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EVALUATION OF FIBER YIELD AND YIELD ATTRIBUTES OF ADVANCED BREEDING LINE OF SMOOTH MESTA AS AFFECTED BY SOWING DATES

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ABSTRACT

The sowing date is a crucial factor for jute and allied fiber crops for better crop growth as well as fiber production. It is more important for advanced breeding lines before variety release. The purpose of this study was to provide information to breeders on the sowing time of advanced breeding lines of smooth Mesta, so they can recommend suitable sowing times for specific varieties. This study was carried out in the Jute Research Substation at Dinajpur, Bangladesh from March to July 2023. For the experimental treatments, three distinct sowing dates-namely, March 20th, March 30th, and April 10th were used, alongside the utilization of an advanced Mesta breeding line, SM-2, developed by the Bangladesh Jute Research Institute. A high-yielding Mesta variety, BJRI Mesta 3 (SAMU-93) was used as a control. A factorial RCBD design with three replications was used. Results showed that advanced breeding lines and sowing dates significantly affected plant height, base diameter, green weight with leaves, green weight without leaves, fiber yield and stick yield. Both the highest fiber yield (2.50 tha^{-1}) and stick yield (5.00 tha^{1}) were found when SM-2 was sown on 30th March. The second highest fiber yield (2.32 tha^{-1}) and stick yield (4.64 tha^{-1}) were found when SM-2 was sown on 10th April. The research showed that fiber yield and stick yields were 21 and 33% higher than the control respectively, when it was sown on 30 March.

Keywords: Mesta, Advanced breeding line, Sowing dates, Plant parameters, Fiber yield

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1. INTRODUCTION

Mesta is an essential natural fiber crop after cotton and jute commercially being used worldwide (Sadhineni et al. 2023). It is one of the most important bast fiber crops grown in Bangladesh (Ali et al. 2017). The fiber obtained from Mesta by biochemical process i.e., retting in water is one of the cheapest natural fibers (Naik et al. 2018). In Bangladesh, the production area of Mesta is not specified separately it is calculated as jute and allied fiber crop and 80-90 lakh bales of raw fiber was produced from 7-8 lakh hectares of land by cultivating jute and allied fiber crops in 2022-2023 (BBS 2023).

Mesta is the most common name used specifically for *Hibiscus subdariffa* var. *altissimo* Hort, both for plant and fiber, although the edible *Hibiscus subdariffa* L. is called roselle. Other common names for the plant and fiber include Kenaf in most countries; Mesta, roselle, hemp, and pusa or pusa hemp (Islam et al. 2019).

Mesta fiber has various uses such that it is used in rope making, gunny bags, carpet, textile engineering etc. Besides this, it is used as a potential feedstock for bioethanol production (Lavanya et al. 2020; 2022). The production and export of jute stick charcoal made from jute and Mesta will strengthen the ever-sick jute farmers' economy (Ghorai et al. 2021).

Pre-released plants which have been developed by plant breeders for use in modern scientific plant breeding are known as advanced lines (Islam and Ma 2016). The specific combining ability of two parents creates superior advanced line about fiber quality such as fiber tenacity, whiteness, brightness, tensile strength etc. (Sharma et al. 2017).

One of the major benefits of cultivating Mesta fiber crops with proper sowing time is that weed management cost is comparatively low and weeds can be controlled merely with thinning (Sadhineni et al. 2022). A woven and mechanically entangled sheet of Mesta was used as soil cover for strawberry cultivation with an aim for weed control and moisture retention (Sengupta and Debnath 2022).

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One significant non-monetary production factor that potentially influences both the quantitative and qualitative traits is sowing time and when standard sowing time falls by, crop yields are drastically decreased (Singh et al. 2013). Sowing time as well as harvesting time is an important factor that affects fiber production and with 10 days change in sowing dates, there should be a significant change in fiber yield (Ahmed et al. 2023). Important growth parameters such as plant height, base diameter, and weight of green plants with leaves and without leaves significantly differ with the various sowing dates (Ahmed et al. 2023). When there is more than 900mm of rainfall and a maximum temperature below 32.0°C for 10 to 16 weeks after sowing (WAS), the active vegetative stage seriously stunts and crop yields decline (Rao et al. 2013). There is very little or no information on the sowing times of various advanced breeding lines of Mesta. Previous studies showed that proper sowing of dated Mesta can reduce the attack of mealy bugs thus fiber production increased a considerable amount. (Rajasekhar et al. 2018). A little variation in sowing time such that 10-15 days can affect the fiber yield seriously, that is why it is very argent to find out the specific period for higher fiber production of the advanced breeding line before variety release. The objective of this study was to determine the suitable sowing dates for the advanced breed line of Mesta, SM-2 (Smooth Mesta-2). The principal objective of this study was to provide information to the breeder for the recommendation of sowing time during variety release.

