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Dr. Md. Abdul Awal joined BJRI as new Director General (DG)

Dr. Md. Abdul Awal joined Bangladesh Jute Research Institute (BJRI) on May 29, 2022 as Director General (DG). Dr. Awal served as the Member Director of the Bangladesh Agricultural Research Council (BARC). He also served as the Director (Administration and Finance) of Bangladesh Wheat and Maize Research Institute (BWMRI) in Dinajpur.

Dr. Md. Abdul Awal obtained B.Sc. Ag. Econ (Hons.) from Bangladesh Agricultural University (BAU), Mymensingh in 1994 and MS degree in Agricultural Economics from the same university in 1996. He did his Ph.D degree from Bangladesh Agricultural University in 2008. He also did a Post-Doctoral degree in Agricultural Economics in 2013 from Cornell University of USA.

He started his career as a Scientific Officer at On-Farm Research Division (OFRD) of the Regional Agricultural Research Station (BARI), Jamalpur in 1997. Later, he was promoted to Senior Scientific Officer and posted to On-Farm Research Division of Bangladesh Agricultural Research Institute in Mymensingh as an In-Charge. Subsequently, he was appointed as Principal Scientific Officer at BARC in 2012. During his service at BARC, Dr. Awal also had served as the Chief Scientific Officer, Planning and Evaluation Division.

Contents

Dr. Awal has published more than 110 scientific research articles in national and international scientific domains. Dr. Awal attended several national and international seminar, workshop and training programs on agricultural research at home and abroad. Over the last two decades, he represented Bangladesh in terms of agricultural development and progress in Thailand, France, Belgium, Italy, China, Germany, Canada and USA.

He was born in a respected Muslim family in 1970 in the village Dakkin Ranigaon, upazila Nalitabari, Sherpur district. Dr. Awal is the father of three daughters. He married Shafali Khatun in 1997. His father late Abdul Maula was a businessman as well as a social worker and mother Golesa Khatun was a housewife.

The 50th Victory Day observed at BJRI

Bangladesh Jute Research Institute (BJRI) Celebrated 50th victory day which is the most precious day of Bangladesh on 16 December 2021. The day was Celebrated with due solemnity and rich tribute paid to the martyrs of the liberation war of 1971. Bangladesh was born as an independent country under the leadership of the father of the nation Bangabandhu Sheikh Mujibur Rahman on December 16, 1971. The independence cost the supreme sacrifice of three million people and the honour of nearly two lakh women. The Country was liberated on this day from the Pakistani occupation forces after a nine month long bloodstrained war of Liberation.

This year, our country celebrated Golden Jubilee of independence. BJRI also celebrated it with befetting manner. Like all over Bangladesh victory day was observed by BJRI with various activities. Director General Dr. Md. Ayub Khan hoisted The National Falg at 7 AM in the premises of the office ground. National anthem was sung by the attendants. Special prayers were being offered in BJRI mosque for the peace of departed souls and for the prosperity of the country. All Directors, scientists, officers and employees made a procession and paid their respect to the great leader Bangabandhu Sheikh Mujibur Rahman Bangabandhu Bhaban at 32 no Dhanmondi, Dhaka. On the occasion of Mujib's centenary, a general meeting and cultural program was organized at 9 AM under the chairmanship of the Director General Dr. Md. Ayub Khan.

BJRI Scientist Dr. H. M. Zakir won National Jute Award 2022

Dr. H M Zakir Hossain, CSO (Product Development Division), Jute-Textile Wing ,Bangladesh Jute Research Institute (BJRI) has been honored as best scientist of 2022 and National Jute Award 2022 was given by Ministry Textile and Jute, Government of Peoples Republic of Bangladesh on the eve of National Jute Day, March 6, 2022. Dr. Md. Abdur Razzak MP, honorable Minister for Agriculture was present as Special Guest and distributed the prize. Md. Golam Dastogir Gazi MP, Minister for Textile and Jute was present as Chief guest. A crest and certificate was given to Dr. Zakir. People from all corners including Ex- Director Generals, University Professors and Ministry of Textile and Jute congratulated the outstanding achievement of Mr. Hossain. BJRI family especially Director General General, Director (Technology), Director (Jute-Textile), Director (Agricultutre), Director (Finance and Admin), Scientists and employee of different level enjoyed this event and congratulated Dr. Zakir for being means of this success for BJRI. Goodwill of BJRI has become more brighter nationally and internationally due this marvelous attainment of BJRI scientist.

Dr. Md. Abdur Razzak, MP Hon'ble Minister of Agriculture, Government of the People's Republic of Bangladesh distributing National Jute Award-2022 on March 6, 2022 to Dr. H. M. Zakir Hossain, CSO, Jute-Textile Wing, BJRI at Osmani Memorial Auditorium on eve of National Jute Day.

Dr. H. M. Zakir Hossain, CSO, Jute Textile Wing BJRI, the winner of The National Jute Award-2022 as best scientist in research category is seen with Dr. Md. Abdur Razzak MP, Ministry of Agriculture, Dr. Golam Dastgir Gazi MP, Minister of Textiles and Jute and other National Jute Award-2022 recipients in different categories.

Engr. Md. Moslem Uddin
joined as Director (Technology), BJRI

Ministry of Agriculture, Govt. of the People's Republic of Bangladesh, has appointed Md. Moslem Uddin as Director (Technology) of Bangladesh Jute Research Institute on 29 December 2021. Accordingly, Engr. Md Moslem Uddin joined as a Director (Technology) of Bangladesh Jute Research Institute on 02 January 2022. Prior to joining this new position, he was working as Chief Scientific Officer at the Chemistry Division of this Institute.

Engr. Md. Moslem Uddin completed his graduation in Textile Technology from College of Textile Engineering and Technology, Dhaka (Presently Bangladesh University of Textiles, BUTEX) in 1990. He had completed his Post Graduate Diploma (PGD) in Industrial Management from Bangladesh Institute of Management (BIM) in 1995, Dhaka. Subsequently, he also completed Master of Engineering degree from Bangladesh University of Engineering and Technology (BUET) with majoring in Industrial Engineering and Management in 2005.

Md. Moslem Uddin started his career as an Engineer (Quality Control) in Padma Textile Mills Ltd. (an Enterprise of BEXIMCO Group). After working in this renowned Textile Industries successfully for more than 2 years, Engr. Moslem Uddin joined in the Textile Physics Division of Bangladesh Jute Research Institute as a Scientific Officer on 30 June 1996. Subsequently, he has been promoted to Senior Scientific Officer (SSO) and Principal Scientific Officer (PSO) on 23 September 2004 and 24 November 2015 respectively in the same Division of BJRI. Recently he has been promoted to Chief Scientific Officer (CSO) in the Textile Physics Division of BJRI on 30 May 2021. During working at BJRI as a Scientist he has successfully completed several Government projects in different positions such as, Principal Investigator (PI), Expert member, etc. Engr. Md. Moslem Uddin is an external examiner of Dhaka University & BUTEX and expert member of Test methods at Bangladesh Standards and Testing Institution (BSTI).

Mr. Moslem has published more than 34 scientific papers in renowned National and International journals. He has attended different seminar and symposium in national and international level.

Mr. Moslem is a Fellow of Institution of Engineers Bangladesh (IEB), and active member of Institution of Textile Engineers and Technologists (ITET), BAAS, and BPS. He is also founders of a BM College, Science Club and Public Welfare Foundation of Sakhipur, Tangail.

Engr. Md Moslem Uddin was born on May 25, 1969 in a respectable Muslim family in Sakhipur Upazila in the district of Tangail. His wife Mrs. Jahanara Khatun is a teacher. He is blessed with two sons. His elder son is currently studying at the Department of EEE at the Islamic University of Technology (IUT), Gazipur, and the younger one is an SSC examinee.

Dr. Ferdouse Ara Dilruba
joined as Director (Jute Textile), BJRI

Dr. Ferdouse Ara Dilruba has been appointed as Director (Jute Textile) of Bangladesh Jute Research Institute (BJRI). Before joining the post of Director (Jute Textile), she was the Chief Scientific Officer (CSO) of Product Development Division, BJRI.

Dr. Ferdouse Ara Dilruba was born on 30 June 1970 in Brahmanbaria and she comes from an aristocratic Muslim family. She is the worthy daughter of her proud father Shahid Ul Alam and mother Shajeda Begum. She has obtained Junior School Scholarship Certificate. She completed her Secondary School Certificate (1st division) from Tejgaon Polytechnic Govt. Girls High School and Higher Secondary Certificate (1st Division) from Begum Badrunnesa Govt. Women College. She had completed Bachelor of Science (Honours) and Masters of Science degrees (1st Class) in chemistry from Dhaka University.

Dr. Ferdouse Ara Dilruba started her research career at Bangladesh Jute Research Institute as Scientific Officer on 30th June 1996 in Chemistry Division and subsequently, she was promoted to Senior Scientific Officer in 2004. By this time she had completed her Ph.D from the Chemistry Department, Jahangirnagor University in 2007. She was promoted to Principal Scientific Officer and Chief Scientific Officer in the year 2015 and 2021 respectively. During her working period, she has published 35 scientific publications (full scientific papers, monographs etc.) in different national and international journals.

Personally she is blessed with two lovely sons namely Rubait Ferdous Ruhan & Md. Farhan Alam. She always desire well wishes from his surroundings.

Dr. Nargis Akter
joined as Director (Agriculture), BJRI

Dr. Nargis Akter has been appointed as the Director (Agriculture) on 29 December 2021. Prior to joining as Director (Agriculture), she was the Chief Scientific Officer (CSO) of Breeding Division of BJRI. She is an expert in Quantitative Genetics and Plant Breeding.

