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NEWSLETTER
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IMPORTANT EVENTS

59th Annual Maize Workshop held at Bengaluru

University of Agricultural Sciences (UAS), Bengaluru and ICAR-Indian Institute of Maize Research, Indian Council of Agriculture Research, New Delhi together organized a three day Annual Maize Workshop at GKVK campus, Bengaluru from 10-12 April, 2016. Dr. J.S. Sandhu, DDG (CS), ICAR, while speaking on the inaugural day said maize crop is as resilient as rice and wheat under climate change scenario. He added that in the next ten years, there is need to double the production and productivity of maize in India to meet the growing demand. He urged farmers to adopt improved production technology to enhance their farm-profitability. Dr. Vinay Mahajan, Director, ICAR-IIMR, New Delhi indicated in PD report that the first trials of AICMIP were conducted in 1957 and since then maize scientists have worked towards increasing maize production which has reached 24.7 million tonnes in 2015 from 2.6 million tonnes in 1957. He conveyed that presently 33 AICMIP centres and 31 voluntary centers are supporting maize research in the country. He highlighted the fact that in spite of 12% lower rainfall, maize production remained stable in 2015. However, he also stressed to increase the focus on development of single cross climate resilient new high yielding maize cultivars. Also he mentioned about the maize hybrids which yielded at least 10 t/ha under good management conditions. Dr. H Shivanna, Vice-Chancellor, UAS, Bengaluru, mentioned that farmers are not getting remunerative price for their farm produce. He suggested the farmers to adopt less water requiring crop like maize; especially the high yielding single cross hybrids which would enhance their profitability. He expressed that he would look forward towards the recommendations of the workshop which would enhance the maize productivity and profitability of farmers. Scientists from public and private sector across the country were participated in this programme. The 'Maize Group' reviewed the progress of last year and the technical programme for 2016-17 was formulated. In addition new hybrids were also identified for release (Table 1)

Glimpses of Annual Maize Workshop

Release of "Maize Journey with IIMR"

Felicitation of Dr. J.S. Sandhu, DDG (CS), ICAR

Union Minister visits PAU, Ludhiana

The Union Minister for Agriculture and Farmer's welfare and President, ICAR Shri Radha Mohan Singh Ji visited Punjab Agricultural University (PAU), Ludhiana on 27 May, 2016. The Minister interacted with farmers and apprised about various Government schemes, including ICAR's scheme, '*Mera Gaon Mera Gaurav*'. Punjab Agriculture Minister Shri Tota Singh; Member of Parliament Shri Mahesh Giri; Vice Chancellor of PAU, Dr. Baldev Singh Dhillon; Vice Chancellor of Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, Dr A.S. Nanda; Director, ICAR- Indian Institute of Maize Research, Dr. Vinay Mahajan; Director, ICAR-Central Institute of Post Harvest Engineering & Technology, Ludhiana, Dr. R.K. Gupta; Director, ICAR-Agricultural Technology Application Research Institute, Zone-I, Ludhiana, Dr. Rajbir Singh; and senior officials from PAU shared the dais with the Minister. A large gathering of the farmers, students, media personnel faculty and staff of PAU and, IIMR, attended the Farmer's Meet.

Union Agriculture Minister interacting with farmers at PAU, Ludhiana
inset- farmers attended meeting

International Yoga Day at ICAR-Indian Institute of Maize Research and Three Day Workshop on Yoga

Workshop on Yoga was organized from 18 to 21, June 2016 at IIMR, New Delhi. Dr Vinay Mahajan, Director, ICAR-IIMR welcomed the Yoga expert Shri Yogi Uday, Morarji Desai from National Institute of Yoga who was invited to introduce the concept of Yoga and its importance in daily human life and. Shri Yogi Uday highlighted the significance of yoga for health, happiness and harmony. Dr K.S. Hooda, Principal Scientist and organizer of the workshop gave a presentation on various aasanas and on their importance. Ms. Meenakshi Gupta and Ms. Sarika Gupta, Yoga Experts from Patanjali Yogapeeth Samiti, Delhi were invited on 20th talk on how to inculcate Yoga in daily routine and also to teach various Yoga aasanas. The International Yoga Day was celebrated on June 21, 2016 in NL Dhawan Committee Room. Dr. Sain Dass, Ex- Director, IIMR was the Chief Guest on the occasion. Sh. Bijender from Mehrauli, Delhi taught about common yoga protocol. The staff of the IIMR were took part in both Workshop as well as International Yoga Day celebration. The workshop was ended with vote of thanks by Dr. KS Hooda.

