

RESEARCH HIGHLIGHTS

Agriculture Research on Jute
2015-2016



BANGLADESH JUTE RESEARCH INSTITUTE

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PREFACE

The scientists of Agricultural Research are working in the discipline of (i) Characterization and evaluation of the germplasm on morpho-agronomic and biotechnological approaches, (ii) Development of disease and insects free high yielding variety with quality seed and fibre in changing climate, (iii) Appropriate agronomic practices with fertilizer management in changing climate, (iv) Improvement of fibre quality with appropriate/improved post harvest processing and (v) sustainable jute based cropping systems in different agro-ecological zones of Bangladesh with the dissemination of the improved technologies to the farmers. The scientists are working hard in their own discipline and developed a large number of matured technologies and improved varieties in the reporting year. The achievements of the research activities of Agricultural Research, Bangladesh Jute Research Institute for the year 2015-2016 are briefly highlighted here.

I express my heartiest gratitude to the all Scientists of Agricultural Research, and the sub-committee members for their untiring efforts for compilation, editing and publishing the Research Highlights.



(Dr. Rahima Khatun)
Director (Agriculture)
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RESEARCH HIGHLIGHT

A. BREEDING DIVISION

One advanced line of white jute BJC-5003 derived from a cross between a variety CVL-1 and a blue seeded germplasm (Acc.1831), (*Corchorus capsularis* L.) was evaluated both at on-station and farmer's field. It gave 4.55% and 4.17% higher yield than the check variety CVL-1 at on-station and at farmer's field respectively. Three potential breeding lines namely, BJC-5002, BJC-5050 and BJC-5105 were tested for higher yield and adaptability at four regional stations and JAES, Manikganj under different agro-ecological zones. All three breeding lines performed better at different stations indicating the possibility of developing new varieties with higher yield and distinct morpho-agronomic characters.

Four genotypes namely, C-2593, C-12221, C-3473 and C-12033 were evaluated with moderate salt tolerant existing variety BJRI Deshi Pat-8 (BJC-2197) at Jute Research Sub-station, Patuakhali of which C-2593 gave higher yield than the existing variety followed by C-12221, C-3473 and C-12033. Three early seeding higher yield and low temperature tolerant breeding lines (C-2234, C-2236 and C-2281) of white jute were evaluated under field condition for assessment of their fibre yield and other agronomic traits. All the lines out yielded than the check variety CC-45 in terms of fibre weight. Eight breeding lines (C-4337/06, C-4439/06, C-6702/A, C-2305, C-5126, C-5127, C-6766 and C-6786) with check variety CVL-1 were evaluated under different agro-ecological zones for assessment of their fibre yield and other attributes. The line C-6702/A gave highest yield followed by C-2305, C-4439/06 and C-4337/06.

For assessment of fibre yield and adaptability one advanced line MG-1 of *C. olitorius* was evaluated under farmer's field as well as at regional stations. The line MG-1 gave 5.32% and 6.16% higher yield than the control variety BJRI Tossa pat-5 at farmer's plot and regional stations respectively. Two breeding lines of different morphological traits namely O-043-7-9 and O-0411-10-4 were evaluated under field condition for assessment of their fibre yield and other yield attributes. The line O-043-7-9 performed better than both the control varieties O-9897 and JRO-524. Three breeding lines O-0412-9-4, O-0512-6-2 and O-049-1-3 were evaluated for their yield and yield contributing traits in a progeny yield trial. Besides, nine lines with check variety O-9897 were evaluated for anatomical feature, 100 lines were screened out for morphological traits, 109 lines for salinity tolerant, 59 lines against waterlogged condition. In addition, hybridization was done by using nineteen germplasm including four cultivated varieties.

An advanced line of kenaf 1641/C (KE-3) was evaluated at six stations of BJRI as well as eight sites of farmer's field of four locations. The line gave 1.73% and 1.49% higher yield than the check variety HC-95 at BJRI stations and farmer's field respectively. Another advanced line of mesta SAMU'93 was isolated having completely smooth stem, petiole and calyces as well as higher yield than the existing control variety HS-24. Development of this line has a great potential due to its prickle free character. It was evaluated at three stations of BJRI and four sites of farmer's field of two locations. Smooth mesta SAMU'93 gave 1.10% and 2.25% higher yield than the check variety HS-24 at BJRI stations and farmer's field respectively. Two breeding lines of kenaf with distinct morphological traits, 1641/A (KE-1) and 1641/B (KE-2)

were evaluated under field condition for the assessment of their fibre yield. Pooled mean showed that both the tested lines gave higher yield than control varieties HC-95 and BJRI Kenaf-3.

Five breeding lines of mesta namely L-30 (SM-1), L-5836 (SM-2), L-5837 (SM-3), L-5880 (SM-4) and S-5703 (SM-5) were identified as distinct on their early maturing character and quick growing habit. These lines were tested at three stations of BJRI (Manikganj, Rangpur and Monirampur). All the locations L-5836 (SM-2) and S-5703 (SM-5) showed better performance than the existing variety HS-24. Four edible leafy vegetable mesta namely 200M (ME-1), L-90 (ME-2), L-339 (ME-3) and L-911 (ME-4) were isolated with higher amount of delicious smooth leaves and calyces of fruit. They were tested for yield and yield attributes at two locations of BJRI and gave higher number of fruits than the control variety VM-1. Besides, four advanced lines as well as three released varieties of kenaf and mesta were evaluated for anatomical feature and 34 progenies of mesta were studied under field condition for the assessment of their yield and yield attributes. In addition, hybridization was done by using nine genotypes and two cultivated varieties of kenaf.

B. GENETIC RESOURCES AND SEED DIVISION

A total of 139 accessions comprising 40 accessions of *Corchorus capsularis*, 40 accessions of *C. olitorius*, 29 accessions of *Hibiscus cannabinus*, 30 accessions of *H. sabdariffa* have been characterized for morpho-agronomic traits for the year 2015-2016. Out of which 9 accessions (4869, 4621, 3394, 2199, 2839, 1478, 1777, 1923 and 2675) of *C. capsularis*, 7 accessions (91807, 1389, 1448, 1395, 2152, 1965 and 1518) of *C. olitorius*, 9 accessions (2768, 4979, 3557, 2727, 1821, 2592, 1993, 4405 and 5114) of *H. cannabinus*, 8 accessions (2993, 2595, 2494, 1859, 4680, 4450, 4920 and 2896) of *H. sabdariffa* were performed better than the other accessions. Besides, seeds of 692 accessions were distributed to different divisions of BJRI, BARJ Project of BJRI and Sher-e-Bangla Agricultural University (SAU) for utilization in their research programmes. Moreover, 651 accessions of which 176 of *C. capsularis*, 81 of *C. olitorius*, 201 of wild *Corchorus* species, 120 of *H. cannabinus* and 73 of *H. sabdariffa* were regenerated to replenish the stock of the gene bank.

Assessment of genetic variation of 51 Kenaf (*Hibiscus cannabinus* L.) germplasm was analyzed through microsatellite markers. The microsatellite loci were multi-allelic, a total of 26 alleles were detected in 51 kenaf germplasm. The average number of allele per locus were 8.66 with a range of 7 (MTIC3) to 11 (MJM606). The highest level of gene diversity value (0.89) was observed in loci MJM606 and the lowest level of gene diversity value (0.74) was observed in loci MJM618. It was observed that marker detecting the highest number of alleles showed higher gene diversity. The PIC values ranged from a low of 0.71 (MJM618) to a high of 0.88 (MJM606). The frequency of the most common allele at each locus ranged from 17.65% (MJM606) to 43.14% (MJM618) with a mean frequency of 33.99. The genetic distance was measured based on Nei's (1972) genetic distance analysis. Comparatively higher genetic distance (1.00) was observed between germplasm pair 1623 vs 1624 and some other germplasm pair. A dendrogram was constructed based on the Nei's genetic distance calculated from the 26 SSR alleles generated from the 51 Kenaf germplasm. The Unweighted Pair Group Method with Arithmetic Means (UPGMA) cluster tree analysis led to the grouping of the 51 germplasm into nine clusters. Cluster I, II, III, IV, V, VI, VII, VIII and IX contain 5, 8, 7, 19, 1, 3, 6, 1 and 1

germplasm respectively. The average genetic distance among 51 Kenaf germplasm was quantified as 0.23.

