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Director's Desk

Global production of plastics in the past half-decade manoeuvring the conventional fossil fuel gave rise to 1.8 giga tonnes of carbon dioxide equivalent to 3.8 percent of global greenhouse gas emissions. Since past seven decades, more than 8.3 billion tonnes of plastic has been produced which remained non-degraded in the environment causing plastic pollution. Plastic pollution is ubiquitous in land, water and groundwater as well as in air. If this paradigm continues, by 2050 an estimated 6.5 giga tonnes of carbon dioxide (equivalent to 15 percent of the global carbon budget) will be generated from anticipated yearly plastic production of over 1,600 megatons.

India aptly has taken leadership to curb single use plastic and pledged to minimise plastic use from 2019 onwards which necessitates use of safer alternative to plastic. This initiative will certainly create an opportunity to revive natural fibre sector in India. India is bestowed with biodegradable and renewable natural fibres namely cotton, jute, mesta, sunnhemp etc. India is not only the world's largest producer of the cheapest bast fibre i.e., jute, but also has the immense potential to meet the future demand.

At present, starch and cellulose based bioplastics are mainly made from food crop like corn and potato which might be a concern for food security. Cellulose based bioplastics from jute fibre having physical qualities similar to plastic may become cheaper and safer alternatives to bioplastics. Jute produces higher biomass than food crops within same growth duration. Research should be focused on development of high cellulose containing jute having low lignin so that conversion efficiency of plant to bioplastic can be enhanced to achieve a sustainable and profitable bioplastic production system.

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Republic Day Celebration

The Republic Day was celebrated in ICAR-CRIJAF. Dr. S. Satpathy, Head, Crop Protection Division hoisted the National Flag which was followed by playing of National Anthem. While addressing the gathering he appreciated the efforts of the staff in development of the Institute. On the other hand, he conveyed the scientists to work with fresh enthusiasm to face new challenges in research on jute agriculture. Other senior officials, staff members along with children, family members participated in celebration.

(Source: S. K. Sarkar)



Republic Day celebration at ICAR-CRIJAF

66th Foundation Day Celebration

The ICAR-CRIJAF celebrated 66th Foundation Day at its Headquarters in Barrackpore on 9th February, 2019. The Chief Guest, Dr. N.C. Pan, Director, ICAR-NINFET, Kolkata emphasized on motivation and unity for doing work collaboratively. Dr. Jiban Mitra, Director, ICAR-CRIJAF appreciated the efforts of the staffs for the achievements of the Institute and motivated them for further overall improvement. Dr. S. Satpathy, Head, Crop Protection Division briefed the audience about the history of the institute and achievements of the division. Shri P.K. Jain, Chief Administrative Officer



Director addressing the staffs during Foundation Day

and Shri G. Ghosh, Finance and Accounts Officer highlighted Institute’s major achievements during the last five years. On the occasion different sports activities among the staff wards and staff members of the Institute was organized. Foundation Day Awards instituted for the first time were given to



Children participating in sports on the occasion of Foundation day

meritorious staffs in different categories. The winners of the different categories viz., scientific, technical, administrative and supporting were also conferred with the “Best Worker Award”. The dignitaries also conferred prizes to the winners of sports event.

(Source: S. K. Sarkar)

Webcast of PM Kisan Samman Nidhi Launching Programme

Webcast of the PM Kisan Samman Nidhi launching programme was hosted by ICAR-CRIJAF on 24th February, 2019 at Barrackpore. Shri Keshari Nath Tripathi, Hon’ble Governor of West Bengal graced the occasion as chief guest. Dr. Jiban Mitra, Director, ICAR-CRIJAF welcomed the chief guest and briefed about the significant achievements of the institute. In his address Hon’ble Governor highlighted about the PM Kisan Samman Nidhi Programme. A number of publications of the institute were released by Hon’ble Governor. Different technologies developed by ICAR-CRIJAF were displayed in a stall. About 350 farmers along with all the staff members of the institute participated in the programme.

(Source: S. K. Sarkar)



Hon’ble Governor of W.B. being felicitated during PM Kisan Samman Nidhi launching

International Womens Day

On the occasion of ‘International Women’s Day’ a training programme on “Gender Sensitisation and Technology Empowerment of SC Farm Women” was organized by the Womens Cell, ICAR-CRIJAF and KVK-II, North 24 Parganas during 6th to 8th March, 2019 at ICAR-CRIJAF, Barrackpore. In addition to this, live telecasting of the Hon’ble Prime Minister, Shri Narendra Modi’s address to the nation at National Women Livelihood Meet, Varanasi was also organized.



Inauguration of Womens Day Training

Twenty five women from different villages of Nadia and North 24 Parganas District participated in the programme. The programme gave impetus to topics on women empowerment, self help groups, drudgery reduction, nutrition, health and hygiene. In addition to this, women from various self help groups of different villages shared their success stories with other farmwomen. The participants appreciated the initiative of ICAR - CRIJAF for organising training especially for farmwomen and expressed satisfaction over the entire programme.

(Source: Shamma A.)



Participants viewing Live Webcast

30th Annual Workshop of AINP-JAF, 2019

The 30th Annual Workshop of All India Network Project on Jute and Allied Fibres (AINPJAF) was held on 14-15 February, 2019 at Bihar Agricultural University, Sabour. Dr. R.K. Singh, ADG (CC), ICAR inaugurated the workshop. Dr. Jiban Mitra, Director ICAR-CRIJAF welcomed the guests and participants. He emphasized for better execution



Inaugural session of 30th Annual Workshop of AINPJAF at BAU, Sabour

of the projects to enhance the efficiency of AINPJAF. Dr. S. Mitra, In-charge AINPJAF presented the summary report on various trials conducted under AINPJAF during 2018-19 crop seasons. The concurrent sessions on Crop Improvement, Crop Production, Crop Protection and Fibre Quality were conducted. Dr. R.K. Singh, ADG (Commercial Crops), ICAR, New Delhi chaired the Variety Identification Committee meeting held on February 14, 2019. Two jute entries namely JROMU-1 and NJ-7005 and one Kenaf entry, JRHC-3N were identified by the Variety Identification Committee. One variety each of kenaf *i. e.* JMBP-4 (Utkarsh) and sunnhemp, SUIN-3 (Kavita) were recommended for release and notification by the Central Sub Committee on



Dr. R.K. Singh ADG (CC), ICAR lighting the lamp

Crop Standard, Notification and Release of Varieties vide Gazette notification number S.O. 1498(E) dated 02.04.2019.

(Source: S. Mitra)

Hindi Workshop

ICAR-CRIJAF organized one day Hindi Workshop on 20 March 2019 in order to promote and implement the Official Language policies and acts in the Institute. Dr. Jiban Mitra, Director presided over the Hindi Workshop. The inaugural session started with the welcome address by In-charge, Rajbhasha Dr. S. K. Pandey and subsequently Mr. R.D. Sharma, Assistant Director (OL) discussed the salient points of Official Language Rules, Official Language Act and Official Language Policies as well as detailed information about Unicode through Power Point presentation in the technical session of the workshop. A total of 57 staffs participated in the said workshop.

(Source: S.K. Pandey)



Director addressing the participants of the workshop

The second One-day Hindi Workshop was organized by the Official Language Implementation Committee of the institute on 29th June, 2019. Dr. Jiban Mitra, Director, in his address said that the organization of Hindi workshops reflects proper



Chief Guest, Mr. Anup Kumar addressing participants of Hindi Workshop

compliance of Official Language Policies for motivation and encouragement of officials for its maximum possible use in official work of the institute. Chief guest, Mr. Anup Kumar, Assistant Director (Official Language), discussed about the Hindi correspondence and noting-drafting in Hindi during the technical session of workshop. He also interacted on English-Hindi translation and Hindi typing. In the second session, Shri Ram Dayal Sharma, Assistant Director (Rajbhasha) discussed on Official Language Policy and Rules. A total of 70 participants attended this Hindi Workshop.

(Source: S.K. Pandey)



Participants of Hindi Workshop

Orientation Programme for Newly Recruited Scientists

One month orientation program commencing from 20 April 2019 - 21 May, 2019 was undergone by two newly recruited scientists, Mr. Vikas Mangal and Mr. Jitender Meena of the institute. The orientation program mainly emphasized research mandate of the institute and the research activities carried out in various Divisions of ICAR-CRIJAF and Regional Stations, technologies and varieties developed by ICAR-CRIJAF, patents filed, activities of ITMU, PME, Vigilance Cell, Grievances Cell, Central Civil Services rules, administrative rules, general financial rules, personnel and training rules.

(Source: S.K. Sarkar)

Institute Research Council (IRC) Meeting

The Institute Research Council (IRC) meeting (2019-20) was conducted during 08-09 May, 2019 under the chairmanship



Dr. J. Mitra, Director, CRIJAF addressing scientists in IRC meeting

of Dr. Jiban Mitra, Director, ICAR-CRIJAF and Co-Chaired by Dr N. C. Pan, Director, ICAR-NINFET to review the proposal of new research projects as well as of the on-going in-house projects and achievements of externally funded research projects. A total of 58 research projects inclusive of both in-house as well as externally funded research projects were reviewed in the IRC. Dr. S.K Sarkar, Pr. Scientist and In-charge PME Cell coordinated the meeting.

(Source: S.K. Sarkar)



Scientist presenting research findings in IRC

ICAR-CRIJAF Organised International Day of Yoga-2019

ICAR-CRIJAF celebrated fifth International Day of Yoga on 21st June, 2019 at its CRIJAF HQs. Programme started with the opening remarks of Dr. R.K. Naik. On this occasion Dr. Pranab Roy, District President, Patanjali Yoga Samiti, North 24 Parganas, Barasat delivered a talk on Yoga and its relevance to mental and health benefits to the participants. He also demonstrated some of the physical *asanas* including *Pranayams*. About 67 official staff of the Institute comprising Scientists, Administrative, Technical and Supporting staff attended the programme and practised different yoga poses.



Dr. J. Mitra, Director, CRIJAF welcoming Chief Guest

The programme was concluded with vote of thanks given by Dr. S.K. Jha, Principal Scientist & In-charge, Agricultural Extension Section.

(Source: R. K. Naik)



Participants practicing different yoga postures

Large-Scale Training cum Demonstrations of Improved Jute Production Technology under Jute-ICARE

Under Jute-ICARE project, 50 large scale training cum demonstrations of line sowing, mechanical weeding by CRIJAF nail weeder and CRIJAF single wheel jute weeder were carried out by the scientists of ICAR-CRIJAF in association with JCI under farmer's field condition in the jute growing states of West Bengal, Bihar, Odisha and Assam from March to May 2019. On an average, 50 farmers were present in each training cum demonstration of line sowing and mechanical weeding. Farmers got acquainted with different aspects of improved jute cultivation techniques



Operation of CRIJAF single wheel jute weeder and full grown line sown jute crop under Jute-ICARE

through trainings, printed materials and demonstrations by scientists of ICAR-CRIJAF in presence of JCI officials and respective State Agricultural Officers. The farmers were very enthusiastic about the improved jute variety JRO-204, line sowing and mechanical weeding by CRIJAF nail weeder and CRIJAF single wheel jute weeder.

