

Important Crop Germplasm Introduced in India during 2006

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Indian agriculture has been tremendously benefited in the past though exotic germplasm introduced and utilized in developing better crop varieties and hybrid. But most of the crop improvement programmes have now reached at the threshold of dramatic advances and an access to exotic germplasm for import is becoming all the more harder from other countries after an enactment of IPR Act, various national and international agreement, and stringent quarantine measure operative. The Indian agriculture production scenario is also confronting numerous other problem which calls upon national strategic approaches to the Global Plan of Action such as broadening the genetic base of the major crops; increasing the range of genetic diversity available to farmers; strengthening the

capacity to develop new crop and varieties that are specifically adapted to local environments; exploring and promoting the use of underutilized crops; and developing genetic diversity to reduce crop vulnerability.

Keeping in the view all these above considerations, an information on the potential useful exotic germplasm has been accessed from various sources and the Bureau imported 16,146 accession from 45 countries, including diverse and trait specific germplasm, in rice, wheat, barley, maize, sorghum, sunflower, soybean, french bean, cowpea, chickpea, chillies, watermelon, tomato, cabbage, strawberry, poppy, cotton, clovers, *Glaucium* and *Elytrigia repens*. Crop species wise account is tabulated below.

Table 1. Promising material introduced during 2006

Crop	Country	Traits	Distribution
Resistant to biotic stress			
CEREALS			
<i>Oryza sativa</i>			
EC572259-67	USA	Resistant to blast disease, kernel smut, rice water weevil and rice stalk borer	DRR, Hyderabad
EC580364-373	Philippines	Brown Plant Hopper (BPH) resistant lines	Pioneer Overseas Corporation, PAU, Ludhiana
EC582484	Philippines	Blast resistant	Pioneer Overseas Corporation
EC580374-375	Philippines	Bacterial blight resistant lines	Pioneer Overseas Corporation, PAU, Ludhiana
EC580376-390	Philippines		
EC582443-44			
49-53, 86-92			
EC582455-61	Philippines	Stem borer tolerant lines	PAU, Ludhiana
EC583878-410	Philippines	Bacterial blight and Rice Tungro disease resistant virus	DRR, Hyderabad
EC58341 1-453	Philippines	Resistant to Grassy stunt virus	DRR, Hyderabad
EC592058	Sri Lanka	Resistant to bacterial leaf blight, brown plant hopper and blast	DRR Hyderabad
<i>Triticum aestivum</i>			
EC580485-86	Canada	Sawfly resistant	DWR, Karnal
EC582225-441	USA	Resistant to yellow brown rust and powdery mildew	DWR, Karnal
EC589025 (1)	USA	Resistance to stripe rust and leaf rust	DWR, Karnal
EC589389-91 (3)	USA	Isogenic for stripe rust resistance gene Yr 36, leaf rust resistance gene Lr 47 and leaf, stripe and rusts resistance gene complex	DWR, Karnal
EC589421 (1)	USA	Resistant to stem, leaf and stripe rusts	DWR, Karnal
EC592591	China	Resistant to yellow, brown, black rusts and powdery mildew	DWR, Karnal
<i>Triticum aestivum</i>			
EC586941	USA	Resistant to wheat stem sawfly	DWR, Karnal
EC586942	USA	Resistant to stripe rust	DWR, Karnal
<i>Triticum turgidum var. durum</i>			
EC592592	USA	Genetic stock rusty, useful for studying genetics of stem rust resistance in tetraploid wheat or in crosses designed to select monogenic progeny from a parent containing multiple genes for stem rust resistance	DWR, Karnal

