

AINP on Jute & Allied Fibres 2011-12

All India Network Project on Jute and Allied Fibres functions through 9 SAUs and an ICAR institute-based centre with its Head Quarter at CRIJAF, Barrackpore. During the year 2011-12 total 55 projects were evaluated on Jute (*C. capsularis* and *C. olitorius*), mesta (*Hibiscus sabdariffa* and *Hibiscus cannabinus*), sunnhemp (*Crotalaria juncea*), ramie (*Boehmeria nivea*), sisal (*Agave sp.*) and flax (*Linnum usitatissimum*) pertaining to Crop Improvement, Crop Production and Crop Protection aspects.

1. Crop Improvement

A total of 28 projects comprising of 159 trials were evaluated at different centres under Crop Improvement programme. Twelve projects were evaluated for jute, nine for mesta, three each for sunnhemp and ramie and one for flax, including germplasm evaluation, national hybridization programme, initial evaluation trials, advance varietal trials-I, advance varietal trials-II and adaptive trials on jute and allied fibre crops.

1.1. Varieties released

Three varieties, 2 of jute viz., JRO-2407 (*C.olitorius*), KJC-7 (*C.capsulais*) and one variety of roselle AHS-161 (*H. sabdariffa*) have been released and notified by Central Variety Release Committee. Despite, one variety of kenaf JBM-71 has been released by State Variety Released Committee of Odisha State.

1.2. Varieties Identified for release

Four varieties namely, JROM 1 of tossa jute, JRCM 2 of white jute, JBM 81 of kenaf and SUIN 037 of sunnhemp have been identified for central release by the Variety Identification Committee in the 10th Annual Group Meeting of All India Network Project on Jute and Allied Fibres held at OUAT, Bhubaneswar, Odisha on 6th and 7th February, 2012.



Hon'ble ADG (CC), ICAR inaugurating the 10th Annual Group Meeting of AINP on JAF at OUAT, Bhubaneswar, Odisha in presence of Prof. DP Ray, VC, OUAT and Prof. BS Mahapatra, Director, CRIJAF



Inaugural address by Hon'ble ADG (CC), ICAR



Welcome address by Prof. BS Mahapatra, Director, CRIJAF

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1.3. Evaluation of germplasm

1.3.1. Jute

Fifty accessions each of *C. capsularis* and *C. olitorius* were evaluated in different locations in 2011-12.

C. capsularis: Considering mean performance over locations, seven accessions for plant height, twelve for basal diameter and two accessions viz., CIJ 170 (11.35 g/pl) and CIJ 139 (11.28 g/pl) for dry fibre yield were found to be superior over better check variety JRC 212 (11.16 g/pl).

C. olitorius: Four accessions, OIJ-086 (2.04 cm), OIJ-042 (1.75 cm), OIJ-206 (1.66 cm) and OIJ-273 (1.61 cm) exhibited higher basal diameter than the better check variety JRO 8432 (1.60 cm). Two accessions, OIJ 044 (16.67 g/pl) and OIJ 052 (14.6 g/pl) surpassed fibre yield of better check JRO 8432 (13.86 g/pl).

1.3.2. Mesta

H. sabdariffa: Seven accessions exceeded plant height over the best check variety AMV 5 (276 cm). Four exceeded basal diameter over the best check variety HS 4288. Eight accessions viz., AS 80-19, AR 66, R 134, R 88, R 318, AR 80, As 80-7 and AS 81-5 exceeded fibre yield over the best check variety HS 4288 (22.8 g/pl).

1.4. National Hybridization Programme

C. capsularis: Progenies from cross combination CIN- 149 x CIN- 321 exhibited maximum basal diameter (2.24 cm). Progenies from CIN- 149 x JRC-321 exhibited best performance for fibre yield (16.00 g/pl).

C. olitorius: Progenies of eleven cross combinations recorded higher fibre yield than average. The cross combination OIJ-245/NPL/YPY/025C X C051 exhibited highest fibre yield (14.40 g/pl).

1.5. Performance of entries in IET and AVT

Tossa Jute (*C. olitorius*)

IET: Test entry KRO-1 turned out to be the best performing entry and recorded 32.13 q/ha of fibre yield.