(Source: B. Majumdar, S. Sarkar, S. K. Jha, R. K. Naik, A.R. Saha, R. Saha and S. Satpathy)

ASCI Training Programme for the Job Role of Quality Seed Grower

ICAR-CRIJAF, Barrackpore organized skill development training for unemployed rural youths for the job role of “Quality Seed Grower” from 3rd January-7th February, 2019 under RKVY. The objective of this training was capacity building by bridging gaps and upgrading skills of farmers, self-employed workers engaged in agriculture especially in quality seed production. Dr. S. S. Singh, Director, ICAR-ATARI, Kolkata was the chief guest of the inaugural session. Twenty participants attended this training. Both theoretical and practical sessions were arranged to provide hands on training in seed production as per National Occupational Standard (NOS) set by National Skill Development Corporation (NSDC). Trainees were assessed through an external assessment agency appointed by ASCI (Agriculture Skill Council of India).

(Source: A. Bera)



Inauguration of ASCI training on “Quality Seed Grower”

ASCI Training Programme for the Job Role of Agriculture Machinery Operator

A training programme for the job role of “Agriculture Machinery Operator” was organized from 23rd January to 27th February, 2019 at ICAR-CRIJAF, Barrackpore. Twenty rural youths participated in this training programme. The course curriculum covered all the subjects essential to perform the job roles of an agriculture machinery operator through theoretical as well as practical classes. Resource persons from other ICAR Institutes, SAUs and Government departments

and Input agencies were also invited. Exposure visits were conducted for the trainees for better understanding of the subject.

(Source: R.K. Naik)



Dr. R.K. Naik, Course Director addressing the trainees



Participants with Institute and ATARI personnel

Trainers’ Training on Improved Jute Production Technology

A one day training on “Improved jute production technology” was organised for the master trainers under Jute ICARE programme on 26th Feb 2019. The training was organised by agriculture extension section, ICAR-CRIJAF under Jute ICARE Project. Thirty master trainers from different districts



Inauguration of Trainers’ Training Programme

of West Bengal participated in the training programme. Mr. Sushanta Pal, Chief Operation Officer, NJB was the chief guest of the training programme. In the training, major emphasis was given on improved jute production technology, use of seed drill and single wheel jute weeder and improved retting using CRIJAF Sona.

(Source: Shamma A.)



Participants of traineres' training programme

National Level Training Program on 'Improved Production Technologies for Jute and Allied Fibres'

A national level training programme on Improved Production Technologies for Jute and Allied Fibres under NFSM Commercial crops (Jute) was organized at ICAR-CRIJAF



Dr. C. S. Kar, briefing about National Training programme

during 5-7th March, 2019. The programme was inaugurated by Dr. J. Mitra, Director, ICAR-CRIJAF. Mr. J. Das, Deputy Director DJD, Kolkata, HoD's and Sectional Heads also attended the inaugural programme. A total of 15 lectures



Participants of National training

on crop production, fibre quality and grading aspects were delivered by the scientists of the Institute. There were 19 participants from Agriculture Department, NGOs of West Bengal and Bihar.

(Source: S. Kumar)

Training Programme on "Improved Jute Production Technology" for SC farmers

ICAR-CRIJAF in collaboration with KVK II North 24 Parganas organized a training programme on 'Improved jute production technology' for the SC farmers under SCSP Scheme on 28th March 2019. Eighty farmers from six villages of Nadia, Hooghly and North 24 Parganas participated in the training. Lectures on different aspects of improved jute production technology were delivered in the training programme. The training concluded with an exposure visit to Agriculture Engineering section to provide first-hand information to farmers on various agricultural implements and machineries used in jute cultivation.

(Source: T. Samajdar)



Dr. T. Samajdar, Head KVK addressing the participants

Training Programmes on "Mid-Season Crop Management Practices in Jute"



Dr. K. Mondal addressing the participants

Three “One Day training” programmes on “Mid-season Crop Management Practices in Jute” were organized by Agricultural Extension Section, ICAR-CRIJAF in



Dr. B Mazumdar addressing the participants

collaboration with KVK, North 24 Parganas (Additional) on 26.06.2019, 27.06.2019 and 28.06.2019 for the SC farmers of the North 24 Parganas and Nadia district. The programme included technical sessions on mid-season weed, water, nutrient, pest management, harvesting and post-harvest management practices for quality fibre production in jute. Altogether, 213 farmers from 24 villages of North 24 Parganas and Nadia district participated in this training programme.

(Source: T. Samajdar)



Participants in the training programme

Events and Meetings at Sub-Stations and KVKs

World Environmental Day

“World Environmental Day” was organised on 5th June, 2019 at RRS, Sorbhog by planting trees at this station. Dr. Kajal Das, Scientist In-charge (RRS, Sorbhog, ICAR-CRIJAF), FAO (ICAR-CRIJAF) and other staffs of the station participated in this programme.



Plantation of saplings at RRS, Sorbhog

(Source: Kajal Das, RRS, Sorbhog)

Training on Improved Production Technology of Ramie

Under SCSP, six trainings on improved production technology of ramie were conducted by RRS, Sorbhog at different villages (Sorbhog, Chandamari, Manikpur and Baniakuchi) in Barpeta districts of Assam during 25th March, 2019 - 30th March, 2019. Three hundred and eleven farmers participated in these training programmes.

(Source: Kajal Das, RRS, Sorbhog)



Training programme under SCSP at RRS, Sorbhog

Kisan Gosthi on Ramie Production Technology



Dr. C. S. Kar addressing participants of ‘Kisan Gosthi’ at RRS, Sorbhog

Kisan Gosthi on Ramie Production Technology was conducted under AICRP on ICAR Seed Project at Ramie Research Station, Sorbhog, Assam on 20.06.2019. Farmers from the villages Uttar Burikhamar, Puthimari, Duramari, Rampur, Noontola, Ahompathar & Sahapur participated in the programme. Dr K. Das welcomed the participants. Dr. S Mitra, Principal Scientist & I/c AINPJAF, ICAR-CRIJAF, Barrackpore and Dr. C S Kar, Nodal Officer Seeds, ICAR-CRIJAF, Barrackpore delivered lectures on different aspects of quality planting material production in ramie. Interaction session among experts and farmers was conducted followed by demonstration on different aspects of ramie cultivation.

(Source: Kajal Das, RRS, Sorbhog).



Dr. S. Mitra addressing participants of 'Kisan Gosthi' at RRS, Sorbhog

Skill Training for Rural Youth (STRY)

Skill Training for Rural Youth (STRY) was organized by KVK, Burdwan on vermicompost and mushroom production during 1-8 January 2019. Fifteen (15) rural youth participated in this training. Exposure visits were also conducted for better understanding of the trainees. Experiential learning methodology was applied to train the participants by which the trainees could learn by doing.

(Source: Sk. Md. Azizur Rahman)



STRY training on mushroom production

District Kisan Mela Purba Bardhaman 2019-cum-Pradhan Mantri Kisan Samman Nidhi Launching Programme (PM-KISAN)

ICAR-CRIJAF KVK, Purba Burdwan had organized District Kisan Mela for Purba Bardhaman district on 24.02.19 at KVK Campus. More than 560 farmers and farm women were present in this event. Shri Sunil Kumar Mondal, Hon'ble MP, Purba Bardhaman, Dr. Mamta Sanghamita, Hon'ble MP, Bardhaman-Durgapur and Shri Alok Kumar Majhi, Hon'ble MLA, Galsi were present in this event. Various activities like lectures, farm produce competition, farmers' quiz, farmers



District Kisan Mela at at KVK Campus

scientist interactions, farmers producer stall, company stall were organized in this event. Inauguration of PM Kisan Samman Nidhi Scheme by Hon'ble Prime Minister was also telecasted.

(Source: Sk. Md. Azizur Rahman)

District Kisan Mela Paschim Bardhaman 2019

KVK Burdwan had organized District Kisan Mela for Paschim Bardhaman district on 25.02.19 at Raniganj. More than 350 of farmers and farm women were present in this event. Mrs. Anubha Chakraborty, Krishi Karmadhakshya, Paschim Bardhaman was present in this event. Various activities like lectures, farm produce competition, farmers' quiz, farmers-scientist interactions were organized in this mela.

(Source: Sk. Md. Azizur Rahman)



District Kisan Mela at at Raniganj

SAC meeting of ICAR-CRIJAF-KVK, North 24 Parganas

First Scientific Advisory Committee (SAC) meeting was organized by ICAR-CRIJAF-KVK, North 24 Parganas (Additional) on 30.05.2019. Dr. Jiban Mitra, Director, CRIJAF chaired the meeting and Dr. S. S. Singh, Director, ICAR-ATARI, Zone V, Kolkata graced the occasion as the Chief Guest. The officers from the State Line departments, Lead Bank Manager, all the Heads, Incharges of the Divisions/Sections, representatives from AIR and press

along with the farmer members attended the meeting. The committee reviewed the Annual Report for the year 2018-19. The Action Plan for the year 2019-20 was discussed various suggestions were incorporated. The issue of farm development was discussed. Dr. Singh emphasised on the DFI by 2022, single window system, formation of FPO, attracting fund from RKVY, market linkage, uploading information in KVK portal, etc. and requested the KVK to take action on the same. Dr. Mitra suggested the KVK to work on Value Chain Management through FPO, ICT, adoption of village for DFI, etc. The meeting ended with the formal vote of thanks.

(Source: T. Samajdar)



Scientific Advisory Committee meeting of ICAR-CRIJAF-KVK, North 24 Parganas

15th SAC Meeting of ICAR-CRIJAF-KVK, Purba Burdwan

The 15th Meeting of the Scientific Advisory Committee was held at KVK, Purba Burdwan, Bud Bud, on 1st June, 2019. The meeting was chaired by Dr. S. Satpathy, Head, Crop Protection division, ICAR-CRIJAF. Dr. Sk. Md. Azizur Rahman, Head, KVK and Member Secretary, SAC appraised the committee regarding Action Taken on the recommendations of XIVth SAC



Farmers interaction during SAC meeting at ICAR-CRIJAF-KVK, Purba Burdwan

followed by progress of technical activities undertaken during 2018-19 and Action Plan of 2019-20. The SAC appreciated the activities undertaken and achievement made as per planned target during the reported period. Analytical review of component demonstrated (FLD & OFT) was thoroughly discussed with each member in light of the recommendations of the XIVth meeting of SAC. The SAC critically reviewed the performance of the technical programmes through open discussion to solicit recommendations to the KVK in reaching more areas of the district with effective agricultural technology dissemination.

(Source: Sk. Md. Azizur Rahman)

ASCI Training Program at KVK and Burdwan

Two ASCI trainings on “Hatchery Production Worker” were organized at ICAR-CRIJAF-KVK Burdwan during 19 February - 26 March, 2019 and 22nd February - 22nd March, 2019 respectively. Twenty rural youths each participated



ASCI Training on Hatchery Production Worker

in training. Resource persons from KVKs, Government Departments and Input Agencies were invited to train the trainees. Exposure visits were conducted for better understanding of the trainees about the subject matter being taught. Experiential learning methodology was applied to train the participants by which the trainees could learn by doing.