2. MATERIALS AND METHODS

2.1. Experimental Site

A field experiment was carried out in the Jute Research Substation at Dinajpur, Bangladesh (latitude: 25° 37' 38.82" North and longitude: 88° 38' 16.04" East) from March 2023 to June 2023. The study area was in the Agro-Ecological Zone 1 (AEZ-1), Permeable silt loam to silty clay loam soil was seen on the hills and in the basins, which are neutral to slightly acidic in response (UNDP and FAO 1988). The soil pH of the research area was 6.2 and organic matter content was low, making it mildly alkaline in response.

2.2. Plant Materials

The advanced breeding line of Mesta named smooth Mesta 2 (SM-2) developed by Bangladesh jute research Institute was used as plant material for this experiment and a high yielding Mesta variety- BJRI Mesta 3 (SAMU-93) developed by breeding division of Bangladesh Jute Research Institute in 2017, was used as a control (Mostofa et al. 2017).

2.3. Design and Treatments

The experiment was laid out in RCBD with three replications. The unit plot size was 4.0m x 2.5m. Space between plot to plot and around the field was 1m and between replications 1.5m. Seeds were sown on three different dates like 20 March, 30 March and 10 April regarded as treatment. Seeds were sown in lines 30 cm apart. Other cultural and intercultural practices were followed as per BJRI recommendation. Plants were harvested 120 days after sowing.

2.4. Major Parameters for Yield and Yield Contributing Attributes Studied

2.4.1. Plant Height: The most important parameter for fiber yield. The plant was cut just on top of the root from where the stem was touched to air. A measuring tape was used to measure the height of the stalk. The unit of the plant height was in meter (m). Ten randomly selected plants were measured for plant height and then the average value was taken.

2.4.2. Base Diameter: Ten randomly selected plants were used to measure the base diameter. A slide caliper was used to measure the base diameter. The measurement was taken three times from three portions of the base of the plant and then the average result was taken. The unit for base diameter was in millimeter (mm).

2.4.3. Green Weight with Leaves (GWL): Ten plants were selected randomly. Then all the leaves of the plant were removed by hand, and it was tied with the raw fiber of one of selected plant and weighted to an electrical balance. The unit of weight was in kilogram (kg). Then it was converted to tons per hectare.

2.4.4. Green Weight without Leaves (GWL_0): 10 randomly selected plants were tied with the raw fiber of one of selected plant and weighted to an electrical balance. The unit of weight was in kilogram (kg). Then it was converted to tons per hectare.

2.4.5. Fiber Yield: All the plants of each plot were cut and left on soil for 2-3 days for dropping of leaves and after dropping the leaves, 3-4 bundle of plants were made of 25 plants to each bundle. Then it was taken to an open source of running water for retting. After 15-18 days when retting was done, the bark (fiber) of the plant was removed from the wooden part and dried to sun. After drying we weighted it to an electric balance. Then we converted the fiber yield tons per hectare.

2.4.6. Stick Yield: After retting fiber was taken out from wooden part (stick) and stick also dried in sun. When it dried completely after 5-7 days sundry then it was weighted to an electric balance. Stick yield was also converted to tons per hectare.

2.5. Statistical Analysis

The statistical analysis of all the gathered data was performed with the help of a computer statistical package named "Design of Biological Research" in R software. The Least Significant Difference (LSD) and T-test were used to determine the mean differences between the treatments at the 0.05 level (Gomez and Gomez 1984). Graphs were created with the help of gplot in R software.