A total of 53.5 kg nucleus seeds have been produced that will be used for breeder seed production in next year. As an indispensable work of the institute, a total of 1485 kg breeder seed of different varieties of white jute, tossa jute and kenaf have been produced. Out of which 688 kg were supplied to BADC and 99 kg to private seed company (Konika Seed Co. Ltd.) for foundation and subsequently for certified seed production.

C. AGRONOMY DIVISION

To determine the optimum sowing date of breeding line OM-1MG1 (BLG) of tossa jute the experiment was designed in RCBD with three replications where recommended cultivar O-795 was used as control at JAES, Manikganj, RS, Rangpur and SS, Jessore during 2015. Crop was sown on five different dates viz 10 March, 20 March, 30 March, 10 April and 20 April regarded as treatment. Plants were harvested at 120 days after sowing. All crops were attended normal cultural practices. Results showed that control variety O-795 yielded numerically higher fibre than advanced breeding line BLG at all the station of JAES Manikganj, RS, Rangpur and SS Monirampur. Significantly higher fibre yield was produced from crop sown on 30 March at Manikganj, 10 April at Rangpur and 20 March at Monirampur.

To determine the optimum sowing date of advanced breeding line KE-3 of kenaf an experiment was laid-out in RCBD with three replications. Cultivar HC-95 was used as control. Crops were sown on three different dates i.e 15 March, 30 March and 15 April regarded as treatment. Plants were harvested at 135 days after sowing. All crops were attained normal cultural practices. Results revealed that advanced breeding line KE-3 sown on 30 March gave significantly higher fibre yield at Manikganj, Kishoreganj and Pakhimara, Potuakhali.

To find out the effect of different weedicides on jute weeds in field condition an experiment was conducted in RCBD with three replications. There were eleven weedicides viz.- Cleaner 50 EC (Quizalofop-p-ethyl), Fenox-Z 10 EC (Fenoxaprop-p-ethyl), Fusilade 150 EC (Fluazifop-p-butyl), Sonat 50 EC (Quizalofop-p-ethyl), Es-plus 150 WG (Ethoxy Sulfuran), Nilson 6.9 EW (Fenoxaprop-p-ethyl), Zinugum 69 EW (Fenoxaprop-p-ethyl), Wheel Super 69 EW (Fenoxaprop-p-ethyl), Dyafof 50 EC (Quizalofop-p-ethyl), M-Qiuz 5 EC (Quizalofop-p-ethyl), Sunwell 5 EC (Quizalofop-p-ethyl) were tested and Control was (No weedicide). Results revealed that only Khudesama (*Echinochloa colonum*) and Anguli ghash (*Digitaria sanguinalis*) controlled by above weedicides. Among 11 different weedicides only Es-plus 15WG (Ethoxy Sulfuran) which controlled Mutha (*Cyperus rotundus*) weed.

To determine the optimum sowing date of BJRI Tossa Pat-6 (O-3820) for seed production at late season an experiment was laid out in RCBD with three replications where cultivar O-9897 was used as control. Different sowing dates viz., 15 July, 30 July, 15 August, 30 August and 15 September were used as treatment. The crop was harvested at proper maturity of the pods of jute plant. Results revealed that the variety O-3820 was produced the highest seed yield at Manikganj. Monirampur and Jessore were obtained sown on 15 August. The lowest seed yield and yield attributes were recorded on 15 July sowing at all the locations.

The experiment was conducted at Manikganj, Rangpur and Jessore during 2014-15 to determine the optimum plant spacing for BJRI Deshi Pat-8 (BJC-2197) of seed production at late season.

The experiment was laid out in RCBD design with three replications. Different plant spacing viz., 30cm×10cm, 30cm×12.5cm, 30cm×15cm, 35cm×10cm, 35cm×12.5cm, 35cm×15cm, 40cm×10cm, 40cm×12.5cm, 40cm×15cm, 45cm×10cm, 45cm×12.5cm and 45cm×15cm were used as treatment. The crop was harvested at proper maturity of the pods of plant. Results revealed that the highest seed yields 1477.33kg^{ha}⁻¹ was obtained at Manikganj, 1162.53kg^{ha}⁻¹ at Rangpur and 1210kg^{ha}⁻¹ was obtained at Monirampur from the spacing 30cm×15cm.

Thirty five *olitorius* accessions were evaluated at Jute Seed Production and Research Centre, Nasipur, Dinajpur. All accessions sown on three different sowing dates were germinated. But, ten accessions viz. 3797, 3771, 3716, 3723, 3754, 3760, 3801, 3803, 3812, and 3803 were not germinated at 3rd sowing i.e. 30th March. Besides, the germinated accessions were not flowered up to 120 days after sown on three dates. Five varieties such as O-4, OM-1, O-9897, BJRI Tossa Pat-4 (O-72), and BJRI Tossa Pat-5 (O-795) showed similar trend in flowering responses as briefed earlier.

Growth and dry matter partitioning study of jute variety BJRI Tossa Pat-5 (O-795) was conducted at JAES, Manikganj during March to September 2015. The variety O-9897 was used as check. The plants were harvested at 15 days interval starting from 30 to 135 days of plant age. BJRI Tossa Pat-5 was found better in respect to plant height, base diameter, dry weight of bark, root and inferior in respect to leaf, stick and number of leaves at harvest in comparison to O-9897. The highest bark green weight (328.60 g/plant) was recorded from the variety O-795 harvested at 120 days after sowing which was insignificant with that of harvested at 90 days after sowing.

The seed yield potential of different accessions of *olitorius* jute were studied. Which were sown on mid August 2015 at JAES, Manikganj with check variety O-9897 and BJRI Tossa Pat-4 (O-72). All the accessions showed better yield and quality except 10 accessions. The highest seed yield was recorded from accession ACC-4311 (750.60kg^{ha}⁻¹). Among the accessions, twenty showed better performance in respect to germination and moisture content. However, there was no significant difference between the performance of accessions and check variety in respect to germination and moisture content, but, significant difference was existed in 1000 seed weight.

A fertilizer trial of the *capsularis* breeding line BJC-5105 was conducted at Manikganj. Maximum plant height (3.12m), base diameter (19.11mm), fibre yield (3.23t/ha) and stick yield (7.22t/ha) were obtained with the combined dose of NPK and S 100-5-30-10 Kg/ha which could be a suitable dose for the cultivation of BJC-5105.

Fertilizer trial of the advanced breeding line of *C. olitorius* blue seeded ovate lanceolate glossy leaves (BLG) showed significantly highest plant height (3.36m), base diameter (19.2mm) fibre yield (3.4t/ha) and stick yield (7.26t/ha) in favor of combined dose of NPK and S 100-10-60-20 Kg/ha that would be a suitable dose for the cultivation of advance breeding line BLG.

The highest fibre (3.13t/ha) and stick yield (7.65t/ha) of advanced breeding Kenaf line KE-3 found with the combination dose of N₁₀₀- P₁₀- K₆₀- S₂₀ Kg/ha.

A field experiment was undertaken to update of existing fertilizer recommendation for seed production for jute variety BJRI Tossa pat 4. Results showed additional 25% NP with RDF may be an effective dose for late jute seed production of BJRI Tossa pat-4.