(Source: Sk. Md. Azizur Rahman)



Dr. Monica Suresh Singh, Course Director addressing the trainees

Training Programme on “Inter-cultural Operation in Jute”

One day training programme on “Inter-cultural Operation in Jute” was organized by KVK, North 24 Parganas (Additional) in collaboration with Agricultural Extension Section, ICAR-CRIJAF on 22.06.2019 for the SC farmers. Dr. T. Samajdar, Principal Scientist and Head, KVK briefed the participants



Inaugural session of training programme

about the aim and objective of the training programme. Use of agricultural implements in inter-cultural operation of jute was discussed in detail followed by farmers-scientist interaction. A total of 61 farmers from six villages of North 24 Parganas participated in the training programme.

(Source: S. K. Jha)



Dr. T. Samajdar Head KVK addressing the participants

Training Programme on “Scientific Kharif Rice Production”

One day training programme on “Scientific Kharif Rice Production” was organized by KVK, North 24 Parganas (Additional) headed by Dr. Tanmay Samajdar, Principal



Inaugural session of training programme

Scientist and Head in collaboration with Agricultural Extension Section, ICAR-CRIJAF on 24.06.2019 for the SC farmers. A total of 68 farmers from five villages of North 24 Parganas participated in the training programme Topics pertaining to Integrated Crop Management, Disease and Pest Management and Integrated Nutrient Management in Kharif Rice were discussed in the training programme. Queries raised by the farmers were answered in the farmers-scientist interaction.

(Source: T. Samajdar)



Participants in the training programme

Delignification of Jute Fibre by Lignin Degrading Bacteria

Higher lignin content in jute fibre is restricting its use as textile fibre. Five promising lignin degrading bacterial isolates were screened on the basis of potency index, MnP (manganese peroxidase) ($126 - 482 \text{ U l}^{-1} \text{ min}^{-1}$) and LiP (lignin peroxidase) ($558.7 - 615.6 \text{ U l}^{-1} \text{ min}^{-1}$) activities out of 95 ligninolytic bacterial isolates obtained from retting water and soil. These

promising ligninolytic isolates were used with retted jute fibre to evaluate their potency of delignification. The isolate L9 performed best among the five isolates and could reduce lignin content from 11.33 to 8.84% i.e. a reduction of 21.97% from the control. The efficient ligninolytic bacterial strains were identified up to species level by using the Biolog Inc. (Hayward, U.S.A). All the five isolates were identified as *Bacillus spp.*

Effect of delignification with ligninolytic isolates on jute fibre quality

Bacterial Isolates	Quality parameters of resultant fibre		
	Lignin content (%)	Fibre strength (gtex ⁻¹)	Fibre fineness (tex)
Control	11.33 ± 0.54	22.20 ± 0.81	2.85 ± 0.28
L3	10.15 ± 0.54	21.64 ± 0.83	2.70 ± 0.22
L9	8.84 ± 0.51	21.66 ± 0.83	2.50 ± 0.24
L10	10.37 ± 0.26	20.90 ± 0.32	2.70 ± 0.30
L26	10.89 ± 0.32	21.85 ± 0.73	2.76 ± 0.25
L30	9.76 ± 0.62	21.19 ± 0.31	2.62 ± 0.30

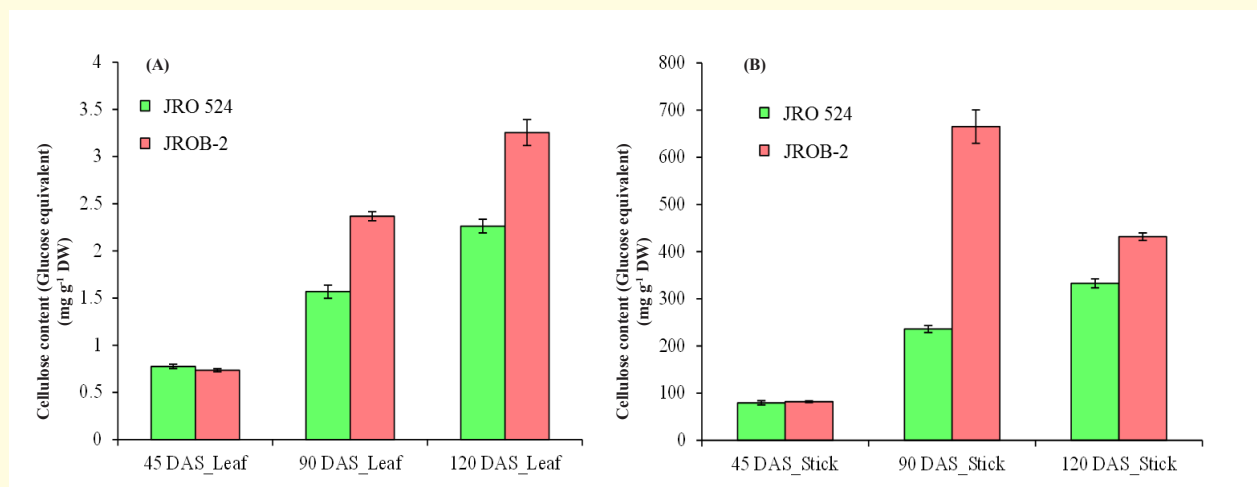
Values (mean ± standard deviation) in each row for a particular set

B. Majumdar, S. Barai and Lipi Chattopadhyay
ICAR-CRIJAF, Barrackpore

JROB-2 Shows High Potential for Production of Bioethanol and other Lignocellulose Derived By-products

The lignocellulosic nature of jute biomass projects its potential for production of clean energy and other diversified products. A study was undertaken to understand the biochemical composition of higher biomass genotype of jute JROB-2 over the traditional variety JRO 524 at three stages of growth i.e., 45 days after sowing (DAS), 90 DAS and 120 DAS. The biomass and plant height of JROB-2 was found to be higher throughout the growth stages. Cellulose content of JROB-2 was found to be higher across all the growth stages in both

leaf and stem as compared to JRO 524. Cellulose content in stem of JROB-2 was highest at 90 DAS with 664.9 mg glucose equivalent g⁻¹ dry weight of biomass. In contrast, the pectin content was found to be lower in the stick and leaf of JROB-2 as compared to JRO 524. This states that the lower content of pectin in the cell wall throughout the growth period may have encouraged JROB-2 to acquire higher biomass. Higher biomass of JROB-2 therefore ensures better bioethanol production potential. In addition, it can also be inferred that JROB-2 is a high biomass yielding genotype which can be used as a source for not only biofuel but also for preparing cellulose derived by-products like paper, cellulose nanocrystals etc. as well as other diversified products like



Cellulose content in (A) leaf and (B) stem of JROB-2 and JRO 524 at three stages of growth

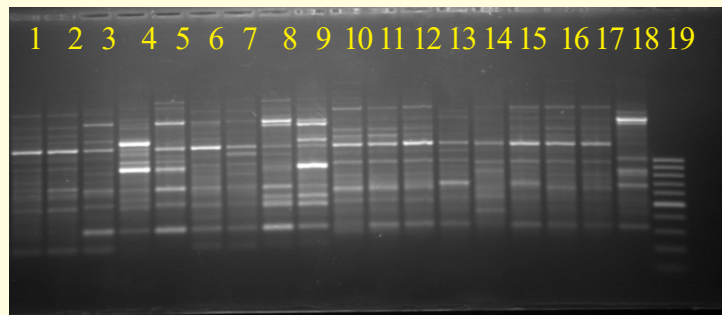
biogas, biochar, lignocellulosic biomass derived metabolites like xylitol, succinates, vanillin, biocomposites etc.

Laxmi Sharma, Srinjoy Ghosh, Suman Roy, Pratik Satya, Bijan Majumdar
ICAR-CRIJAF, Barrackpore

Efficacy of IPM Module Against Stem Rot and Insect Pests of Jute (*Corchorus olitorius* L.)

Holistic IPM module comprising, components of cultural (deep ploughing, line sowing with 5-6 lakh plant population/ha, N:P:K: 60 (30+15+15):30:30, single hand weeding at 21 DAS, Variety: JRO 204), chemical (soil application of CaOCl_2 @ 30 kg/ha at 7 DBS (days before sowing), seed treatment (ST) with (a) carbendazim @ 2g/kg + (b) imidacloprid @ 4g/kg, insecticidal spray with spiromesifen @ 1ml/litre and profenophos @ 2 ml/litre); biological control agents (ST with *Trichoderma viride* @ 10g/kg, soil application of *Pseudomonas fluorescens* @ 100g/sq. m before sowing and neem oil spray @ 3-4 ml/litre) were tested against major disease and insect pests of jute at ICAR-CRIJAF, Barrackpore and in farmers' field of different villages in North 24 Parganas of West Bengal. Stem rot incidence, yellow mite, hairy caterpillar and semilooper infestations in complete IPM module were 2.1%, 0.6%, 0.5% and 0.2% in comparison to 16.5%, 7.2%, 2.7% and 4%, respectively, in farmers' practice. High fibre yield and benefit cost ratio of 29.25 q/ha and 1.61 were observed in full IPM module as compared to 13.4 q/ha and 1.3, respectively, in farmers' practice.

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DNA fingerprint profile for primer SCoT-22

Legends-M: DNA ladder, 1: AMV-1; 2: AMV-2; 3: AMV-4; 4: AMV-5; 5: CRIJAFR-5; 6: CRIJAFR-8; 7: HS4288; 8: HS7910; 9: GR-27; 10: Non-bris; 11: AMC-108; 12: MT-150; 13: HC-583; 14: JBM-G-4; 15: JBM-81; 16: JRM-3; 17: JRM-5; 18: JBMP-2; 19: JRKM 9-1

Tea Looper, *Biston suppressaria* Guenee (Geometridae: Lepidoptera): A New Pest of Jute

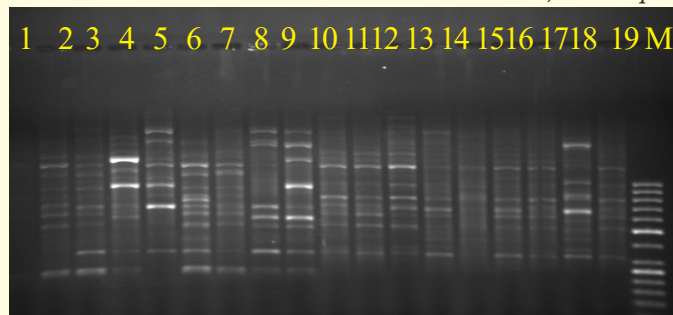
Survey was conducted for monitoring of new insect pest on jute in adjoining villages of ICAR-CRIJAF. During the survey, larvae with blackish to brownish colour with transverse white bands, thoracic legs three pairs and last pair of abdominal legs was identified, manifesting looper type larval characteristic

DNA Fingerprinting for Mesta Varieties Using SCoT Markers

A total of 19 varieties including 10 roselle and 9 kenaf were screened with 20 SCoT markers to develop DNA fingerprints. True to type seeds (20) from each variety were germinated in Petri plates under laboratory conditions. Genomic DNA was isolated from five days old seedlings by bulking 10 seedlings from each variety separately. DNA was quantified and purified for PCR analysis. PCR was standardized with PCR reaction performed for 19 mesta varieties using SCoT markers. Primer SCoT-22 differentiated 3 varieties, SCoT-4 differentiated 2 varieties and SCoT-2, SCoT-3, SCoT-17 and SCoT-26 differentiated only 1 variety each. These markers can be used for DNA fingerprints and marker related studies in mesta.

