NEWSLETTER
January – December 2017 Volume - XII Pages 1 – 17

भारतीय बीज विज्ञान संस्थान

ICAR- INDIAN INSTITUTE OF SEED SCIENCE

NEWSLETTER

32nd Annual Group Meeting of AICRP-NSP (Crops)

The 32nd Annual Group Meeting of AICRP-NSP (Crops) was organized during 22nd-24thApril, 2017 at SKRAU, Bikaner. The meeting was inaugurated by Chief Guest Dr. M. Bhaskaran, Hon'ble Vice Chancellor, TNOU, Chennai and Chaired by Dr. D.K. Yadava, ADG (Seed), ICAR, New Delhi. Dr. S. Rajendra Prasad, Former Director, ICAR-IISS, Mau gave the opening remarks, wherein he emphasized on appreciable results received by storage of seed in 40% CO_2 and also by super grain bags to store pulses and oilseed crops. Dr. D.K. Agarwal, Director (Acting), ICAR-IISS, Mau presented the annual progress report of AICRP-NSP (Crops) for 2016-17. Dr. Agarwal highlighted that ICAR through NSP has achieved significant progress by enhancing total quality seed production from 35 lakh quintals in 1980-81 to 343.52 lakh quintals in 2015-16, by making available sufficient quantity of breeder seed. Dr. M. Bhaskaran, Vice Chancellor, TNOU in his address emphasized on the need of proper and futuristic planning of seed production activity and STR experiments in each centre. He specifically mentioned proper integration of all the 5 components of STR and requested all the scientists to avoid duplication of the work. He mentioned about judicious use of resources under situation of budget cut. He stressed to take up practical utility based programmes and document recommendations of experiments crop wise, discipline wise and center wise to make available for all concern with seed sector. Dr. D.K. Yadava, ADG (Seed) expressed concern over declining share of Government sector in seed production, which is 24% only and stressed the need to increase the contribution of Government sector for quality seed supply. The house felicitated ten superannuating scientists; Dr. S.K. Rao, Dr. V. Devdas, Dr. O.S. Dahiya, Dr. P.C. Nautiyal, Dr. D.K. Mishra, Dr. A.K. Karg, Dr. Rame Gowda, Dr. G. Reddy, Dr. G. Singh and Dr. J.K. Sharma for their immense contributions rendered towards AICRP-NSP (Crops). GBPUAT, Pantnagar was awarded as best centre for breeder seed production and AAU, Anand was awarded as best centre for seed technological research during the year 2016-17. In addition, three books on seed production and seed pathology were released in the function.

XII Annual Review Meeting of ICAR Seed Project

XII Annual Review Meeting of ICAR Seed Project – "Seed Production in Agricultural Crops" was organized by ICAR-IISS, Mau in collaboration with MPKV, Rahuri during 29-30th July, 2017. Inaugural session of the meeting was graced by Hon'ble Vice Chancellor, MPKV, Rahuri; Dr. K. P. Viswanatha, Dr. D. K. Yadava; ADG (Seed) (Acting), ICAR, New Delhi; Dr. K.D. Kokate; Director Extension Education, MPKV, Rahuri, Dr. S. R. Gadakh; Director of Research, MPKV, Rahuri, Dr. Malavika Dadlani; Ex-JDR, ICAR-IARI, New Delhi, Dr. Dinesh K. Agarwal; Director (Acting), IISS, Mau, Dr. S.M. Kuruppan Chetty; Technical Advisor, (ABIC), Nepal and Dr. M. B. Dhonde; Chief Scientist (Seeds), MPKV, Rahuri. Dr. S. R. Gadakh welcomed the august gathering after which Dr. Dinesh K. Agarwal; Director (Acting), IISS presented the progress and future thrust areas of ICAR Seed Project. He exhorted that 6.20 lakh quintals of quality seed has been produced during 2016-17 and mentioned perspectives *viz.* addressing Varietal Replacement Rate (VRR) & Seed Replacement Rate (SRR) and model deployment by enabling partnership with varied stakeholders. Dr. D. K. Yadava; ADG (Seed), ICAR highlighted the role played by ICAR Seed Project in increasing infrastructure capabilities of SAUs and ICAR institutes in NARES. He stressed upon the role of seed security for food security *per se.* Council's inclination towards reviewing of AICRPs and withdrawal of fund provision for non-performing centres was brought to attention of cooperating centres. He emphasized on renewed thrust on model deployment activities (Farmers Participatory Seed Production (FPSP) and Seed Village Scheme) under ICAR Seed Project. Dr. K. P. Viswanatha; Hon'ble VC, MPKV gave an overview of seed infrastructure facilities of MPKV and lauded efforts made by nodal officers of ICAR Seed Project cooperating centres for the efforts made towards quality seed production. He emphasized that MPKV is proactive in institution of gene banks and also garnered funds from state government in this regard. During the session, best performing centres for the year 2016-17 *viz.* BAU, Ranchi (SAU Category) & ICAR – DRMR, Bharatpur (ICAR institute category) were honored for the outstanding achievements made by referred centres during 2016-17 in terms of quantum of seed production, capacity building, technology dissemination and model deployment activities.

Network Project

1. AICRP-National Seed Project (Crops)

The total breeder seed production under AICRP-NSP (Crops) reached the level of 122616 q against the indent of 104046 q during 2016-17.

2. ICAR Seed Project-Seed Production in Agricultural Crops

During the year 2016-17, total production of quality seed including all classes was 620743 quintals against the target of 462404 quintals. Production comprises 124576 quintals of foundation seed, 273681 quintals of certified seeds, 98199 quintals of truthfully labelled seed and 30422 quintals of planting material of field crops. In addition, 239 lakh planting material and 1.9 lakh tissue culture plantlets were produced against the targets of 288 and 2.6 lakh, respectively.

Research Highlights

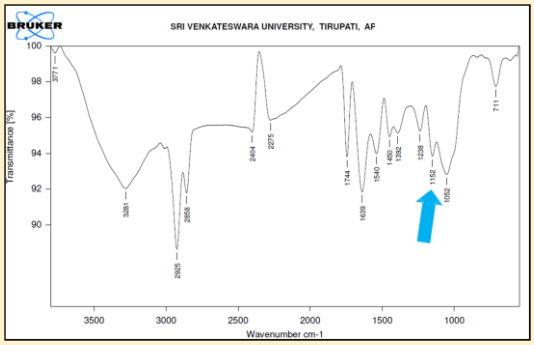
Seed Molecular Biology

Molecular regulation of dormancy and seed longevity in rice and soybean

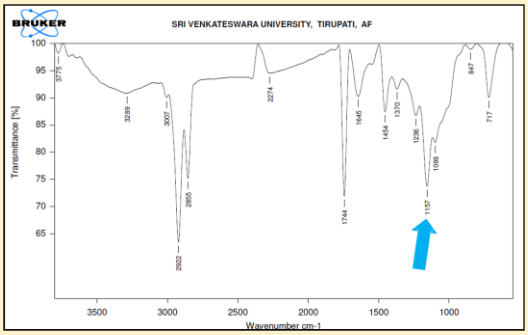
Biochemical changes associated with seed deterioration in soybean was being studied. Reactive oxygen species (ROS) are produced as a normal product of cellular metabolism. When the level of ROS exceeds the defense mechanisms (enzymic or nonenzymic antioxidants), a cell is said to be in a state of "oxidative stress." The enhanced production of ROS can pose a threat to cells by causing peroxidation of lipids, oxidation of proteins, damage to nucleic acids, enzyme inhibition, activation of programmed cell death (PCD) pathway and ultimately leading to death of the cells in turn loss of vigour in seeds.