International Yoga Day celebration

Table 1 List of cultivars identified during 59th Annual Maize Workshop

Hybrid Name	AICRP Centre/ Company	Pedigree	Public/ Private	Area of Adaptation		Average Yield (t/ ha)	Maturity	Other Characters	Season
				Zone	States				
X35D601 (P3401)	Pioneer Hi-Bred Private Ltd., Chikkaballapur, Karnataka	PHSAB × PH1N06	Private	Peninsular Zone (Zone IV)	Andhra Pradesh, Telangana, Maharashtra, Tamil Nadu and Karnataka	9.39	Late	Orange, semi-flint	*Kharif*
HTMH 5108	Hytech Seed India Private Ltd., Hyderabad, Telangana	HM00024 × HM00037	Private	Peninsular Zone (Zone IV)	Andhra Pradesh, Telangana, Maharashtra, Tamil Nadu and Karnataka	9.72	Late	Orange-yellow, semi-flint	*Kharif*
DKC9133	Monsanto India Ltd., Bengaluru	H5228Z × H1620Z	Private	Central West Zone (Zone V)	Rajasthan, Gujarat, Chhatisgarh and Madhya Pradesh	6.75	Late	Orange, semi-flint	*Kharif*
HTMH 5402	Hytech Seed India Private Ltd., Telangana Hyderabad,	(HM00061 × HM00024) × HM00057	Private	Peninsular Zone (Zone IV)	Andhra Pradesh, Telangana, Maharashtra, Tamil Nadu and Karnataka	8.93	Medium	Orange-yellow, semi-flint	*Kharif*
DKC9144 (IM8478)	Monsanto India Ltd., Bengaluru	BT049Z × H1620Z	Private	4 Peninsular Zone (Zone IV)	Andhra Pradesh, Telangana, Maharashtra, Tamil Nadu and Karnataka	8.61	Medium	Yellow, semi-flint	*Kharif*
Central Maize VL 55 (FH 3605)	ICAR-VPKAS, Almora	V 407 × V 405	Public	Northern Hill Zone and Peninsular Zone (Zone I and IV)	Jammu & Kashmir, Uttarakhand, Himachal Pradesh, North-east hills, Andhra Pradesh, Telangana, Maharashtra, Tamil Nadu and Karnataka	7.55	Early	Yellow, flint	*Kharif*
X35C537 (P3544)	Pioneer Hi-Bred Private Ltd., Chikkaballapur, Karnataka	PH1H7C × PH1RA9	Private	North West Plain Zone, North East Plain Zone and Peninsular Zone (Zone II, III and IV)	Delhi NCR, Punjab, Haryana, Western Uttar Pradesh, Eastern Uttar Pradesh, Bihar, Jharkhand, Odisha, West Bengal, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana and Maharashtra	10.85	Late	Orange-yellow, semi-flint	*Rabi*
P3533	Pioneer Hi-Bred Private Ltd., Chikkaballapur, Karnataka	PHM6T × PH15K8	Private	Peninsular Zone (Zone IV)	Andhra Pradesh, Telangana, Maharashtra, Tamil Nadu and Karnataka	8.87	Late	Orange, semi-flint	*Rabi*
GK3150	Ganga Kaveri Seeds Pvt. Ltd., Hyderabad, Telangana	(GKMZ152 × GKMZ163) × GKMZ53	Private	North West Plain Zone (Zone II)	Delhi NCR, Punjab, Haryana and Western Uttar Pradesh	12.03	Late	Yellow, semi-flint	*Rabi*
Bisco X 6573 (LG 34.03)	Bisco Bio Sciences Pvt. Ltd., Telangana Secunderabad,	BLI 103 × BLI 101	Private	North West Plain Zone (Zone II)	Delhi NCR, Punjab, Haryana and Western Uttar Pradesh	11.84	Late	Orange-yellow, semi-flint	*Rabi*
KMH2589	Kaveri seed Company Ltd., Secunderabad, Telangana	KML-2924 × KML-2323	Private	North West Plain Zone and Peninsular Zone (Zone II, and IV)	Delhi NCR, Punjab, Haryana, Western Uttar Pradesh, Andhra Pradesh, Telangana, Maharashtra, Karnataka and Tamil Nadu	11.63	Late	Orange-yellow, semi-dent	*Rabi*
IL8534	Monsanto India Ltd., Bengaluru	B1470Z × G7720Z	Private	Peninsular Zone (Zone IV)	Andhra Pradesh, Telangana, Maharashtra, Tamil Nadu and Karnataka	9.02	Late	Orange-yellow, semi-flint	*Rabi*
DKC9120 (II8210)	Monsanto India Ltd., Bengaluru	S8128Z × D1540Z	Private	North East Plain Zone and Peninsular Zone (Zone III and IV)	Eastern Uttar Pradesh, Bihar, Jharkhand, Odisha, West Bengal, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana and Maharashtra	8.91	Late	Orange yellow, semi-dent	*Rabi*