SCoT primers differentiating the mesta varieties	
Primer name	Variety
SCoT-26	JBMP2
SCoT-3	Non-bris
SCoT-22	JRKM 9-1
SCoT-2	AMV 2
SCoT-4	JRM 3
SCoT-17	HC583
SCoT-22	CRIJAFR 8
SCoT-4, SCoT-22	CRIJAFR 5

Kanti Meena and S.K. Pandey
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DNA fingerprint profile for primer SCoT-26

and causing defoliation on young leaves. The late instar larvae appeared brownish in colour with only thoracic and last pair of abdominal legs and forming a characteristic crotch between the main stem and axil of leaf. The pest was identified as tea looper, *Biston suppressaria*. The pest infestation is manifested on jute for the first time.

V. Ramesh Babu
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Tea looper caterpillar, *Biston suppressaria* larvae feeding on jute leaf

***Ageratum conyzoides* an Alternate Host of Mesta Yellow Vein Mosaic Virus**

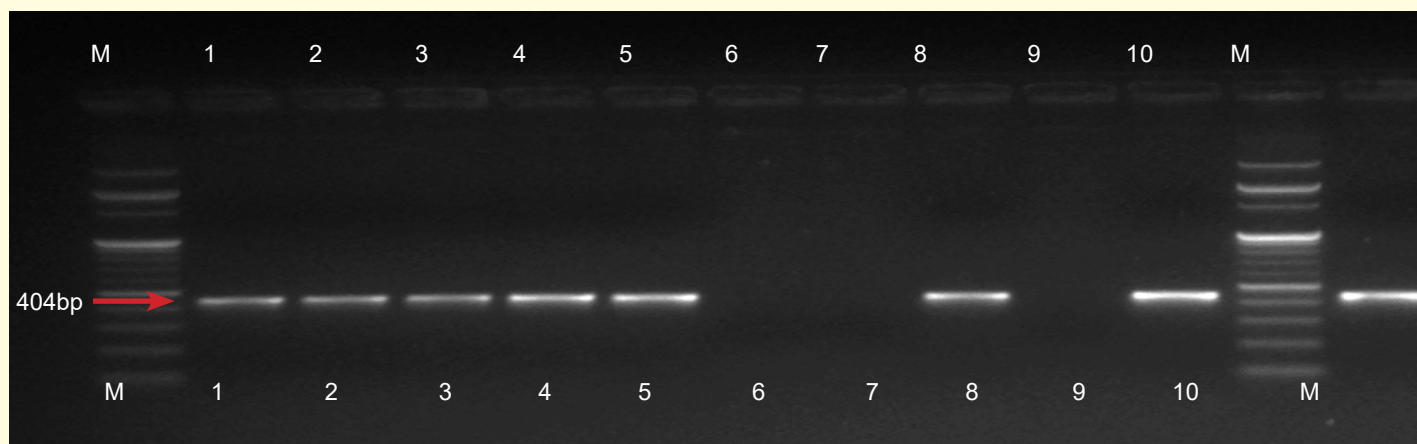
Mesta Yellow Vein Mosaic Virus is known to spread through whiteflies (*Bemisia tabaci*) in a persistent manner and causes severe economic losses. *Ageratum conyzoides* (goat weed) grown in the vicinity of mesta crop probably serves as alternate host or acts as a reservoir for MeYVMV in off season. Due to succulent nature of *A. conyzoides* leaves, whiteflies continuously suck the sap from leaves and transfer the MeYVMV from diseased

plants to healthy weed plants which later on spreads to mesta crop. Viral DNA was extracted from virus-infected weed plants. The presence of virus in disease infected plants was confirmed by PCR amplification method using MeYVMV specific DNA primers (F- CGCGTCACAAAGTCTCGTAT and R- TCGTTCTTCACAGTAGCCGT).



Ageratum conyzoides

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Lane 1-10 indicates amplified DNA of *MeYVMV* isolated from *Ageratum conyzoides*; Lane M: 1KB plus DNA ladder

Genetic Variability of Indian Sunnhemp (*Crotalaria juncea* L.) Accessions for Fibre Yield and Green Biomass

A set of forty sunnhemp (*C. juncea*) accessions representing different agro ecological regions of India were evaluated primarily for fibre and green biomass yield. The genotypes exhibited high variability for all the yield traits under study. Plant height ranged from 268.5 to 350.0 cm with a mean of 312.1±16.9 cm. Four accessions surpassed check variety K 12

Yellow (334.0 cm) for plant height. Average basal diameter was 14.0±1.9 mm. Average green biomass yield/plant of the accessions was 277.1±56.2 g and ranged from 172.6-474.2 g/plant. Twelve accessions outperformed check K 12 Yellow (297.0 g/plant) for green biomass yield. Fibre yield of the accessions ranged from 2.5 to 15.3 g/plant with a mean of 6.7±1.9 g/plant. Three accessions out yielded check K 12 Yellow (8.8 g/plant) for fibre yield. Among the genotypes, SIN-07 recorded superior values for fibre yield, green biomass yield and stick yield.

Statistical parameters of genetic variability in *C. juncea*.

Traits	Range	Mean±SD	Best performing genotype
PH (cm)	268.5-350.0	312.1±16.9	SIN-28 (349.9)
BD (mm)	8.7-19.0	14.0±1.9	SIN-06 (17.4)
GBY (g/plant)	172.6-474.2	277.1±56.2	SIN-07 (456.4)
FY (g/plant)	2.5-15.3	6.7±1.9	SIN-07 (11.9)
SY (g/plant)	27.5-82.6	48.0±11.7	SIN-07 (75.6)

PH=plant height, BD=basal diameter, GBY= green biomass yield, FY=fibre yield and SY= stick yield

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Exploration for Collection of Jute and Allied Fibre Germplasm

In exploration for collection of new accessions of jute and allied fibre in collaboration with ICAR-NBPGR, Regional Station, Hyderabad a total 108 accessions including wild and cultivated species of jute and allied fibres (*Corchorus*

olitorius -36; *C. aestuans* - 23; *C. trilocularis* - 17; *C. fascicularis* - 08; *Hibiscus sabdariffa* - 14; *H. cannabinus* - 09; *Crotalaria verrucosa* - 01) were collected from six districts of Telangana and two districts of Maharashtra comprising 40 villages in 26 mandals. The surveyed area is located between 17.26 to 19.50 N latitude and 77.07 to 79.01 E longitudes. Seed samples were submitted to NBPGR, New Delhi for long-term storage.



Jute and allied fibre germplasm collected during exploration (a) *H. sabdariffa*; long calyx type, (b) *H. sabdariffa*; diverse calyx type, (c) *H. cannabinus*, (d) *C. fascicularis* and (e) *C. aestuans*.

A. Anil Kumar, Maruthi, R.T. and Kamala Venkateswaran*
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* Regional Station of ICAR-NBPGR, Hyderabad

Influence of Time and Dose of Fertilizer Application on Seed Yield of Tossa Jute

In South Bengal condition, the maximum number of pods/plant (19.22) was produced with T₇ (N 80 kg, P₂O₅ 40 kg, K₂O 80 kg/ha in which 50% N was applied at 21-28 DAS coinciding with weeding and thinning; 25 % N at 42 DAS coinciding with topping of apical bud; and 25% N at 56 DAS coinciding with

active branching). Similarly, the maximum number of seeds/pod (199.67) was recorded on T₇ and no fertilizer application produced the lowest number of seeds/pod (150.67). The 1000 seed weight of jute seed varied significantly with different doses and time of fertilizer application. The highest 1000 seed weight (2.78 g) and seed yield (974.20 kg/ha) was also obtained with T₇.

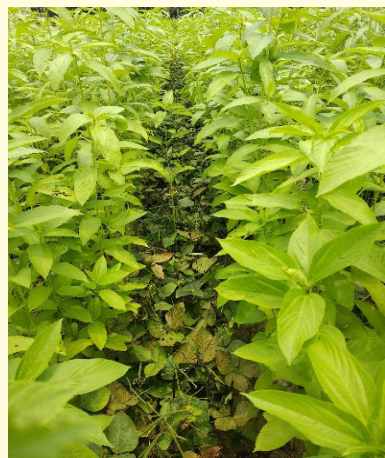
Yield parameters and seed yield of *olitorius* jute seed as influenced by time and dose of fertilizer application.

Treatments	Number of pod/plant	Number of seed/pod	1000 seed weight (g)	Seed yield (kg/ha)
T ₁ : No fertilizer	11.89 ^d	150.67 ^d	2.27 ^c	561.7 ^d
T ₂ : N ₈₀ (2 splits)	17.00 ^c	179.11 ^c	2.33 ^c	736.5 ^c
T ₃ : N ₈₀ (3 splits)	17.22 ^c	185.33 ^{bc}	2.64 ^b	818.7 ^{bc}
T ₄ : N ₈₀ (2 splits) P ₄₀	17.89 ^{bc}	188.00 ^{abc}	2.63 ^b	862.8 ^b
T ₅ : N ₈₀ (3 splits) P ₄₀	18.44 ^{ab}	187.67 ^{abc}	2.65 ^b	887.3 ^{ab}
T ₆ : N ₈₀ (2 splits) P ₄₀ K ₈₀	18.78 ^{ab}	197.88 ^{ab}	2.70 ^{ab}	894.2 ^{ab}
T ₇ : N ₈₀ (3 splits) P ₄₀ K ₈₀	19.22 ^a	199.67 ^a	2.78 ^a	974.2 ^a
CD (P=0.05)	1.096	13.193	0.089	90.55

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Yield and Competition of Jute and Mung bean in Intercropping

Competition of jute (*cv* NJ 7010) and mung bean (*cv* TMB-37) with varied spatial arrangements and densities in alternate single row (ASR) and alternate band (AB) planting was estimated in an open field experiment at ICAR-CRIJAF.



Mungbean at harvesting stage in alternate double row system of planting

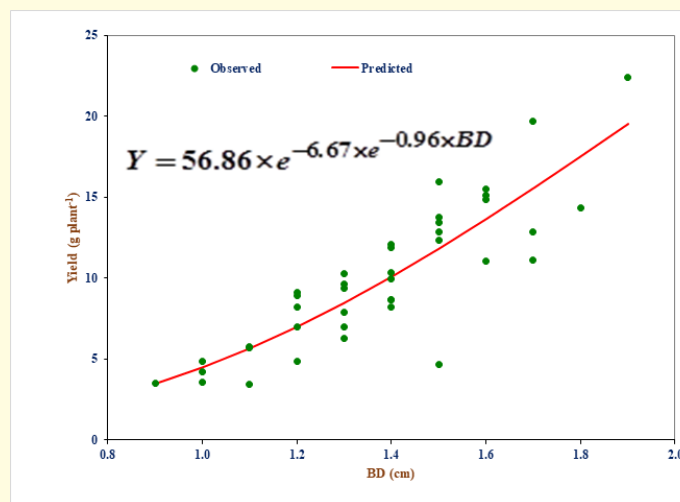
Alternate band planting was advantageous in crop management and resulted in stable yield for component crops with high overall yield and profit. In every situation of ASR and AB resulted in total yield advantage up to 54% and 41%, respectively, though individual yields were low to their corresponding sole yield. Jute was highly dominant and competitive in this crop combination. For the two planting systems of ASR and AB, jute retained 70-97% and 65-

89% of sole fibre yield, mungbean retained 26-71.5% and 40-64.5% of sole grain yield, jute equivalent yield increased by 4.9% to 45.3% and 30.7% to 51.1% over sole jute, respectively. Land equivalent ratios (LER) and area X time equivalent ratios (ATER) exceeded unity and monetary advantage index exceeded Rs 27000/ha. Thus, jute-mung bean intercropping was productive and profitable than monocropped jute in every situation.