An experiment was conducted to clarify the ability of Jute production by using tricho compost sole and by integration with chemical fertilizer for the variety BJRI Tossa Pat-4. Significantly

superior yield was obtained by RDF compared to using tricho compost in combination with chemical fertilizer or tricho compost as a sole treatment.

D. PEST MANAGEMENT DIVISION

To determine the occurrence of different seed borne diseases and their percentage of seed borne infection of seed samples of jute, kenaf and mesta caused by fungi, 43 seed samples belonging to breeder's, foundation and TLS were collected from different locations and subjected to seed health and germination test under laboratory condition. Fungal pathogens viz. *Macrophomina phaseolina*, *Colletotrichum corchori* and *Botryodiplodia theobromae* were very limited in most of the collected seed samples. The Fungus *Fusarium* was highest (21%) recorded in BJC-83 followed by O-9897 having 20 % infection which were collected from JAES. The lowest percentage of *Fusarium* infected seed (1%) was recorded in CVE-3 collected from Chandina regional station of BJRI. The highest percentage of total pathogen (35%) was recorded in O-9897 and in HC-2 collected from JAES followed by 30 % recorded in BJC-7370 collected from the JAES. The lowest seed borne infection (1%) was recorded in O-795 collected from Monirampur. Seeds of Faridpur regional station were found totally infection free.

Some selected advanced lines of capsularis germplasm, Acc. 2147, 2149, 2403, 2498, 2197 and CVL-1 and for olitorius, the accessions were Acc.- 2491, 2883, 2496, 2499, with variety O-9897 and O-3820 were tested against the stem rot disease to isolate disease resistant/tolerant genotypes. For capsularis, Acc.- 2147, 2149, 2403, 2197 and variety CVL-1 had moderately resistant character (MR) and accession 2197 had susceptible reaction against stem rot disease in artificially inoculated sick bed under field condition. The olitorius Acc.- 2491, 2496, variety O-9897 and O-3820 had moderately resistant reaction and accessions 2883 and 2499 had susceptible reaction against stem rot in artificially inoculated sick bed under field condition.

Promising lines of *Corchorus olitorius* (tossa), *C. capsularis* (deshi) and *Hibiscus cannabinus* along with respective recommended varieties viz. O-9897, CVL-1 and HC-95 were tested against fungal diseases at JAES, Manikgonj and Kishoregonj regional station, BJRI. In case of deshi jute, BJC-5002 had the lowest fungal disease infection (3.10%) recorded at before harvest of the crops at Rangpur. Among the healthy plants, the highest fibre weight per plant were 15.83gm in BJC-5003 at JAES. The lowest fibre weight per plant were 9.51gm in BJC-5002 at Rangpur. Among the diseased plant, the highest fibre weight per plant were 10.43gm in CVL-1 at JAES. In case of tossa jute OMI MGI (BLG), had the lowest fungal disease infection (2.30%) recorded at before harvest of the crops at Rangpur. Among the healthy plants, the highest fibre weight per plant were 12.77gm in OMIMGI (BLG) at Rangpur. The lowest fibre weight per plant were 8.45gm in OM-1 at JAES. Among the diseased plant, the highest fibre weight per plant were 11.60 gm. in O-3820 at Rangpur. In case of kenaf, KE-3 had the lowest fungal (1.41%) recorded at before harvest of the crops at Rangpur. Among the healthy plants, the highest fibre weight per plant were 14.25gm in KE-3 at Rangpur and the lowest fibre weight per plant were 8.93gm in HC-95 at JAES. Among the diseased plant, the highest fibre weight per plant were 13.04 gm. in KE-3 at Rangpur

Comparative performance of different varieties of different sources were conducted at Manikgonj and Kishoregonj regional station of BJRI. Before spraying, highest total disease incidence (13.27%) and lowest total disease incidence (6.16%) were recorded at JAES and KRS, respectively. After spraying, the highest total disease incidence (5.08%) at JAES was

recorded in O-795 variety and the lowest total disease incidence (2.11%) at KRS was recorded in O-9897 variety. The highest mean fibre yield/plant (10.29 gm) and fibre yield/ha (3.55 ton) of two locations were recorded in OM-1 and O-9897 varieties, respectively. The highest mean stick yield/plant (21.88 gm) and stick yield/ha (8.32 ton) of two locations were recorded in O-9897 variety. The highest mean seed yield/plant (4.07 gm) and seed yield/ha (337.40 kg) of both locations were recorded in O-9897 variety

Newly assayed fungicides viz. Gutivo 75G, Hakdak 45 WG, Absotip 75 WG, Absodak 45 WG, ACI FLO and Dithane M-45 were tested against against seed borne fungal pathogens of jute, kenaf and mesta at JAES and KRS. In case of JAES, before spraying the highest total disease incidence (19.65%) and lowest total disease incidence (12.17%) were recorded. After spraying, the highest total disease incidence (4.47%) was recorded under control treatment. Whereas the lowest total disease incidence (1.87%) was recorded with ACI- Flo spraying. In case of KRS, before spraying the highest total disease incidence (12.30%) and lowest total disease incidence (6.16%) were recorded. After spraying, the highest total disease incidence (5.08%) was recorded under control treatment. Whereas the lowest total disease incidence (2.11%) was recorded with Absodak 45 WG and Dithane M-45 spraying. The lowest fibre yield/plant (6.52 gm) and fibre yield/ha (2.95 ton) at KRS were recorded under control condition. The highest mean fibre yield/plant (9.44 gm) and fibre yield/ha (3.70 ton) of two locations were recorded under Gutivo 75G and Absotip 75G sprayed plants, respectively. Highest stick yield/plant (21.89 gm) and stick yield/ha (9.33 ton) at JAES were recorded under Absodak 45G and Absotip 75G sprayed plants, respectively. The lowest stick yield/plant (19.84 gm) and stick yield/ha (5.43 ton) at KRS were recorded under control treatment. The highest mean stick yield/plant (21.25 gm) and stick yield/ha (8.99 ton) of two locations were recorded under ACI-Flo and Absodak 45G spraying plants, respectively. The highest seed yield/plant (4.49 gm) and seed yield/ha (588.35 kg) at JAES were recorded under Gutivo 75G sprayed plants. The lowest seed yield/plant (3.23 gm) and seed yield/ha (378.45 kg) at KRS were recorded under control condition. The highest mean seed yield/plant (4.31 gm) and seed yield/ha (547.31 kg) of both locations were recorded under Gutivo 75G sprayed plants.

Survey on diseases revealed that the total disease incidence ranged from 0.00- 66.04% in different stations of BJRI. The highest disease incidence (66.04%) was recorded in BJC-5050 at Rangpur followed by 62.11% in HS-24 at Rangpur. The highest stem rot (62.11%) was recorded in HS-24 at Rangpur followed by 34.59 % stem rot in SAMU-93 at Rangpur. The highest anthracnose (31.45 %) was recorded in BJC-5050 at Rangpur followed by 18.24 % in BJC-2197 at Kishoregonj. The highest leaf yellowing (22.22%) was recorded in in HC-2 at Kishoregonj followed by 17.28 % recorded HC-95 at CRS, Dhaka. Die back disease ranged from 0.00-21.69 %. The highest die back (21.69 %) was recorded in O-72 in experimental plot at kishoregonj regional station of BJRI. Root knot disease was not prominent but ranged from only 0.00-1.72 %.