Dr. Nargis Akter was born on 3 February 1968 in an aristocratic Muslim family at Faridpur. Dr. Akter has been very talented and wise since childhood. In 2010, she obtained Ph.D from Bangladesh Agricultural University (BAU), She completed MS (Genetics and Plant Breeding from Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur in 2001 and she acheived B.Sc Ag. (Hons) degree in at BAU in 1993 with remarkable result. She successfully attended different in country and foreign training programs. She participated training on Plant Breeding and Seed Production in Sweden and Philippine.

Dr. Akter started her professional career at Bangladesh Jute Research Institute as a Scientific Officer (SO) on 30th June 1996. In her scientific career she was directly involved in varietal development activities including supervision of field research of Jute and Allied Fibre crops. She was also actively involved in the developmental processes of stress tolerant variety of BJRI. Dr. Akter was also engaged in dissemination and popularization of newly released improved varieties at Farmers' fields. Dr. Nargis Akter has more than twenty eight scientific papers in different national and international journals. Now she is newly appointed as a Principle Investigator (additional charge) at Basic and Applied Research on Jute (BARJ) Project.

Biography of Dr. Md. Masroor Anwer

Dr. Md. Masroor Anwer awarded his Ph.D degree in 2013 from the Department of Physics, Bangladesh University of Engineering and Technology (BUET), Dhaka. Title of his thesis was "Electrical and Optical Properties of Plasma Treated Jute". He had done his M.Sc Engineering in Electrical and Electronic (EEE) in 2004 and B.Sc Engineering in Electrical and Electronic (EEE) in 1993 from the same University.

He started his carrier as a Scientific Officer (SO) at Bangladesh Jute Research Institute (BJRI), Manik Mia Avenue, Dhaka-1207 on 30th June 1996. Later, he promoted to Senior Scientific Officer (SSO), Principal Scientific Officer (PSO) and Chief Scientific Officer (CSO) on 23th September 2004, 24th November 2015 and 17th October, 2021 respectively in the same institute. He is now holding the position of CSO and head of division at Textile Physics Division from 17th October, 2021 to till date in the same institute.

He is highly expert in speaking English, preparing various reports, analyzing data, presenting research findings in seminar, workshop and team work. Dr. Anwer gained his expertise on the following research and activities in his service life.

- Research on plasma physics, Polymer sciences and plasma polymerization for diversification of jute.
- Expert on electrical circuit and devices design, transmission and distribution system design, high voltage relays, transformer and circuit breaker, power plant design etc.
- Expert on various types of treatment techniques of natural and man made fibres, yarns and fabrics.

Dr. Anwer is a member of BUET Alumni Association. He is associated with professional institute like Engineering Institution, Bangladesh, Bangladesh Physical Society, Bangladesh Academy of Sciences etc.

Dr. Anwer has 35 scientific papers and more than 18 other publications like popular articles, monographs, bulletins, abstracts published in different national and international print media like journals, newsletters, magazines, daily newspapers etc. He took part in different workshops related to technological research where he got opportunity to know about the scope of Bangladesh in international research and development from the national and international experts.

Dr. Anwer is the younger son of Late Md. Akil and Late Mrs. Akramun Nessa of Faridabad, Dhaka. He is happily married and blessed with two daughters

Biography of Dr. Md. Golam Mostofa

Md. Golam Mostofa awarded Ph.D in 2012 from the Department of Genetics and Plant Breeding of Bangladesh Agricultural University (BAU), Mymensingh on Genetic Divergence, Combining Ability, Heterosis and Gene Action of Yield Characters in Kenaf (*Hibiscus cannabinus L.*). He had done his M.S (GPB) in 2001 and B.Sc.Ag in 1991 (held in 1995) from the same university.

He has started his professional career in Bangladesh Jute Research Institute (BJRI) on 30 June 1996 as Scientific Officer (SO) and was promoted to Senior Scientific Officer (SSO) and Principal Scientific Officer (PSO) on 23 September 2004 and 24 November 2015, respectively. He is now holding the position of Chief Scientific Officer at Fibre Quality Improvement Division from 25 November 2021 with the responsibilities of research, personnel management and all sorts of institutional activities.

Dr. Mostofa has more than 25 years research experience on Jute and Allied Fibre (JAF) crops. He developed and implemented a good number of research projects/ works/experiments on JAF production and seed technological affairs like production, post-harvest processing, quality control management, storage etc. Varietal maintenance and nucleus seed production of Kenaf and Mesta are of his some appreciative works during PSO period. Beside, some outstanding contributions to research are:

- Development of smooth (KBL-51), high yielding (KBL-155(1)), quick growing & early maturing (KBL-73) kenaf breeding lines. All the lines are under trial for variety release.
- Development of a vegetable type (edible) Mesta variety, BJRI Mesta 4 (VM 2).
- Development of two high yielding Mesta promising lines (SM-2 and SM-5).
- Involvement with the formal release activities of five outstanding varieties of Jute, Kenaf and Mesta (BJRI Kenaf 4, BJRI Mesta 3, BJRI Deshi Pat Shak 2 & 3 and BJRI Deshi Pat 10).

He received in-country training on Computer Training Course, Foundation Training Course, Postgraduate Certificate Course on Seed Technology, Conservation and Utilization of Plant Genetic Resources (PGR), Administration and Financial Management, Knowledge and Awareness Building on Agricultural Policies, Project Development and Management, Project Appraisal Study, Marker Assisted Selection, Sustainable Development Goal (SDG), Mutation Breeding of Field and Horticultural Crops, Training Course on e-Filing, Training Course on Service Process Simplification, Rules of Annual Confidential Report (ACR) Writing, Public Procurement Procedures (Good, Works and Services) etc. He also attended a foreign training on “Advanced Certificate Course in Computer Application for Plantations” at Tamil Nadu, India.

Dr. Mostofa is a member of BAU Alumni Association. He associated with professional institute like Krishibid Institution, Bangladesh; Genetics and Plant Breeding Society of Bangladesh, Seed Science Society of Bangladesh etc. He is also acting as Board Member of Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka-1207.

He has two books on jute and allied fibre crops. Moreover, he has 23 scientific papers and more than 10 other publications like popular articles, monographs, bulletins, abstracts published in different national and international print media like journals, newsletters, magazines etc. He took part in different workshops related to agricultural research where he got opportunity to know about the scope of Bangladesh in international research and development from the international experts.

Dr. Mostofa was born in 1968 at Chalk Durgapur, Mithapukur and comes from a noble Muslim family of Rangpur district. He is the son of Md. Tomiz Uddin Shah (late) and Mist. Rabeya Begum (late). His wife Roksana Mostofa is housewife. He has one daughter, Kaniz Mostafa Mou presently final year student of Jahangir Nagor University and one son, Miraz Mostafa reading in Petroleum and Mining Engineering (PME) in Military Institute of Science and Technology (MIST), Dhaka, Bangladesh.

Biography of Dr. Mahmud Al Hossain

Bangladesh Jute Research Institute (BJRI) appointed Dr. Mahmud Al Hossain as Chief Scientific Officer Genetic Resources and seed Division of Agriculture Wing of BJRI on 25, November 2021. Prior to joining as Chief Scientific Officer, he was the director (Admin and finance) of this institute. He is appointed as a Project Director at Establishment of Jute research sub-stataion at Motherganj in Jamalpur district and strengthening of research activities.

Dr. Mahmud Al Hossain was born on 12 November, 1969 in an aristocratic Muslim family in Barishal. His father, late Amjad Hossain, was a well-known lawyer and his mother Mrs. Khaleda Begum, was an educator by profession. Dr. Hossain has been a talented and wise man since childhood. Dr. Mahmud, mild laughter and well behaved by nature, hold B.Sc, Ag (Hons) from Patuakhali Krishi College, Patuakhali, M.S degree from Bangabandhu Sheikh Mojibur Ranman Agricultural University, Gazipur subsequently, he also obtained Ph.D from Patuakhali Science and Technology University, Patuakhali. He started his professional career at Bangladesh Jute Research Institute as a Scientific Officer (SO) on 30th June 1996. He has more than thirty scientific papers in different national and international journals. He is happily married to Israt jahan and blessed with a daughter Jerin Tasnim and a son Raiyan Mahmud. His wife Israt Jahan is the inspiration for all his activities.

He Developed salt tolerant Jute variety for the coastal region. Now he is engaged to develop waterlogging tolerant jute variety for the char land regions of Bangladesh. He is seeking the cooperation and prayers of all.

He Developed salt tolerant Jute variety for the coastal region. Now he is engaged to develop waterlogging tolerant jute variety for the char land regions of Bangladesh. He is seeking the cooperation and prayers of all.

Biography of Dr. Md. Nazrul Islam

Md. Narzul Islam awarded Ph.D in 2014 from the Department of Entomology, Bangladesh Agricultural University (BAU), Mymensingh on "Study on bionomics, extent of damage and management of jute yellow mite, Polyphagotarsonemus latus (Banks)". He had done his M.S (Entomology) in 2007 from Sher-e-Bangla Agricultural University (SAU), Sher-e-Bangla Nagar, Dhaka and B.Sc.Ag (Hons.) in 1989 from Bangladesh Agricultural University, Mymensingh .

He started his carrier as Scientific Officer at this Institute on 30 June 1996. Then he promoted to Senior Scientific Officer (SSO) and Principal Scientific Officer (PSO) on 23 September 2004 and 24 November 2015, respectively. He is now holding the position of Chief Scientific Officer at Pest Management Division from 25 November, 2021.

