

Co A 89085 is an early maturing sucrose-rich and red rot resistant sugarcane (*Saccharum officinarum*) clone with good ratooning. Co A 89085 was developed from a bi-parental cross Co 6806 x Co 775 followed by selection. It is suitable for cultivation under irrigated and rain-fed conditions. It comes to maturity by nine

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months and serves as an opening mill cane. It is insensitive to temperatures and, hence, can be planted from December-January to May-June. It responds to iron and zinc application both in plant and ratoon crops.

It is erect in habit with medium thick cane. Foliage is light green with medium-sized leaves and curved tips. Leaf sheath is light green with purple blotches. Exposed stalk is green with black blotches while un-exposed stalk is greenish yellow. It is non-lodging and non-flowering type. It is moderate cane yielder (95–115 t/ha), rich in sucrose (19-21%). Maximum sugar accumulation takes place from 8th month onwards up to 11 months without any deterioration. It has relatively less fibre and bagasse. The cane yield advantage over the popular standard variety, Co 6907 was 3.95%, while the CCS yield and jaggery yield were about 23.84 and 25.90%, respectively. It performed well in different locations of East Coast Zone under AICRP trials, on-farm testing and large-scale demonstrations.

It is resistant to all the three races of red rot (*Colletotricum falcatum*) *viz.*, Cf 419, Cf 997 and Cf 671 prevalent in Andhra Pradesh and suitable for crop rotation with cereal or pulse or even with commercial crops like cotton.

Registration of Coffee Germplasm, Selection 5A (INGR No. 02009; IC 2968845)

CS Srinivasan, D Ganesh and R Naidu
Central Coffee Research Institute, Chikmagalur (Karnataka)

Arabica coffee (*Coffea arabica*) shows different degrees of susceptibility to leaf rust (*Hemileia vastatrix* B. & Br.). Selection 5A was bred at Central Coffee Research Institute (CCRI), Chikmaglur, India by crossing Devamachy hybrid (a natural hybrid of *C. robusta* x *C. arabica*) with S.881 (a wild arabica strain introduced from Rume Sudan in Africa). The F_3 generation was planted in 1967, which showed high uniformity for bush size and rust resistance.

Selection 5A is characterized by spreading and drooping branches and generally smaller leaves. Young unfolding leaves are green in colour. Fruits and seeds are longish with reduced breadth giving more of "B" grade beans (retained on 6.00 mm sieve). It has recorded mean yield of 1176 kg/ha at CCRI. This selection performed well in the coffee area of Andhra Pradesh.

Selection 5A expresses high field tolerance to rust (80% plants free from rust). Seedlings tested at Coffee Rust Research Centre, Portugal, have shown high tolerance to "coffee berry disease" caused by *Colletotrichum kahawae* – a dreaded disease of coffee in Africa. It has shown cup quality at par with other arabica varieties developed in India.

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