Hybrid Name	AICRP Centre/ Company	Pedigree	Public/ Private	Area of Adaptation		Average Yield (t/ ha)	Maturity	Other Characters	Season
				Zone	States				
*Advsw2	Advanta Ltd., Hyderabad, Telangana		Private	Northern Hill Zone, North West Plain Zone, North East Plain Zone and Peninsular Zone (Zone I, II, III and IV)	Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Delhi NCR, Punjab, Haryana, Western Uttar Pradesh, Bihar, Jharkhand, Odisha, West Bengal, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana and Maharashtra				
ADVSW-1 (Hi-brix 39)	Advanta Ltd., Hyderabad, Telangana	Hi-brix 39F × Hi-brix 39M	Private	Northern Hill Zone, North West Plain Zone, North East Plain Zone and Peninsular Zone (Zone I, II, III and IV)	Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Delhi NCR, Punjab, Haryana, Western Uttar Pradesh, Bihar, Jharkhand, Odisha, West Bengal, Karnataka, Tamil Nadu, Andhra Pradesh, Telangana and Maharashtra	13.9	Medium	Yellow, resistant to Northern Corn Leaf Blight	*Kharif*
Shalimar Popcorn-1 (KDPC-2)	Dryland (Karewa) Agricultural Research Station, SKUAS&T, Srinagar, J&K	HKI-PC-7, HKI-PC-8, KD Local Pop-1, KD Local Pop-3	Public	Northern Hill Zone, North West Plain Zone, North EastPlain Zone and Central West Zone (Zone I, II, III and V)	Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Delhi NCR, Punjab, Haryana, Western Uttar Pradesh, Bihar, Jharkhand, Odisha, West Bengal, Rajasthan, Gujarat, Madhya Pradesh and Chhattisgarh	3.92	Early	Yellow, flint	*Kharif*
Central Maize VL Baby corn 2 (Vivek Hybrid 27)	ICAR-VPKAS, Almora	VL 335 × VL 345	Public	Northern Hill Zone, North West Plain Zone, Peninsular Zone and Central West Zone (Zone I, II, IV and V)	Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Delhi NCR, Punjab, Haryana, Western Uttar Pradesh, Tamil Nadu, Andhra Pradesh, Telangana, Maharashtra, Karnataka, Rajasthan, Gujarat, Madhya Pradesh and Chhattisgarh	2.13	Extra-early	Yellow, semi-dent	*Kharif*

*Release and notification proposal not available

Institute Outreach Programmes

Extension services are being provided through Front Line Demonstrations (FLDs), field days, trainings etc., under National Food Security Mission (NFSM) and Tribal Sub-Plan (TSP) scheme. During *Rabi* 2015-16, a total of 10 ha at Basireddypalli village, Ranga Reddy district, Telangana were covered under FLDs. During the year 2016-17, IIMR has been allotted 300 FLDs, out of these 200 demonstrations have been allotted to different AICRIP centres and NGOs to demonstrate technologies in various states during *kharif* 2016. Government of India's TSP scheme was implemented to upscale the knowledge and uplift the economic conditions of tribal farmers. The Institute organized three National Level Training programmes from 16-18 February, 8-10 March and 14-16 March, 2016 at New Delhi for tribal farmers in respect of latest production systems and value addition technologies of maize. In these trainings, 105 tribal farmers from 6 states viz. Chhattisgarh, Gujarat, Jharkhand, Jammu and Kashmir, Odisha and Rajasthan were trained. The seed of improved maize hybrid and maize shellers were also provided to each farmer.

TSP programme at IIMR

Winter Nursery Centre, ICAR-IIMR, Rajendranagar, Hyderabad organized training programmes on 28-29 March, 2016 in collaboration with Maize Research Centre, PJTSAU, Hyderabad to sixty tribal farmers of Burjugadda Thanda, Shamshabad mandal, Ranga Reddy district, Pilligunda Thanda, Hanwada mandal, Mahbubnagar district, Telangana under TSP on promotion of maize production technology.

Distribution of certificates to tribal farmers of Burjugadda Thanda, Ranga Reddy district

Distribution of sprayers to tribal farmers of Ranga Reddy district, Telangana

Distribution of Rotary weeders and shellers to farmers of Burjugadda Thanda, Ranga Reddy district, Telangana

The trainings on scientific cultivation of maize for enhanced profitability, hybrid maize seed production and agricultural skill development were organized at Regional Maize Research & Seed Production Centre, ICAR-IIMR, Begusarai for farmers of Bihar state.

Farmers Training at Begusarai

Date	Title	Farmer Participants/ beneficiaries
05-01- 2016	मक्का की वैज्ञानिक खेती एवं उत्पादन तकनिकी	77
20-01- 2016	मक्का की वैज्ञानिक खेती एवं अधिक आय हेतु विकल्प	47
17-03- 2016	संकर मक्का बीज उत्पादन	112
19-03- 2016	संकर मक्का बीज उत्पादन हेतु कृषक कौशल विकास प्रशिक्षण	96

Three trainings were organized on "Integrated Crop Management in Maize" for farmers of Tamil Nadu during February and March, 2016 under ATMA project, in which more than 60 farmers were participated.