He is highly expert in speaking English, preparing various reports, analyzing data, presenting research findings in seminar, workshop and team work. Dr. Nazrul gained his expertise on the following research and activities in his service life.

Research on screening and monitoring of germplasm and advance lines of jute and allied fibre crops for developing insect and mite resistant varieties.

Research on pesticide and botanicals evaluation, insect biology, detection and identification of predators and parasitoids for controlling insect and mite pest of jute and allied fibre crops.

He had successfully completed a research project as principal investigator titled "Study on bionomics, species diversity/ host range, management technique of Mealybug in Kenaf and Mesta" (CRG, PIU, BARC, NATP-2).

Dr. Nazrul has been working as a Research supervisor and thesis examiner of MS degree in the field of Entomology. He has attended some professional training course both at home and abroad. He is awarded "Integrity Award" in 2021-2022 fiscal year of BJRI.

Dr. Nazrul is a member of BAU Alumni Association. He is associated with professional institute like Krishibid Institution, Bangladesh, Bangladesh Entomological Society, Varsity Circle, Kaliakair, Gazipur etc.

He has four books on Insect and mite pests of jute, Kenaf and Mesta and their management. Moreover, he has 45 scientific papers and more than 18 other publications like popular articles, monographs, bulletins, abstracts published in different national and international print media like journals, newsletters, magazines etc. He took part in different workshops related to agricultural research where he got opportunity to know about the scope of Bangladesh in international research and development from the international experts.

Dr. Nazrul is the elder son of Md. Kiam Uddin and Mrs. Amena Begum of Kaliakair, Garzipur. He is happily married to Rehana Parvin and blessed with a daughter and a son.

Biography of Dr. A. T. M. Morshed Alam

Dr. A. T. M. Morshed Alam was born on 01 January 1969 in an aristocratic Muslim family in the village, Zoka in Shajahanpur upazilla of Bogura district. He passed the SSC Examination from Bogura Zilla School, Bogura (under Rajshahi Board) in 1984 with 1st division and stood 19th position in the combined merit list. He passed HSC Examination from Government Azizul Haque College, Bogura (under Rajshahi Board) in 1986 with first division and letter marks in Chemistry and Biology. Then he graduated from Bangladesh Agricultural University, Mymensingh in 1990 (held in 1993) with a B.Sc. Ag. (Hons.) degree in Agriculture. He completed his Master of Science (M.S.) degree in Agronomy from the same university in 1996 and obtained 1st class.

During the thesis semester (July-December) of Master's he joined at Bangladesh Jute Research Institute (BJRI) as a Scientific Officer on 30th June 1996. Subsequently, he promoted to different positions at BJRI such as, Senior Scientific Officer (SSO) on September 2004, Principal Scientific Officer (PSO) on November 2015. While working at BJRI, he was awarded a Ph.D. Scholarship (Ph.D. in Seed Science and Technology) by the Government of People's Republic of Bangladesh. Under this scholarship program, he was successfully awarded Ph.D. (Seed Science and Technology) from Bangabandhu Sheikh Mujibur Rahman Agricultural University, Gazipur, Bangladesh on May, 2015.

Dr. A. T. M. Morshed Alam has been engaged in the research of fiber and seed production technologies of jute of Agriculture Wing of BJRI for more than 20 years from 1996 to 2016. During his research career in BJRI, he has published more than 25 research articles in different international peer-reviewed journals at home and abroad. He has also more than 20 popular articles on different aspects of jute published in different Monthly/Quarterly / Half yearly publications.

He has published three research papers on his Ph.D work in the famous Bangladesh Journal of Agronomy, Bangladesh Journal of Ecology and Annals of Bangladesh Agriculture during 2019, 2020 and 2021, respectively.

He has been working for a long time as an 'External Examiner' of postgraduate (M.S. in Agronomy and M.S. in Seed Science and Technology) level (Master's Thesis) in the Department of Agronomy and Department of Seed Science and Technology, Sher-e-Bangla Agricultural University, Dhaka since 2004.

He is life member of some professional bodies such as, Krishibid Institution of Bangladesh (KIB), Bangladesh Society of Agronomy (BSA), Bangladesh Society of Seed science and Technology etc.

Dr. Morshed has been appointed as 'Chief Scientific Officer' (CSO) in the Planning, Training and Communication Division of BJRI on 25 November 2021. He is currently working as head of the division of Planning, Training and Communication Division and coordinating research planning, development, training and communication affairs among the intra and inter divisions of BJRI. In personal life, he is happily married and blessed with one son and one daughter.

Biography of
Dr. M M Alamgir Sayeed

Dr. M. M. Alamgir Sayeed was born on 31 December 1971 in an aristocratic Muslim family in the village of Nehalpur in Manirampur Upazila of Jashore district. He passed the SSC Examination from Nehalpur High School, Manirampur, Jashore (under Jashore Board) in 1986 with 1st division and Star Marks. He passed HSC Examination from Government Titumir College, Dhaka (under Dhaka Board) in 1988 with first division and letter mark in Mathematics. He later graduated from Dhaka University affiliated 'College of Textile Engineering and Technology', Tejgaon, Dhaka (now Bangladesh University of Textiles, BuTex) in 1992 (held in 1994) with a B.Sc. degree in Textile Technology and obtained 1st Class with 2nd Position.

Prior to joining at Bangladesh Jute Research Institute (BJRI) as a Scientific Officer on 30th June 1996, he served as Production Officer (Quality Control) at Prime Composite Mills Ltd, Pagla, Narayanganj for one and a half years (from December 1994 to June 1996). Subsequently, he promoted to different positions at BJRI such as, Senior Scientific Officer (SSO) on September 2004, Principal Scientific Officer (PSO) on November 2015 and Chief Scientific Officer (CSO) on November 2021. While working at BJRI, he was awarded a Post-Graduate Scholarship (M. Tech Textile Engineering) in 1998 by the Government of India (ICCR Scholarship). Under this scholarship program, he did his Masters of Engineering (Textiles) degree and obtained 1st class with Distinction from the M S University of Baroda, Gujarat, India in 2000.

Most recently, Dr. Sayeed received a foreign Ph.D Scholarship from Bangladesh Agricultural Research Council (BARC), NATP, Phase-I to pursue PhD in the 'Department of Textile and Fibre Engineering' of Indian Institute of Technology Delhi (IIT Delhi), Indian one of the best Universities and he has successfully awarded a Ph.D from IIT Delhi on March 2014.

Dr. M. M. Alamgir Sayeed has been engaged in the research of jute and jute products in the Technology Wing of BJRI for more than 25 years since 1996. During his research career in BJRI, he has published more than 40 research articles in different International peer-reviewed journals at home and abroad. He is currently doing research on "Jute Fibre Reinforced Composite".

His research work (during Ph.D at IIT Delhi) on 'Nonwoven Geotextile' was presented at the '5th International Technical Textiles Congress' held at Izmir, Turkey on November 2012 and subsequently, his research work was presented through a poster at the conference organized by Nonwoven Innovation Academy (NIA) held at Tourcoing, France on November 2013 and he awarded a 'Student Grant' by the European Disposables and Nonwovens Association (EDANA), Belgium for presenting that poster in France in NIA 2013.

He has published three research papers in the famous Journal of Civil Engineering (Geo-Technical Engineering) 'Geotextiles and Geomembranes' (Elsevier Journal, Impact Factor

5.292) and Composite research work has been published in 'Polymer Composites' (I. F. 3.171), 'Composites Part B: Engineering'(Elsevier Journal, Impact Factor 9.078), 'Journal of Composite Materials' (I. F. 2.591), 'International Journal of Plastics Technology' (Springer Journal).

His research work has also been published in 'Materials and Design' (I. F. 7.991), 'Journal of Textile Institute' (I. F. 1.880), 'Textile Research Journal' (I. F. 1.820), 'Indian Journal of Fibre and Textile Research' IJFTR(I. F. 0.655), J.T.A.T.M., etc. He also recently published two book chapters entitled 'Opportunities with Renewable Jute Fiber Reinforced Composites to Reduce Eco-Impact of Nonrenewable Polymers' in "Encyclopedia of Renewable and Sustainable Materials (published by Elsevier) and 'Re-use of Plastic products: Materials perspective' in "Encyclopedia of Materials: Plastics and Polymers" (published by Elsevier).Elsevier paid ($100.00) as honorarium for each of the publications of the said Book Chapters.

It is mentionable that details of Dr. M MAlamgir Sayeed's significant research work can be found at ORCID ID (https://orcid.org/0000-0001-7746-0329), Research Gate (Score 18.26), LinkedIn and Google Scholar. Dr. Sayeed has been working as a 'Reviewer' for various Peer-reviewed International Journals. Notable among them are 'Polymer Composites' (Impact Factor 3.171),' Journal of Natural Fibers' (Impact Factor 5.323), 'SN Applied Science' (Springer Journal), 'Journal of Polymers and the Environment' (Impact Factor 3.667, Springer Publication), 'Textile Research Journal '(I. F. 1.820), Journal of Composite Materials (I. F. 2.591) etc.