Lipid Peroxidation

FTIR (Fourier Transform Infra-red Spectroscopy)analysis of fresh and accelerated aged soybean seed lot was carried out to study the extent of lipid peroxidation caused by the ROS. Aldehydes are the end products of lipid peroxidation and these functional groups are detected in FTIR studies. In the accelerated aged seed lots there was steep increase in the aldehydes (represented by the absorbance at 1157cm^{-1}) indicating the rapid lipid peroxidation. Lipids make the major constituent of cell membrane and damage to these lipids will lead to loss in membrane stability there by resulting in increased membrane fluidity and permeability and ultimately the death of cells.



Fresh



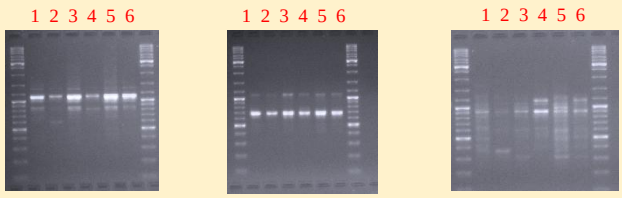
Accelerated aged

FTIR spectra of fresh and accelerated aged seed lot (var. JS-97-52)

Oxidative damage to DNA

ROS are a major source of DNA damage. ROS can cause oxidative damages to nuclear, mitochondrial, and chloroplastic DNA. DNA is cell's genetic material and any damage to the DNA can result in changes in the encoded proteins, which may lead to malfunctions or complete inactivation of the encoded proteins. Accelerated ageing in soybean lead to apoptotic DNA fragmentation *i.e.*, internucleosomal fragmentation of genomic DNA at regular repeating oligonucleosomal fragments (100-150bp), which is a characteristic of programmed cell death (PCD) observed in plant and animal systems under adverse conditions.

Even though repair system exists for damaged DNA, excessive changes caused by ROS lead to permanent damage to the DNA and in turn the seeds.



Fresh (0 hr) **Acc. aged (24 hr)** **Acc. aged (72 hr)**

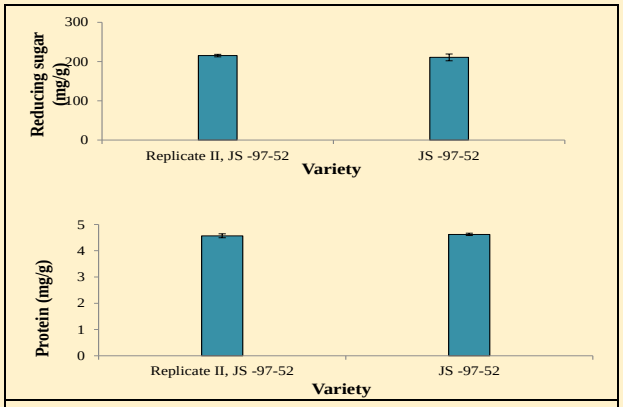
Fig: Genomic DNA profile of fresh and accelerated aged seeds of various varieties

1. JS-97-52	4. JS-95-60
2. JS-93-05	5. JS-335
3 . JS-20-34	6. JS-20-29

Oxidative damage to proteins and sugars

Under excessive ROS production, site- specific amino acid modification, fragmentation of the peptide chain, aggregation of cross- linked

reaction products, altered electric charge, enzyme inactivation and increased susceptibility of proteins to proteolysis occur. Protein and reducing sugar in JS-97-52 have been studied; because these primary metabolites forms Maillard products during dry storage, as a result, the ROS regime increases and ultimately become toxic to the cell. From the results var. JS-97-52 and its successive generation shown no changes in reducing sugar and protein contents, respectively.



Sugar and protein content in seed coat of soybean var. JS-97-52 at two consecutive generations

Revalidation studies of DNA fingerprint technique developed by Seed Certification agency, Coimbatore

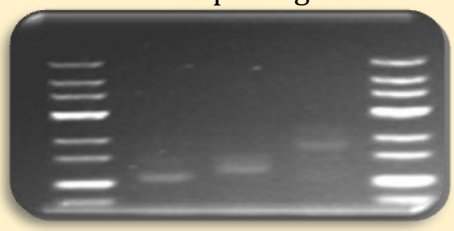
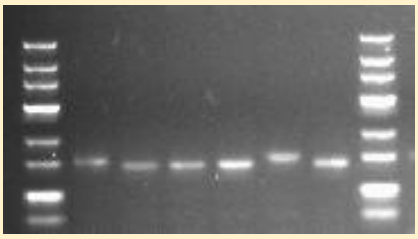
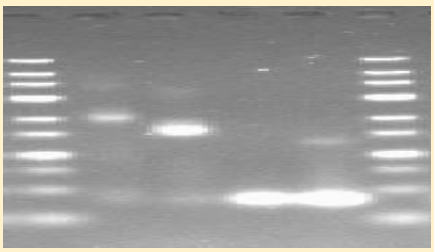
The ICAR-Indian Institute of Seed Science, Mau has been directed to validate the testing protocol developed by DNA finger print laboratory, Directorate of Seed Certification and Organic Certification (DSCOC), Coimbatore.

Claim

Directorate of Seed Certification and Organic Certification (DSCOC) has claimed that they have standardized the DNA isolation and molecular markers to identify the 15 notified paddy varieties such as ADT-36, ADT-37, ADT-38, ADT-39, ADT-43, ADT (R)-45, ADT (R)-46, BPT-5204, CO-43, CO-51, ASD-16, CR-1009, IR-20, IR-50 and IW Ponni, as an alternative to GOT. In their study, 150 SSR markers have been used to find polymorphic markers. Among them, only 45 markers are polymorphic in nature, which can readily identify the varieties. Hence, revalidation study has been performed to find unique SSR markers for specific varieties.

Result

In the re-validation studies, it was found that SSR markers RM-204, 258 and 1812 are able to differentiate the varieties ADT (R)- 45, ADT (R)- 46 & CO-51; IR-50 and IW-Ponni, ADT-45, ADT-43, IW PONNI & CO-51 , respectively.