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ICAR-CRIJAF, Barrackpore

Predictive Model for Estimation of Dry Fibre Yield of *Tossa* Jute

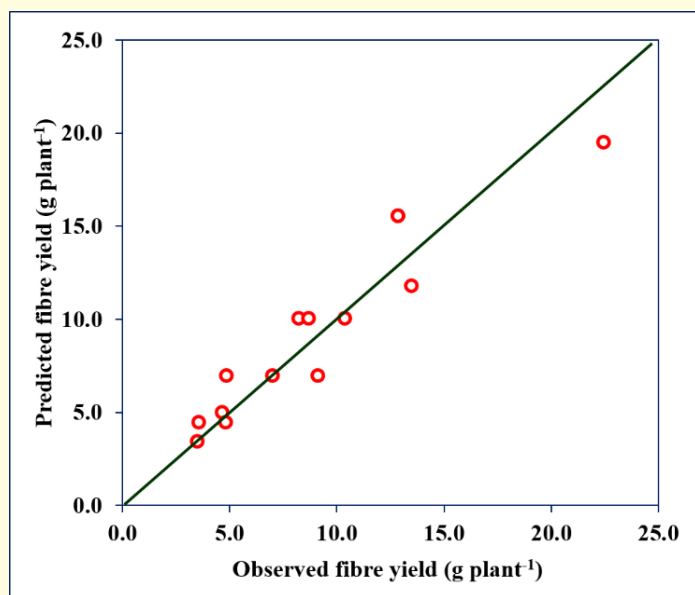
Relationship between the total dry fibre yield (g plant⁻¹) and basal diameter (cm) of *tossa* jute (*C. olitorius*) was fitted using Gompertz model ($Y = k \times e^{-b \times e^{-a \times BD}}$), where Y is weight of the dry fibre yield (g plant⁻¹), BD is basal diameter (cm) measured at 3-5 cm above ground level, *k*, *a* and *b* are parameters of Gompertz model. Data of BD (measured form 110 days plant) and dry fibre yield of randomly selected 60 jute plants. The BD values of the selected plants ranged from 0.85 to 1.86 cm and dry fibre yield ranged from 3.07 to 22.79 g plant⁻¹. The original dataset of 60 plants were divided into two mutually exclusive and independent sets of 45 (75%) and 15 (25%) for model fitting and validation, respectively. The model was fitted using Levenberg-Marquardt algorithm in SAS 9.3 NLIN procedure. The fitted model resulted in high R-square (0.89) and low Akaike information criteria (AIC) (48.36). Validation of the fitted model was done by ($Y=56.86 \times e^{-6.67 \times e^{-0.96 \times BD}}$) plotting 1:1 graph of observed against predicted values of jute fibre yield, obtained by using the fitted model parameters. As Gompertz model satisfied both



Observed and predicted fibre yield at different BD after fitting Gompertz model on 25% data set

the model fitting and validation criteria, it can be used as the predictive model for estimation of dry fibre yield of *tossa* jute.

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Validation of the Gompertz model of dry fibre yield–bd on using 25% data set

Human Metastasis like Event Found to Cause Jute Stem Rot (*Macrophomina phaseolina*) Symptoms at Distant Plant Parts

Stem rot disease caused by *M. phaseolina* in white jute (*C. capsularis*) manifests the initial symptom that appears as dark brown or black necrotic spot on the stem at knee height and sometimes reappears at a upper point, leaving the lower portion healthy and green making it undetectable by microscopy or PCR. First time in plant system, presence of Nuclear Receptor Co-Activator (NCOA3) was evidenced which directly binds nuclear receptors and stimulates the transcriptional activities in a hormone-dependent fashion. NCOA3 is a p160SRC family homolog that functions as a nuclear receptor co-activator by interacting with steroid receptors and possesses an intrinsic histone acetyltransferase activity. In the jute-*M. phaseolina* system NCOA3 interacts with CBP/P300, SRC1, ER stress response protein to initiate signaling



Jute stem rot symptoms at distant plant parts

pathway that proliferates *M. phaseolina* induced metastasis as happen in human cancer. Domain architecture of NCOA3 consists of several functional domains which is different from animals.

MicroRNA, miR-99a was also identified which is identical with human miR-99a that inverses the metastasis by suppressing NCOA3 and serves as defence tool in *M. phaseolina* resistant cell lines. Post pathogen infection overexpression of miR-99a was noted in diseased plant cells, but in advanced stage of apoptosis miR-99a level reduced drastically. *M. phaseolina* infection abates host defence pathway and induces cell death in host plant. A stable micro-RNA scraper strategy was used to inhibit miR-99a *in vivo* which could convert nonaggressive lesions into apoptotic ones. This miR-99a is especially responsible for inhibition of several steps of apoptosis including local invasion, vascular survival at a distant site, cytoplasm condensation and cytoskeletal elements disintegration. Such pleiotropy is achieved via coordinated repression of a cohort of apoptosis promoting genes, including NCOA3. Indeed, NCOA3 re-expression reverses miR-99a imposed suppression of pseudo-metastasis. The repression of NCOA3 by miR-99a to suppress pseudo-metastasis is novel in plant system.

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S. Satpathy
ICAR-CRIJAF, Barrackpore

Modified Scraper Unit for CRIJAF Single Wheel Jute Weeder

“CRIJAF single wheel jute weeder” has been modified at its scraper unit to cater the need of removing weeds in jute sown in line and other upland row crops with more than 240 mm spacing and also to suit varying soil conditions. A semi-arc shaped soil working unit of 180 mm width has been designed and fabricated for better coverage and easy movement in the soil during operation. The unit is made of hardened m.s. flat of 2.5 cm width cm and front edge was sharpened for smooth

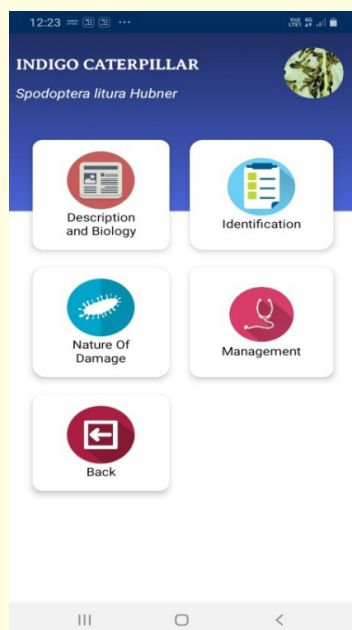


CRIJAF single wheel jute weeder with modified scraper

cutting of soil crust as well as grass. The beam of the unit is made of m.s. square bar of 16 cm length. Two holes were engraved on the upper part of the beam for fixing the unit tightly on the tool frame of weeder. The operator needs to use push-pull force to break the soil crust and uproot or cut the weeds. During its evaluation, it was found that, at an average speed of 28.08 m/min, the field capacity was found to be 0.026-0.028 ha/h.

R. K. Naik
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JAF-Safe: An Android Based Mobile App for Insect Pest Management in Jute



An android based mobile App “JAF-Safe” has been developed by ICAR-CRIJAF for quick retrieval of information on insect pest management of jute and allied fibre crops. Information on proper identification of insect pests, time and extent of damage of crop plants is the first step towards its management. The identity of the insects primarily depends on time of infestation and nature of damage. Hence, the idea about the damage gives first hand clue about the insect involved in causing the damage. JAF-Safe

mobile app is the guide for jute farmers to take decisions on pest management activities. The information given in this App will be most useful for extension workers, students, teachers and farmers. This App is available in Google Play Store with a key word “JAF-Safe” and in Krishi Portal.



B.S. Gotyal and S. Satpathy
ICAR-CRIJAF, Barrackpore

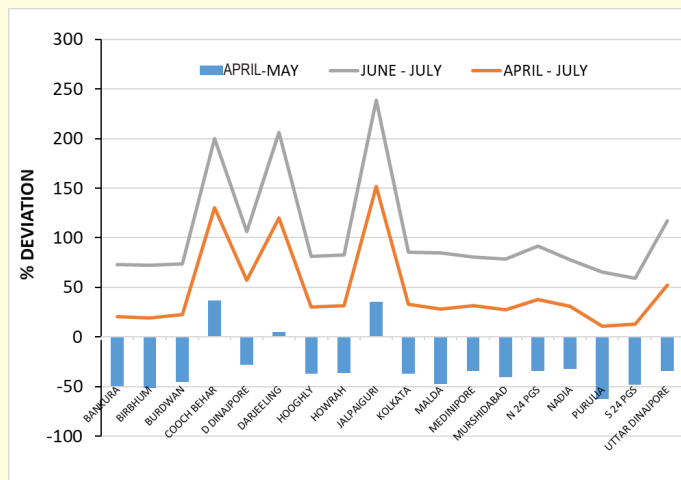
Account of 102 Year Extreme Rainfall and Air Temperature Related to Jute Production in West Bengal

District level rainfall and temperature data of 102 year (1901-2002) were analyzed for assessment of trend and extreme events related to jute production in West Bengal. The deviation from optimum rainwater and air temperature

(April-May: rainwater- 229 mm, T_{max} -37°C, T_{min} -24°C & June July: rainwater- 304 mm, T_{max} -37°C, T_{min} -24°C) were computed and observed that the long-term average (102-year) actual rainwater during April-May was lower in all the districts except in Darjeeling, Cooch Behar and Jalpaiguri. Maximum air temperature was higher in Bankura, Birbhum, and Murshidabad but lower in rest of the jute growing districts of West Bengal. The minimum air temperature was lower than optimum in Cooch Behar, Dakshin Dinajpur, Darjeeling, Hooghly, Jalpaiguri, Malda, South 24-Parganas, and Uttar Dinajpur and it was higher in the rest. However, in June-July, actual rainwater was higher than the optimum (304 mm) for all the districts that means there was no shortage of rain water for jute production during that period but the stagnation of water in jute field was observed as detrimental to fibre quality. During this period (June-July) both the maximum and minimum air temperatures were within the optimum range and congenial to jute growth in all the jute growing districts except in Darjeeling and South 24-Parganas where only minimum air temperature was found lower than the optimum which reduced the jute growth.