He has also been working for a long time as 'Technical Editor' of BJRI Published Journal (Bangladesh Journal of Jute and Fibre Research) and BJRI Newsletter. During his Masters research work at ATIRA, Ahmedabad, India, two research papers were presented in the 'Joint Technological Conference (JTC)' published by ATIRA, BTRA, SITRA, and NTRA. 1st paper was presented at 41st JTC held at BTRA, Bombay in 2000 and 2nd paper was presented at 42nd JTC held at ATIRA, Ahmedabad, India in 2001. Besides this, three research articles were published in the 'Indian Journal of Fibre and Textile Research' (IJFTR) from his Master's dissertation. In recognition of his Master's dissertation, he received the "Best Paper Award" from the ATIRA Foundation, Ahmadabad for the research paper presented at 42nd JTC held at ATIRA in 2001. Currently he has been working as an 'External Examiner' of undergraduate (Project viva for B Sc in Textile Engineering) and postgraduate level (Master's Thesis) in the Department of Fabric Engineering of Bangladesh University of Textiles (BuTex) since 2014.

He is active Fellow/member of some professional bodies such as, Institution of Textile Engineers and Technologists (ITET), Fellow, Institution of Engineers, Bangladesh (IEB), Asiatic Society of Bangladesh, Indian Institute of Technology Delhi (IIT Delhi) Alumni Association etc.

He is currently working as 'ChiefScientific Officer' (CSO) in the Dyeing and Printing Division of the Technology Wing of BJRI and doing research on jute and jute products, especially 'Natural fibres Reinforced Composites'. In personal life he is married and blessed with one son and one daughter.

BJRI Mesta 4 (VM-2): A newly released variety of *Hibiscus sabdariffa* var. *sabdariffa*

Dr. Md. Golam Mostofa, Chief Scientific Officer
Iffat Jahan Nur, Scientific Officer

Hibiscus sabdariffa L. comprises two distinct botanical varieties: the edible var. sabdariffa and the fibre producing var. *altissima*. The edible variety is a short bushy plant (1-2 m) bearing profuse smooth fruits having large fleshy calyx and epicalyx. This type is grown for culinary purposes and is popularly known as roselle or rosella. Its fleshy calyx and epicalyx are used for jelly making and dried form is processed into other confections like cordial drinks, jams, sauces, liqueurs, wines and food preserves. The fibre producing variety is a tall (2-4 m), erect, un-branched plant with smaller inedible hairy fruits. It is a tropical and subtropical crop.

Vegetable mesta (*Hibiscus sabdariffa* var. *sabdariffa*) is an indigenous crop in Bangladesh, locally recognized as 'Meshta','Chukur' or 'Tokfol' and mostly grown in Chittagong Hill Tracts of the country. It is originated from West Africa and belongs to the family Malvaceae. The major edible mesta producing countries are Tropical Africa, Sudan, Egypt, Ethiopia, Mali, Nigeria, Chad, India, Indonesia, the Philippines, Malaysia, Brazil, Australia, Mexico, Hawai and Florida of USA. However, Thailand and China are the world's largest commercial producers. It is an annual crop which requires around six to eight months completing its production cycle. Three color groups are usually found: dark red, green and reddish green.

Dark red

Green

Reddish green

Bangladesh Jute Research Institute has recently developed a vegetable mesta (roselle) variety: BJRI Mesta-4 (VM-2) through pure line selection from local race, released by National Seed Board (NSB) in March, 2022. The variety is time-bound or time-based means that whenever it is sown, that gives flowers on November to December. It is suitable for a wide range of sowing time, April to June (for leaf) and July to September (for fruit). It is dwarf and bushy plant, its stem is green with node purple, leaf semi-cordate, flower cream with red centre, fruit reddish green and capsule (pointed) having fleshy calyx, leaf and calyx taste sour. It can withstand vagaries of growing conditions, as drought or increased rains, infested of weeds, or similar adversities, much more than either jute or kenaf. However, the average yield of the variety is: calyx 16-18 tha^{-1} (fresh) and 2.5-3.5 tha^{-1} (dried), leaves 10-12 tha^{-1} and seed 1.10 tha^{-1}. The variety is specially characterized by its high carotenoid content (85.89 µg/g) in calyces and protein (14.44%) in leaves. All the plant parts are effectively useful. Its leaves are consumed as vegetable and the most important part is the fleshy calyces renowned for its flavor (organic acid) and aroma for which this is used in preparing confectionary items (e.g., jam, jelly, juice, pickles, dry fruits, drinks, beverages etc.) and a number of dishes. The seeds of roselle are used to produce vegetable oil and also in cosmetic industry.

Fresh leaves

Leaf vorta and curry

seed oil

Nutritional benefits: Roselle is famous for its high nutritional and medicinal values with a bunch of health benefits. Its leaves and calyx contains high amount of protein, vitamin C, vitamin B, calcium, iron, phosphorus and a plenty of anti-oxidants specially

Nutritional values and anti-oxidant properties of Vegetable Mesta (VM-2) (100g oven dried sample)

Nutrient	Leaves	Calyces	Nutrient	Leaves	Calyces
Moisture (%)	11.83	12.93	Calcium (%)	1.75	1.10
Ash (%)	11.61	7.07	Magnesium (%)	0.252	0.252
Carbohydrate (%)	52.58	73.29	**Anti-oxidant Properties with activity**		
Protein (%)	14.44	4.38	Total Phenol content (mg)	313.96	418.14
Fiber (%)	28.18	13.91	Total Flavonoid content (mg)	22.05	36.52
Fat (%)	7.09	0.73	Pro-anthocyanidin content (mg)	45.47	9.28
Sodium (%)	0.304	0.426	Total carotenoid content (mg)	-	0.086
Potassium (%)	0.973	0.973	DPPH activity (µmole)	216.85	286.96

anthocyanin, carotenoid and flavonoid. A diet rich in vegetables and fruits can notably reduce the risk of diverse human cancers. The presence of vitamins and pro-vitamins, such as ascorbic acid, γ-tocopherol, carotenoids and phenolic substances in roselle plant is well documented. Its fresh leaves, calyces and seeds are regarded as anti-diabetic, anti-cholesterol and anti- cancerous agent rich source.

In Bangladesh, roselle or mesta leaves are steamed with dried or fresh fish to make paste with garlic, onion, and chilies or cooked with fish. A popular soup or dish is also prepared from mesta leaves along with prawn stock. Leaves are also used to make Pacchadi (pesto) by mixing with spices. The production of a non-alcoholic beverage from roselle calyces is very popular. Either fresh or dried roselle calyces are used to prepare soft drinks. Tea prepared from roselle calyces have lots of health benefits and highly valued as organic product. It is a caffeine free herbal tea.

Medicinal uses: Roselle has been used as medicinal plants throughout generations. Roselle extract has been proven scientifically to possess high antioxidant activity, anti-proliferation and anti-carcinogenic properties. The plant aqueous extract is traditionally used as diuretic, for treating gastrointestinal disorders, liver diseases, fever and hypertension. The seed extracts of roselle inhibit growth of several fungus and bacteria. The boiled leaves help to remedy of cracks in the feet and speedup maturation of ulcers. Roselle extracts are perfectly safe for use in skin conditioning treatments. It has immune-protective effects which proved based on their ability to protect human cells against cadmium-induced damage such as tumor necrosis. It has anti-nociceptive, anti-inflammatory and anti- diarrhoeal qualities. It also reduces extra fat from liver and abdomen. The extracts of calyces reduce the deposits of calcium oxalate crystal on kidneys due to its uricosuric effect with no toxicity or negative side effects. It shows strong anti-cancer activities against prostate cancer cells. Calyx extracts act as a defensive means for liver diseases by destroying radicals and conserving enzymes responsible for medicine detoxification. It reduces body fat and body mass index (BMI). Calyx extract also contain several amino acids those are important for our body.

Conclusion: Vegetable mesta (regardless of its name: Roselle or Chukur or Mesta) is a multipurpose crop having the potential to boost the revenue of Bangladeshi farmers, producers, and processors through fetching higher market prices in both the export and domestic markets. However, its significance in our country is still unrecognized. According to global trade roadmap, the worldwide demand for vegetable mesta will be doubled by next few years due to the awareness in natural herbal products. Therefore, this is high time we realize the prospect of vegetable mesta in Bangladesh and promote its versatile utilization.

What we have to do for increasing production of jute fiber

Dr. A.T. M. Morshed Alam
Chief Scientific Officer
Planning, Training and Communication Division

Introduction: Jute is a dicotyledonous fiber producing crop. It is one of the most important and traditional cash crops of Bangladesh which is known as "Golden Fiber". The quality of jute fiber in Bangladesh is much better than other jute producing countries in the world and Bangladesh is in the second position after India in terms of fiber production. It is to be noted that Bangladesh is currently ranked first in the world in terms of fiber exports. Considering these aspects, the reputation of jute in Bangladesh is still worldwide. As a result, the jute farmers of this country have been getting good price of jute for the last few years. Therefore, we need to be more attentive and diligent in increasing the productivity and fiber yield of eco-friendly jute crop.

Production of jute fiber: Jute is cultivated in kharif season in Bangladesh. Jute is a crop of hot and humid climate which grows well in areas with 23-24°C temperature and 90% relative humidity. The river washed silty soil of this country is especially suitable for jute cultivation. Therefore, the world's best quality jute fiber is produced in the soil of Bangladesh. Jute is cultivated in about 6-7 lac hectares of land in Bangladesh every year and about 80.0-90.0 lac bales of jute fiber are produced from the cultivated area. The area under jute cultivation, total production and fiber yield of the last five years are cited below in the table 1.