The IIMR participated in "*Krishi Unnatti Mela*" in Pusa campus, New Delhi from 19-21 March, 2016. More than 1,000 visitors visited the exhibition and availed information on maize production, protection and value addition.

IIMR also participated in farmer's field school in village Nawala, district Muzzaffarnagar (U.P.) on 7th May, 2016 and exhibited its technologies. The field school was inaugurated by the Hon'able Dr. Sanjeev Baliyan, Minister of Agriculture and Farmers Welfare (State), Government of India. The farmers were appraised about production technologies of maize and also discussed several other agricultural issues like maize production and marketing system, Pradhan Mantri Fasal Bima Yojana, etc.

Farmers Field school at Muzaffarnagar

IIMR also participated in "*Gramoday Se Bharat Uday*" programme at Jamshedpur, Ranchi (Jharkhand) on 23-24 April, 2016. More than 100 visitors and dignitaries visited the IIMR exhibition and discussed various issues on maize based production systems. Hon'able Prime Minister of India Shri Narendra Modi was addressed the programme on occasion of National Panchayati Raj day on 24th April, 2016 in J.R.D Tata sports complex Jamshedpur.

In Bihar, seed of three varieties of soybean were distributed to the farmers. Fifteen Technologies leaflets/ bulletins covering the maize technologies were also provided to the farmers. The general issues like Pradhan Mantri Fasal Bima Yojana, Soil Health Cards, and Marketing Systems were also the part of discussion during interaction with farmers. The associated agencies with "*Mera Gaon, Mera Gaurav*" scheme were International Plant Nutrient Institute, Begusarai, DATTC Ranga Reddy district, PJTSAU, Rajendranagar, Sri Sathya Sai Village Integrated programme and Department of Agriculture, Sonipat, Haryana.

Farmers visit at Begusarai

RMR&SPC, ICAR-IIMR, Begusarai conducted a farmer field visit on 12-01-2016 to demonstrate different maize hybrids for *rabi* season in Bihar. In which 70 farmers visited the Farm

Mera Gaon Mera Gaurav programme

Under "Mera Gaon, Mera Gaurav" scheme of Government of India, IIMR selected villages in 5 states viz., Andhra Pradesh, Haryana, Punjab, Rajasthan and Bihar. Winter Nursery Centre, IIMR in collaboration with MRC, PJTSAU, Hyderabad adopted 5 villages viz., Burjugadda Thanda, Shamshabad Mandal, Ranga Reddy District, Pamulaparthi, Wargal Mandal, Medak District, Polepalli, Jadcherla Mandal, Mahbubnagar District, Batlachandaram and Dadapur, Doma Mandal, Ranga Reddy District in Telangana. Under this scheme two Gosthis in Jakhouli (Haryana) and Pamulaparti, Hyderabad (Telangana) were organised where more than 90 farmers participated. The farmers meet were organized and the objective and purpose of selection of villages under Mera Gaon Mera Gaurav has been discussed. Crop advisories were given and created awareness about technical and other related aspects such as farming, soil health management and water conservation. Distributed Rotary weeders and shellers to 30 tribal farmers of Burjugadda Thanda village under TSP. Inputs such as maize seed was distributed to farmers of Pamulaparthi village under FLDS based on cluster approach and Polepalli, Batlachandaram and Dadapur villages under TSP. In Rajasthan soil health card have been prepared and distributed in the selected villages.

Kisan Gosthis in Jakhouli (Haryana)

ICAR-IIMR, organized a 3 days Training programme

ICAR-IIMR has organized a 3 days (1-3 June, 3016) training programme on "Yield enhancement in maize through breeding and testing of newly developed genotypes in all India coordinated research programme" at New Delhi. A total 22 scientists working in maize across the country in different field were participated in this training. The objectives of the

Group photo with Trainee

ADG (FFC) addressing the trainee

Interaction of trainee with world food prize winner Dr S.K. Vasal

programme was to brief newly joined scientists in maize about breeding (conventional and molecular) approaches and testing of maize genotypes in AICRP trials. The participants were benefited from lectures delivered by various expert and eminent scientists like world food prize winner Dr S.K. Vasal, Dr. N.N. Singh, Ex-Project Director, Directorate of Maize Research.

New initiatives

The agro-climatic zones of maize which were named as Zone-1, Zone-2, Zone-3, Zone-4 and Zone-5 were renamed on 59th Annual Maize Workshop. The details of renaming are as follows.