Some promising lines of jute, kenaf and Mesta were compared with recommended varieties in different locations in respect of pest infestation. Three lines of *C. olitorius* viz. BLG, O-049-13 and O-0412-9, four lines of *C. capsularis* viz C-5002, C-5003, C-5050 and C-5105, three lines of kenaf KE-1, KE-2 and KE-3 and one mesta line SAMU-93 along with O-9897, CVL-1, HC-95 and HS-24 as check variety, respectively were grown at Rangpur, Kishoreganj, Chandina and Faridpur regional station and Monirampur sub-station of BJRI. None of the lines of *C. olitorius* and *C. capsularis* was found completely free from yellow mite apion and semilooper infestation. Among the *C. olitorius* and *C. capsularis* accessions, highest yellow mite infestation

50.98% was recorded in the O-049-13 at Rangpur and lowest 10.27% infestation in C-5050 at Manikganj. Highest apion infestation 96.67% was recorded in the accession O-049-13 at Rangpur and lowest 16.67% in C-5002 at Kishoreganj. Highest bore/plant 4.9 was recorded in O-049-13 at Rangpur and the lowest bore/plant 0.3 in O-0412-9-4 at Chandina regional station of BJRI. Semilooper infestation was highest 98.02% in C-5105 and lowest 72.58% in O-9897 at Manikganj. On the other hand, highest jute hairy caterpillar infestation 3.02% was observed in O-049-13 at JAES (Jute Agriculture Experimental Station) Manikganj.

To find out resistant accession against yellow mite and apion, forty accessions of *C. capsularis* and forty accessions of *C. olitorius* were tested at JAES, Manikganj along with CVL-1 and O-9897 check variety, respectively. None of lines were found completely free from yellow mite infestation. Among these accessions, only seven accessions (4935, 2839, 1533, 2395, 2114, 1923 and 2797) of *C. capsularis* and only one accession (1978) of *C. olitorius* were found free of apion infestation which is very remarkable.

To find out the resistance accessions against Mealy bug and Spiral borer, thirty six accessions of kenaf (*Hibiscus sp.*) along with HC-95 check variety were screened in the field of Manikganj. Only eight accessions (3899, 4384, 4385, 4387, 2494, 4397, 1859 and 2896) were found completely free from mealy bug infestation. On the other hand, eighteen accessions (3404, 3482, 3592, 3656, 4598, 4819, 5097, 2595, 4398, 2896, 2938, 2993, 4907, 2584, 4680, 4920, 5022 and 5096) were found completely free from spiral borer infestation.

Three varieties of kenaf HC-95, HC-2, BJRI Kenaf -3 (Bot kenaf) and one variety of Mesta (HS-24) were found infested by Mealy bug in various level in the field. Among the kenaf and Mesta varieties, HC-24 showed the highest level of Mealy bug infestation (25.04%) at Chandina, whereas, 0% infestation was in control plot of that variety. Fibre yield loss were 26.66%, 35.85%, 65.71% and 20.63% in HC-95, HC-2, BJRI Kenaf-3 and HS-24, respectively in Manikganj that were 64.97%, 30.07%, 55.53%, and 19.86% in Chandina.

Nine new acaricides viz. Alvit 80WDG, Gherao 1.8EC, Foraway 40EC, Listar 40EC, Hexymite 10EC, Padma-sulf 80WDG, Dewvit 80WDG, Muktavit Plus 80 WG, Luthium 40 WDG @ 2.25kg/ha, 550ml/ha, 250ml/ha, 250ml/ha, 500ml/ha, 2.25kg/ha, 2.25 kg/ha, 2.25 kg/ha, 80gm/ha, respectively were tested against jute yellow mite in a standard variety O-9897 and found effective giving more than 80% reduction of infestation at JAES, Manikganj and Tarabo, Narayanganj at 7th day after spray.

Ten new insecticides viz. Orozon 10G, Panchatara 5SG, Meron 5EC, Benz 60WDG, Emilon 20SL, Hakdak 45WG, Achta 1%EC, Capture75 WDG, Capture 40% WDG, Lufa 55EC @ 16.8kg/ha, 1.5kg/ha, 500ml/ha, 200gm/ha, 550ml/ha, 400gm/ha, 1.5L/ha, 250gm/ha, 225gm/ha, 150ml/ha, respectively were found effective for controlling jute hairy caterpillar giving more than 80% reduction of infestation in JAES, Manikganj and Tarabo, Narayanganj at 5th day after spray.

Survey on insect and mite pests of jute & allied fibre crops was conducted in the experimental plots of different regional stations of BJRI according to a prescribed format. Heavy infestation of yellow mite (55.40%) was recorded at Rangpur regional station during the month of May-June. Apion infestation (15.85-35.37%) was observed at different locations during the month of July-August. Poor infestation (14.50-25.34%) of jute hairy caterpillar was recorded at different location during the month of June-July. Mealy bug infestation was highest (38.24%) at Central station, Dhaka during the month of July-August. Semilooper infestation was highest (84.84%)

at JAES, Manikganj, during the month of July-August. The highest infestation of spiral borer (35.59%) was recorded at Faridpur regional station of BJRI during the month of August-September.

E. FIBRE QUALITY IMPROVEMENT DIVISION

Jute retting is performed by the joint action of water and various microbes present in water of pond, canal, ditches, air and soil. Jute retting microbes and their containing enzymes separates the fibres from woody core of jute plants. Conducting the 1st experiment in 2015-2016, ten different retting fungi were isolated this year and their retting activities were checked. Among the fungi isolated *Rhizopus sp.* showed good retting activities than the other 10 retting fungi and it was retted the green jute bark within 12 days. *Aspergillus sp.1* retted green ribbon within 13 days of application and produced fibre was also cream color in appearance. The last three organisms isolated during this year are *Sporotrichum sp.* isolated from coconut, *Mucor sp.* isolated from palmyra fruit, and *Aspergillus sp.11* isolated from lemon were non-retter.

In the experiment of retting and fibre properties of pre-released jute varieties, the results of the pre-released variety BJC-5002 gained highest yield (1783 kg/ha) and BJC-5003 gave the second highest yield (1570 kg/ha) than the check variety CVL-1. The cutting percentage was also higher in check variety than the pre-released variety. In case of *olitorius* jute, pre-released variety OM-1 MG-1 (BLG) yielded higher amount of jute fibre than the check variety BJRI *tossa* pat-6 (O-3820). Fibre colour of *olitorius* jute was golden to light golden but in *capsularis* it was whitish to light cream in appearance. Retting period varies from 13-15 days for both pre-released jute varieties.

In the next experiment, the results of the released variety BJRI deshi pat-8 gained more yield (2114 kgha⁻¹) than the check variety CVL-1. But cutting percentage was same in check and comparable varieties. In case of *olitorius* jute, released variety BJRI *tossa* pat-6 yielded (2313 kgha⁻¹) higher amount of jute fibre than the other comparable and check variety (O-9897). In case of kenaf, HC-95 gave more yields (2409 kgha⁻¹) than BJRI kenaf-3 and check variety HC-2. Fibre colour of *olitorius* jute was golden to light golden but in *capsularis* and it was whitish to light cream in appearance. Retting period varies from 12-15 days for deshi, 15-16 days for *tossa* jute but 15-17 days was for kenaf.

The shortest retting period 16 and 18 days was found using the retting effluent collected from Faridpur. The moderate retting period 19-20 days was recorded while using the effluent collected from retting pond and canal of Chandina station. The highest retting time 23 days was observed using retting effluents collected from the canal of Manikganj. The sample collected from Faridpur produced shiny cream colour fibre which was the best in appearance but in chandina it was bright cream in colour. The retting time in control (Tap water) was 31 days.

In case of double roller jute ribboner needs 17 labours costing 5100/- for ribboning of 1 bigha jute land from harvesting to drying. But in power operated jute ribboner method needs 15 labours with costing 4800/- for ribboning of 1 bigha jute land from harvesting to fibre drying. It is seen that 2 labours are less needed in power operated Jute ribboner method than Double roller Jute Ribboner method. More field trial will be conducted on Power operated Jute Ribboner in coming season for more and clear information.