Table 1. The statistics of jute cultivation in the last 5 years from 2017-18 to 2021-22 in Bangladesh

Year	Cultivated area (Lac ha)	Total production (lac bale)	Total production (lac ton)	Average yield of fiber (Bale/ha)	Average yield of fiber (ton/ha)
2017-18	7.58	88.95	16.14	11.73	2.13
2018-19	6.50	74.40	13.50	11.44	2.08
2019-20	6.65	68.19	12.37	10.25	1.86
2020-21	6.82	77.25	14.02	11.33	2.06
2021-22	7.45	82.77	15.02	11.10	2.02

Source: Fiber Crop Production, Crops Wing, DAE, Khamar Bari, Dhaka-1207.

It can be seen by reviewing the information described in the table above that in the last 5 years, the average area under jute cultivation in Bangladesh is 6.0 lakh hectares, total fiber production is 78.31 lac bale or 14.21 lac ton and average fiber yield is 11.17 lac bale or 2.03 lac ton. So, we have to find a way to increase the area under jute cultivation. If jute cultivation can be increased then the total production of fiber will also be increased.

Things to do to increase the production of jute fiber:

1) To expand the cultivation of high yielding varieties of jute: During the last 13 years (2008-2021) of the present agro-friendly government, a total of 13 high yielding varieties of jute and allied fiber crops have been developed by BJRI. Among them, 6 varieties of desi jute, 3 varieties of tossa jute, 2 varieties of kenaf and 2 varieties of mesta have been innovated. Among these 13 high yielding varieties, BJRI Tosha Pat-8 (Robi-1) and salt tolerant BJRI Desi Pat-10 are the latest varieties which have been released as cultivars by the National Seed Board for cultivation, in 2019 and 2021, respectively.

Table 2: High yielding jute and allied fiber crop varieties developed by BJRI from 2016-17 to 2021-22

Sl. No.	Name of varieties	Year of release	Sowing time	Fiber yield (ton ha^{-1})
1.	BJRI Kenaf-4 (Red Kenaf)	2016-17	1st week of March to 2nd week of May	3.50
2.	BJRI Tossa Pat -7	2017-18	1st week of March to middle of April	2.70-3.30
	BJRI Deshi Pat-9	2017-18	Last week of March to middle of April	2.60-3.00
	BJRI Mesta-3	2017-18	1st week of March to 2nd week of May	2.50-2.80
3.	BJRI Tossa Pat-8 (Robi-1)	2018-19	Last week of March to last week of April	3.30-3.70
4.	BJRI Deshi Pat Shak-2	2019-20	2nd week of February to last of October	3.00-3.50
	BJRI Deshi Pat Shak-3	2019-20	2nd week of February to last of October	3.00-4.00
5.	BJRI Deshi Pat-10	2020-21	1st week of March to last week of April	3.50-4.00
6.	BJRI Measta -4 (VM-2)	2021-22	Last week of March to last week of June (For leaf)	10.00-12.00 (Fresh leaf yield)
			1st week of July to last week of September For calyx)	16.00-18.00 (Fresh calyx) 2.50-3.50 (Dry calyx)

Source: Breeding Division, BJRI, Dhaka-1207.

Cultivation of these high yielding varieties of jute and allied fiber crops developed by BJRI needs to be extensively expanded at the farmer level.

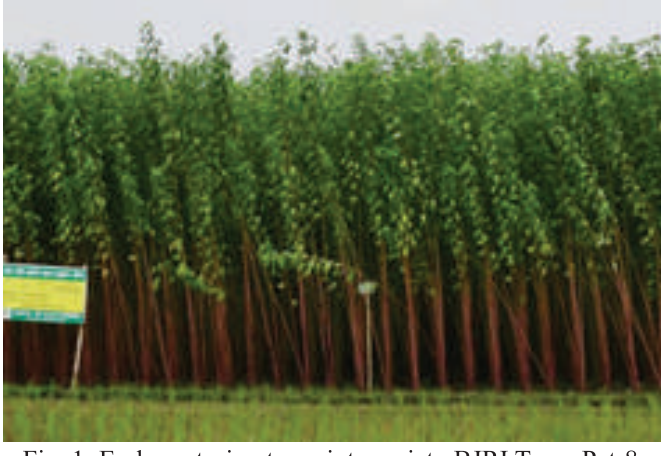


Fig. 1: Early maturing tossa jute variety BJRI Tossa Pat-8 (Robi-1) developed by BJRI

Fig. 2: Salt tolerant deshi jute variety 'BJRI Deshi Pat 10' developed by BJRI

2) To ensure timely supply of good quality jute seeds to the farmers: Bangladesh requires 5000-5500 metric tons of jute seeds every year. Of this, only 1000 metric tons of jute seeds are produced in the country. The rest of the seeds enter into Bangladesh either through imports from neighboring India or illegally. Most of the seeds are often of low quality. Due to poor distribution system, jute farmers of our country do not get good seeds of high yielding varieties released by BJRI timely. They become dependent on easily available Indian seeds at affordable prices. To overcome this situation, we need to ensure the supply of jute seeds of high yielding varieties developed by BJRI to the farmers before the sowing season.

3) Sowing seeds at proper time: The fiber yield of jute mostly depends on timely sowing of seeds. The appropriate time for sowing jute seeds is March-April. At this time, the length of the day is 12-13 hours, the temperature is 20^0C-35^0C and the humidity is 80% to 90% which is which is suitable for physical growth of jute plant. If seeds are sown before or after this period, the physical growth of the jute plant is disrupted and premature flowering occurs in jute plant. As a result, the yield of fiber is severely reduced. Considering these issues, jute

seeds should be sown at proper time' so that the jute plant gets enough opportunities for physical growth.

4) Expansion of jute cultivation in nonconventional areas: The demand for jute products is declined worldwide due to the discovery of polythene and plastics. As a result, the price of jute in the world market has come down. In this situation the farmers are deprived of the fair price of jute and at a stage they lost interest in jute cultivation. Then the cultivation of jute gradually came down to the marginal land. However, in recent times the use of eco-friendly jute products has increased among the people due to environmental awareness. As a result, the demand for jute products in the world market is gradually increasing. As a result, the price of jute has also gone up. Due to this, the jute farmers of our country have been getting good price of jute for the last few years and the interest in jute cultivation has increased among the farmers. In this situation, initiatives need to be taken to expand the cultivation of saline tolerant jute varieties suitable for cultivation in saline lands in the coastal areas of the southern part of the country. So, the fallow lands of the coastal areas will come under cultivation, so the farmers will be benefitted economically and the production of jute will increase to a great extent. As a result, jute production will increase significantly.

Conclusion: Jute is an eco-friendly natural fiber. The use of jute and jute products is increasing day by day as a result of global environmental awareness. Therefore, to keep up with the recent growing demand for jute in the domestic and international markets, the amount of jute cultivable land needs to be increased. Therefore, research programs need to be undertaken to innovate more high yielding and short durated jute varieties. Initiatives should be taken to expand jute cultivation in nonconventional areas and uncultivated lands so that arrangements should be made to supply high yielding varieties of jute seeds released by BJRI to the farmers before the sowing season. In order to achieve this goal, all those who are involved in jute research feel that it is necessary to take the initiative to implement the roadmap prepared by the Ministry of Agriculture for the purpose of achieving self-sufficiency in jute seeds.

Bright prospects to make charcoal, activated carbon, computer and photocopier ink from jute stick in Bangladesh

Dr. Md. Nurul Islam, Chief Scientific Officer, Chemistry Division

Introduction: Bangladesh is the second largest producer of jute in the world. Jute is one of the major cash crops in the country. The trade, production, use and export of jute and jute products has made Bangladesh known worldwide. The production of charcoal from jute stick has created new possibilities for multifaceted use of jute. In Bangladesh, jute sticks are used as burning resource in the rural area. There is very little commercial usage of jute sticks in Bangladesh. The jute stick can be used as raw material of charcoal. Bangladesh has now 50 charcoal factories in production that started to perform a great role in the economy of Bangladesh by exporting charcoal to China and Taiwan. About 16 lakh Metric Ton (MT) of jute has been produced in Bangladesh. About 40-45 lakh MT of jute sticks are produced against 16 lakh MT of jute, which used to fall as agricultural waste. Most of the jute sticks produced in the country was used for cooking fuel in the villages, tents for battle leave and for household purposes. At present, due to the huge demand in the world market, Jute stick charcoal is being exported abroad more than 50 countries of the world including

China and Taiwan. By making activated carbon, computer and photocopier ink is possible to earn huge foreign currency by meeting the demand of different sectors of the country and exporting it abroad. About 3 million people can directly and indirectly access economic activities at different stages of the jute production related business. Jute stick is an eco-friendly charcoal industry as it emits very low levels of carbon. Charcoal mills are also considered environment friendly. Therefore, it is important to formulate a research policy in the national interest and capable of competing in the international market. Establishment of sustainable and international standard export oriented charcoal, activated carbon, computer and photocopier ink manufacturing industries.