3. RESULTS AND DISCUSSION

3.1. Effect of Advanced Breeding Line / Variety on Fiber Yield and Yield Contributing Characteristics of an Advanced Breeding Line of Smooth Mesta (SM-2)

3.1.1. Plant Height: Plant height is the most important parameter for fiber yield and yield contributing characteristics of Mesta. The result revealed that there was a significant difference between advanced breeding line (L) and variety (V) (Fig. 1A). The highest plant height (2.8m) was found from the advanced breeding line. We observed the lowest plant height (2.63m) in control. The result of the study indicated that advanced breeding line was 6.07% taller than the control. Similar results was observed in an experiment where advanced breeding line of kenaf was more vigorous and it produced more taller plant than the local variety (Li and Huang 2013).

3.1.2. Base Diameter: The data pertaining from this study demonstrated that the result was highly significant in the case of base diameter (Fig. 1B). The highest base diameter (17.31mm) was observed in the advanced breeding line and the lowest base diameter (15.13mm) was observed in control. Advanced breeding line showed 12.59% greater result than the control. Advanced breeding line for Mesta and kenaf showed greater base diameter (Guggari and Sheelavantar 2004; Li and Huang 2013).

3.1.3. Green Weight with Leaves (GWL): There was a significant difference between advanced breeding line and variety (Fig. 1C). The highest amount of green weight of plant with leaves was found in advanced breeding line (7.52 tha^{-1}) and the control showed the lowest green weight of plant with leaves (6.42 tha^{-1}). Advanced breeding line showed 14.62% greater results than the control. A similar result was found in a study that green weight with leaves was increased in case of advanced breeding line of Mesta than the control (Arpita and Kumar 2014).

3.1.4. Green Weight without Leaves (GWL_0): The result showed that the advanced breeding line was statistically different from the control (Fig. 1D). The mean comparison of advanced breeding line and control showed that the highest green weight of plant without leaves was found in advanced breeding line (5.51 tha^{-1}) and the lowest green weight was found in control (4.57 tha^{-1}). The highest result of green weight without leaves showed 17.05% greater result than the control. A similar finding was made in a study, which showed that the advanced breeding line of Mesta had higher green weight without leaves than the control (Arpita and Kumar 2014).

3.1.5. Fiber Yield: The most important attribute is fiber yield. The result obtained from the study indicated that advanced breeding line and variety was significant for fiber yield (Fig. 1E). The highest fiber yield was obtained from the advanced breeding line (2.28 tha^{-1}) and the lowest fiber yield was obtained from the control (2.16 tha^{-1}). The highest fiber yield showed 5.26% greater result than the lowest fiber yield. Due to improved physiological characteristics, the advanced breeding lines produced height fiber yield than the compared variety (Guggari and Sheelavantar 2004; Li and Huang 2013; Arpita and Kumar 2014).

3.1.6. Stick Yield: The stick yield was greatly affected by advanced breeding line and variety (Fig. 1F). The result showed that the highest stick yield was found in SM-2 (4.56 tha^{-1}) and the lowest stick yield was found in SAMU-93 (3.68 tha^{-1}). SM-2 showed 19.30% higher stick yield than SAMU-93. For improved physiological characteristics, the advanced breeding lines produced height stick yield than the compared variety (Guggari and Sheelavantar 2004; Li and Huang 2013; Arpita and Kumar 2014).