In the experiment of optimum field duration and time of ribboning after harvesting of jute by Auto Jute Ribboner, the highest fibre yield 2125 kg ha^{-1} was found from 125 days aged plant but the lowest was 1360 kg ha^{-1} from 90 days aged plants. Maximum retting time (21 days) was required for 130 days aged plants but the lowest was 9 days at 90 days jute plant. Jute retting time was ranged from 9-21 days. There was no cutting percentage at 80-110 days aged plants and best quality fibre was obtained. The cutting percentage was ranged from 1.0% to 5.0% at 115-130 days aged plants in the study areas.

F. JUTE FARMING SYSTEMS DIVISION

Farmers' alternative (FA) pattern Boro rice-Jute - T.Aman was tested agro-economically against farmers' (F) pattern Boro rice – Fallow - T.Aman in the medium high land of Manikganj in 2015-16 cropping season. The gross return (GR) was found 94.32% higher under FA pattern than the GR of farmer's pattern. Pattern basis total gross margin was found 256.3% higher under FA pattern. Same pattern was tested at Monirampur, Jessore and found tremendous profitable (277% higher gross margin) than the farmers patter.

The pattern Jute - Late Jute seed + Lalshak - Onion was tested as farmers' alternative (FA) pattern in comparison to farmers' (F) pattern Jute - T. Aman - Fallow at Manikganj in 2015-16 cropping season. Under improved management, the yield of jute fibre was recorded 2451 kg ha^{-1} , jute seed was recorded 603 kg ha^{-1} , Lalshak was recorded 2113 kg ha^{-1} and onion was recorded 9074 kg ha^{-1} . FA management pattern obtained 42.43 % higher gross return and generated 309.03 % more gross margin. The benefit cost ratios (BCR) were positive in both patterns.

A study was under taken in different jute growing areas namely Kustia, Kurigram and Manikganj during 2015-16 to estimate the update scenario of cost and return of tossa jute cultivation. The average total cost (TC) of all the location per hectare was amounted to Tk. 78247. The average cash cost per hectare was about 63% of total cost, amounting to Tk. 49320 in case of Tossa jute cultivation at farm level. The total cost per hectare was found highest in Kustia (Tk. 80238) compared to other four locations due to higher wages of human labour. The highest gross return was observed in Kustia (Tk. 107973 ha^{-1}) and the highest gross margin was recorded Tk. 47849 ha^{-1} in Kurigram on the basis of full cost due to lower wage rate. The Benefit Cost Ratio (BCR) was found highest in Kurigram 1.63 on the basis of full cost and 2.63 on the basis of cash cost.

Under technology dissemination program 340 farmers were trained on modern technology of jute production and jute based cropping pattern at Charmukimpur, Manikganj; Kustia; Kurigram; Monirampur, Jessore, Pakhimara, Patuakhali,. The main objectives of the programme was to motivate the farmers and adopt modern technologies and improved verities in their own situation as well as formulating further research programme.

BJRI Technology transfer through Jute Village & Jute Blocks were conducted in different areas of Bangladesh to motivate farmers, adopt new technologies and evaluate feedback for further research development during 2015-16. The highest average yield of BJRI Tossa jute variety O-9897 (2519 kg ha^{-1}) and the lowest average yield was found (2321 kg ha^{-1}) of BJRI tossa Pat-5. The highest gross return among all varieties over all locations was Tk. 120504 ha^{-1} at Kustia where involving total variable cost was 80315 Tk ha^{-1} for BJRI tossa jute O-9897 variety. The

highest average gross margin was Tk. 40190 ha⁻¹ which achieved by O-9897 variety in Kustia. The average BCR of all areas were 1.50, 1.44, 1.41, 1.47 and 1.46 for O-9897, BJRI Tossa Pat-4, BJRI Tossa Pat-5, CVL -1 and HC-95 varieties respectively.

G. FARM MANAGEMENT UNIT

Farm management unit of BJRI conducted the research under the two projects. Nine experiments were conducted under the two projects in different location (regional and sub-station) of BJRI during the year 2015-16.

A comparative trial was undertaken of different varieties (O-9897, O-72 and O-795) of *tossa* jute of BJRI with Indian variety JRO-524 at different locations for yield performance. The experiment was conducted at three research station of BJRI during March 2015 to August 2015. The individual results of different stations showed that in Monirampur stations all tested varieties performed better than others varieties except O-72. The highest fibre yield was obtained from O-9897 (3.28 tha⁻¹) followed by JRO-524 (3.22 tha⁻¹) in Monirampur. In Rangpur the highest fibre yield was recorded from O-72 and JRO-524 (3.15 tha⁻¹) but in Faripur the highest fibre yield was recorded in O-9897 (3.12 tha⁻¹). The average results showed that the highest fiber yield were recorded in O-9897 (3.16 tha⁻¹) which is followed by JRO-524 (3.15 tha⁻¹). It is indicated that the fibre yield of BJRI variety and exotic variety were similar.

To popularize the BJRI varieties among the farmers of different jute growing areas, a field demonstrations program were carried out under different research station of BJRI. A total of 791 demonstration plot was set up of which area of 30-33 decimal of each farmer. The average yield of deshi, tossa and kenaf were recorded 2.80 tha⁻¹, 3.00 tha⁻¹ and 3.08 tha⁻¹, respectively. Among the location highest fibre yield was recorded in Monirampur.

An experiment was conducted in Rangpur Regional station to evaluate the fibre yield of tossa variety at different age of harvest. The result showed that JRO-524 gave higher yield irrespective of all age of harvest. Average yield of all harvest age were 2.64 tha⁻¹ in JRO-524, 2.53 tha⁻¹ in O-72, 2.51 tha⁻¹ in O-795 and 2.48 tha⁻¹ in O-9897. Average yield of all harvest age were 2.64 tha⁻¹ (JRO-524) followed by 2.53 tha⁻¹ (O-72), 2.51 tha⁻¹ (O-795) and 2.48 tha⁻¹ (O-9897). The age of harvest 120 days was given higher fibre yield (3.21 tha⁻¹) irrespective of all varieties followed by harvest age of 110 days (2.66 tha⁻¹). It might be due to the yield contributing characters e. g. plant height, base diameter and bark thickness were gradually increased with the advancement of age of harvest.

To determine the inter-row spacing (25 cm, 30cm and 35cm) and intra-row spacing (5, 7.5 and 10 cm) of kenaf for fibre production an experiment was conducted in Jute Research Regional Station, Rangpur. Results showed that plant height and base diameter were not influenced by the inter-row spacing but intra-row spacing affected the plant height and base diameter. However, the fibre yield and stick yield were affected significantly by the spacing. Inter-row spacing 25 cm and 30 cm produced similar fibre yield (2.66 tha⁻¹) and (2.73 tha⁻¹), which was significantly higher from 35 spacing (2.51 tha⁻¹). Among the intra-row spacing significantly highest fibre yield was recorded in 5cm (2.70 tha⁻¹), which was followed by 10cm (2.69 tha⁻¹) spacing.

A field experiment was conducted at the Jute Research Regional Station, Rangpur of Bangladesh Jute Research Institute during the period from April to August 2015 to assess

minimizing the urea fertilizer losses and getting more yield. The highest fibre yield (3.25 tha^{-1}) was recorded in T_5 ($T_5 = 50\% \text{ basal} + 25\% \text{ foliar} + 25\% \text{ foliar}$) treatment followed by T_2 ($T_2 = 50\% \text{ basal} + 25\% \text{ top} + 25\%$) and T_1 ($50\% \text{ basal} + 50\% \text{ top dress}$) treatment 3.10 tha^{-1} , 3.05 tha^{-1} , respectively.