AVT-I: Test entry JROG-1 (26.51 q/ha) was found to be the best entry followed by JROG-2 which recorded 25.62 q/ha of fibre yield.

AVT II: Test entry JROM-9-1 was found to be the best performer with fibre yield 27.35 q/ha.

White jute (*C. capsularis*)

IET: Test entry JRCJ-2 (34.10 q/ha) was the best performer followed by NCJ- 28-10, NDJC-2011, BCCC-1 and JRCJ-1.

AVT-I: Test entry NCJ-28-1 (26.86 q/ha) was best performing entry.

AVT II: In 2011 Test entry NCJ-27-40121 (26.95 q/ha) was found to be the best followed by JRC-9057 (26.64 q/ha) and KJC-11 (25.28 q/ha).

Roselle (*H. sabdariffa*)

IET: Test entries AHS-223 (30.13 q/ha), AHS-211 (30.06 q/ha), JBRP-02 (29.70 q/ha) and JBRP-01 (29.47 q/ha) out yielded the best check AMV 5 (29.15 q/ha).



Dr. S. Satpathy, In-charge, AINP on JAF presenting research achievements

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AVT-I: All test entries out yielded the best check AMV 5 (22.57 q/ha) except AHS-188.

AVT-II: Test entry AHS-169 recorded the highest fibre yield (26.16 q/ha) with 7.39% yield superiority over the best check AMV 5 (24.36 q/ha).

Kenaf (*H. cannabinus*)

IET: All the test entries out yielded the check varieties HC 583 and AMC 108.

AVT-I: All the test entries performed better than both the check varieties.

AVT-II: Test entry JRKM-9-1 (26.19 q/ha) performed best followed by JRKM-9-5 (23.01 q/ha) and JRKM-9-3 (22.47 q/ha) over better check HC 583 (20.65 q/ha).

Sunnhemp (*C. juncea*)

IET: Test entry SUIN-67 (12.44 q/ha) out yielded both the checks K 12 Yellow (12.21 q/ha) and SH 4 (11.55 q/ha).

AVT-I: Test entry JRJ-610 performed best with a fibre yield of 8.97q/ha followed by JRJ-611 8.37 q/ha.

Ramie (*B. nivea*)

AVT-II (new plantation): Maximum dry fibre yield (9.47 q/ha/year) was observed in the entry R-1411 followed by check R 6734 (Kanai) (9.2 q/ha/year) and R 1449 (8.67 q/ha/year).

AVT-II (old plantation): The maximum dry fibre yield (18.74 q/ha/year (4 cuttings)) was observed in the entry R-1411 followed by R- 1412 (17.45 q/ha/year) and check R 67 34 (Kanai) (17.26 q/ha/year)

Flax (*L. usitatisimum*)

AVT-II: For plant height JRF-4 (100.5 cm) ranked first which was closely followed by JRF-1 (100.0 cm) and FT-895 (99.0 cm). Test entry JRF-2 and JRF-4 (3.6 q/ha each) produced highest fibre yield.

1.6. Adaptive trials

Nine adaptive trials comprising of jute, mesta, sunnhemp and ramie were conducted with suitable checks.

White jute (*C. capsularis*)

JRCM 2: Adaptive Trial laid at 2 locations in West Bengal and 3 locations in Uttar Pradesh. It out yielded national check JRC 698 by 11.56% with yield potential of 31.36 q/ha.

KJC 9: This entry was tested at 4 locations in Odisha and 3 locations in UP. It out yielded national check JRC 212 by 14.19% with average yield of 28.0 q/ha.

Tossa Jute (*C. olitorius*)

JROM 1: This entry was tested at 3 locations in Odisha, 2 locations in West Bengal and 1 location in Bihar. It out yielded check variety JRO-524 by 20.72% with fibre yield of 32.32 q/ha.

Roselle (*H. sabdariffa*)

JRR 09: This entry was tested at 1 location each in Odisha and West Bengal. It out yielded national check AMV 5 by 17.58% with fibre yield 23.54 q/ha.

AHS 161: This entry had been in adaptive trial at 2 locations in Andhra Pradesh and out yielded check AMV 5 by 12.73% with fibre yield of 27.62 q/ha.