Charcoal production process: Charcoal is a porous black solid, consisting of an amorphous form of carbon, obtained as a residue when jute sticks, bone or other organic matter is heated in the absence of air. In Bangladesh charcoal is produced from jute stick. A special type of eco-friendly stove burns jute sticks at a temperature of 300-500^{0}C for 6 to 10 hours and removes its water and other substances 75-80% carbon, 4-5% ash, 5-6% humidity, volatile matter 8-10%. The finished mixed black substance that is found, which is packaged by special technology is called charcoal. One kg of charcoal is available from five kg of jute stick. Charcoal preparation are shown in figure -1

Jute stick Jute stick powder Charcoal

Fig 1: Preparation of charcoal from jute sticks

Uses of Charcoal:

- Charcoal is being used for making medicine.
- It is also used to absorb odors and toxins in gases.
- The medical use of activated charcoal is mainly the absorption of poisons.
- Activated charcoal is used for relieving discomfort from insect bites.
- It is used to promote a healthy digestive tract by removing toxins.
- Charcoal may be used as a source of carbon in chemical reactions.
- Charcoal is a raw material of many items like Fireworks, BBQ, Hookan, Shisha etc.
- Charcoal of different paper is used as raw material in making water filters.
- Used as a raw material in making life-saving anti-toxin-tablets.
- Charcoal is used to make toothpaste.
- Charcoal is used as fertilizer to increase soil fertility.
- Used in making face washes and cosmetics.
- The raw material charcoal is used to make ink for photocopiers and printers.
- Charcoal is the raw material used to make mobile batteries.
- Charcoal is used as a raw material in making fireworks.
- Charcoal is used as a fuel in all industries where intensive heating is required, including melting of iron, gold and silver. In addition, the solid liquid obtained by extracting charcoal is used as bitumen in road casting.

Charcoal Demand/Market: China is the main importer of jute ash from Bangladesh. A part from China, there is a huge demand for charcoal in different countries of the world like South Korea, Hong Kong, Taiwan, Japan, Brazil, Canada and Mexico. There is a huge demand for charcoal in water purification plants in Europe. The market for charcoal in Turkey, Germany and America is expanding. As there is sufficient raw material in the country, carbon paper, photocopy and printer ink, water filters, life-saving anti-toxin-tablets, toothpaste, fertilizers to make the land fertile, face washes and cosmetics, mobile battery raw materials, fireworks are used. All these products can be exported abroad at 8 to 10 times profit by meeting the demand of the country. We can earn 100 million USD by meeting the demand of the country and exporting abroad.

Feedback and Actions: India and Bangladesh account for 90% of the world's jute production. Once upon a time Bangladesh was the largest cultivator of jute but farmers are constantly moving away from jute cultivation without getting the price of jute. Due to the increase in demand and price of jute and jute products in recent times, farmers are seeing a glimmer of hope in new jute cultivation.

It is possible to add maximum value of jute stick through charcoal production. Due to lack of investment, only 1.0-2.0 percent of the total jute stick is used to make charcoal. The quality of carbon produced from jute sticks is the highest. By exporting activated carbon, computer and photocopier ink made from jute charcoal, it is possible to earn foreign currency and play a special role in the economy. China is still the main export market and has been exporting charcoal to various countries including Japan, Brazil, United States, South Korea, Taiwan, Canada, Mexico.

There is no domestic market for charcoal in the country, as the process or technology for making activated carbon; computer and photocopier ink from charcoal has not been developed in the country. Chemistry division of Bangladesh Jute Research Institute (BJRI) has developed Activated Carbon (AC) by using various chemicals. We are trying to use our developed AC in various fields such as water purifiers, fireworks, life-saving anti-toxin tablets, cosmetics, photocopiers and computer inks.

AMAZING BACTERIA- SOIL HEALTH AND POWER BATTERY

Zakaria Ahmed, Ph.D.
Technology Wing, Bangladesh Jute Research Institute

Soil In Microbiological Point of View: Soil is full of life, essential for nutrient cycling and carbon storage. To better understand how it functions, researchers conducted the first global study of bacteria and fungi in soil. Their results show that bacteria and fungi are in constant competition for nutrients and produce an arsenal of antibiotics to gain an advantage over one another. Overall, the bacterial diversity in soil is lower if there are relatively more fungi. It was found that a strong link between the number of antibiotic resistance genes in bacteria and the amount of fungi, especially those with potential for antibiotics production such as Penicillium which could well be explained by the fact that fungi produce antibiotics in warfare with bacteria, and only bacteria with adequate antibiotic resistance genes can survive this. The antagonism between fungi and bacteria influences the overall diversity of bacterial communities and determines their genetic repertoire of antibiotic resistance. This information can be used to predict the spread of genes that lead to antibiotic resistance in different ecosystems, and via what routes they may reach human pathogens. It could also help predict and pinpoint locations with high levels of natural antibiotics producers. It was also found that regional differences in the distribution of bacteria and fungi. Bacteria are everywhere, with the highest genetic diversity in temperate zones with a moderate climate. Environmental factors such as temperature are most decisive in their relative abundance- they often prefer hot and wet locations. Fungi are usually more prevalent in colder and dryer climates like the tundra. They also tend to be more geographically restricted, with differences in populations between continents. This implies that the relative contributions of bacteria and fungi to nutrient cycling are different around the world, and that global climate change may affect their composition and function differently. Soil contains more carbon than air and plants combined. This

means that even a minor change in soil carbon could have major implications for the Earth's atmosphere and climate. When comparing data from the unspoiled soil sites with data from locations affected by humans, such as farmland or garden lawns, the ratios between bacteria, fungi and antibiotics were completely different. According to the scientists, this shift in the natural balance shows the effect of human activities on the soil microbiome, with unknown consequences so far. However, a better understanding of the interactions between fungi and bacteria in soil could help to reduce the usage of soil fertilizer in agriculture, as one could give beneficial microorganisms a better chance at survival in their natural environment. Microscopic fungi that live in plants' roots play a major role in the storage and release of carbon from the soil into the atmosphere. Some types of symbiotic fungi can lead to 70% more carbon stored in the soil. Natural fluxes of carbon between the land and atmosphere are enormous and play a crucial role in regulating the concentration of carbon dioxide in the atmosphere and, in turn, Earth's climate. Soil contains more carbon than both the atmosphere and vegetation combined, so predictions about future climate depend on a solid understanding of how carbon cycles between the land and air. Plants remove carbon from the atmosphere during photosynthesis in the form of carbon dioxide. Eventually the plant dies, sheds leaves, or loses a branch or two, and that carbon is added to the soil. The carbon remains locked away in the soil until the remains of the plant decompose, when soil-dwelling microbes feast on the dead plant matter and other organic detritus. That releases carbon back into the air. One of the limits that both the plants and the soil-dwelling microbes share is the availability of nitrogen, an essential nutrient for all life. Most plants have a symbiotic relationship with mycorrhizal fungi, which help extract nitrogen and nutrients from the soil and make that nitrogen available for the plants to use. Recent studies have suggested that plants and their fungi compete with the soil microbes for the nitrogen available in the soil and that this competition reduces decomposition in the soil. There are two major types of the symbiotic fungi, Ecto- and Ericoid Mycorrhizal (EEM) fungi and Arbuscular Mycorrhizal (AM) fungi. EEM fungi produce nitrogen-degrading enzymes, which allows them to extract more nitrogen from the soil than the AM fungi extract. Examining data from across the globe, found that where plants partner with EEM fungi, the soil contains 70% more carbon per unit of nitrogen than in locales where AM fungi are the norm. The EEM fungi allow the plants to compete with the microbes for available nitrogen, thus reducing the amount of decomposition and lowering the amount of carbon released back into the atmosphere which showed that trees and decomposers are really connected via these mycorrhizal fungi. Previous studies considered soil degradation, climate and plant productivity to be the most important regulators of soil carbon content. However, findings published in Nature by researchers suggest that soil biology plays a greater role. The role of these fungi is currently not considered in global climate models. The majority of plants team up with fungi, exchanging plant carbon for soil nutrients supplied by the fungus. These mutually beneficial relationships can be broadly grouped into three major categories: Arbuscular mycorrhizas (AM), Ectomycorrhizas, and Ericoid mycorrhizas. The AM symbiosis is most common, occurring in approximately 85% of plant families, while Ecto- and Ericoid Mycorrhizas (EEM) occur in a few common families. It was found that soils supporting EEM plant communities contained 70% more carbon per unit nitrogen than soils supporting AM-dominated plant communities. The effect is significant at the global scale, because it is independent of biomass accumulation, temperature, precipitation and soil clay content. The marked difference in soil carbon levels between AM and EEM ecosystems is due to the way the two kinds of mycorrhizal fungi acquire nutrients. EEM fungi produce enzymes that allow them to access organic forms of nitrogen, which are not available to AM fungi. By depleting nitrogen from the soil organic matter, EEM fungi limit the activity of the microorganisms that break down dead organic matter and return the carbon to the atmosphere. AM ecosystems impose fewer restrictions on the growth of carbon-consuming microbes.