The survey result showed that average gross return $124,750/\text{Tkha}^{-1}$, production cost $72,337/\text{Tkha}^{-1}$, gross margin was $52,413/\text{Tkha}^{-1}$ and the benefit cost ratio 1.72. The highest fibre yield (2.64 tha^{-1}) was recorded in Monirampur, production cost, gross return and gross margin also highest in Monirampur. The lowest production cost $55,364/\text{Tkha}^{-1}$ and the highest benefit cost ratio (2.02) was recorded in Rangpur region. It may be concluded that cultivation cost jute of in Rangpur region is more profitable than other surveyed area due to lower labour cost.

A seed production program was conducted at different research stations of BJRI during June 2015 to March 2016. The program comprised of three deshi jute varieties (viz. CVL-1, BJRI Deshi pat-5 and BJRI Deshi pat-6), three tossa jute varieties (viz. O-9897, BJRI Tossa pat-4 and BJRI Tossa pat-5) and three kenaf varieties (viz. HC-2, HC-95 and BJRI Kenaf-3). A total of 3163 kg seed of different varieties of jute and kenaf were produced.

A programme ‘Nizer Beez Nize Kori’ was conducted at farmer’s field under supervision of Regional stations and Sub-station of BJRI to make the farmers self sufficiency in jute seed. To implement the programme jute seeds were distributed among the selected farmers of different region. Farmers were selected with the help of DAE. A total of 24500 kg of jute seeds were produced.

An experiment was conducted at the Bangladesh Jute Research Institute (BJRI), Regional Station, Rangpur, Bangladesh during July to December 2015 to study the effect of drying period of harvested plant and method of threshing on yield and quality of kenaf seed. The trial consist of three drying period of harvested plant (viz., threshing before drying of harvested plant, threshing after 7 days drying of harvested plant, threshing after 14 days drying of harvested plant) and two method of threshing (viz., Traditional method of threshing, mechanical method of threshing) in a Randomized Complete Block Design (RCBD) with four replications. The result of the present study concludes that the highest kenaf seed was obtained from mechanical threshing method in all the drying period and it required minimum time. The best quality seed in respect to accelerated ageing germination and field emergence was also obtained in both the threshing methods.

RESEARCH ACHIEVEMENTS

A. BREEDING DIVISION

a) Promising or outstanding results of practical importance which are being tested at several locations for validity

One advanced line of white jute BJC-5003 (*Corchorus capsularis* L) derived from a cross between a variety CVL-1 and a blue seeded germplasm (Acc.1831) was evaluated both at on-station and farmer's field. It gave 4.55% and 4.17% higher yield than the check variety CVL-1 at on-station and farmer's field respectively. The potential breeding lines namely, BJC-5002, BJC-5050 and BJC-5105 were tested for higher yield and adaptability at four regional stations and JAES, Manikganj under different agro-ecological zones. All three breeding lines performed better at different stations indicating the possibility of developing new varieties with higher yield and distinct morpho-agronomic characters.

An advanced line of tossa jute, MG-1 was evaluated under field condition at different locations for yield and adaptability, DUS test of the line has been completed successfully. Breeding lines O-043-7-4 and O-0411-10-4 derived from single crosses were under advanced yield trial for evaluation of their yield and other yield contributing characters.

One breeding line of kenaf 1641/C (KE-3) was evaluated under adaptive research trial at different locations for yield and adaptability and its seeds was sent to SCA for DUS test in 2015.

Another line of prickle and bristle free smooth mesta SAMU'93 was studied at different locations for yield and other characters and its seeds was also sent to SCA for DUS test.

b) Preliminary promising results with new information (short note type) which may be used as tools for further development of a technology (or a variety)

Four genotypes of white jute namely, C-2593, C-12221, C-3473 and C-12033 were evaluated with moderate salt tolerant existing variety BJRI Deshi Pat-8 (BJC-2197) at Jute Research Sub-station, Patuakhali of which C-2593 gave the higher yield than the existing variety followed by C-12221, C-3473 and C-12033.

Three early seeding higher yield and low temperature tolerant breeding lines (C-2234, C-2236 and C-2281) of white jute were evaluated under field condition for assessment of their fibre yield and other agronomic traits. All the lines out yielded than the check variety CC-45 in terms of fibre weight.

Eight breeding lines of white jute (C-4337/06, C-4439/06, C-6702/A, C-2305, C-5126, C-5127, C-6766 and C-6786) with cheek variety CVL-1 were evaluated under different agro-ecological zones for assessment their fibre yield and other attributes. The line C-6702/A gave highest yield followed by C-2305, C-4439/06 and C-4337/06.

Two breeding lines of tossa jute namely O-043-7-9 and O-0411-10-4 were evaluated under field condition for yield and adaptability. Three breeding lines with desirable morphological traits

namely O-0412-9-4, O-0512-6-2 and O-049-1-3 were obtained from single crosses and tested under progeny yield trial.

Two breeding lines of kenaf, 1641/A (KE-1) and 1641/B (KE-2) were evaluated under field condition for assessment of their fibre yield and other yield attributes.

Five breeding lines of mesta namely L-30 (SM-1), L-5836 (SM-2), L-5837 (SM-3), L-5880 (SM-4) and S-5703 (SM-5) were identified as distinct for their early maturing character and quick growing behavior. They were tested at three stations for yield performance. Besides, four edible leafy vegetable mesta namely 200M (ME-1), L-90 (ME-2), L-339 (ME-3) and L-911 (ME-4) were evaluated with higher amount of delicious smooth leaves and calyces of fruit.

B. GENETIC RESOURCES AND SEED DIVISION

a) Results ready to be adopted in the farmer's field or awaiting permission from appropriate authority like NSB, plant protection committee etc.

Nil

b) Promising or outstanding results of practical importance, which are being tested at several locations for validity

Nil

c) Preliminary promising results with new information (short note type), which may be used as tools for further development of a technology (or a variety)

Characterization of 40 accessions of white jute, 40 accessions of tossa jute, 29 accessions of kenaf and 30 accessions of mesta were conducted for preliminary evaluation on the basis of morpho-agronomic traits. Based on major yield contributing characters 9 accessions of white jute, 7 accessions of tossa jute, 9 accessions of kenaf and 8 accessions of mesta were performed better than the other accessions. Seeds of 692 accessions were distributed to different divisions of BJRI, BARJ Project of BJRI and Sher-e-Bangla Agricultural University (SAU) for their research purposes. Moreover, 651 accessions of which 176 of *C. capsularis*, 81 of *C. olitorius*, 201 of wild *Corchorus* species, 120 of *H. cannabinus* and 73 of *H. sabdariffa* were regenerated to replenish the stock of the Gene Bank. Fifty one accessions of kenaf were characterized at molecular level using microsatellite markers.

A total of 1485 kg breeder seeds of different varieties of white jute, tossa jute and kenaf were produced and 688 kg supplied to BADC and 99 kg tossa jute were supplied to private seed company (Konika Seed Co. Ltd.) for foundation and subsequently for certified seed production. Besides, around 53.5 kg nucleus seeds have also been produced that will be used for breeder seed production in next year.

C. AGRONOMY DIVISION

a) Results ready to be adopted in the farmer's field or awaiting permission from appropriate authority like NSB, plant protection committee etc.

To determine the optimum sowing date of breeding line OM-1MG1 (BLG) of tossa jute the experiment was designed in RCBD with three replications where recommended cultivar O-795 was used as control at Jute Agriculture Experimental Station (JAES), Manikganj, Jute Research Regional Station (RS), Rangpur and substation Monirampur, Jessore during 2015. Crop was sown on five different dates like 10 March, 20 March, 30 March, 10 April and 20 April regarded as treatment. Plants were harvested at 120 days after sowing. All crops were attended normal cultural practices. Results showed that control variety O-795 yielded numerically higher fibre than advanced breeding line BLG at all the station of JAES Manikganj, RS, Rangpur and SS Monirampur. Results also revealed that significantly higher fibre yield was produced from crop sown on 30 March at Manikganj, 10 April at Rangpur and 20 March at Monirampur.