Crop	Country	Traits	Distribution
Hordeum vulgare			
E 586943	USA	Resistant to all known greenbug biotypes	PC (Wheat), DWR, Karnal
Zea mays			
EC583148-167	Nigeria	Resistance to foliar disease, gray leaf spot, maize streak virus, northern leaf blight and common rust	NBPGR, New Delhi
OILSEEDS			
Helianthus annuus			
EC586972	USA	Resistant to downey mildew	DOR, Hyderabad
Glycine max			
EC592181-212	Taiwan	White fly and downy mildew resistant	NRC Soybean, Indore
EC586966	USA	Resistant to stem canker and soybean mosaic virus	"
EC5 6967	USA	Resistant to southern stem canker, soybean cyst nematode, reinform nematode, sudden death syndrome, frog eye leaf spot	"
GRAIN LEGUMES			
Phaseolus vulgaris			
EC589388 (I)	USA	Resistant to all known strains of virus (BCMV), Bean common Mosaic Necrosis virus, root rot	IIPR, Kanpur
EC589468	USA	Resistant to BCMV and CTV and tolerant to bean rust	IIPR, Kanpur
EC590327	Canada	Resistant to BCMV, tolerant to white mold,	IIPR, Kanpur
EC592938	USA	Resistant to common bacterial blight	IIPR, Kanpur
Vigna unguiculata			
EC587822	Senegal	Resistant to cowpea aphid borne mosaic virus (CABMV), bacterial blight	IIPR, Kanpur
VEGETABLES			
Capsicum annum			
EC572236,39	Taiwan	Resistant to Chilli Veinal Mosaic Virus and Poty Virus Y	J.K.Agr. Genetics, Hyderabad
EC572238,43-45	Taiwan	Anthracnose resistant lines	J.K.Agr. Genetics, Hyderabad
Capsicum baccatum var. pendulum			
EC572240-42	Taiwan	Anthracnose resistant lines	J.K.Agr. Genetics, Hyderabad
Capsicum chinense			
EC589469	Taiwan	Resistant to anthracnose and bacterial wilt	UAS, Bangalore
Citrullus lanatus			
EC572745-47	Taiwan	Disease resistant	Vibha Agrotech Ltd., Hyderabad
Cucumis melo			
EC589374 (I)	USA	Resistant to powdery mildew	IIVR, Varanasi
Lycopersicon esculentum			
EC571821-829	Taiwan	Resistant to whitefly transmitted gemini virus, bacterial wilt, tomato mosaic virus and fusarium wilt	Centre for Plant Biotech and Mol. Biology, Thrissur
EC580001	Taiwan	Resistant to bacterial wilt, tomato mosaic virus, gray leafspot, fusarium wilt (race 1)	MAU, Parbhani
EC580988-020	Taiwan	Resistant to bacterial wilt, Tomato mosaic virus, fusarium wilt and gray leaf spot, late blight, white fly transmitted gemini virus, early blight	Nodai Seeds India Pvt. Ltd., Gurgaon
EC586975	Taiwan	Resistant to Gemini virus, bacterial wilt, tomato mosaic virus, fusarium wilt, gray leaf spot and early blight	VNR Seed, Raipur
EC588212-230	Taiwan	Resistant to late blight, bacterial wilt, mosaic virus, fusarium wilt	Ankur Seeds Pvt, Nagpur
FRUITS			
Fragaria ananassa subsp. Ananassa			
EC 571812	USA	Resistant to leaf spot, leaf scorch, powdery mildew and red stele	NBPGR, Regional Station, Shimla
EC 571816	USA	Resistant to botrytis, verticillium wilt, red stele, powdery mildew and spotted spider mite	NBPGR, Regional Station, Shimla
EC571820	USA	Resistant to red stele races A-I, A-3, A-4 and fruit rots	NBPGR, Regional Station, Shimla

Crop	Country	Traits	Distribution
MEDICINAL & AROMATIC PLANTS			
<i>Papaver sp.</i>			
EC587085-88	Denmark	Resistant to downey mildew	NRC M&AP, Anand
Resistant to Abiotic Stress			
CEREALS			
<i>Oryza sativa</i>			
EC571081-155	Philippines	Drought tolerant lines	Barwale Foundation, Hyderabad
EC571211-227	Philippines	Submergence tolerant lines	Barwale Foundation, Hyderabad
EC571228-238	Philippines	Deep water lines	Rice Research Station Chinsurah, WB
EC580501-509	Philippines	Deep water lines	CSSRI, Karnal
EC581120-23	Philippines	Submergence tolerant lines	CSSRI, Karnal
EC581124-27	Philippines	QTL lines	CSSRI, Karnal
EC582463-64,68-69,71	Philippines	Fe toxicity tolerant lines	PAU, Ludhiana
EC582211-24	Philippines	Aerobic, moderate drought tolerance	PAU, Ludhiana
<i>Triticum aestivum</i>			
EC582225-441	USA	Tolerant to frost and lodging	DWR, Kamal
EC589421 (1)	USA	Var. Oropos tolerant to lodging, low temperature and diverse climatic conditions	DWR, Kamal
EC592591	China	Variety Jimmai-5, tolerant to cold and drought	DWR Kamal
EC586941	USA	Tolerant to lodging	DWR, Kamal
EC586942	USA	Variety Jerome tolerant to lodging and stripe rust	DWR, Kamal
OILSEEDS			
<i>Helianthus annuus</i>			
EC586971	USA	Excellent lodging resistance	DOR, Hyderabad
GRAIN LEGUMES			
<i>Phaseolus vulgaris</i>			
EC589468	USA	Resistant to lodging	IIPR, Kanpur
VEGETABLES			
<i>Capsicum annum</i>			
EC582593	USA	Heat and drought tolerant	IIVR, Varanasi
<i>Lycopersicon esculentum</i>			
EC581 035-1 043	Taiwan	Heat tolerant	Nodai Seeds India Pvt. Ltd., Gurgaon
EC581525, EC592058-59	Sri Lanka	Heat tolerant varieties	IIVR, Varanasi
MEDICINAL AND AROMATIC PLANTS			
<i>Apium graveolens</i>			
EC587045	China	Tolerant to high temperatures	IIVR, Varanasi
Lines for Heterosis Breeding			
CEREALS			
<i>Oryza sativa</i>			
EC571 539-48	Philippines	Cytoplasmic Male Sterile (CMS) and maintainer lines	NBPGR, New Delhi, Pioneer Overseas Corporation, Hyderabad,
EC573166-200	Philippines	Cytoplasmic Male Sterile (CMS) and maintainer lines	NBPGR, New Delhi, Pioneer Overseas Corporation, Hyderabad,
EC571 553-58	Philippines	Thermogenic Male Sterile (TGMS) lines	CSSRI, Kamal,
EC581124-27	Philippines	QTL lines	Annappurna Seeds, West Bengal ,
EC582493-500	Philippines	Maintainer and restorer lines	M/s Erika Seeds, Hyderabad ,
EC588896-935	Philippines	Maintainer and restorer lines	M/s Rasi Seeds, TN
EC588992-9027	Philippines	Maintainer and restorer lines	M/s Rasi Seeds, TN
<i>Triticum aestivum</i>			
EC580487-489	Germany	Double Haploid lines, true isogenic and homozygous having different cytoplasm	IGFRI, Jhansi
<i>Sorghum bicolor</i>			
EC582502-508	USA	Isogenic lines for brown midrib genes	• NRC, Sorghum, Hyderabad
EC582509-513	USA	Male sterile lines	• IGFRI, Jhansi • NRC, Sorghum, Hyderabad • IGFRI, Jhansi