Marker	Differentiation of varieties based on electrophoregram
RM-204	 Differentiation of ADT-45, ADT-46, CO-51 using RM204 (1,4 & 8 lane: 100bp ladder)
RM-258	 Banding pattern of RM-258 (Lane-wise: 100bp ladder, ADT-45, CO-51, ADT-43, ADT-39, IR-50, IW-PONNI and 100bp ladder)
RM-1812	 Fig.6: Banding pattern of RM-1812 (Lane-wise) low range DNA ladder, ADT-45, ADT-43, IW PONNI & CO-51 low range DNA ladder

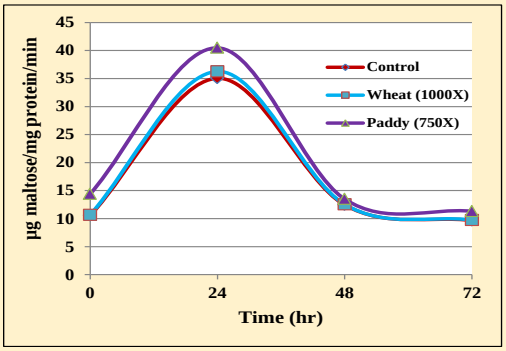
However, all other markers shall remain failed as unique markers, since the particular SSR marker amplified a common allele in the varieties assessed (but not specific), as a result, it has showed same banding pattern (due to same molecular weight). Such SSR markers may not be much informative to identify the genetic purity of seed lot.

Seed Physiology Storage and Testing

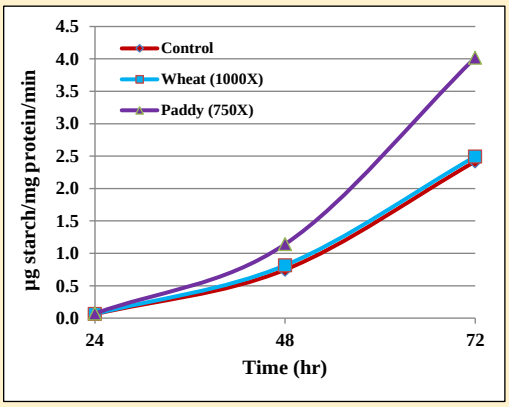
Enhancing seed quality in rice and soybean with smoke water

The biologically active compounds present in smoke water are emerging as potential growth regulators in agriculture and horticulture. Under In-house project "Enhancing seed quality in rice and soybean with smoke water" different parameters related to germination and seedling vigour were studied with the previously standardized dilutions/ concentrations of smoke water derived from paddy and wheat straw respectively.

During the process of germination, the imbibition of water is accompanied by a leaching of substances (mainly potassium, phosphates, sugars and amino acids) out of the seeds. This exudation of sugars and other electrolytes results from membrane damage and in severe conditions lead to loss in vigour and poor stand establishment. The electrical conductivity of seed leachates was higher in control seeds (187.0 µS/ cm) when compared to that of treated seeds (228.4 µS/ cm) indicting the probable role of smoke water in improving the membrane stability. Promotion of germination and seedling vigour by smoke water might be due to its effect on improved seed reserve mobilization. The mobilization of seed carbohydrates during germination was examined by studying the activity of α and β amylase.



(i)



(ii)

(i) β-amylase activity and (ii) α-amylase activity in GP-74, (rice grermplasm line) seeds following imbibition.

β-amylase activity was higher (36.39% over control) during the initial phase (0 h to 24 h) following imbibition with paddy straw derived from smoke water. The activity declined and reached basal levels at 48 h. However, the β-amylase activity recorded in case of wheat straw derived smoke water treatment was non-significant in relation to the activity observed with that of control. A steep increase in α-amylase activity from 48h following imbibitions was recorded in paddy straw derived smoke water treatment. At 72 h, α-amylase activity was 66% higher than that of control. Promotion of this initial activity by smoke water may have led to higher starch mobilization and hence seedling vigour. The result were non-significant with the wheat straw derived smoke water. These observations *i.e.*, rapid uptake of water coupled with swift mobilization of seed reserve (carbohydrates) can be correlated to the increase in germination rate and seedling vigour in the

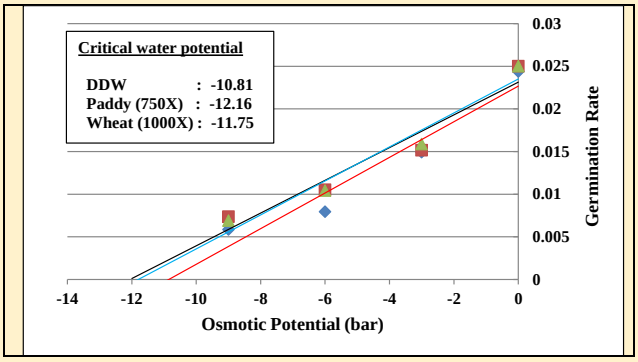
paddy straw derived smoke water treated seeds.

The effect of smoke water on promotion of seed germination and seedling growth was also examined under sub-optimal conditions in lab (water stress using PEG in Perti plates). For estimating the critical water potential in rice seeds, solutions with osmotic potentials of -2 bar to -12bar were prepared as per the equation given by Michel, (1983).

$$\Psi = 1.29(PEG)^2T - 140(PEG)^2 - 4.0(PEG)$$

Where, Ψ= Water potential (bars), T = Temperature (25˚C) and PEG = Concentration of PEG (g/g H_2O) unknown.

A seed must reach a minimal water content known as the critical hydration level in order to germinate. Germination is not possible in most species unless the water potential of the seed is greater than -1.5 MPa. It has emerged that for seed germination to occur, there is a requirement of minimum seed water potential called the threshold or base water potential. The external water potential (Ψ) value at or below which seeds cannot reach their critical hydration level is called its critical water potential. It was observed that, smoke water treated seeds maintained higher critical water potential (-12.16 bars and -11.75 bars) and showed higher germination rate compared to control seeds (-10.81). This higher potential can occur due to production of osmolytes like sugars as higher β-amylase and α-amylase activity was observed under smoke water treatment.



Relationship between germination rates and water potential in rice seeds treated with control (DDW), smoke water from paddy straw (750 times diluted) and smoke water from cellulose (1000 times diluted).

Seed production & certification

Effect of various bioactive chemicals on traits favouring out crossing and their molecular characterization in hybrid rice (*Oryza sativa* L.)

Under the in-house project titled "Effect of different bioactive chemicals on traits favouring out-crossing and their molecular characterization in hybrid rice (*Oryza sativa* L.)", where the revalidation of bioactive molecules on two hybrid parental lines PRH10 and DRRH2 (A and R line) were done The present study revealed that hybrid seed setting has increased by 5-8% in both hybrids in all treatments over control. This increase in yield can be attributed to increase in the panicle exsertion (5-8%), stigma exsertion (6-10%), spikelet opening angle (2-5°) and flag leaf angle (2-5°) (Table-3). Among the treatments, T6 showed higher seed setting (7-8%) and stigma exsertion (8-10%) over control.

Further, pollen storage (at 4^0C, -20^0C and -80 ^{0}C) and viability testing studies showed that the per cent of pollen viability has been reduced by about 50% at 4^0C, Similarly, 15-20% at -20^0C and 12-15% at -80^0C after four months of storage, respectively. Therefore, in the present study, it has been found that the pollen storage at low temperature (at -20^0C and-80^0C) would maintain the pollen viability more than three months in rice.