To determine the optimum sowing date of advanced breeding line KE-3 of kenaf an experiment was laid-out in RCBD with three replications and cultivar HC-95 was used as control. Crops were sown on three different dates like 15 March, 30 March and 15 April regarded as treatment. Plants were harvested at 135 days after sowing. All crops were attained normal cultural practices. Results showed that advanced breeding line KE-3 sown on 30 March gave significantly higher fibre yield at Manikganj, Kishoreganj and Pakhimara, Potuakhali.

To determine the optimum sowing date of BJRI Tossa Pat-6 (O-3820) for seed production at late season an experiment was laid out in RCBD with three replications where cultivar O-9897 was used as control. Different sowing dates viz., 15 July, 30 July, 15 August, 30 August and 15 September were used as treatment. The crop was harvested at proper maturity of the pods of plant. Results revealed that from the variety O-3820 was produced the highest seed yield at Manikganj and at Monirampur, Jessore were obtained sown on 15 August. The lowest seed yield and yield attributes were recorded sown on 15 July at all the locations.

Thirty five accessions of olitorius jute sown on three different sowing dates were germinated. But, ten accessions viz. 3797, 3771, 3716, 3723, 3754, 3760, 3801, 3803, 3812, and 3803 were not germinated at 3rd sowing i.e. 30th March. Besides, the germinated accessions were not flowered up to 120 days after sown on three dates. Five varieties such as O-4, OM-1, O-9897, BJRI Tossa Pat-4 (O-72), and BJRI Tossa Pat-5 (O-795) showed similar trend in flowering responses as briefed earlier. The variety BJRI Tossa Pat-5 (O-795) was found better in respect to plant height, base diameter, dry weight of bark, root and inferior in respect to leaf, stick and number of leaves at harvest in comparison to O-9897. The highest bark green weight (328.60 g/plant) was recorded from the variety O-795 harvested at 120 days after sowing which was insignificant with that of harvested at 90 days after sowing. The highest seed yield was recorded from accession ACC-4311 (750.60 kg ha⁻¹). Among the accessions, twenty accessions showed better performance in respect to germination and moisture content. However, there was no significant difference between the performance of accessions and check variety in respect to germination and moisture content, but, significant difference was existed in 1000 seed weight.

It may be suggested to use the fertilizer dose of NPK and S 100-10-60-20 Kg/ha for the cultivation of advanced breeding line of *C. olitorius* blue seeded ovate lanceolate glossy leaves (BLG) to obtain higher yield and maximum benefit.

The advanced Kenaf breeding line KE-3 produced highest growth and yield by $N_{100}\text{-}P_{10}\text{-}K_{60}\text{-}S_{20}$ kg/ha.

b) Promising or outstanding results of practical importance, which are being tested at several location for validity

The experiment was conducted at Manikganj, Rangpur and Jessore during 2014-15 to determine the optimum plant spacing of BJRI Deshi Pat-8 (BJC-2197) for seed production at late season. The experiment was laid out in RCBD design with three replications. Different plant spacing viz., 30cm×10cm, 30cm×12.5cm, 30cm×15cm, 35cm×10cm, 35cm×12.5cm, 35cm×15cm, 40cm×10cm, 40cm×12.5cm, 40cm×15cm, 45cm×10cm, 45cm×12.5cm and 45cm×15cm were used as treatment. The crop was harvested at proper maturity of the pods of plant. Results revealed that the highest yields 1477.33 kg/ha⁻¹ was obtained at Manikganj, 1162.53kg/ha⁻¹ at Rangpur and 1210kg/ha⁻¹ was obtained at Monirampur from the spacing 30cm×15cm. Using additional 25% NP with RDF would be better for late jute seed production for the variety BJRI Tossa pat-4.

c) Preliminary promising results with new information (short note type), which may be used as tools for further development of a technology (or a variety)

To find out the effect of different weedicides on jute weeds in field condition an experiment was laid out in RCBD with three replications. There were eleven weedicides like- Cleaner 50 EC (Quizalofop-p-ethyl), Fenox-Z 10 EC (Fenoxaprop-p-ethyl), Fusilade 150 EC (Fluazifop-p-butyl), Sonat 50 EC (Quizalofop-p-ethyl), Es-plus 150 WG (Ethoxy Sulfuran), Nilson 6.9 EW (Fenoxaprop-p-ethyl), Zinugum 69 EW (Fenoxaprop-p-ethyl), Wheel Super 69 EW (Fenoxaprop-p-ethyl), Dyafof 50 EC (Quizalofop-p-ethyl), M-Qiuz 5 EC (Quizalofop-p-ethyl), Sunwell 5 EC (Quizalofop-p-ethyl) and Control (No weedicide) were tested. Weedicides were sprayed after 12 days of seed sowing at the doses of 650ml/ha of all the weedicides except Es-plus 15WG (Ethoxy Sulfuran) and Fusilade 50EC (Fluazifop-p-butyl) which doses were 200g/ha. Results revealed that only Khudesama (*Echinochloa colonum*) and Anguli (*Digitaria sanguinalis*) controlled by above weedicides among 11 different weedicides except Es-plus 15WG (Ethoxy Sulfuran) which controlled Mutha (*Cyperus rotundus*) only.

Highest plant height (3.12m), base diameter (19.11mm), fibre yield (3.23t/ha) and stick yield (7.22t/ha) were obtained with the combined dose of NPK and S 100-5-30-10 Kg/ha which could be a suitable dose for the cultivation of *capsularis* breeding line BJC-5105.

D. PEST MANAGEMENT DIVISION

a) Result Ready for adoption in farmers' field awaiting permission from appropriate authority like NSB, Plant Protection Committee etc.

The report on determination of threshold level or seed standard of *Macrophomina phaseolina* and *Colletrotichum corchori* has been submitted to National Seed Standard Committee for breeder, foundation and TLS. The matter is well described and awaiting for approval of NSB for seed health standard.

Nine new acaricides evaluated for controlling jute yellow mite in the field and found effective giving more than 80% reduction of infestation.

Ten new insecticides were tested against jute hairy caterpillar in the field and were found effective for controlling jute hairy caterpillar giving more than 80% reduction of infestation. These pesticides can be recommended for farmers use.

b) Promising or outstanding results and practical importance which are being tested at several locations for validity

Four capsularis germplasm. Acc. 2147, 2149, 2403 and 2197 and two olitorius, the accessions were Acc.- 2491 and 2496 had Moderately resistant character (MR) against the stem rot disease of jute .

Among the 40 accessions of *C. capsularis* and 40 accessions of *C. olitorius* screened in the field, seven accessions (4935, 2839, 1533, 2395, 2114, 1923 and 2797) of *C. capsularis* and one accession(1978) of *C.olitorius* were found free of apion infestation that can be used for further experiment.

Among the 36 accessions of kenaf (*Hibiscus sp.*) tested in the field, eight accessions (3899, 4384, 4385, 4387, 2494, 4397, 1859 and 2896) were found completely free from mealy bug that can be used for further experiment.

c) Preliminary promising results with new information that may be as tools further development of technology

Five new fungicides were tested jute diseases in the field and were found effective for controlling diseases giving more than 80% reduction of infestation. New assayed fungicides viz. Gutivo 75G, Hakdak 45 WG, Absotip 75 WG, Absodak 45 WG, ACI FLO may be ready for recommendation depending one year experimental results.

Promising lines of *C. olitorius* BLG showed the lowest infestation(32.42%) against jute yellow mite and can be used for variety development. Promising lines of Mesta(*Hibiscus sp.*), SAMU-93 line showed no infestation against spiral borer and the lowest infestation against mealy bug that can be used for variety development.