Kenaf (*H. cannabinus*)

JBM 81: This entry had been evaluated at 3 locations in West Bengal and 2 locations in Odisha. It out yielded national checks HC 583 and AMC 108 by 3.05 % & 42.81%, respectively with yield potential of 23.65 q/ha.

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JBM 85: This entry was tested at 2 locations in West Bengal and 1 location in Odisha. It out yielded check varieties HC 583 and AMC 108 by 1.66 % and 11.81%, respectively with average fibre yield 23.95 q/ha.

Sunnhemp (*C. juncea*)

SUIN 037: This entry had been tested at 4 locations in Uttar Pradesh. It out yielded check varieties K 12 Yellow and Shailesh by 17.97% and 16.39%, respectively with average yield 10.44 q/ha.

Ramie (*B. nivea*)

R-1411: Trial was laid at Sorbhog, Assam. Entry R 1411 exhibited maximum dry fibre yield, base diameter, green weight and stick weight (q/ha/year) 18.20 q/ha, 1.05 cm, 484.4 q/ha and 299.0 q/ha, respectively.

1.7. Fibre quality

Tossa jute

IET: Fibre tenacity of JROK-7 and BCCO-5 was found to be fairly good at Kalyani and Nagaon centres.

AVT-I: Fibre samples of Kalyani, Nagaon and CRIJAF graded between TD-3 to TD-4 and all entries in general, were finer than the checks.

AVT-II: Grade of fibre samples of all centres varied from W-4 to W-5 whereas all samples of CRIJAF graded as TD-3 except JROS-7 (W-2).

White jute

Entire fibre samples in general, of IET, AVT-I and AVT-II trials of white jute ranged between W-4 to W-5 grades.

Roselle

All the fibre samples of AVT-I and AVT-II trials of roselle at Kendrapara centre were average to weak in tenacity, but very fine in nature with grade M-3 to M-4.

Kenaf

Hard root content varied from 20 to 30% and 1.0% defects in all the samples of kenaf trials AVT-I and AVT-II. Fibre grades varied from M-3 to M-4, but all the samples were very fine in nature.

Sunnhemp

All test entries had high tenacity value as compared to check varieties at both Aduthurai and Kalyani centres under IET and AVT-I trials.

2. Crop Production

In Crop Production, 63 trials were conducted under 19 projects. The fibre yield of the new *C. olitorius* genotype JROM 1 was higher than the check variety JRO 524 at Coochbehar centre only though the yield was at par with the other check variety JRO 8432. Maximum fibre yield was recorded with 80: 17.5: 33.3 kg/ha (N: P: K) fertilizer dose at Kalyani centre only. The fibre yield of new *C. capsularis* genotypes JRCM 2 and KJC 9 were statistically at par but significantly superior than the check variety JRC 698 at Coochbehar centre only and the fibre yield of new genotypes increased significantly upto 80: 17.5: 33.3 kg/ha (N:P:K) fertilizer dose only. The fibre yield of the new kenaf entries JBM 81 and JBM 85 could not exceed the yield of the check variety HS 583 while higher fibre yield was observed with 80: 17.5: 33.3 /ha fertilizer dose at Kendrapara. The new roselle entry AHS 161 out yielded the check varieties AMV 5 and HS 4288 at Amadalavalasa only.

The fibre yield target of jute (3.5 and 4 t/ha) could not be achieved with the application of NPK on soil test basis alone or in presence of organic matter. Under acidic soil condition, application

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of inorganic fertilizer on soil test basis integrated with lime or lime and organic manure recorded significantly higher fibre yield of jute, mesta and rice in Coochbehar and Amadalavalasa centres. All the weed control treatments effectively reduced the weed biomass at almost all the centers. Two hand weeding recorded highest fibre yield at Nagaon (29.75 q/ha), Bahraich (29.16 q/ha) and Coochbehar (27 q/ha) which were at par with butachlor 50% EC / pretilachlor 50% EC (pre-emergence) + one hand weeding treatments. At Kalyani, highest fibre yield was recorded in butachlor 5G @ 1.5 kg/ha + one hand weeding treatment. Application of butachlor as spray or in granular form followed by one hand weeding recorded maximum fibre yield of mesta at Amadalavalasa while at Adhuthurai, highest mesta fibre yield (17.17 q/ha) was recorded in quizalofop ethyl @ 60 g/ha at 15 DAE + one hand weeding treatment.