Zone	States
Northern Hill Zone (NHZ) (Z-1)	Jammu and Kashmir, Himachal Pradesh, Uttarakhand (Hill region), North Eastern Hill Regions (Meghalaya, Sikkim, Assam, Tripura, Nagaland, Manipur, Arunachal Pradesh)
North West Plain Zone (NWPZ) (Z-2)	Punjab, Haryana, Delhi, Uttarakhand (Plain), Uttar Pradesh (Western region)
North East Plain Zone (NEPZ) (Z-3)	Bihar, Jharkhand, Odisha, Uttar Pradesh (Eastern region), West Bengal
Peninsular Zone (PZ) (Z-4)	Maharashtra, Karnataka, Andhra Pradesh, Tamil Nadu
Central West Zone (CWZ) (Z-5)	Rajasthan, Madhya Pradesh, Chhattisgarh, Gujarat

Promising technologies

Maize cultivars notified and released during January-June, 2016

Eight cultivars have been notified by Central Sub-Committee on Crop Standard and Notification for different agro-climatic conditions of the country. Among these, four are public-bred which include three of early maturity released for Jammu and Kashmir and one is of medium maturity, released for spring season. The remaining four were proprietary cultivars, among them three are late maturity, out of which two *viz.*, BIO 9782 (BIO 237), Dragon (NMH-1247) were for rabi season and one is early maturity.

Table 2 List of cultivars notified during January to June, 2016

Cultivar	Name of AICRP (maize) Centre/ Company	Notification No.	Notification Date	Area of Adaptation	Maturity	Average Yield (t/ha)	Characters	Season
D2244 (DAS-MH-501)	DOW Agro Sciences India Pvt. Ltd., Mumbai	112 (E)	13/01/2016	Jammu & Kashmir, Himachal Pradesh, Uttarakhand, North East hills, Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu Madhya Pradesh Rajasthan, Gujarat and Chhattisgarh	Early	7.09	Yellow orange, semi-dent	*Kharif*
*Shalimar Maize Composite-5 (PS-98)	SKUAST, Srinagar	112 (E)	13/01/2016	Jammu and Kashmir/2013	Early	-	-	*Kharif*
*Shalimar Maize Composite-6 (KDM-322)	SKUAST, Srinagar	112 (E)	13/01/2016	Jammu and Kashmir/2013	Early	-	-	*Kharif*

Cultivar	Name of AICRP (maize) Centre/ Company	Notification No.	Notification Date	Area of Adaptation	Maturity	Average Yield (t/ha)	Characters	Season
*Shalimar Maize Composite-7 (KDM-72)	SKUAST, Srinagar	112 (E)	13/01/2016	Jammu and Kashmir/2013	Early	-	-	*Kharif*
LAXMI 3636 (LTH 22)	Yaaganti Seeds Pvt. Ltd., Hyderabad	112 (E)	13/01/2016	Andhra Pradesh, Telangana, Karnataka, Maharashtra and Tamil Nadu	Late	9.06	Orange yellow, semi-dent	*Kharif*
BIO 9782 (BIO 237)	Bioseed Research India a Division of DCM Shriram Ltd., Hyderabad	112 (E)	13/01/2016	Uttar Pradesh, Bihar, Jharkhand, Odisha, West Bengal, Rajasthan, Gujarat, Chhattisgarh and Madhya Pradesh	Late	10.27	Orange yellow, semi-dent	*Rabi*
Dragon (NMH-1247)	Nuziveedu Seeds Limited, Hyderabad	112 (E)	13/01/2016	Punjab, Haryana, Delhi, Western Uttar Pradesh	Late	9.97	Bright yellow semi-dent bold kernels with orange tinge	*Rabi*
PMH 8 (JH 31244)	Punjab Agricultural University, Ludhiana, Punjab	112 (E)	13/01/2016	Punjab	Medium	8.3	Yellow-orange, flint	*Spring*

*State releases

Hybrids Registered

In the period January-June, 2016, two hybrids have been registered under PPV&FR Act, 2001. The detailed information are given below.

Hybrids/OPVs	Name of centre	Period of protection
Vivek Maize Hybrid 39	VPKAS, Almora	February 1, 2016 to January 31, 2031
Vivek Maize Hybrid 43	VPKAS, Almora	February 1, 2016 to January 31, 2031

New Application Filed

In the period of January to June, 2016, two applications of maize cultivars have been filed for protection under PPV&FR Act, 2001. The details are given below.

Hybrids	Name of centre	Date of filing	Acknowledgement no.
Palam Sankar Makka 1 (EHL162508)	CSK, HPKV, Bajaura, Kullu (HP)-175125	07/06/2016	REG/2016 /699
Palam Sankar Makka 2 (EHL 161708)	CSK, HPKV, Bajaura, Kullu (HP)-175125	07/06/2016	REG/2016 /698

Research Highlights

Decision Support System (DSS) of maize inbred germplasm

Selection of parental lines is the most crucial step in Single Cross Hybrid (SCH) technology. Parental lines are initially selected based on combination of phenotypic traits possessed by different inbred lines. In order to support and assist breeders in choosing potential parental lines, for developing hybrids, development of Decision Support System (DSS) has been initiated. The DSS presently houses data of 300 inbred lines with information of 13 traits viz. time of anthesis, time of silk emergence, density of spikelets, number of kernel rows, number of kernels per row, grain type, plant height, ear placement height, anthocyanin colouration at base of glume, anthocyanin colouration of anthers, grain colour, kernel row arrangement and 1000-kernel weight. The database in DSS was developed using the latest version of Drupal (7.34), Hypertext Preprocessor (PHP) was used for frontend development and the database (backend) was developed in My Structured Query Language (MySQL). The DSS allows selection of various inbred lines with different permutations and combinations of the 13 traits along with high-quality images of the tassels and the cobs to aid in decision making.