E. FIBRE QUALITY IMPROVEMENT DIVISION

a) Results ready to be adopted in the farmer's field or awaiting permission from competent authority like NSB, plant protection committee etc.

Nil

b) Promising or outstanding result of practical importance which are being tested at several locations for validity

In the experiment of retting and fibre properties of pre-released jute varieties, the results of the pre-released variety BJC-5002 gained highest yield (1783 kg/ha) and BJC-5003 gave the second

highest yield (1570 kg/ha) than the check variety CVL-1. The cutting percentage was also higher in check variety than the pre-released variety. In case of *olitorius* jute, pre-released variety OM-1 MG-1 (BLG) yielded higher amount of jute fibre than the check variety BJRI *tossa* pat-6 (O-3820). Fibre colour of *olitorius* jute was golden to light golden but in *capsularis* it was whitish to light cream in appearance. Retting period varies from 13-15 days for both pre-released jute varieties.

In case of double roller jute ribboner needs 17 labours costing 5100/- for ribboning of 1 bigha jute land from harvesting to drying. But in power operated jute ribboner method needs 15 labours with costing 4800/- for ribboning of 1 bigha jute land from harvesting to fibre drying. It is seen that 2 labours are less need in power operated Jute ribboner method than Double roller Jute Ribboner method.

In the experiment of optimum field duration and time of ribboning after harvest of jute by Auto Jute Ribboner, the highest fibre yield 2125 kgha⁻¹ was found from 125 days aged plant but the lowest was 1360 kgha⁻¹ from 90 days aged plants. Maximum retting time (21 days) was required for 130 days aged plants but the lowest was 9 days at 90 days jute plant. Jute retting time was ranged from 9-21 days. There was no cutting percentage at 80-110 days aged plants and best quality fibre was obtained. The cutting percentage was ranged from 1.0% to 5.0% at 115-130 days aged plants in the study areas.

c) Preliminary promising results with new information (short note type), which may be used as a tool for further development of technology

In the experiment of retting and fibre properties of pre-released jute varieties, the results of the pre-released variety BJC-5002 gained highest yield (1783 kg/ha) and BJC-5003 gave the second highest yield (1570 kg/ha) than the check variety CVL-1. The cutting percentage was also higher in check variety than the pre-released variety. In case of *olitorius* jute, pre-released variety OM-1 MG-1 (BLG) yielded higher amount of jute fibre than the check variety BJRI *tossa* pat-6 (O-3820). Fibre colour of *olitorius* jute was golden to light golden but in *capsularis* it was whitish to light cream in appearance. Retting period varies from 13-15 days for both pre-released jute varieties.

It was observed, in the experiment of optimum field duration and time of ribboning after harvest of jute by Auto Jute Ribboner, the highest fibre yield 2125 kgha⁻¹ was found from 125 days aged plant but the lowest was 1360 kgha⁻¹ from 90 days aged plants. Maximum retting time (21 days) was required for 130 days aged plants but the lowest was 9 days at 90 days jute plant. Jute retting time was ranged from 9-21 days. There was no cutting percentage at 80-110 days aged plants and best quality fibre was obtained. The cutting percentage was ranged from 1.0% to 5.0% at 115-130 days aged plants in the study areas.

F. JUTE FARMING SYSTEMS DIVISION

- a) Results ready to be adopted in the farmer's field or awaiting permission from appropriate authority like NSB, plat protection committee etc.**

Nil

- b) Promising or outstanding results of practical importance which are being tested at several locations for validity**

Alternative pattern Boro rice - Jute - T.Aman was tested agro-economically against farmers' pattern Boro rice – Fallow - T.Aman in the medium high land of Manikganj in 2 consecutive cropping seasons. The gross return was found 99.73% higher under FA pattern than the GR of farmer's pattern. Pattern basis total gross margin was found 256.3% higher under FA pattern. Same pattern was tested at Monirampur, Jessore and found tremendous profitable (277% higher gross margin) than the farmers patter.

Jute - Late Jute seed + Lalshak - Onion pattern was tested as farmers' alternative (FA) pattern in comparison to farmers' (F) pattern Jute - T. Aman - Fallow at Manikganj in 2 consecutive cropping seasons. FA management pattern generated 307.50 % more gross margin. The benefit cost ratios (BCR) were positive in both patterns.

- c) Preliminary promising results with new information (short note type) which may be used as tools for further development of a technology (or a variety)**

BJRI Technology transfer through Jute Village & Jute Blocks were conducted in different areas of Bangladesh to motivate farmers, adopt new technologies and evaluate feedback for further research development during 2015-16. The highest average yield of BJRI Tossa jute variety O-9897 (2519 kgha⁻¹) and the lowest average yield was found (2321 kgha⁻¹) of BJRI tossa Pat-5. The highest gross return among all varieties over all locations was Tk. 120504 ha⁻¹ at Kustia where involving total variable cost was 80315 Tkha⁻¹ for BJRI tossa jute O-9897 variety. The highest average gross margin was Tk. 40190 ha⁻¹ which achieved by O-9897 variety in Kustia. The average BCR of all areas were 1.50, 1.44, 1.41, 1.47 and 1.46 of O-9897, BJRI Tossa Pat-4, BJRI Tossa Pat-5, CVL -1 and HC-95 varieties respectively.

Study in Kustia, Kurigram and Manikganj during 2015-16 to estimate the update scenario of cost and return of tossa jute cultivation shows promising result. The average total cost (TC) of all the location per hectare was amounted to Tk. 78247. The average cash cost per hectare was about 63% of total cost, amounting to Tk. 49320 in case of Tossa jute cultivation at farm level. The total cost per hectare was found highest in Kustia (Tk. 80238) compared to other four locations due to higher wages of human labour. The highest gross return was observed in Kustia (Tk. 107973 ha⁻¹) and the highest gross margin was recorded Tk. 47849 ha⁻¹ in Kurigram on the basis of full cost due to lower wage rate. The Benefit Cost Ratio (BCR) was found highest in Kurigram 1.63 on the basis of full cost and 2.63 on the basis of cash cost.

G. FARM MANAGEMENT UNIT

- a) Results ready to adopt in farmer's field or awaiting permission from competent authority like NSB, Plant Protection Committee**

Nil

- b) Promising and outstanding results of practical importance, which are being tested at several locations for validity**

Nil

- c) Preliminary promising results of with new information's (short note type) which may be used for further development of a technology (or a variety)**

Regional effect was observed in fibre yield based on a trial of comparative of performance of tossa jute. It was noticed that highest fibre yield was recorded in O-9897 (3.28 tha^{-1}) in Monirampur and in Faripur (3.12 tha^{-1}). In Rangpur the highest fibre yield was recorded in O-72. The average results showed that the highest fiber yield were recorded in O-9897 (3.16 tha^{-1}) which is followed by JRO-524 (3.15 tha^{-1}). It's concluded that in Faridpur and Jessore region is more suitable for O-9897.

The spacing 25-30 cm row to row and 5 cm intra-row spacing maximize the fibre yield of kenaf. Inter-row spacing 25 cm and 30 cm produced similar fibre yield (2.66 tha^{-1}) and (2.73 tha^{-1}), which was higher from 35 spacing (2.51 tha^{-1}). Among the intra-row spacing significantly highest fibre yield was recorded in 5cm (2.70 tha^{-1}), which was followed by 10cm (2.69 tha^{-1}) spacing. It's concluded that 5 cm intra-row spacing with 25-30 cm inter-row spacing given higher fibre yield.

Mechanical threshing method for kenaf seed production is more convenient in respect quality seed production as well as cost reduction. The best quality seed in respect to accelerated ageing, germination and field emergence was obtained by using this threshing method.