Effect of bioactive chemicals on traits favouring out-crossing in A lines (female) of hybrid parents PRH10 and DRRH2

Treatments	Panicle exsertion (%)		Spikelet opening angle (°)		Stigma exsertion (%)		Pistil length (Pix)	
	DRRH2	PRH10	DRRH2	PRH10	DRRH2	PRH10	DRRH2	PRH10
T1 (Control)	73.54	74.93	21.67	24.67	43.03	59.37	298.70	306.70
T2 (60ppm, GA_3)	77.26	79.66	24.57	27.17	45.13	62.31	334.50	342.40
T3 (1mm, MeJ*)	75.44	77.76	23.67	25.00	44.20	64.10	324.50	337.30
T4 (2mm, MeJ)	76.75	78.50	24.33	26.00	**46.07**	**65.77**	337.00	341.30
T5 (T2+T3)	**78.36**	**80.16**	**25.83**	**27.67**	45.33	64.95	**340.00**	**348.00**
T6 (T2+T4)	**80.77**	**82.07**	**26.33**	**29.33**	**48.53**	**67.50**	**339.10**	**353.80**
C.D.	2.50	4.18	2.558	1.48	3.192	3.21	11.66	16.47

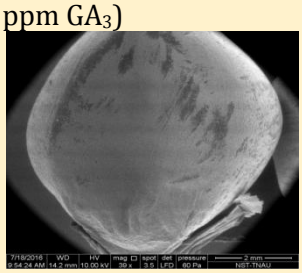
*MeJ: Methyl jasmonite

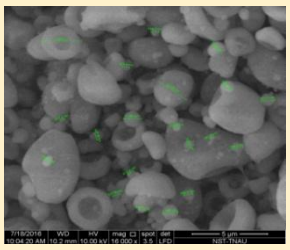
Chemical spraying during flowering stage

Pollen collection and storage in air tight container along with silica beads in box

Analyte	*Remarks*
Ethyl Cellulose in Binary solvent (Ethanol+ DMF)	Droplet formation
10 % DMF (Dimethyl Formamide)	Droplet formation
10 % PVA (Poly Vinyl Alcohol) + 100ppm GA_3	Nano fibre formation achieved
10 % EC in Ethanol + 100ppm GA_3	Electro-spraying achieved
Dissolving Ethyl cellulose in Ethanol is a viable option	

Synthesized nano- fibre matrix (10 % PVA + 100 ppm GA_3)





Electro-spraying by using Ethyl Cellulose Polymer system(10 % EC + 100 ppm GA_3)

Hydropolymers: As regulatory switch for germination and smart delivery system in hybrid seed production of maize

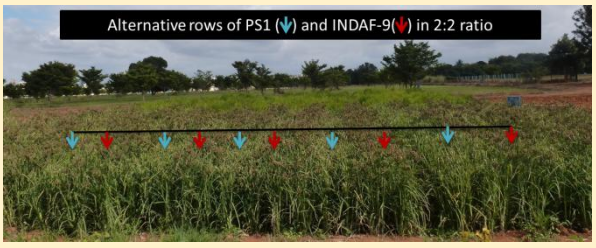
Referred study will pave way for designing of nano-matrix (polymer system) for prolonged release of analyte in a bid to develop high throughput technology towards precision application of analytes for productivity maximization. With respect to infusion of analyte in polymer system, progress was made pertinent to application of GA_3 through ethyl cellulose polymer system. Referred work was carried out at TNAU Nano Technology facility.

Improving hybridization efficiency, seed set and development of male sterile lines for hybrid seed production in finger millet (*Eleusine coracana* L. Gaertn)

Experiment was conducted to improve pollination success and seed set in partial male

sterile line PS-1 obtained from All India Coordinated Small Millet Improvement Project, Bengaluru. INDAF-9 is one of the popular finger millet cultivar with pigmentation on nodal region and fingers used as male parent to cross with PS-1. Experiment was laid out in randomized block design with 2 replications. Two rows of genotype INDAF 9 and PS-1 were sown in alternate fashion against the wind direction. The PS-1 was sprayed with Maleic hydrazide (MH) (100ppm, 200ppm, 300ppm, 400ppm and 500ppm + with and without rope pulling) at post tillering stage, whereas GA_3 (25ppm, 50ppm, 75ppm, 100ppm and 150ppm + with and without rope pulling & flag leaf cutting) and methyl jasmonate (1mM, 2mM, 3mM and 4mM) was sprayed just before the initiation of fingers from flag leaf.

The results showed that application of MH and GA_3 has pronounced effects on floral and morphological attributes compared to methyl jasmonate. Higher concentrations of MH influenced the plant growth severely making it stunted, reduced internodal distance, affected both stamen and pistil thereby rendering the fingers sterile in PS-1. GA_3 has favorable effect on plant growth increasing plant height, peduncle length, length of lemma, filament, stigma and seed set too. From each treatment, 10 main spikes were harvested, threshed and sown separately. The observation on true hybrids (pigmented seedling) from each treatment was recorded. Increase in the concentration of GA_3, increases the seed set percentage, whereas increase in the concentration of MH; decreases the seed set considerably.



Seed economics & policy research

Impact assessment of quality seed production: addressing scope and efficiency of certified seed production among seed growers

The data and information on costs and returns collected from commercial grain producer, certified and hybrid seed producer of paddy from Karimnagar district, Telangana have been analyzed. Analysis of survey data is as follows:

Economics of paddy certified seed production

The ratio of fixed and variable cost in paddy certified seed production was 32:68. Human labour was the major component of cost on inputs applied for seed production of paddy. Its share in total costs was about 38.21 per cent. It was followed by bullock & machine labour accounting for about 11.87 per cent of the total cost of paddy seed production. The share of seed cost to total input was about 1.64 per cent. Cost of manures and fertilizers used for crop accounted for about 6 per cent. Cost of plant protection measures accounted for about 3.22 per cent. The total cost in certified seed production of paddy was Rs. 57315 per hectare. The average yield of paddy quality seed and rejected seed was 40.0 quintal and 4.0 quintal and by-product was 25.0 quintal. The gross return and net return was Rs. 83150 and Rs. 25835 per hectare, respectively.

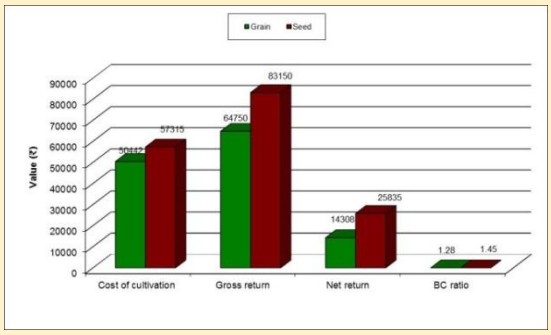
Cost and return in certified seed production of paddy (Rs./ha)

S. No.	Particulars	Amount (Rs.)	Per cent
1	Human labour	21900	38.21
2	Bullock & Machine labour	6800	11.87
3	Seed	940	1.64
4	Irrigation	1200	2.09
5	Manures & Fertilizers	3435	5.99
6	Plant protec-	1847	3.22

	tion chemicals		
7	Seed certification charges	1200	2.09
8	Interest on working capital	1493	2.61
9	Total variable cost (Rs.)	38815	67.72
10	Total fixed cost (Rs.)	18500	32.28
11	Total cost	57315	100.00
12	Yield		
a	Seed (q)	40.00	
b	Rejected seed (q)	4.00	
c	By-product (q)	25.00	
13	Gross return (Rs.)	83150	
14	Net return (Rs.)	25835	
15	BC ratio	1.45	

Comparison in paddy grain and certified seed production

The total cost of cultivation in paddy certified seed production was around 13.63 per cent higher than grain production; while, gross return was about 28.42 per cent higher in certified seed production (Rs. 83150 /ha) than grain production (Rs. 64750/ha). Consequently, net return from seed production of paddy was 80.56 per cent (Rs. 25835/ha) higher than grain production (Rs. 14308/ha). Hence, production of certified seed has resulted in win-win situation for the farmers with higher yield and better quality of output. Because of seed production, seed producer fetched higher price than the grain in the marketing of produce.