This DSS would be helpful for breeders in the selection of parental lines based on needs and requirements of various research programmes. Two hundred and eighty accessions of indigenous maize germplasm lines regenerated under the CRP-AB project.

Drs. N Sunil, J.C. Sekhar and KP Singh

ICAR-IIMR identified stable source of charcoal rot resistance in QPM genetic background

A set of 135 inbred lines comprising of 117 Normal, 15 QPM and 3 Popcorn were evaluated for charcoal rot disease (Macrophomina phaseolina) at multiple environments under artificially created epiphytotic condition at hot-spots locations. These QPM genotypes were also evaluated for their percent lysine and tryptophan content in multiple environments. The promising genotypes identified with stable resistance against charcoal rot disease with high percent lysine and tryptophan content in three environments were again confirmed for their resistance (Table 3) and quality traits (Table 4 & 5) during Kharif 2015 at New Delhi (hot-spots for charcoal rot). The mean performance for morpho-agro traits of potential donors vis-a-vis checks has been given in Table 6. The promising identified lines viz., DQL1019, DQL1020 and DQL1022 could be used as potential donor lines for charcoal rot resistance with high lysine and tryptophan content in QPM genetic background.

Dr. Bhupender Kumar

Table 3 Stable sources of resistance against charcoal rot disease in maize

Inbred name	Rabi 2012-13 (Hyderabad)-E1	Kharif 2013 (Delhi)-E2	Kharif 2013 (Hyderabad)-E3	Kharif 2015 (Delhi)-E4	Mean	Remarks
DQL 1020	2.3	2.3	2.5	2.1	2.3	R
DML 339	2.8	2.4	2.1	2.7	2.5	R
DQL 1019	2.3	2.2	2.5	2.7	2.4	R
DQL 1005	2.5	2.0	3.0	3.2	2.7	R
DML33	2.3	2.8	3	5.4	3.4	MR
DML 289	3	2.3	2.8	4.7	3.2	MR
DML50	5	2.4	4.8	3.7	4.0	MR
DQL 1022	4.3	1.8	4.5	3.9	3.6	MR
DML315	4.1	3.1	4	2.8	3.5	MR
CM117-3-4-1 (C)	3.1	2.7	3	2.4	2.8	R
WOSC (C)	7	7	7.6	7.2	7.2	S

E*= Environments, R= Resistant, MR= Moderately Resistant, S- Susceptible, C = Check; Rating scale 1-3.0 disease resistance (R); 3.1-5.0 moderately resistance (MR) and 5.1-9.0 susceptible (S)

Table 4 Genotypes identified with high Lysine and Tryptophan content (%)

Inbred name	Rabi 2012-13 (Hyderabad)-E1		Kharif 2013 (Delhi)-E2		Rabi 2013-14 (Delhi)-E3		Kharif 2015 (Delhi)-E4		Mean		% Sup. over C1, C2			
	Lysin	Tryp	Lysin	Tryp	Lysin	Tryp	Lysin	Tryp	Lysin	Tryp	Lysin	Tryp	Lysin	Tryp
DQL 1019	3.59	0.87	3.71	0.89	3.89	0.94	3.11	0.84	3.58	0.89	33.40	37.2	32.41	32.1
DQL 1022	3.51	0.85	3.63	0.88	3.82	0.91	3.71	0.8	3.67	0.86	36.85	32.3	35.83	28.4
DQL 1017	3.1	0.73	3.23	0.78	3.38	0.81	2.83	0.82	3.14	0.79	16.98	20.8	16.11	17.2
DQL 1005	2.98	0.69	3.1	0.74	3.28	0.79	3.32	0.73	3.17	0.74	18.28	13.5	17.41	10.1
DQL 1018	2.64	0.63	2.69	0.65	2.89	0.68	3.3	0.72	2.88	0.67	7.46	3.1	6.67	0.0
DQL 1001	3.01	0.7	3.2	0.76	3.55	0.85	2.81	0.73	3.14	0.76	17.26	16.9	16.39	13.4
DQL1020	-	-	-	-	-	-	3.21	0.78	3.21	0.78	19.78	20.0	19.00	16.4
CML176 (C 1)	2.51	0.6	2.68	0.64	2.71	0.65	2.83	0.69	2.68	0.65	-	-	-	-
HKI 163 (C 2)	2.57	0.61	2.71	0.65	2.87	0.68	2.65	0.73	2.70	0.67	-	-	-	-