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ICAR-CRIJAF, Barrackpore

Physiological Response of Jute Seedlings to Drought



District level rainwater deviation from water requirement of jute in West Bengal

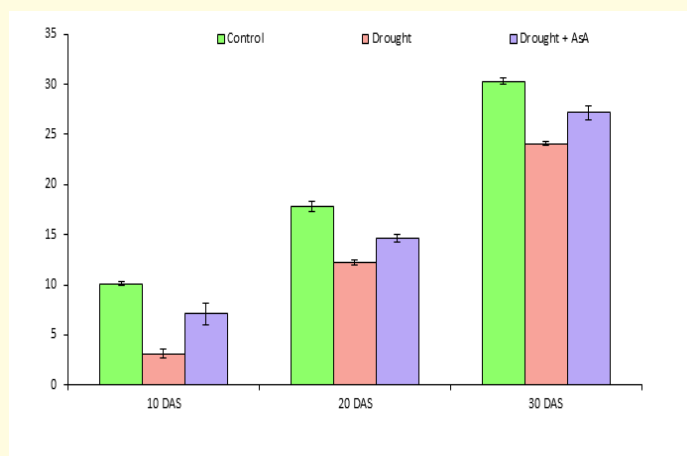
Drought is commonly observed at early stage of jute growth which results in developmental retardation. Seedlings were subjected to drought at 10 DAS, 20 DAS and 30 DAS by withholding irrigation. Additional set of plants were treated with 10 mM ascorbic acid (AsA) through foliar application. The soil moisture content was maintained at 7.6%-9.6% (average 8.6%) with relative water content of 53.6%-60.9% (average 57.25%) under drought. Drought at all stages reduced plant height, leaf number, chlorophyll content, carotenoid content and membrane stability which were found to be better in plants sprayed with AsA. At 10 DAS, plant height and leaf number were most affected by drought

whereas the membrane stability, chlorophyll and carotenoid content were affected equally at all three stages. The loss in leaf number may be attributed to both leaf shedding as well as non-emergence of new leaves under drought. Moreover, the effect of exogenous AsA in maintaining the plant height and leaf number was more prominent at 10 DAS. Therefore AsA plays an important role in maintaining leaf number and plant height at early onset of drought at 10 DAS.

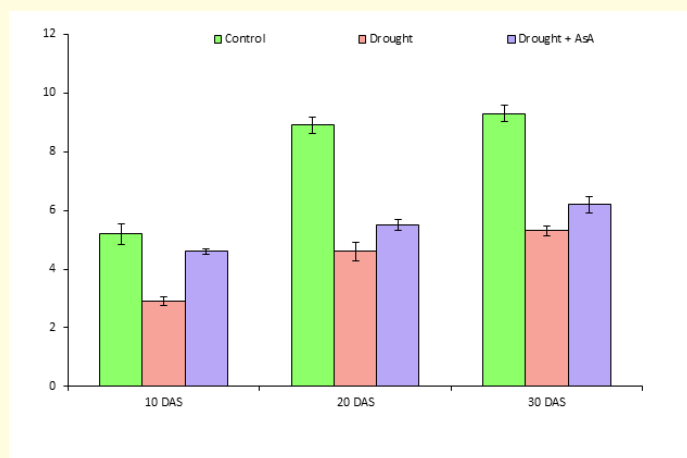
L. Sharma, S. Roy, P. Satya, D. Barman, S. Mitra and J. Mitra
ICAR-CRIJAF, Barrackpore

Perceived Impact of TSP on Tribal Farmers' Livelihood

A benchmark survey on the livelihood of tribal farmers of Makaltala and Farmania villages revealed that various agriculture and allied activities can profitably be carried out to improve socio-economic status of the tribal families. Keeping this in mind, various activities for enhancing the livelihood security were introduced by ICAR-CRIJAF from



Plant height of jute seedlings under drought at 10 DAS, 20 DAS and 30 DAS with exogenous Ascorbic acid



Leaf number of jute seedlings under drought at 10 DAS, 20 DAS and 30 DAS with exogenous Ascorbic acid

2014-15 to 2017-18 under Tribal Sub Plan (TSP). The major interventions were improved jute varieties, line sowing, jute-mung intercropping, nail weeder, retting with CRIJAF Sona, improved package of practices of mustard, coriander, nigella, kharif and boro rice, duckery, poultry and entrepreneurship development through various training programmes. Several trainings were imparted to women Self Help Groups (SHG) on preparation of jute bag and other handicraft. The perceived impact study of different interventions on farmers (n=80) indicated that the TSP interventions in the village helped to enhance the livelihood security of the farmers.

Perceived impact of TSP interventions by tribal farmers

Particulars	Score	Rank
Gain in confidence in farming	141	1
Gain in skill in proper use of inputs and implements	135	2
Gain in knowledge	131	3
Increased decision making capacity	130	4
Increased food availability	129	5
Improvement in living conditions	120	6
Optimum use of resources	110	7
Increased social interaction	100	8
Cropping intensity increased	87	9
Increased income	84	10
Area under the crops increased	82	11
Improvement in children education	78	12
Optimum use of family labour	76	13
Provided employment opportunity	74	14
Reduced migration	70	15

Shamna. A, S.K.Jha, S.Kumar and R.K. Naik
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CRIJAF Jute- Paddy Weeder for Weeding in Both Jute and Paddy

Jute is mainly grown in jute-rice-oilseeds/pulses/vegetable cropping sequences in jute growing belts. Previously developed CRIJAF nail weeder for mechanical weeding in row sown jute was improvised to develop CRIJAF Jute- Paddy weeder which can work both under upland and wet land condition (transplanted rice). In this CRIJAF Jute- Paddy weeder provisions have been made to attach two conical rotors/other rotors and one boat with the CRIJAF nail weeder replacing its front wheels and nail assembly behind the tool to work in wet land condition.

CRIJAF Jute-Paddy weeder can be operated 10 to 15 days after rice transplantation by to and fro movement in between rice rows (25 cm), at 1-2 cm standing water. It has been tested



CRIJAF Jute- Paddy weeder and its operation in transplanted rice

successfully in farmers' field in North 24 Parganas and Nadia districts for three years. It saves up to 60 man days/ha for weed control in rice. It reduces dependence on manpower and herbicides. Its field capacity is around 0.14 ha/day.

A.K. Ghorai,
ICAR-CRIJAF, Barrackpore

Inclusion of Fodder in Integrated Farming System under Sisal Plantation for Enhancing Farm Income

The gap of about 3-3.25 m between two double rowed sisal plantations can be utilized profitably if intercropped with other crops along with animal components in which the farm waste component can be utilized as the input for other component. With this rational integrated farming system approach in sisal plantation at SRS, Bamra, Odisha was taken up comprising cereal based fodders viz. maize, jowar, oats and hybrid napier and leguminous fodder viz. cowpea and cluster bean. The Integrated Farming System not only generated an additional income of Rs. 14,685/- per ha apart from annual production of 10.42 tonnes of grass but also revealed an increase in yield attributing characteristics of sisal in comparison to the sisal plantation without fodder. The vegetative cover due to fodder cultivation also aided in conservation of both soil and water by checking the surface run-off. The green fodder, as a rich source of Vitamin A and other food supplements enhances milk production in the dairy.

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Cluster Bean



Cowpea



Maize



Oats

Zero Tillage Jute After Summer Rice/ Onion to Minimize Cost of Cultivation

The reduction of cultivable area of jute in India during current decade is primarily due to its escalating cost of cultivation. Savings in the cost of ploughing, irrigation, fertilizer and drudgery in sowing through adopting zero tillage jute after summer rice or onion harvest may alleviate this problem to some extent. At ICAR-CRIJAF, zero tillage jute (cv. NJ 7010) was sown (2018) after onion harvest. After harvest,



Zero till jute (60 DAS) after summer rice in clay soil at Paschim Medinipur, WB.

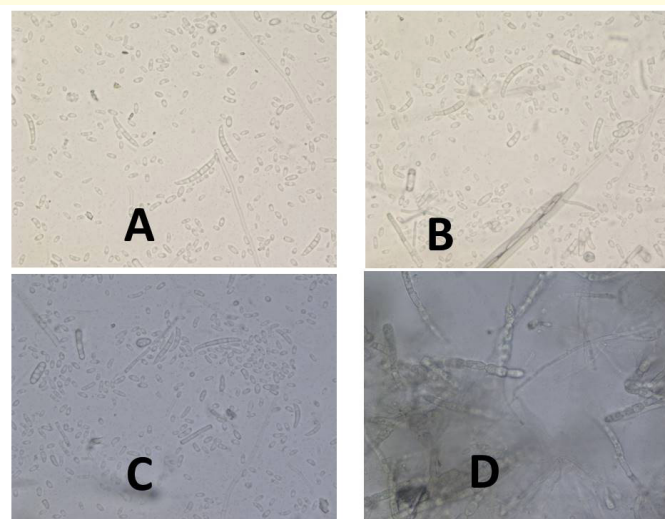
Glyphosate 41% SL was sprayed on zero tilled field @ 5ml/l to control established weeds. Two days after it, jute seed (cv. NJ 7010) was broadcast on this field and was given shallow flood irrigation (2 cm approx.). It eliminated the cost of ploughing completely. For controlling grassy weeds Quizalofop 5 EC @ 60 g/ha a.i. was applied at 21 DAE. The fertilizer dose given was N:P:K:: 30:00:00 in the place of N:P:K:: 60:30:30. Another shallow irrigation were applied to the jute crop at severe drought. In zero till alluvial soil, the jute fibre yield was up to 30 q/ha. The mean jute plant height was 334 cm, basal diameter was 1.60 cm. Pilot studies on zero till jute were also at Kalapunja, Paschim Midnapur, WB (2018 & 2109) in clay soil. After summer rice (Boro) harvest, jute cv NJ 7010 were sown on zero till bare soil (full of hair cracks) followed by one shallow flood irrigation. The fertilizer dose farmers applied were Nitrogen: 108.61 kg and Phosphorus: 51.8 kg /ha in the form of Gromor (28:28:0). Weed control accomplished by spraying of post emergence herbicide quizalofop ethyl 5EC @ 60 g/ha at 21 DAE. Farmers got 37.5 q fibre yield/ha in both the years.

In conventional jute cultivation at least two plough and one planking are required for sowing of jute which requires about Rs. 7500/ha. Zero tillage sowing of jute (broadcast method) after onion saves the cost of fertilizer (Rs.2500/ ha) due to its high residual fertility. Zero till soil being smooth and even, it increases the irrigation efficiency and reduces irrigation cost by Rs.2500/ ha.

A.K. Ghorai,
ICAR-CRIJAF, Barrackpore

Morphological Identification of *Fusarium udum* f. sp. *crotolariae*: The Causal Organism of Sunnhemp Wilt

Sunnhemp plants showing typical vascular wilt symptoms were collected from farm of ShRS, Pratapgarh. The pathogen was isolated by tissue isolation method on PDA medium and its cultural and morphological characters were recorded. The isolated fungus produced greyish mycelium with flattened growth. Macroconidia were falcate, 3 to 4 septate with hooked



Morphological characteristics of *Fusarium udum* f. sp. *crotolariae* isolated from Sunnhemp. A-C: Macroconidia and Microconidia, D: Chlamydospores in chain

apical cells. Microconidia were oval to reniform with 0 to 1 septa. Chlamydospores were produced either singly, in pairs, or in short chains. Morphological characteristics indicated that isolate was closely related to *F. udum*. Pathogenicity test of isolated *Fusarium* spp. on sunnhemp seedlings confirmed the pathogenicity of *F. udum* sp. *crotolariae* causing wilt disease in sunnhemp.