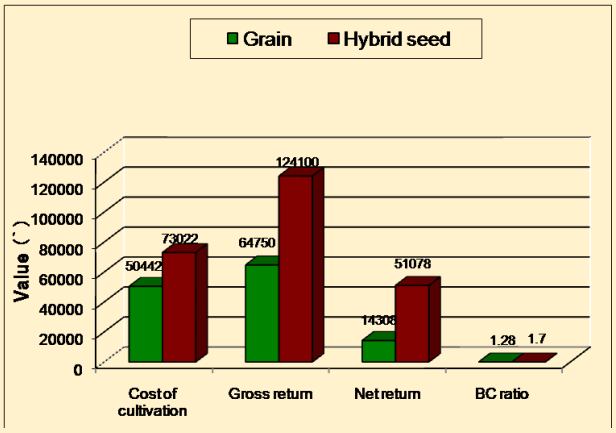


Cost and return in paddy grain and certified seed production

Economics of paddy hybrid seed production

Comparison in paddy grain and hybrid seed production

The total cost of cultivation in paddy hybrid seed production was around 44.76 per cent higher than grain production while, gross return was about 91.66 per cent higher in hybrid seed production (Rs. 124100/ha) than grain production (Rs. 64750/ha). Consequently, net return from hybrid seed production of paddy was 257.0 per cent (Rs. 51078/ha) higher than grain production (Rs. 14308/ha). Hence, production of hybrid seed has resulted in higher profitability situation for the farmers. Because of hybrid seed production, seed producer fetched higher price than the grain in the marketing of produce. The BC ratio has increased from 1.28 in paddy grain production to 1.70 in paddy hybrid seed production.



Impact assessment of institutional interventions on quality seed production system under ICAR Seed Project

Under refereed project, analyzed crop wise SMR after compilation of seed rate and yield data for various crops and tabular analysis was carried out using both study based SMR data and existing SMR data, which are in use by seed production sector in India. Study used

data pertained to average seed yield obtained and seed rate used in production for the triennium ending 2014-15, which was produced in the seed production fields of 40 cooperating centers of ICAR Seed Project. Data pertained to different varieties of a single crop were compiled. The results from tabular analysis show that there has been significant change in SMR levels in comparison to existing norms.

Discernible change in Seed Multiplication Ratio due to yield gains

The results on cereals showed that in case of paddy about 35 % increase was occurred. In case of other major cereals such as wheat, *Ragi*, Sorghum, Bajra and Maize, it was 50, 394, 107, 137 and 79 %, respectively. Perusal of data shows that in case of chick pea the yield gain resulted in an increase in SMR by 40 %. But in case of pigeon pea, horse gram and moth bean there were little evidence of yield gain from change in use of improved varieties over time. Other pulses crops such as Black gram, Green gram, Lentil, Cluster bean, Cowpea and Peas showed a percent increase in SMR by 12.5, 30, 13, 77.5, 32.5 and 70 %, respectively. In case of oilseed crop, groundnut showed 100 % increase over existing SMR value in use. Regarding other oilseeds such as Rapeseed & Mustard, Sesame, Soybean, Sunflower and Safflower showed a percent increase of 177, 15.6, 131, 226 and 40 %, respectively. From the above results it is clearly evident that there is positive and significant yield gains due to use of improved varieties, which replaced the old varieties. About half of the crops used in the study showed that there is more than 50 % increase in SMR when compared with SMR values based on old yield values. In case of pulse crops such as pigeon pea, moth bean, lentil and horse gram showed either no change or low level percent decrease in SMR obtained in data. In case of cereals all the cereals showed a more than 30 % increase over the old SMR values in use. Likewise in case of oilseeds except sesame all crops showed more than 30 % increase over the old SMR values. These results strongly pointing towards the need for revising the current SMR, which has been in use, while making various policy decisions in the Indian seed sector.

Capacity building – training programmes organized

Certified Farm Advisor Programme: Module II (Seed Technology)

Indian Institute of Seed Science, Mau (UP) organized this training programme in collaboration with National Institute of Agricultural Extension Management (MANAGE), Hyderabad during 23rdOct– 06th Nov, 2017. Hands on training followed by field visits together with lab orientation in a bid to cater the needs of clientele of seed domain was the generic order of institution of referred training programme. In-toto 13 participants from varied states attended the training programme and referred training programme is being continued under Module III, where mentors from IISS shall guide the participants in application of technical know-how pertinent to seed production, processing and quality assurance in respective operational domains.

कृषि मेला एवं कृषि प्रदर्शनी – 2017

भा.कृ.अनु.प.–भारतीय बीज विज्ञान संस्थान, मऊ द्वारा दिनांक 28.03.2017 को एक कृषि मेला एवं कृषि प्रदर्शनी का आयोजन कुशमौर स्थित परिसर में किया गया। जिसमें मऊ जनपद के विभिन्न भागों से लगभग 500 किसानों ने भाग लिया। मेले का विषय ''दलहनी फसलें,