E*= Environments, C1, C2= Checks

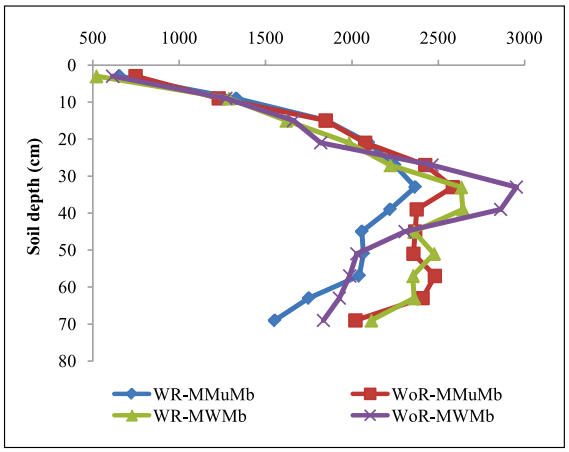
Table 5 Mean performance of donor lines for morph-agro traits in *kharif* 2014-2015

Inbred name	DA	DS	ASI	EH	EL	ED	TW
DML1	59	61.5	2.5	53.3	11.8	3.75	316
DML 339	58.5	60.5	2.0	55.9	9.8	3.95	294.5
DQL 1020	56	58.5	2.5	48.6	8.8	3.65	183
DQL1019	61.5	64.5	3.0	53	10.7	4.4	186
DML315	55.5	59	3.5	51.7	12.7	3.75	168.5
DQL1022	63	65.5	2.5	50.4	12.2	4.0	216
DQL 1030	58.5	61.5	3.0	55	8.8	3.7	175.5
DQL1017	61.5	63.5	2.0	43.5	13.9	3.05	175.5
CM117-3-4-1(C)	57.5	60.5	3.0	55.2	11.2	4.5	187.5
WOSC (C)	57	60.5	3.5	54.4	10.9	4.2	184.5
HKI 163(C)	62.5	65.5	3.0	47.15	12.75	3.8	162.5
BML6 (C)	61	64.5	3.5	55.1	13.75	4.6	136.5
CML269(C)	58	60.5	2.5	55.9	12	3.95	206.5
HKI1128(C)	59	61.5	2.5	43.6	11.9	3.65	225

*DA: Days to anthesis (50%), DS: Days to silking (50%),ASI: Anthesis silking Interval, EH: Ear height (cm),EL: Ear length (cm) , ED: Ear diameter (cm),TW: Test weight, 1000 kernel weight (g)

Residue retention reduces penetration resistance

The residue application (WR) lead to depletion in canopy temperature by more than 3.5oC compared to less than 2.5oC in without residue (WoR). The retention of residue leads to decrease in penetration resistance in both the intensified maize system i.e. maize-wheat-mungbean (MWMb) and maize-mustard-mungbean (MMuMb) after three years of experimentation as compared to no residue application under conservation agriculture. These results show that the application of residue could be a beneficial strategy for improving crop and soil health.



Penetration resistance in soil with application of residue

Sources of resistance

Various lines derived from diversified genetic background and PFSR resistant pools, evaluated against diseases MLB, Rajasthan downy mildew and post flowering stalk rots under artificial inoculation conditions in various hot spot locations, selected promising lines were enumerated below;

Selected resistant lines to Maydis leaf blight, Rajasthan Downey mildew and Post flowering

Pedigree	MLB (Lud)	RDM (Udp)	PFSR			
			Lud	Hyd	Udp	Delhi
IML15001	2.5	0.00	4.2	4.6	4.4	3.0
IML15004	3.0	10.0	4.7	5.0	4.9	4.0
IML15008	3.5	13.0	4.7	2.8	3.8	2.5
IML15009	2.5	6.00	4.5	1.5	3.0	2.5
IML15010	2.0	8.00	4.8	2.9	3.9	3.5
IML15011	1.5	18.0	2.7	4.0	3.4	2.5
IML15015	3.0	33.0	3.8	4.8	4.3	4.0
IML15017	3.0	0.00	3.3	5.2	4.8	3.2
IML15018	3.0	50.0	3.0	3.6	3.3	4.0
IML15020	2.0	15.0	5.0	4.8	4.9	2.0
IML15023	2.5	33.0	3.5	4.2	3.9	4.2
IML15024	3.0	0.00	5.0	4.8	4.9	3.0
IML15029	4.5	60.0	3.3	4.8	4.1	1.5
IML15029	4.0	0.00	3.5	3.8	3.7	2.6
IML15030	4.5	5.00	5.0	4.0	4.9	3.5
IML15031	3.5	11.0	4.3	4.6	4.5	4.0
IML15035	3.5	0.00	4.0	4.5	4.3	4.2
IML15036	4.0	13.0	3.8	4.3	4.1	2.5
IML15038	4.0	23.0	4.3	2.6	3.6	4.2