Crop	Country	Traits	Distribution
OILSEEDS			
<i>Helianthus annuus</i>			
EC586970	USA	Maintainer	DOR, Hyderabad
EC586973	USA	Restorer line having gene for fertility restoration	DOR, Hyderabad
GRAIN LEGUMES			
<i>Pisum sativum</i>			
EC581505-514	USA	Differential lines	CSKHPKV, Palampur
FIBRES			
<i>Gossypium hirsutum</i>			
EC561526	USA	Male Sterile lines	Proagro Seed Company, Andhra Pradesh
VEGETABLES			
<i>Capsicum annuum</i>			
EC571257-266	Taiwan	Cytoplasmic Male sterile (CMS) lines and maintainers	AAU, Gujarat IIVR, Varanasi
<i>Lycopersicon esculentum</i>			
EC572692-708	USA	Male sterile lines	IIVR, Varanasi, NBPGR, New Delhi.
Agronomic Traits			
CEREALS			
<i>Oryza sativa</i>			
EC571549-52	Philippines	Early and late maintainer population	NBPGR, New Delhi
EC571549-52	USA	Early maturing	DRR, Hyderabad
EC580391-396	Philippines	High yielding	Pioneer Overseas Corporation, Ghaziabad
EC582473-81	Philippines	Introgression line for high yield	PAU, Ludhiana
EC582482	Philippines	Acid Sulfate tolerant line	PAU, Ludhiana
EC592058	Sri Lanka	High yielding and early maturing	DRR Hyderabad
<i>Triticum aestivum</i>			
EC582225-441	USA	High yielding, non shattering type	DWR, Karnal
EC589025 (1)	USA	Good grain yield	DWR, Karnal
EC589421 (1)	USA	High yielding, semi dwarf, broad, adaptation	DWR, Karnal
EC592591	China	Variety Jimnmai-50 high yielding, wide spread adaptation, early maturing	DWR, Karnal
EC586941	USA	Variety Choteav, superior yield	DWR, Karnal
EC586942	USA	Variety Jerome, early maturing	DWR, Karnal
<i>Hordeum vulgare</i>			
EC586943	USA	Variety Post 90, high yielding, widely adapted	PC (Wheat), DWR, Karnal
OILSEEDS			
<i>Helianthus annuus</i>			
EC581515-519	USA	Tolerant to soil salinity and for genetic base broadening for agronomic and oil content characters in development of hybrids, parents or improved germplasm	DOR, Hyderabad
<i>Helianthus annuus</i>			
EC586970	USA	Short statured type	DOR, Hyderabad
EC586971	USA	Short statured line	DOR, Hyderabad
<i>Glycine max</i>			
EC592181-212	Taiwan	Vegetable type, early & late maturing	NRC Soybean, Indore
EC586966	USA	Variety Desha, early maturing	NRC Soybean, Indore
EC586967	USA	Variety Lonoke high yielding, good standability, shattering resistance	NRC Soybean, Indore
GRAIN LEGUMES			
<i>Phaseolus vulgaris</i>			
EC589388 (1)	USA	Variety Quincy -high yielding	IIPR, Kanpur
EC589468	USA	Variety silver cloud, high yielding	IIPR, Kanpur
EC590327	Canada	Semi determinate growth habit with very short vines or no vines, upright plant and canopy, higher podding nodes on stems	IIPR, Kanpur
EC590328	Canada	Non nodulation genetic stocks	IIPR, Kanpur