पोषण सुरक्षा एवं कृषक समृद्धि हेतु'' था। मेले का उद्घाटन मुख्य अतिथि डा. बिजेन्द्र सिंह, निदेशक, भा.कृ.अनु.प.–भारतीय सब्जी अनुसंधान संस्थान, वाराणसी द्वारा दीप प्रज्जवलित कर किया गया। इस अवसर पर निदेशक, भारतीय बीज विज्ञान संस्थान, मऊ डा. दिनेश कुमार अग्रवाल ने संस्थान के क्रियाकलापों, अनुसंधान उपलब्धियों एवं कृषकों के लिए चलायी जा रही विभिन्न परियोजनाओं के बारे में बताया। मेले में पधारे डा. टी.के. श्रीवास्तव, प्रधान वैज्ञानिक एवं विभागाध्यक्ष भा.कृ.अनु.प.–भारतीय गन्ना अनुसंधान संस्थान, लखनऊ ने संस्थान में विगत में किये गये विभिन्न शोध कार्यों की चर्चा की साथ ही किसानों को संस्थान में चल रही बीज विज्ञान एवं प्रौद्योगिकी सम्बन्धी शोध एवं उपलब्धियों का फायदा उठाने की अनुशंसा की। काशी हिन्दू विश्वविद्यालय, वाराणसी के पादप रोग विज्ञान विभाग के अध्यक्ष डा. एच.बी. सिंह ने किसानों की आवश्यकतानुसार मौलिक शोध पर जोर देते हुए ट्राइकोडर्मा विरडी का गोबर के उपले से उत्पादन कैसे किया जाय पर प्रकाश डाला। जवाहरलाल नेहरू कृषि विश्वविद्यालय, जबलपुर के कृषि अधिष्ठाता डा. धीरेन्द्र खरे ने किसानों से मुखातिब होते हुए बताया कि किसानों की समृद्धि शासन द्वारा किये गये प्रयासों एवं किसानों की अपनी मेहनत पर निर्भर करता है, और इसका उदाहरण आज मध्य प्रदेश में किसानों की दशा है जहां वे नगदी फसलों को उगाकर लाभ ले रहे हैं। इस मौके पर किसान प्रतिनिधि के रूप में मंचासीन श्री प्रभुनाथ मल्ल ने क्षेत्र में किसानों के सम्मुख आ रही विभिन्न प्रकार की समस्याओं के बारे में सभी को अवगत कराया और आशा जतायी कि इनका निदान उत्तर प्रदेश व भारत सरकार के स्तर पर किया जाना चाहिए। निदेशक, राष्ट्रीय कृषि उपयोगी सूक्ष्मजीव ब्यूरो डा. अनिल कुमार सक्सेना ने खेती में सूक्ष्मजीवों की उपयोगिता पर प्रकाश डालते हुए ब्यूरो द्वारा विकसित विभिन्न कल्चर्स व लिक्विड फार्मुलेशन की उपयोगिता के बारे में किसानों को बताया। साथ ही पूर्वांचल के किसानों को कड़ी मेहनत करन` हेतु प्रोत्साहित किया। मेले के तकनीकी सत्र में भारतीय बीज विज्ञान संस्थान एवं राष्ट्रीय कृषि उपयोगी सूक्ष्मजीव ब्यूरो के वैज्ञानिकों डा. ए.के. तिवारी, डा. ए.के. सिन्हा, डा. सुशील शर्मा एवं डा. पीके. शर्मा द्वारा कृषि के विभिन्न आयामों यथा कृषि फसलों में बीज उत्पादन, सूक्ष्मजीवों की उपयोगिता, फूलों की खेती एवं मृदा स्वास्थ्य के ऊपर अपने–अपने व्याख्यान दिये। मेले में पल्स सीड हब एवं रिवाल्विंग फण्ड स्कीम के अंन्तर्गत उत्कृष्ठ कार्य करने वाले मऊ जनपद के चार किसानों को प्रशस्ति पत्र देकर सम्मानित भी किया गया। इसी अवसर पर संस्थान द्वारा प्रकाशित प्रसार पत्रिका 2017 का भी मुख्य अतिथि व अन्य अतिथियों द्वारा विमोचन किया गया। अन्त में मुख्य अतिथि डा. बिजेन्द्र सिंह, निदेशक, भा.कृ.अनु.प.–भारतीय सब्जी अनुसंधान संस्थान, वाराणसी ने कृषकों को सम्बोधित करते हुए समन्वित कृषि पर जोर देने को कहा तथा किसानों को मौसम एवं बाजार की मांग के अनुसार सब्जियों एवं फलों की खेती पर भी आगे बढ़ने के लिए उत्साहित किया। मुख्य अतिथि ने भारतीय बीज विज्ञान संस्थान द्वारा किये गये विभिन्न गतिविधियों एवं उपलब्धियों पर भी अपनी संतुष्टि व्यक्त करते हुए किसानों को ज्यादा से ज्यादा संस्थान से जोड़ने के लिए प्रेरित किया। मेले में विभिन्न कृषि निवेशों यथा बीज, खाद एवं कृषि यंत्रों के एक दर्जन स्टाल लगे साथ ही उत्तर प्रदेश सरकार के मऊ स्थित कृषि व पशुपालन सम्बन्धी स्टाल भी लगाये गये। भारतीय स्टेट बैंक द्वारा स्टाल लगाकर कृषकों के लिए बैंक द्वारा दी जा रही सुविधाओं के बारे में भी जानकारी दी। अन्त में मेले के संयोजक डा० टी.एन. तिवारी, वरिष्ठ वैज्ञानिक (पादप कार्यिकी) ने सभी अतिथियों, कृषकों, क्षेत्र से आये हुए सम्भ्रान्त व्यक्तियों, वैज्ञानिकों, संस्थान में कार्यरत सभी कर्मचारियों एवं मीडिया से आये हुए प्रतिनिधियों का धन्यवाद ज्ञापन किया।

Kisan Mela at ICAR-IISS, Mau

Farmers' training programmes on quality seed production techniques of *Rabi* Crops

Referred training programmes have been organized under Seed Village Scheme and Mera Gaon Mera Gaurav Programme on 20.11.2017 at Bagali Pijra; 21.11.2017 at Itora; 30.11.2017 at Vinodpur, Mau. The topics covered under the programme were principles and methods of seed production in mustard, chickpea, lentil and wheat; production of foundation and certified seed; importance of quality seed production and seed processing; seed village scheme and economics of seed production.

In order to promote quality seed for improving production and productivity of agriculture, ICAR- Indian Institute of Seed Science, Mau has implemented seed village scheme, where production and distribution of quality seeds to the farmers was being promoted with financial support from DAC&FW, MOA&FW, Govt. of India.

Name of districts covered	:	Mau, Ballia and Ghazipur
No. of village covered	:	297 Villages
Seeds distributed	:	2641.97 quintals
No. of farmers benefited	:	6845 farmers
Crops	:	Wheat, Mustard, Lentil and Chickpea

Distribution of quality seed under Seed Village Scheme in district Mau, U.P.

Programmes/ Meeting/Training attended

S. No.	Name of programme/ Meeting/ Training	Date/ duration	Venue	Participants
1	Foundation stone laying of ICAR-IISS Regional Station at GKVK Campus, Bangalore by Hon'ble Secretary, DARE and DG, ICAR, New Delhi.	15.01.2017	GKVK Campus, Bangalore	Dr. Dinesh K. Agarwal Dr. Govind Pal Shri A.K. Soni
2	20th Annual Breeder Seed Review Meeting.	16.01.2017	B.P.Pal Auditorium, NBPGR, New Delhi	Dr. Dinesh K. Agarwal Dr. Somasundaram G. Dr. Sripathy K.V.
3	Second workshop of Nodal Officers of ICAR research data repository for knowledge management (KRISHI: Knowledge based Resources Information Systems Hub for Innovations in Agriculture).	24-25.01.2017	NASC Complex and ICAR- IASRI, New Delhi	Dr. Govind Pal
4	National Seed Seminar 2017 on Food security through augmented seed supply under climate uncertainties.	28-30.01.2017	ICAR- IARI, New Delhi	Dr. Govind Pal
5	National Seed Seminar.	29-30.01.2017	NASC Complex, New Delhi	Dr. Dinesh K. Agarwal
6	ICAR-AICRP Review Committee meeting.	14.02.2017	NBPGR, Pusa, New Delhi	Dr. Dinesh K. Agarwal
7	ICAR Directors' Conference.	14-15.02.2017	A. P. Shinde Hall, NASC Complex, New Delhi	Dr. Dinesh K. Agarwal
8	Seed Review Meeting for NEH region.	28.02.2017	ICAR RC NEH, Barapani, Meghalaya	Dr. Dinesh K. Agarwal Dr. Sripathy K.V.
9	Brain storming session on "UP-Present status of seed demand, availability and strategies to bridge the gap".	07.03.2017	Kisan Mandi Bhavan, Lucknow	Dr. Udaya Bhaskar K.
10	21 days ICAR winter school on 'Advanced Statistical Techniques in Genetics and Genomics'.	02-22.03.2017	ICAR-IASRI, New Delhi	Dr. Bhojraja Naik
11	State-wise Coordination Committee for Doubling Farmers Income by March 2022 – Meeting for Uttar Pradesh state.	20-21.03.2017	ICAR-IVRI, Izatnagar	Dr. Dinesh K. Agarwal