Powered Battery: Researchers have created a biodegradable, paper-based battery that is more efficient than previously possible. For years, there has been excitement in the scientific community about the possibility of paper-based batteries as an eco-friendly alternative. However, the proposed designs were never quite powerful enough, they were difficult to produce and it was questionable whether they were really biodegradable. This new design solves all of those problems. The biobattery uses a hybrid of paper and engineered polymers. The polymers - poly (amic) acid and poly (pyromellitic dianhydride-p-phenylenediamine) - were the key to giving the batteries biodegrading properties. It was tested by the researchers that the degradation of the battery in water and it clearly biodegraded without the requirements of special facilities, conditions or introduction of other microorganisms. The polymer-paper structures are lightweight, low-cost and flexible. Power enhancement can be potentially achieved by simply folding or stacking the hybrid, flexible paper-polymer devices. Thus producing the biobatteries is a fairly straightforward process and that the material allows for modifications depending on what configuration is needed. The manufacturing technique reduces fabrication time and cost, and the design could revolutionize the use of bio-batteries as a power source in remote, dangerous and resource-limited areas. Instead of ordering batteries by the pack, we might get them by the ream in the future. Stand-alone and self-sustained, paper-based, point-of-care devices are essential to providing effective and life-saving treatments in resource-limited settings. On one half of a piece of chromatography paper, placed a ribbon of silver nitrate underneath a thin layer of wax to create a cathode. The pair then made a reservoir out of a conductive polymer on the other half of the paper, which acted as the anode. Once properly folded and a few drops of bacteria-filled liquid are added, the microbes' cellular respiration powers the battery. The device requires layers to include components, such as the anode, cathode and PEM (proton exchange membrane). The final battery demands manual assembly, and there are potential issues such as misalignment of paper layers and vertical discontinuity between layers, which ultimately decrease power generation. Different folding and stacking methods can significantly improve power and current outputs. Scientists were able to generate 31.51 microwatts at 125.53 microamps with six batteries in three parallel series and 44.85 microwatts at 105.89 microamps in a 6x6 configuration. It would take millions of paper batteries to power a common 40-watt light bulb, but on the battlefield or in a disaster situation, usability and portability is paramount. Plus, there is enough power to run biosensors that monitor glucose levels in diabetes patients, detect pathogens in a body or perform other life-saving functions. Among many flexible and integrative paper-based batteries with a large upside, paper-based microbial fuel cell technology is arguably the most underdeveloped. A research has developed an entirely textile-based, bacteria-powered bio-battery that could one day be integrated into wearable electronics. These textile-based biobatteries exhibit stable electricity-generating capability when tested under repeated stretching and twisting cycles. There is a clear and pressing need for flexible and stretchable electronics that can be easily integrated with a wide range of surroundings to collect real-time information. Those electronics must perform reliably even while intimately used on substrates with complex and curvilinear shapes, like moving body parts or organs. Compared to traditional batteries and other enzymatic fuel cells, microbial fuel cells can be the most suitable power source for wearable electronics because the whole microbial cells as a biocatalyst provide stable enzymatic reactions and a long lifetime. Sweat generated from the human body can be a potential fuel to support bacterial viability, providing the long-term operation of the microbial fuel cells. If we consider that humans possess more bacterial cells than human cells in their bodies, the direct use of bacterial cells as a power resource interdependently with the human body is conceivable for wearable electronics.

Training Program of BJRI

BJRI scientists, officers and employees have been trained on skill development, official rules, e-documents, agricultural and technical research, right to information, grievance redressed management. Farmers are also trained from regional/sub stations of BJRI on modern cultivation of Jute and Allied Fiber (JAF) crops.






Some Picture of BJRI Training Program

Jute Cotton and Viscose Blending: A New Prospect

Jannatul Bake Molla[1] & Dr. H.M. Zakir Hossain[2]
[1]Senior Seientific Officer, Jute-Textile Wing, BJRI
[2]Chief Scientific Officer, Jute-Textile Wing, BJRI

Introduction: Jute is a bast fibre and cotton is seed fibre but viscose is regenerated cellulose fibre directly spun from cellulose. The fibre which we get by regeneration from its main origin is termed as regenerated fibre.

Viscose is a manufactured fiber made from natural materials. It's one of the three types of rayon: modal, lyocell, and viscose. Each is treated differently and made into fabrics with different properties. The term "viscose" refers to the viscous organic liquid which is regenerated into fibers for making the fabric. Viscose rayon is derived from cellulose, the main constituent of plant cell walls. Cellulose is treated with chemicals to make a fiber mimicking the qualities of natural fibers, such as silk and cotton. Viscose fabric often looks like silk and feels like cotton.

Fig-1: Modified Jute

Fig-2: Cotton

Fig-3: Viscose fibre

Background of Viscose: Viscose was discovered in 1891 and the first commercial production was undertaken in 1905 by Courtaulds as an affordable alternative to natural silk.. It is made from cotton linters or wood pulp, usually obtained from spruce, bamboo, hemlock, eucalyptus, sugarcane and pine trees. Jute plant may be the biggest source of viscose extraction.

This versatile fabric, often known as artificial silk, is found in jacket linings, t-shirts, active wear, fashionable dresses, and tunics. Its versatility lies in the fact that it can be blended with different fabrics such as cotton and polyester to boost their benefits. The wood cellulose goes through several steps leading to the final product, viscose fabric.

Viscose Manufacturing Process:

The manufacturing process of viscose is shown below.

Cell-OH (Cellulose) + NAOH $\longrightarrow$ Cell-ONa (Soda cellulose) + H_2O

Cell-ONa (Soda cellulose) + CS_2 $\longrightarrow$ Cell-O-CS-SNa
(Sodium Cellulose Xanthate)

Cell-O-CS-SNa (Sodium Cellulose Xanthate) + H_2SO_4 $\longrightarrow$ Cell-OH (Regenerated Cellulose)+ Na_2SO_4.

Here we break down the process of viscose production in 10 steps:

1. Wood chips are dissolved in chemicals such as sodium hydroxide, making brownish wood pulp.
2. This wood pulp containing the cellulose is then dissolved in caustic soda, turning it into an alkali solution. The process removes all impurities from the solution, making it a clean raw material for the fabric.
3. The alkali solution is pressed between rollers, eliminating excess liquid, forming pressed sheets.
4. These pressed sheets are then shredded into crumbs.
5. Crumbs are treated with carbon disulfide.
6. The treated crumbs are dissolved in chemicals such as sulfuric acid, creating the viscous solution. The "viscose" fabric or the viscose process of manufacturing rayon owes its name to this viscous solution.
7. The viscous solution is filtered to remove any undissolved element.
8. Next is degassing, required to eliminate bubbles of air trapped in the solution that may cause weak spots in the fiber.
9. The solution is then forced through a spinneret, a machine making filaments (slender thread-like fiber) of regenerated cellulose.
10. The regenerated cellulose fibers are then spun into yarns to be woven or knit into viscose fabric.

Is Viscose Environment-Friendly?

According to the Council for Textile Recycling, the average citizen in the United States throws away 70 pounds of clothing and other textiles annually. Textile waste occupies nearly 5 percent of landfills. To minimize this problem, consider environment-friendly fabrics that don't leave large carbon footprints. Since viscose is made from a renewable resource, it's biodegradable, making it environment-friendly. However, its production process causes some negative environmental impacts.

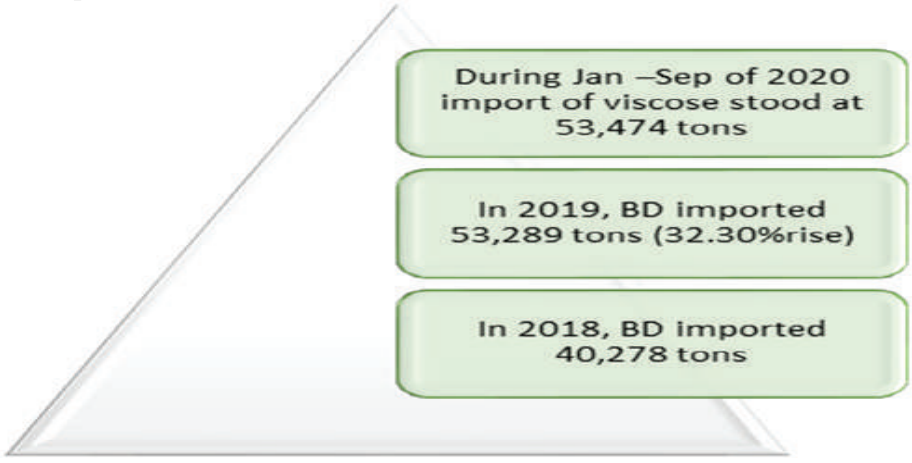
Deforestation is a major environmental concern because wood cellulose is harvested by chopping trees. To tackle deforestation, major fashion brands are now working with viscose fabric manufacturers who source their wood cellulose from sustainably-grown forests. Sustainable growth allows for the continual use of a natural resource without depleting it or causing any environmental damage. Sometimes, harmful chemicals such as hydrogen sulphide are found in air emissions around viscose manufacturing sites.

The process of manufacturing viscose requires a lot of water, depleting one of our natural resources. In terms of eco-friendliness, viscose fabric is better than synthetic fibers but not as good as all-natural fibers.

Blending of viscose with Jute and Cotton: A development and innovative study on ''Study the jute, cotton and viscose blended yarn'' was undertaken in BJRI for producing a special jute cotton and viscose blended yarn .Viscose fabric often looks like silk and feels like cotton. As, it is not possible to make shinny and silky yarn to blend jute with other natural fibre. Hence, jue is introduced in blending with jute cotton and viscose blended yarn. There is no perfect fibre. All fibres have well, far and poor characteristics, so blending is the technique to combine the fibres which emphasizes the good qualities and minimize the poor qualities of fibres. Blending also makes the fabric manufacturing process economical. Jute is a high-modulus, coarse, brown colored, rough, cheap fiber, and viscose is a low-modulus, fine, white, smooth, lustrous fiber. Their blending is accomplished mainly with the idea of imparting the color, luster, and softness of rayon to jute yarns, increasing weaving efficiency and reducing imperfections in jute products. This would help to diversify the use of jute products into new areas such as tapestry, curtain cloth, and fabrics with special effects. Again, mixture of a small amount of jute with viscose would reduce unit price of the

product and increase its dimensional stability . Cotton is a cool, soft comfortable and is the principle clothing fiber of the world. This fabric absorbs and release perspiration quickly, thus allowing the fabric to "breath." Cotton provides absorbency and consequent comfort.