Crop	Country	Traits	Distribution
<i>Vigna unguiculata</i> EC582501	USA	Variety EIN-EI Ghazal, good for grain production under rainfed conditions	IIPR, Kanpur
EC587822	Senegal	Early maturing	IIPR, Kanpur
VEGETABLES			
<i>Brassica oleracea</i> var. <i>botrytis</i> EC572748	Taiwan	Early maturing (40-45 days)	Vibha Agrotech Ltd, Hyderabad
FRUITS			
<i>Fragaria ananassa</i> sub sp. <i>ananassa</i> EC571820	USA	Early ripening	NBPGR, Regional Station, Shimla
FORAGES			
<i>Trifolium pratense</i> EC578957	USA	Variety Freedom, free from pubescence, good for hay making, faster drying & reduced dustiness	IGFRI, Jhansi
<i>Elytrigia repens</i> EC 586940	USA	Variety Eversett, advanced generation synthetic cultivar for high rhizome production ability to spread by rhizomes and used for land stabilization and reclamation	IGFRI, Jhansi
Quantitative/ Qualitative Traits for Value Addition			
CEREALS			
<i>Oryza sativa</i> EC572269	Philippines	Iron rich line	IARI, New Delhi DRR, Hyderabad
<i>Triticum aestivum</i> EC589025 (1) EC592591	USA China	Excellent bread and noodle making quality Variety Jimmai-50 better quality for bread & noodle making	DWR, Karnal DWR Karnal
<i>Hordeum vulgare</i> EC586943 EC586944	USA USA	Variety Post 90, good straw quality Variety Radiant proanthocyanidin free, potential malting barley and carry the gene that controls a high amount of thermostable beta amylase	PC (Wheat), DWR, Karnal PC (Wheat), DWR, Karnal
<i>Zea mays</i> EC592161 ECS86945-47	USA USA	Yellow kernels, white cobs, good husk coverage High amylase, high oil content, high protein quality and waxy with specialty starches, populations of vegetable type	DMR, IARI, New Delhi DMR, IARI New Delhi
ECS83148-167	Nigeria	Tropical mid altitude lines	NBPGR, New Delhi
OILSEEDS			
<i>Helianthus annuus</i> EC586970	USA	High oleic fatty acid	DOR, Hyderabad
<i>Glycine max</i> ECS92181- 212 ECS92211-19	Taiwan Taiwan	Vegetable type High oil content	NRS, Soybean Indore "
GRAIN LEGUMES			
<i>Cicer arietinum</i> EC571855-572003	Syria	Large seeded kabuli type germplasm	PAU, Ludhiana IIPR, Kanpur
<i>Cicer arietinum</i> EC583236	USA	Extra large kabuli variety	ICRISAT, Patancheru

Crop	Country	Traits	Distribution
VEGETABLES			
<i>Brassica oleracea</i> var. <i>botrytis</i> EC572748	Taiwan	Globular shaped	Vibha Agrotech Ltd, Hyderabad
<i>Capsicum annuum</i> EC582593	USA	Variety Tangerine dream, non pungent, banana type peppers, heat and drought tolerant, excellent keeping quality suitable for ornamental and culinary applications	IIVR, Varanasi
<i>Citrullus lanatus</i> EC572745-47	Taiwan	Globular shaped, firm fleshed, small seeded, sugar content 11-12% and disease resistant	Vibha Agrotech Ltd. Hyderabad
<i>Lycopersicon esculentum</i> EC572692-708	USA	Carotene rich and high lycopene content	IIVR, Varanasi, NBPGR NR, New Delhi.
FRUITS			
<i>Fragaria x ananassa</i> subsp. <i>ananassa</i> EC 571812	USA	Large fruited	NBPGR, Regional Station, Shimla
EC 571814, 817	USA	Large fruited, good flavor, outstanding fruit quality	NBPGR, Regional Station, Shimla
MEDICINAL AND AROMATIC PLANTS			
<i>Glaucium flavum</i> EC587081	Denmark	High glycoyrrhizin content	NRC M&AP Anand