Publications

Publication in Research Journals

- A.K. Tiwari, T.N. Tiwari, Govind Pal, H.K. Singh and Gunjeet Kumar (2017) Breaking seed dormancy in flower crops: a review. *Current Horticulture* 5 (2), 3-14.
- Amrit Lamichaney, Sripathy KV, Umesh Kamble, Natarajan S, PK Katiyar and Abhishek Bohra (2017) Differences in seed vigour traits between desi (pigmented) and kabuli (non-pigmented) ecotypes of chickpea (*Cicer arietinum* L.) and its association with field emergence. *Journal of Environmental Biology,* 38:1-12.
- Chandu Singh, N. K. Singh, R. K. Singh, S.P. Jeevan Kumar, K. V. Prabhu and A.K. Singh (2017) Determination of variability, correlation and validation of marker trait association for grain chalkiness traits in rice (*Oryza sativa* L.). *Indian Journal of Genetics and Plant Breeding* (Accepted).
- Chandu Singh, S. P. Jeevan Kumar, Sripathy K V, Somasundaram G, Udaya Bhaskar K, Ramesh K.V., Madan Kumar and S. Rajendra Prasad (2017) Rapid identification of rice germplasms using chemical tests. *Seed Research* (Accepted).
- Chandu Singh, Sripathy K.V., S.P. Jeevan Kumar, Bhojaraja Naik K., Govind Pal, Udaya bhaskar K., Ramesh K.V. and Somasundaram G.(2017) Delineation of inheritance pattern of aleurone layer colour through biochemical tests in rice. *Rice* (10): 48 Pp 1-10.
- Hardev Ram, Rajiv K. Singh, Govind Pal, Rakesh Kumar, M.R. Yadav and T. Yadav (2017) Response of wheat (*Triticum aestivum*) genotypes to different tillage practices for improving productivity and seed quality in eastern Indo-Gangetic plains of India. *Indian Journal of Agricultural Sciences* 87 (10): 60-64.
- Kumar, S. P. J., Prasad, S. R., Banerjee, R., Agarwal, D. K., Kulkarni, K. S. and Ramesh, K. V. (2017) Green solvents and technologies for oil extraction from oilseeds. *Chemistry Central Journal*, 11:9.
- S. Rajendra Prasad, J.S. Chauhan and K.V. Sripathy (2017) An overview of national and international seed quality assurance systems and strategies for energizing seed production chain of field crops in India. *Indian Journal of Agricultural Sciences*, 87 (3): 3-15.
- Somasundaram, G. and M. Bhaskaran (2017) Standardization of accelerated ageing duration for screening of rice genotypes for seed longevity. *International Journal of Agricultural Science and Research*. 7(2): 397-404.
- Somasundaram, G. and M. Bhaskaran (2017) Effect of seed priming on germination and vigour in low and high longevity rice genotypes. *International Journal of Agricultural Science and Research*. 7(2): 373-380.
- Tiwari AK, Kumar G, Tiwari B, Kadam G B and Saha TN (2017) Genetic diversity among turf grasses by ISSR markers, *Indian Journal of Agricultural Sciences.* 87 (2): 251–256.
- Tiwari AK, KumarG, Tiwari B, Kadam G B and Saha TN (2017) Optimization of ISSR-PCR system and assessing genetic diversity amongst turf grass (*Cynodon-dactylon)* mutants, *Indian Journal of Agricultural Sciences* . 86 (12): 1571–1576.

Papers presented in Seminar/ Symposia/ Conferences

- Ashutosh Kumar, S.P. Jeevan Kumar, Madan Kumar, D.K. Agarwal, T.N. Tiwari and A.K. Tiwari (2017) Protein modifications and their effect on seed quality. In

"International conference on structure and dynamics of biomolecules", January 27-28 , 2017, Department of Physics, DDU Gorakhpur University, Gorakhpur, India.

- Bhojaraja Naik K, Ravishankar P, Vijayakumar H. P, Ramesh K. V, Tomar R. S and Agarwal D. K. (2017), Genetic variability for floral and morphological traits in cultivated and wild accessions of Finger millet [*Eleusine coracana* L. Gaertn]., International Conference on Emerging Trends in Allied and Applied Biotechnology (ICAABT-2017), during April 01-02, 2017.
- K.V. Ramesh, Madan Kumar K. V. Sripathy, Udaya K. Bhaskar and T.N. Tiwari (2017) Studies on seed quality enhancement through smoke extracts. In proceedings of National Seed seminar 2017, ICAR-IARI, New Delhi,-Pp 42.
- Natarajan, S., R.K. Bhatt, R. Dhandapani, H.P. Vijayakumar and G. Somasundaram (2017) Standardization of seed testing procedures in pasture legumes. Presented in XIV National Seed Seminar on "Food Security through Augmented Seed Supply under Climate Uncertainties" held at ICAR-IARI, New Delhi, during January 28-30, 2017.
- Radhika C, Govind Pal, Udaya Bhaskar K., S. Rajendra Prasad and D.K. Agarwal (2017) Impact of new varieties on quality seed production system in India: perspectives on revision of current seed multiplication ratio (SMR). In Souvenir & abstract XIV National Seed Seminar 2017 at ICAR- IARI, New Delhi, during 28-30 January, 2017. Pp. 333-334.
- S.P. Jeevan Kumar, D.K. Agarwal, Govind Pal, T.N. Tiwari, Sripathy K.V., Ramesh K.V., Madan Kumar, Udaya Bhaskar K. and Somasundaram G. (2017) Intellectual assets managements in agriculture and food science sector in Indian council for agricultural research. Proceedings of the International conference on recent trend in agriculture environmental and biosciences, 26-29, Chandigarh, India.
- S.P. Jeevan Kumar, S. Rajendra Prasad, D.K. Agarwal, Sripathy K.V, Govind Pal, Avinash Kumar Pathak and Jitendra Kumar (2016) Assessment of seed deteriorative changes in groundnut (*Arachis hypogeae* L.)" in International Conference on Agricultural Sciences and Food Technologies for Sustainable Productivity and Nutritional Security, at UAS, GKVK campus, Bengaluru, 25-27, August,-2016.
- Sripathy, K. V., Ramesh K. V., Udaya K bhaskar, Somasundaram and S. P. Jeevan Kumar (2017) Physiological and biochemical changes associated with nano particulate seed invigoration in greengram (*Vigna radiata* L.) cv. CO 6. Pp. 267: In XIV National Seed Seminar on "Food Security Through Agumented Seed Supply under Climate Uncertainties" during 28-30th January, 2017 at ICAR-IARI, New Delhi.