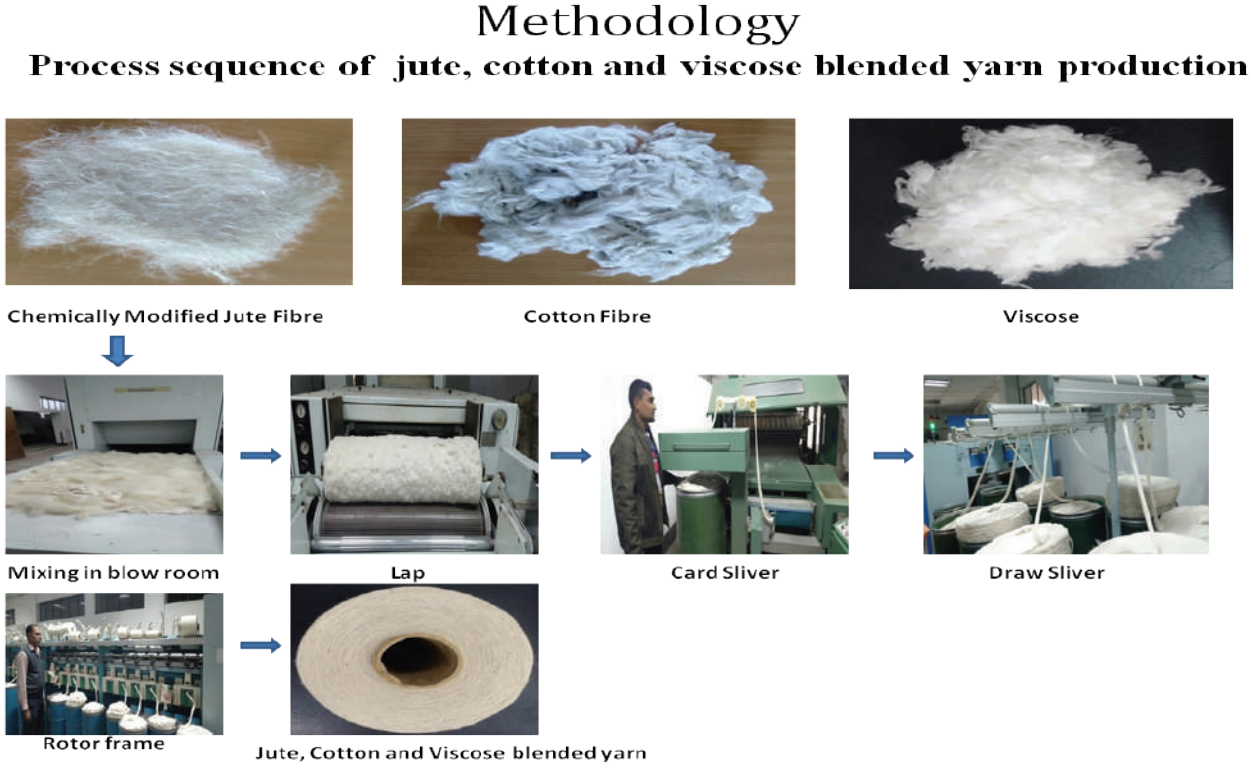
Justification of Jute Cotton and Viscose Blending: As, both viscose and cotton are costly and almost 100% imported fibre. The aim of this project is to produce jute cotton and viscose blended yarn with a view to replacing valuable cotton and viscose fibre and saving foreign currency. Import of viscose fibre from 2018 to



Objectives of the program:

- To develop and produce of jute, cotton and viscose blended yarn.
- To increase the diversified uses of jute.
- To promote marketing of new jute based blended products.
- To use jute with cotton and viscose in cotton processing
- To inspire the entrepreneur for the production of newly introduced diversified jute products.

Flow Chart of Jute, Cotton and Viscose blending:



Advantages of the Jute Cotton and Viscose blended Yarn :

1. It is a shinny and silky blended yarn.
2. It is a eco-friendly green product.
3. Sophisticated diversified blended products can be produced.
4. It will create new trend and fashion.
5. Viscose rayon is very breathable, making it a cool fabric for stylish summer wear. As jute products is low thermal conductivity. So it is possible to make summer products with jute cotton and viscose blending.
6. New texture fabrics will be produced.
7. New dimension of jute will be opened.

Beneficiaries:

- Spinning industry
- Handicraft sector
- End user(consumer)
- New entrepreneur
- SME
- Weaving industry

Conclusion: The value of cotton and viscose fibre is higher than jute fibre. Due to recent war between Russia and Ukraine, the import price of cotton and viscose fibre has increased a lot. Presently the prize (Tk./kg) of cotton and viscose fibre is 384 and 220 which is almost 4 times and 2 times of jute prize (134 Tk./kg) respectively . Hence, the successful blending of jute, cotton and viscose will open avenue for sophisticated but cost effective blended products. This innovation will contribute our foreign currency reserve by minimizing import of cotton & viscose and maximizing export of jute blended products.

BJRI GENE BANK AT A GLANCE

BANGLADESH JUTE RESEARCH INSTITUTE

Dr. Abu Saleh Muhammad Yahiya

Background of BJRI Gene Bank: Gene banks are biodiversity reservoirs and sources of alleles for sustainable genetic enhancement of plant crops. It is an important way to conserve genetic resources from home and abroad. The Gene Bank of Bangladesh Jute Research Institute (BJRI) was installed in 1982 under Agriculture Research Wing. Since, then it has started with the activities of collection, conservation, characterization, evaluation and documentation of jute and allied fibre (JAF) germplasm. Initially, it started with an old stock of 1662 accessions of land races, obsolete cultivars, genetic stocks and mutants which are being maintained in the Gene Bank. This Gene Bank is not meant for Bangladesh only but for other countries, because it has been functioning as the Centralized Germplasm Repository (CGR).

BJRI Gene Bank

Germplasm Collection: During the period 1986-90 an intensive collection of both indigenous and exotic jute and allied fibre germplasm have been accomplished. With the support of Bangladesh Agricultural Research Council (BARC)

Subscription rate per year

Bangladesh	Tk.	100.00
Asia	$	15.00
Europe	$	18.00
Africa	$	18.00
America	$	20.00
Australia	$	20.00

- No Subscription for less than one year is accepted
- One may become a Subscriber for more than one year, multiplying Subscription rate accordingly.
- Subscription may be started at any time of the year, but it will be treated as calender year (January-December) with back issue (if any) All the back issue are available.
- 10% Agency commission may be allowed for collection at least 3 (Three) Subscriber.
- Subscription should be sent in advance through Cheque, Bank Draft or cash in the name of the Director General, Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka-1207.
- All correspondence should be made with the Editor/Publication Officer, Bangladesh Jute Research Institute, Manik Mia Avenue, Dhaka-1207, Bangladesh.

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a domestic collection of 1708 accessions of jute, kenaf and mesta germplasm was made throughout the major areas of Bangladesh. Exotic jute and allied fibre germplasm were collected from Kenya, Tanzania, Thailand, Japan, Indonesia, USA, China, Brazil, Taiwan, Nepal, Pakistan and many other countries during 1987-1990 under the patronization of the then International Jute Organization (IJO). International Plant Genetic Resources Institute (IPGRI) was also involved with the collection.

Major Function: The Gene Bank of BJRI has also been functioning as the Centralized Germplasm Repository (CGR) and the Global Repository for jute and allied fibre germplasm of the IPGRI. A duplicate set of exotic jute and allied fibre germplasm have been stored in the Gene Bank of Common Wealth Scientific and Industrial Research Organization (CSIRO), Canberra, Australia for safe storage of the seeds through a bilateral agreement with Bangladesh Government and CSIRO. In order to have an effective monitoring, co-ordination and variety development programme a group of scientists and supporting staffs have been working under Genetic Resources and Seed Division with intensive care. The major activities of the Gene Bank Department of BJRI are germplasm collection, seed processing, maintenance, characterization, evaluation, multiplication, documentation and distribution according to national and global requirement. For the proper utilization of the germplasm interactions are being made among the scientists working in the Gene Bank Department and other user scientists of home and abroad.

Scientist working in medium storage condition (+40C Cell)

Capacity of BJRI Gene Bank: Length, width and height of BJRI Gene Bank are 5.08 meter, 3.52 meter and 2.5 meter, respectively. It has two separate cells ie. $+4^0$C (active storage) and at-20^0C (base storage). The storage facility in this gene bank has about 1,00,000 accessions with 200 g of seeds for each accession in two cold cells.

Present status: At present, a total of 6052 germplsam have been stored in the Gene Bank of BJRI with 15 species of *Corchorus* and 22 species of *Hibiscus* in which 2405 accessions of *Corchorus capsularis*, 1490 accessions of *Corchorus olitorius*, 688 accessions of *Hibiscus cannabinus*, 467 accessions of *Hibiscus sabdariffa*, 289 accessions of wild *Corchorus*, 314 wild accessions of *Hibiscus*, 280 accessions of allied genera and 119 accessions of Inter specific hybrids. These accessions of different species are being maintained in the Gene Bank at $+4^0$C (active storage) and at -20^0C (base storage) which are collected from home and abroad. Until now half of the accessions of jute, kenaf and mesta germplasm have been characterized for morpho-agronomic parameters.

Total germplsam in BJRI Gene Bank as on 30 June, 2021

Species Name	**Accessions**
Corchorus capsularis	2405
Corchorus olitorius	1490
Hibiscus cannabinus	688
Hibiscus sabdariffa	467
Wild *Corchorus spp*	289
Wild *Hibiscus*	314
Allied genera	280
Inter specific hybrid	119
Total	**6052**

Major Achievements: The BJRI Gene Bank provides safe storage to ensure that the varieties, landraces, obsolete cultivars, genetic stocks, mutants and any other kind of genetic resources of JAF crops and that they are easily available for future use by farmers, plant breeders and researchers.