Pedigree	MLB (Lud)	RDM (Udp)	PFSR			
			Lud	Hyd	Udp	Delhi
IML15039	2.5	0.00	4.3	3.3	3.8	2.6
IML15041	2.5	11.0	2.8	3.0	2.9	2.8
IML15042	3.0	10.0	5.0	2.6	4.0	4.2
IML15045	4.5	0.00	5.0	3.7	4.5	3.2
IML15047	3.0	18.0	5.0	3.4	4.3	4.2
IML15049	4.5	15.0	4.8	4.8	4.8	3.0
IML15050	4.5	53.0	4.8	2.9	3.9	3.2
Local Resistant Check	2.0	0.0	3.2	3.2	1.0	2.5
Local Susceptible check	4.5	89.0	6.5	7.4	6.5	6.8

MLB; Maydis leaf blight, RDM: Rajasthan downy mildew, PFSR: Post flowering stalk rots, Lud; Lidhiana, Udp: Udaipur, Hyd: Hyderabad

Participation in conferences, workshops, Symposium, meetings in India

Name	Programme	Venue	Date
Dr. Meena Shekhar	IPS 6th International Conference on "Plant, Pathogens and People"	NASC Complex, New Delhi	23-27 February, 2016
	Delhi Zone Annual Meeting & National Symposium on "Biosecurity in Food Value Chain"	Dr BP Pal Auditorium, ICAR1-NBPGR, New Delhi	20 February, 2016
Dr. S.L. Jat	Oral presentation in 'India Maize Summit 2016' on	FICCI, Federation House, New Delhi	26 May, 2016
	National Group Meeting Kharif 2016 of AICRP on Forage Crops and Utilization.	Srinagar	16-17 May, 1016.
	Oral presentation in National Seminar on Integrating Agri-Horticultural and Allied Research for Food and Nutritional Security in the Era of Global Climate Disruption"	Imphal, Manipur	4-6 March, 2016.
Dr. S.B. Singh	National Symposium on Genomics & Molecular Breeding.	CCS University, Meerut, U. P.	28-29 March, 2016
Dr. S.B. Singh	Attended meeting with district administration on "Action plan for Pradhan Mantri Krishi Sinchai Yojna"	Begusarai.	17 February, 2016
	Attended meeting at Secretariat Office Patna (Bihar Govt) on "Better coordination with Central Agricultural Research Institutes	Patna, Bihar	26 February, 2016
Dr. C.M. Parihaer Dr. Bhupender Kumar	National Seminar on Integrating Agri-Horticultural and Allied Research Food and National Security in the Era of Global Climate Disruption.	Imphal, Manipur.	4-6 March, 2016.
Dr. Nirupma Singh	IPS 6th International Conference on "Plant, Pathogens and People"	NASC Complex, New Delhi	23-27 February, 2016

Award/s and Honours Received

Dr S.B. Singh, PS, ICAR-IIMR, Begusarai, received "Innovative Scientist of the Year Award-2015" for Genetics and Plant Breeding in the International Conference, Bangkok, 1-5 February, 2016

Dr S.B. Singh, PS appointed Co- Chairman in Technical Session-IX of International Conference, Bangkok, 1-5 February, 2016.

Dr S.L. Jat, receiving best poster Award by DDG (Animal Sciences) in National Seminar at Imphal, Manipur

Dr C.M. Parihar won Silver Medal in badminton singles (Men) in ICAR Inter Zonal Sports Tournament at ICAR-CAZRI, Jodhpur

Dr. Nirupma Singh received **Best Poster Award** for "Evaluation of hybrids for yield and resistance to post flowering stalk rot in maize" by **Nirupma Singh, Meena Shekhar, R. Ambika Rajendran and Ram Babu** in 6th International Conference "Plant, Pathogens and People", New Delhi, February 23-27, 2016.

Foreign Visit

Dr. S.B. Singh, Principal Scientist, RMR&SPC, ICAr-IIMR, Begusarai, visited Thailand to attend the International Conference on Innovative Approaches in Applied Sciences and Technologies, held at Kasetsart University, Bangkok, Thailand during 1-5 February, 2016.

New Joining in IIMR Office

Sh. Mukesh Chaoudhay, Scientist, Plant Breeding, joined ICAR-IIMR, Ludhiana on 11 April, 2016.

Sh. Alla Singh, Scientist, Scientist, Plant Biotechnology, joined ICAR-IIMR, Ludhiana on 11 April, 2016.

Sh. Praveen Kumar Bageria, Scientist, Plant Pathology, joined ICAR-IIMR, Ludhiana on 11 April, 2016.

Transfer

Dr Ambika Rajendran Scientist, Plant Breeding, was transferred from ICAR-IIMR, New Delhi to ICAR-IARI, New Delhi on 30 June, 2016.

Sh. Ajay Kumar Singh, T-2 joined was transferred from ICAR-IIMR, New Delhi to ICAR-IARI, New Delhi on 15 May, 2016.

Promotion

Drs. Nirupma Singh, Ambika Rajendran, Bhupender Kumar and Ganapati Mukri, were promoted from 6000 Research Grade Pay to 7000 Research Grade Pay

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