At Bahraich and Coochbehar, the optimum sowing time for seed jute crop was found to be 21st July while at Kalyani, it was 7th August though the sowing could be delayed upto 22nd August with significant decrease in seed yield. Maximum seed yield of jute was observed when the crop was sown at 60cm x 15cm spacing at Bahraich and with 45cm x 15cm spacing at Kalyani, Kendrapara and Coochbehar centres, respectively.

At Kalyani, jute sown on 30th March to 3rd week of April with one irrigation + 80 kg N+18 kg P+33 kg K/ha + bunding all around plot gave highest fibre yield (43.61 q/ha) and it was statistically at par (42.50q/ha) with late sown (1st to 3rd week of May) crop + N: P: K (60:13:25) + elemental sulphur @ 30 kg/ha. At Amadalavalasa, rainfed sowing + 60 kg N+ 13 kg P+ 25 kg K + 30 kg S/ha resulted in higher basal diameter, plant population and highest roselle fibre yield (24.6 q/ha).

The retting of whole plant *olitorius* jute with CRIJAF microbial consortium was completed in 12 to 15 days compared to 19 to 21 days required without consortium at CRIJAF, Coochbehar, Kalyani and Nagaon centres, while retting of *capsularis* jute with consortium completed in 7 days compared to 13 days required under without consortium at Bahraich centre. The mesta retting with consortium was completed in 7 days during the month of November as compared to 14 days under normal retting at Amadalavalasa centre. There was improvement in fibre quality in the form of colour, lusture and fibre strength with consortium in all the centres.

Mesta variety MT 150 recorded significantly higher green biomass and successive increase in nitrogen dose increased the green biomass significantly up to 100 kg N/ha application at Kendrapara, Aduthurai and Amadalavalasa. Applications of nitrogen (60 kg /ha) in three equal splits recorded significantly higher mesta fibre yield at Kendrapara and Amadalavalasa centres while application of 40 kg N/ha in 3 split (10, 15 and 15 kg/ha) was at par with 60 kg/ha in three equal splits at Aduthurai. Application of organic matter significantly increased mesta fibre yield at all the centres. Sowing of mesta on 1st July with 60 cm x 10 cm spacing and topping at 45 DAS recorded significantly higher seed yield of mesta at Aduthurai.

Sowing of sunnhemp on 15th May with 45 cm x 10 cm spacing and topping at 45 DAS recorded significantly higher seed yield of the crop at Aduthurai. At Pratapgarh, maximum seed yield of sunnhemp was observed when the crop was sown on 15th May with 30 cm x 10 cm spacing and topping was done on 30 DAS, though the sowing could be delayed to 1st June at Pratapgarh without significant decline in seed yield of the crop. At Rahuri, sowing of sunnhemp between 1st to 22nd July at 30 cm x 10 cm spacing recorded significantly higher seed yield of sunnhemp.

At Barrackpore, maximum total annual yield of ramie was observed with 150% RDF (16.14 q/ha) which was statistically at par with the yield recorded with T₄ treatment [125% N from RDF (inorganic) + 25% N from FYM] (15.40 q/ha) but was significantly higher than the yield recorded with rest of the treatments.

The highest number of leaves as well as maximum leaf length of sisal at Bamra was observed in June cutting. Substitution of 30-60 kg/ha of fertilizer nitrogen without reduction in leaf number and leaf length of sisal was possible through use of sisal waste @ 20 t/ha at Bamra.

3. Crop Protection

In Crop Protection, 27 trials pertaining to germplasm screening survey and surveillance of pests and diseases and pest management were conducted under 7 projects. On the basis of survey and surveillance, the common insect pests infesting jute were semilooper, Bihar hairy caterpillar (BHC), yellow mite and stem weevil. Infestation of indigo caterpillar (36.74%), *Myllocerus*

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beetle (30.62%) and mealy bug (1.8%) was specific at Nagaon, Barrackpore and Katihar, respectively. The yellow mite infestation was more consistent across the centres with maximum infestation of 13.76%, 34.76% and 90.00% at Coochbehar, Nagaon and Barrackpore, respectively. At Kendrapara, Nagaon and Barrackpore, the peak period of semilooper infestation was from 2nd week of June to 2nd week of July respectively at 65-90 DAS. Maximum stem weevil infestation coincided at 55 to 70 DAS during May-June with highest infestation of 25% at Barrackpore followed by 21.65% at Nagaon. No infestation of weevil was observed at Coochbehar. In mesta, jassid, aphid, whitefly, mealy bug and semilooper were found to be prevalent at Amadalavalasa. The severity of aphid and mealy bug was comparatively more during September and October.