Books

- R.P. Singh, Dinesh K. Agarwal, S. Rajendra Prasad, Sripathy K.V and S. P. Jeevan Kumar (2017) Varietal and seed replacement in the era of climate change. Pp. 156. ICAR-Indian Institute of Seed Science, Mau, U.P., India. ISBN: 978-81-925128-2-6.

Book Chapters

- Garlapati VK, Gour RS, Sharma V, Roy LS, S.P. Jeevan Kumar, Thakur AK and Banerjee R (2017) Current Status of Biodiesel Production from Microalgae in India. In: Lalit Kamel Singh and Gaurav Chaudhary (Eds.) Vol. 2: Advances in

Biofeedstocks and Biofuels: Production Technologies for Biofuels. Wiley – Scrivener Publishing House, Austin, USA, pp.129-154. (ISBN: 978-1-119-11752-0).

- S. P. Jeevan Kumar, S. Rajendra Prasad and Anshu Singh (2017) Health prospects of bioactive peptides derived from seed storage proteins. State-of-the-art technologies in Food Science: Promotion of human health, stability issues (In press). Goyal and Goyal (Eds), Apple Academic press publishers. July 2017, Hard ISBN: 9781771886161.
- S.P. Jeevan Kumar, Avanthi Althuri, Sanjeev Kumar, Anjani Devi Chintagunta, Anamika Gupta and Rintu Banerjee (2017) Biodiesel production from oleaginous microorganisms. In: Practices and Perspectives in Sustainable Bioenergy: A Systems Thinking Approach. (M. Mitra, ed.), Springer. Accepted.
- S.P. Jeevan Kumar, Lohit Srinivas Gujjalla, Archana Dash, Bitasta Talukdar and Rintu Banerjee. Biodiesel production from lignocellulosic biomass using oleaginous microbes: A review. In: Arindam Kuila and Vinay Sharma (Eds.): Lignocellulosic Biomass Production and Industrial Applications. Wiley –Scrivener Publishing House, Austin, USA, pp.65-92. (ISBN: 978-1-119-32360-0).
- Savita Singh, Ashutosh Kumar, Madan Kumar, S.P Jeevan Kumar , Mohd. Imran, Arvind Nath Singh and Keshawanand Tripathi (2017) Bioremediation of Pesticides Residues: A Phycological Approach. In International Nova Publishers.

Annual Reports & Proceedings

- Somasundaram G., Sripathy K.V., Ramesh K.V., Udaya bhaskar K.,S. P. Jeevan Kumar, T. N. Tiwari, Govind Pal, Madan Kumar and Sudhir K. Singh (2017)32nd Annual Group Meeting of AICRP-NSP (Crops) held during 22-24thApril, 2017 at SKRAU, Bikaner.
- Udaya bhaskar K., Dinesh K. Agarwal , Ramesh K.V., Sripathy K.V., Govind Pal, S. P. Jeevan Kumar, Boraiah K. M. and Umesh R. Kamble (2017) Annual report of ICAR Seed Project, published at 12th Annual meeting of ICAR Seed Project at MPKV, Rahuri during 29-30th July, 2017.
- Udaya bhaskar K., Sripathy K.V., Ramesh K.V.; Govind Pal and Dinesh K. Agarwal (2017) Proceedings of 12th Annual Review Meeting of ICAR Seed Project "Seed Production in Agricultural Crops" held during 29-30th July, 2017 at MPKV, Rahuri.

Technical Bulletins/ Magazines/Training Manuals

- Vijay Paul, Rakesh Pandey, Anjali Anand and Ramesh K.V. (2017) Measurement of Plant Respiration by Infrared Gas Analyser (IRGA). In Manual of ICAR Sponsored Training Programme on "Physiological Techniques to Analyze the Impact of Climate Change on Crop Plants" 16-25 January, 2017, Division of Plant Physiology, IARI, New Delhi. Pp. 31-34.
- Vijay Paul, Rakesh Pandey, Ramesh K.V. and R.C. Meena (2017) Atomic Absorption Spectroscopy (AAS) for Elemental Analysis of Plant Samples. In Manual of ICAR Sponsored Training Programme on "Physiological Techniques to Analyze the Impact of Climate Change on Crop Plants" 16-25 January, 2017, Division of Plant Physiology, IARI, New Delhi. Pp. 84-86.
- Vijay Paul, Ramesh K.V. and Rakesh Pandey (2017) Analysis of Mineral Nutrients: Sampling Techniques and

Methods of Digestion for Plant Samples. In Manual of ICAR Sponsored Training Programme on "Physiological Techniques to Analyze the Impact of Climate Change on Crop Plants" 16-25 January, 2017, Division of Plant Physiology, IARI, New Delhi. Pp. 77-81.

Awards

1. Dr. Govind Pal received '**Best Presentation Award**' in International conference on recent trends in Agriculture, Environmental and Bio-sciences 2017 during April 27-29, 2017 at Chandigarh.
2. Dr. Bhojraja Naik, received ***BRICPL Young Biotechnologist Award*** in International Conference on emerging trends in Allied and Applied Biotechnology organized by The Biologix Research and Innovation Centre Private limited (India) Orchha, MP during April 01-02, 2017

Personnel: ICAR-IISS, Mau

Staff	Designation	Joining / Promotion / Transfer
Dr. Govind Pal	Sr. Scientist	13.09.16 (Promoted to Pr. Scientist)
Mrs. Radhika C	Scientist SS	25.03.17 (Transfer)
Dr. A. K. Tiwari	Sr. Scientist	01.04.17 (Transfer)
Dr. Somasundaram G.	Scientist SS	07.07.17 (Transfer)
Dr. Madan Kumar	Scientist SS	07.07.17(Transfer)
Dr. T. N. Tiwari	Pr. Scientist	10.07.17 (Transfer)

****----****

Compiled and edited:
Udaya bhaskar K.
Ramesh K.V.
Govind Pal
Sripathy K.V.
S. P. Jeevan Kumar
Vijayakumar H.P.
Boraiah K.M.
Bhojaraja Naik
Dinesh K. Agarwal

Assisted:
H.N. Chauhan

Corresponding Address
ICAR- Indian Institute of Seed Science
Kushmaur, Mau Nath Bhanjan- 275103
Uttar Pradesh, India
Phone: 0547- 2530326
Fax: 0547- 2530325
E-mail: director.seed@icar.gov.in
http://www.seedres.in

Published:
Dr. Dinesh K. Agarwal, Director (Acting), ICAR- IISS, Mau