K.V. Shivakumar and S.K. Sarkar
ICAR-CRIJAF, Barrackpore



Pathogenicity of *Fusarium udum* f. sp. *crotolariae* on Sunnhemp

PUBLICATIONS

Research Papers

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- Saha, A. R., Mazumdar, S. P., Majumdar, B., Sarkar, S., Paswan, A., and Biswas, B. (2019). Mati parikkha o lakkhamatra bhittik alu utpadaner janno sar proyoger prastut ganakari (In Bengali), *Leaflet* ICAR-CRIJAF, Barrackpore (February 2019).
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- Shamna, A., Jha, S.K., Kumar, S. and Roy, M.L, (2019). Role of agriculture extension and supporting services in transfer of technology – A case study, Compendium of abstracts, National Seminar on “Sustainable Resource Management for Enhancing Farm Income, Nutritional Security and Livelihood Improvement”. 1-3 February, 2019, Visva Bharati. P. 12.

Radio Talk

- Sitangshu Sarkar, Principal Scientist was invited by Prasār Bhārati to deliver a radio talk on “Ei samaye pāt chāse karaniyo” for farming community listeners of India and Bangladesh broadcasted by Maitree Channel of All India Radio, Kolkata on 05.04.2019.
- Sitangshu Sarkar, Principal Scientist was invited by Prasār Bhārati to deliver a radio talk on “Ei samaye pāt chāser prastuti” for farming community of India broadcasted by Geetanjali Channel, All India Radio, Kolkata on 06.04.2019.
- Sitangshu Sarkar, Principal Scientist was invited by Prasār Bhārati to deliver a radio talk on “Pāter atit, bartamān o bhobishyat” for farming community of India broadcasted by Geetanjali Channel, All India Radio, Kolkata on 10.04.2019.
- Sitangshu Sarkar was invited by Prasār Bhārati to deliver a radio talk on “Ei samaye pāt chāse karaniyo” for farming community of India and Bangladesh broadcasted by Maitree Channel of All India Radio, Kolkata on 12.04.2019.
- B. Majumdar, Principal Scientist participated as an expert

in the “Khet khamarer Katha” programme for farming community of India and Bangladesh on a topic “Paat Chase Pusti Byabasthapan” broadcasted by the Maitree Channel of All India Radio, Kolkata on 06/04/2019 and by Akashbani Kolkata on 05.04.2019 in “Aajker Chas Bas” Programme.

B. Majumdar and Dr. S. Sarkar participated as expert in the “Khet khamarer Katha” programme for farming community of India and Bangladesh on a topic “Paat Chaser Katha” broadcasted by the Maitree Channel of All India Radio, Kolkata on 17.04.2019.

Invited Lectures

B. Majumdar, delivered a lead paper on “Production of quality jute (*Corchorus olitorius*) fibre through deployment of improved microbial retting method by the farmers

of Dakshin Dinajpur” in COBACAS 4th National Conference on “Diversified farming system: Sustainable Livelihood and Doubling Farmer’s Income”. Majhian Campus, UBKV, Balurghat, 17-18 January, 2019.

M.S. Behera, Principal Scientist was invited to deliver a lecture on ‘Scope and opportunity of growing medicinal and aromatic plants in jute based cropping system’ in National Conference of Stakeholders on “Conservation, Cultivation, Resource Development and Sustainable Utilization of Medicinal Plants of North-Eastern India”, 6-7 March 2019, Nagaland University, Lumami.

S. Datta, Principal Scientist delivered an invited lecture on “Scope of Herbicide Resistant Crops: Tools for Integrated Weed Management” in International symposium on “Biotechnology for Food-Nutritional Security and Organic Agriculture”, 25-26 March, 2019, DBT-NECAB, AAU, Jorhat.

HUMAN RESOURCE DEVELOPMENT

Training undergone by the Scientists/ Staff Members

Name of the Programme/training	Place and Date	Name of the Participants
Scientists		
Identification and Mass Multiplication of Entomopathogens for the Management of Insect Pests	ICAR-IIOR, Hyderabad 21-26 January, 2019	Dr. V. Ramesh Babu
CAFT on Genomics Assisted Crop Breeding Techniques	PAU, Ludhiana 22 Jan-11 Feb, 2019	Dr. H.R. Bhandari
30 th Annual Workshop of AINP on Jute and Allied Fibres	BAU, Sabour 14-15 February 2019	18 scientists of ICAR-CRIJAF
Clinic on Intellectual Property Rights (IPR)	ICAR-NINFET, Kolkata 02 March, 2019	Dr. S. K. Sarkar Dr. R. Saha
PAT Training	ICAR-NBPGR, New Delhi 03 Jun- 03 Sept, 2019	Dr. Jitendra Kumar Meena
PAT Training	ICAR-NIPB, New Delhi 03 Jun- 18 Sept, 2019	Mr. Vikas Mangal
Administrative Staff		
Enhancing Efficiency and Behavioural Skills of Stenographer Grade-III, PA, PS and PPS Officer of ICAR Hqs/Institutes	ICAR-NBSSLUP (RS), Kolkata 07-12 January, 2019	Mrs. N. Mandal
How to create the EMD and how to use e-office (e-file) and maintain the e-office as local admin	ICAR-IASRI, New Delhi 03-04 May, 19	Shri Surajit Barman Ms. Farheen Banu
Technical staff		
Sensitization / Training Programme for e-office for ICAR institutes	ICAR-IASRI, New Delhi 23-24 January, 2019	Mr. G. Ghosh Mr. P. Singh
KOHA for Library Staff of ICAR	ICAR-NAARM, Hyderabad 21-26 February, 2019	Mr. R. Mitra
Motivation, Positive Thinking and Communication Skills for Technical Officers (T-5 and above) of ICAR Institutes	ICAR-IISWC, Dehradun 13-19 March, 2019	Mr. S. Biswas

Capacity Building and skill upgradation programme for technical staff on farm management	ICAR-IIFSR, Modipuram, Meerut 13-19 February, 2019	Mr. Bitan Das
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Seminars/Conferences/Symposia attended:

Programme	Place and Date	Name of the Participant
National Conference on “Emerging trends in Phyto-pesticides and pheromone research-PHYTOPHEROCON2019”	Annamalai University Tamil Nadu 03-04 January, 2019	Dr. V. Ramesh Babu
4 th National Conference on Diversified Farming System: Sustainable Livelihood and Doubling Farmer’s Income organized by Cooch Behar Association for Cultivation of Agricultural Sciences (COBACAS)	Regional Research Station (Old Alluvium Zone) of UBKV, Majhian, Dakshin Dinajpur, West Bengal. 17-18 January, 2019	Dr. Sitangshu Sarkar, Dr. Bijan Majumdar, Dr. Amit Ranjan Saha, Dr. Ritesh Saha
53 rd Annual Convention of ISAE and International Symposium on “Emerging Technologies for Precision and Climate Smart Agriculture”.	Inst. Agril Sci., BHU, Varanasi 28-30 January, 2019	Dr. R.K. Naik, Sr. Scientist
National Seminar on “Sustainable Resource Management for Enhancing Farm Income, Nutritional Security and Livelihood Improvement”	Visva-Bharati, Sriniketan 01-03 February, 2019	Dr. S.P. Mazumdar
National Seminar on “Natural Fibre Resource Management for Sustainable Developments”	ICAR-NINFET, Kolkata 02-03 February, 2019	Dr. M.S. Behera Dr. D. Barman Dr. R.K. Naik
International Symposium on “Advances in Agrometeorology for Managing Climatic Risks of Farmers”,	JNU, New Delhi 11-13 February, 2019	Dr. D. Barman
National Conference of XIV Agriculture Science Congress on “Innovations for Agricultural Transformation”	ICAR-IARI, New Delhi 20-23 February, 2019	Dr. A.R. Saha Dr. R.K. De Dr. R. Saha Dr. M.S. Behara Dr. R.K. Naik
National Symposium on “Recent Challenges and Opportunities in Sustainable Plant Health Management”	BHU, Varanasi 26-28 February, 2019	Dr. K. Mandal
West Bengal State Science Congress	Science City, Kolkata 28 February - 1 March, 2019	Dr. S. Datta
The 6 th Dr. S.K. Mukherjee and Dr. K.K. Rohatgi-Mukherjee Annual Endowment Lecture of Raman Centre for Applied & Interdisciplinary Sciences	NBSSLUP (RS), Kolkata 01 March, 2019	Dr. D.K. Kundu
National Conference of Stakeholders on “Conservation, Cultivation, Resource Development and Sustainable Utilization of Medicinal Plants of North-Eastern India”	NU, Lumami 06-07 March, 2019	Dr. M.S. Behera
National Symposium on ‘Use of agrochemicals for a sustainable agriculture and environment’ organized by the Society for Fertilizer and Environment (SFE)	BCKV, Kalyani; 16 March, 2019	Dr. Sitangshu Sarkar, Dr. Dilip Kumar Kundu, Dr. Amit Ranjan Saha
DBT NECAB Symposium	AAU, Jorhat 25-26 March, 2019	Dr. S. Datta
National Seminar on “Use of Agrochemicals for a Sustainable Agriculture and Environment and the 6 th Annual Convention of the Society for Fertilizers & Environment”	BCKV, Kalyani 27 March, 2019	Dr. S. Sarkar Dr. D.K. Kundu Dr. A.R. Saha

COMMERCIALIZATION

Registration and Commercialization of Technologies

Commercialization of the technologies extension of license

Non-exclusive license of M/s Bengal Biotech and Research, West Bengal for large scale production and sale of CRIJAF SONA has been extended for two years w.e.f. 12th April, 2019, based on the report of the committee for inspection of the production site and recommendation of ITMC.

Rate revision: The institute continued the commercialization contract with the following manufacturers for different institute technologies with the revised rates mentioned as below:

Technology	Name of the manufacturer	Revised rate (Rs.) w.e.f. 01.04.2019
CRIJAF SONA	M/s Bengal Biotech & Research	50 per Kg
	M/s Next 2 Nature	60 per Kg
Multi Row Seed Drill	M/s Joy Maa Tara Enterprise & M/s Krishi Udyog	<ul style="list-style-type: none"> • 4100 per unit (4-row) • 4500 per unit (5-row)



MoU signed with M/s Bengal Biotech and Research, WB

Royalty: During Jan-Jun, 2019, total Rs. 1.84 Lakhs was received as royalty payment of various commercialized technologies (CRIJAF-Nail Weeder, CRIJAF Multi-Row Seed Drill and CRIJAF SONA, CRIJAF Flax Fibre Extractor, CRIJAF Single Wheel Jute Weeder and CRIJAF Herbicide Applicator).

(Source: ITMU)

Participation in Intellectual Property Rights (IPR) Clinic: Dr. R. Saha I/c ITMU and Dr. S.K. Sarkar, I/c PME Cell ICAR-CRIJAF attended the Clinic on Intellectual Property Rights (IPR) at ICAR-NINFET, Kolkata on 02.03.2019. The IPR Clinic covered various aspects of IPR like Patents, Copyrights, Trademarks, and biodiversity laws and their

application in scientific research and commercialization. Another target of this Clinic was to identify and settle on the problems faced by the researchers to file the patent and their queries about the delay of their patent applications at Patent Office.