Stem rot was observed to be the major disease in jute. At Barrackpore, the incidence of stem rot of jute increased with crop age from 1.0 % at 60 DAS to 6.2 % at 110 DAS. Similarly root rot incidence increased from 0.1-0.2% at 60 DAS to 7.9% at 110 DAS. At Coochbehar root rot incidence was the lowest (3.3 – 9.4%) at 75 DAS but stem rot (1.9-8.3%) and black band (0.6-4.6%) was the highest at 105 DAS. At Katihar, stem and root rot was the most devastating disease with peak incidence (7.7 to 20.3 %) in mid-July to end of August. In mesta foot and stem rot (16.2-34%), leaf rot (4-18%) and phytoplasma disease (15-4-38.0%) were prominent at Amadalavalasa.

In evaluation of germplasms against pest infestation/incidence the white jute (*C.capsularis*) germplasm CIJ-170 was immune to mite infestation. Two accessions of white jute i.e. OIN-332 and OIJ-225 were immune to stem weevil whereas OIJ-150 was free from mite infestation at Nagaon. On the basis of overall infestation, the mesta entries were rated to be tolerant against mealybug and aphid. Among the *tossa* jute germplasms, OIN-110, OIJ-270 and CIN-467 were least infested with stem rot at Coochbehar, Bahraich and Kendrapara respectively. In Katihar, 4 lines of white jute were free from both stem and root rot. In mesta all the lines were highly susceptible to foot and stem rot except ER-7 which was moderately susceptible.

Sowing of jute seed crop in mid-August had minimum seed infection (1.7%) and seed discoloration (9.2 /pod). Spraying of 0.1% carbendazim at pod maturation reduced the seed infection by 35.1% and seed discoloration by 32.9%. Highest seed yield of 14.0 q/ha was obtained in mid-August sown crop.

The effect of sowing time and insecticides indicated that at Coochbehar late sown crop was less infested by insects. The spraying of fenazaquin 10 EC (0.015%) at 45 and 60 DAS and profenophos 50 EC (0.10%) at 70 and 80 DAS resulted in highest yield (29.67q/ha) in 12th April sown crop. At Nagaon also same treatment was superior with 27.95 q/ha yields. The foliar spraying of abamectin 1.8 EC (0.0015%) at 45 and 60 DAS followed by lamda cyhalothrin 5 EC (0.003%) at 70 and 80 DAS resulted in reduced pest incidence and the highest fibre yield (26.84 q/ha) at Katihar.

Three new varieties, viz. JRO 2407 (Samapti) of *tossa* jute, KJC 9 (Shrestha) of white jute and AMV 7 of HS mesta were recommended for release and notification by CVRC. Four new varieties, viz. JROM 1 in *Tossa* jute, JRCM 2 in white jute, JBM 81 of kenaf and SUIN 037 of sunhemp has been identified for Central release during the last Annual Group meeting of AINP on J&AF. Retting of jute and mesta using CRIJAF microbial consortium significantly reduced the retting time by 7 days and also improved the fibre quality in terms of colour, lusture and fibre strength as compared to normal retting process. The yellow mite infestation was more consistent across the centres with maximum infestation of 13.76%, 34.76% and 90.00% at Coochbehar, Nagaon and Barrackpore, respectively coinciding at 45 to 65 DAS during mid-May to mid-June. Infestation of indigo caterpillar (36.74%), Myllocerus beetle (30.62%) and mealybug (1.8%) was specific at Nagaon, Barrackpore and Katihar respectively. The application of fenazaquin 10EC (0.015 %) at 45 and 60 DAS could reduce mite infestation significantly.