(Source: R. Saha)

Appointment of Anjan Sen & Associates as Patent Attorney: To give fresh impetus on IPR protection of institute technologies, a new firm M/s Anjan Sen and Associates has been engaged w.e.f. 30.03.19 to act as IPR attorney on behalf of ICAR-CRIJAF

(Source: ITMU)

AWARDS and RECOGNITIONS

Dr. S. Satpathy, Head, Crop Protection Division was conferred with “ISVS Fellowship-2017” of Indian Society of Vegetable Science–2017, Varanasi for significant contribution in the field of Vegetable Research during the Vegetable Science Congress- VEGCON-2019, 01-03 February, 2019, RAU, Jodhpur.

Dr. Ritesh Saha, Principal Scientist awarded with Best Oral presentation award for the research paper “System productivity, Resource and Radiation use efficiency under Conservation Agriculture in jute based Cropping Systems” in COBACAS 4th National Conference on “Diversified Farming System: Sustainable Livelihood and Doubling Farmer’s Income” on 17-18 January, 2019, Majhian Campus, UBKV, Balurghat.

Dr. M.S. Behera, Principal Scientist received the Best Paper Award conferred by The Indian Natural Fibre Society, Kolkata during National Seminar on Natural Fibre Resource Management for Sustainable Development, 2-3 February, 2019 held at ICAR-NINFET, Kolkata.

Dr. Dhananjay Barman, Senior Scientist was awarded with Best Paper Presentation Award conferred by Association of Agrometeorologists, Anand for the research paper ‘Spatial and temporal variability analysis of rainfall for major jute growing districts of West Bengal’ during International Symposium on “Advances in Agrometeorology for Managing Climatic Risks of Farmers”, 11-13 February, 2019, JNU, New Delhi.

Dr. B.S. Gotyal, Senior Scientist was awarded with the NAAS Associateship for the year 2019.



Dr. B. S. Gotyal receiving NAAS Associateship

Institute Annual Award presentation during Foundation Day: The Institute conferred awards for various categories of staff members during the Foundation Day ceremony of the Institute on 9th February, 2019. Dr. A. Anil Kumar, Scientist was awarded with ‘Best Young Scientist Award 2018’. Under technical category Mr. M.K. Pradhan, Technical Officer was awarded with ‘Best Technical Personnel Award-2018’. Under administrative categories Mr. Rajkumar Ghosh, Assistant was conferred with ‘Best Administrative Personnel Award-2018’. Similarly, Mr. Ratna Bahadur, Skilled Support Staff was awarded with ‘Best Skilled Support Staff Award-2018’.



Sh. M.K. Pradhan receiving the Best Technical Personnel Award.



Sh. Rajkumar Ghosh receiving the Best Administrative Personnel Award.



Sh. Ratna Bahadur receiving the Best Skilled Support Staff Award.

DISTINGUISHED VISITORS

Name of the Visitor	Affiliation	Date
Dr. S.S. Singh	Director, ICAR-ATARI, Kolkata	03 Jan, 2019 30 June 2019
Dr. N.C. Pan	Director, ICAR-NINFET, Kolkata	09 Feb, 2019
Sh. Keshari Nath Tripathi	Hon'ble Governor of West Bengal	24 Feb, 2019



Sh. Keshari Nath Tripathi, Hon'ble Governor, W.B. releasing CRIJAF Bulletin during launching of PMK-Samman Nidhi

JOININGS/NEWLY RECRUITED/NEW COLLEAGUES

Scientists



Dr. Jitendra Kumar Meena
Scientist
CRIJAF, Barrackpore
Date of joining-16.04.2019



Mr. Vikas Mangal
Scientist
CRIJAF, Barrackpore
Date of joining-16.04.2019

TECHNICAL PERSONNEL



Mr. R.N. Kumar
Technician Trainee (T-1)
SRS, Bamra
Date of joining-03.01.2019



Mr. A. Banerjee
Technician Trainee (T-1)
ICAR-CRIJAF, Barrackpore
Date of joining- 11.01.2019



Mr. S. Nandy
Technical Assistant (T-3)
ICAR-CRIJAF, Barrackpore
Date of joining-11.02.2019



Mr. A. Singha Roy
Technician Trainee (T-1)
CSRSJAF, Bud Bud
Date of joining-13.02.2019



Kazi Md. Azharuddin
Technician Trainee (T-1)
KVK, North 24 PGS
Date of joining-26.03.2019

SKILLED SUPPORTING STAFF



Shri Fakir
Skilled Supporting Staff
SRS, Bamra
Date of joining-27.04.2019



Shri Lochindra
Skilled Supporting Staff
SRS, Bamra
Date of joining- 27.04.2019



Shri Abdul Merej
Skilled Supporting Staff
RRS, Sorbhog
Date of joining-01.05.2019



Shri Bishu Chhetri
Skilled Supporting Staff
KVK, 24 (N) Paragnaas
Date of joining-02.05.2019



Shri Ram Asre Yadav
Skilled Supporting Staff
ShRS, Pratapgarh
Date of joining-03.05.2019



Shri Sanat Bagdi
Skilled Supporting Staff
CSRSJAF, Bud Bud
Date of joining-27.04.2019



Shri Chintaharan Das
Skilled Supporting Staff
RRS, Sorbhog
Date of joining-01.05.2019

SUPERANNUATION



Dr. S. Biswas
Pr. Scientist
CRIJAF, Barrackpore
Date of retirement-28.02.2019



Mr. P.K. Biswas
T-5
CRIJAF, Barrackpore
Date of retirement-28.02.2019



Sri Dharendra Nath Kundu
Skilled Supporting Staff
CSRSJAF, Bud Bud
Date of retirement-30.06.2019



Shri Chintaharan Das
Skilled Supporting Staff
RRS, Sorbhog
Date of retirement-31.05.2019



Shri Sanat Bagdi
Skilled Supporting Staff
CSRSJAF, Bud Bud
Date of retirement-30.04.2019

COLLEAGUES LEFT ICAR-CRIJAF



Dr. Mukesh Kumar
Scientist (S.S)
joined RAU, Samastipur, Bihar as
Associate Professor on
28.03.2019

Present scenario of jute seed chain in India

Quality seed is the basic input for achieving higher yield for any crop. Higher seed replacement rate (SRR) coupled with reasonable varietal replacement rate (VRR) play significant role in increasing crop productivity. Use of farmers' saved seed is very uncommon in jute as fibre crop is usually harvested before pod formation stage leaving no scope for seed harvest from same plant. Unfavourable agro-climatic conditions in fibre growing regions also discourage farmers for jute seed production. The bulk of the required seed is produced by the private sector organizations based in Andhra Pradesh, Telengana, Maharashtra and Karnataka.

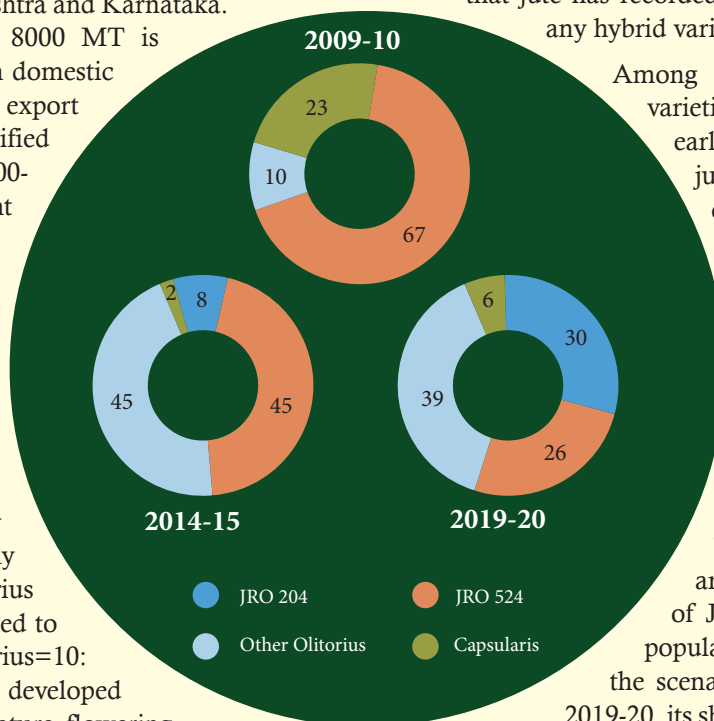
Annual seed production of 8000 MT is used to meet demand of both domestic seed requirement as well as export market. Although annual certified jute seed production (4000-5000 MT) seems sufficient for domestic requirement of quality seed, regular export of 2500-3000 MT leads to dearth of quality seed for our own farmers.

This also somehow jeopardised the VRR of jute in the seed chain. The jute area once dominated by capsularis varieties during early seventies (capsularis : olitorius = 75: 25) dramatically converted to *tossa* jute (capsularis : olitorius=10: 90) after release of JRO-524 developed through integration of premature flowering resistance gene from Sudan Green. Since its release in 1977, area under JRO-524 has increased gradually. This variety enjoyed monopoly, not only in India but also in our neighbouring south east Asian countries particularly in Bangladesh, covering about 90% of jute cultivation area in both countries. This is not only because of the popularity of the particular variety, but also due to trader's tendency to

bank upon assured market (both domestic and export) of old and established variety.

During last two decades, ICAR- CRIJAF has developed some outstanding varieties e.g., JRO-128, JRO-8432, S-19, JRO -204, CO-58, JRO-2407 etc. These varieties are superior to JRO 524 in terms of fibre yield and fibre quality. However, the advantage of yield and fibre quality of newer varieties could not be realised due to dominance of this single variety JRO-524. In addition, traders' compulsion to supply JRO-524 as per importers' demand skewed seed production in favour of JRO-524. Due to the initiatives from ICAR-CRIJAF and other government agencies like NJB, DJD and JCI during past 10 years the situation is improving gradually. Its noteworthy that jute has recorded more than 80% SRR without any hybrid variety in the seed chain.

Among high fibre yielding *tossa* jute varieties, JRO-204 (Suren) suitable for early-March sowing in entire *tossa* jute growing belt of the country was developed by ICAR-CRIJAF, Barrackpore, West Bengal and released in 2007. This variety has gained popularity among jute farmers and gradually reduced the dominance of JRO-524 (Navin). The share of predominant variety JRO 524 in breeder seed indent was almost 63% during 2010-11 and rests were of other white and *tossa* jute varieties. The share of JRO-204 was only 4%. With the popularization of JRO-204 (Suren), the scenario changed profoundly and in 2019-20, its share (30%) is more than the share of JRO-524 (26%). The share of other olitorius varieties including old and new (S-19, CO-58, JRO-2407 etc.) has also increased substantially from 19% to 39%. As in other crops, in jute also Varietal and seed replacement are most effective ways of increasing crop yield. Therefore, all stakeholders, policymakers should take initiative to ensure high SRR with quality seed (certified seed) and healthy VRR for the benefit of the farming community.



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