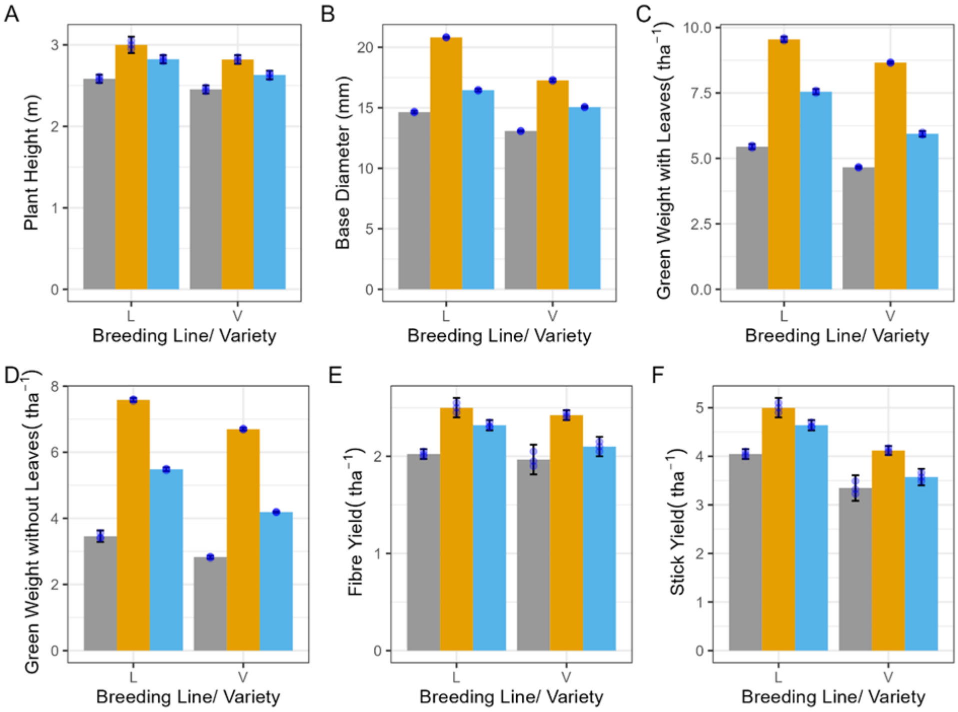

Fig. 1: Effect of advanced breeding line / Variety on fiber yield and yield contributing characteristics of an advanced breeding line of smooth Mesta (SM-2); Legends: L= Advanced Breeding line, V= BJRI Mesta -3

3.2. Effect of Sowing Dates on Fiber Yield and Yield Contributing Characteristics of an Advanced Breeding Line of Smooth Mesta (SM-2)

3.2.1. Plant Height: The result from the study showed that there was statistical difference among the treatment in case plant height (Fig. 2A). The highest plant height was found in S_2(2.91m) and the second highest plant height was found in S_3(2.73m). The lowest plant height was observed in S_1(2.52m). The highest plant height found in S_2 showed 13.99% taller than the lowest plant height found in S_1. Standard rainfall and moderate temperature during the last of March favored to get maximum plant height (Rao et al. 2012).

3.2.2. Base Diameter: The mean comparison of three different sowing dates i.e., S_1, S_2 and S_3 showed that they were not statistically similar to each other (Fig. 2B). The highest base diameter was obtained from S_2(19.04mm) and the second highest base diameter was observed in S_3(15.75mm). The lowest base diameter was found in S_1(13.86mm). The S_2 showed 27.20% greater base diameter than the S_1. Base diameter reached its maximum when it got moderate temperature and standard rainfall in the last week of March (Rao et al. 2012).

3.2.3. Green Weight with Leaves (GWL): For green weight with leaves, the result from the study of three sowing dates found significant (Fig. 2C). The highest green weight of plant with leaves was recorded in S_2(9.11 tha^{-1}) and the second highest green weight of plant with leaves was recorded in S_3(6.75 tha^{-1}). The lowest green weight of plant with leaves was found in S_1(5.06 tha^{-1}). The height green weight of plant with leaves showed 44.45% greater result than the lowest green weight of plant with leaves. Later part of March to earlier of April produced height leaf area index and grater biomass (Mamun et al. 2022).

3.2.4. Green Weight without Leaves (GWL_0): A significant difference was observed among the three sowing dates in case of green weight without leaves (Fig. 2D). The highest green weight of plant without leaves was recorded in S_2(7.14 tha^{-1}) and the second highest green weight of plant without leaves was recorded in S_3(4.84 tha^{-1}). The lowest green weight of plant without leaves was found in S_1(3.14 tha^{-1}). The height green weight of plant without leaves showed 56.02% greater result than the lowest green weight of plant without leaves. Greater biomass was produced in kenaf when sown from 27th Marrch to 5th April (Mamun et al. 2022).

3.2.5. Fiber Yield: The data pertaining from the study showed that the mean comparison of S_1, S_2 and S_3 were statistically different from each other (Fig. 2E). The highest fiber yield was derived in S_2(2.46 tha^{-1}) and the second highest fiber yield was derived in S_3(2.21 tha^{-1}). The lowest fiber yield was found in S_1(1.99 tha^{-1}). The height fiber yield showed 19.10% greater result than the lowest fiber yield. The highest plant population was found and produced highest fiber yield when sown in the last week of March in advanced line of kenaf, Mesta and jute (Bhattacharjee et al. 2007; Mamun et al. 2022; Ahmed et al. 2023).

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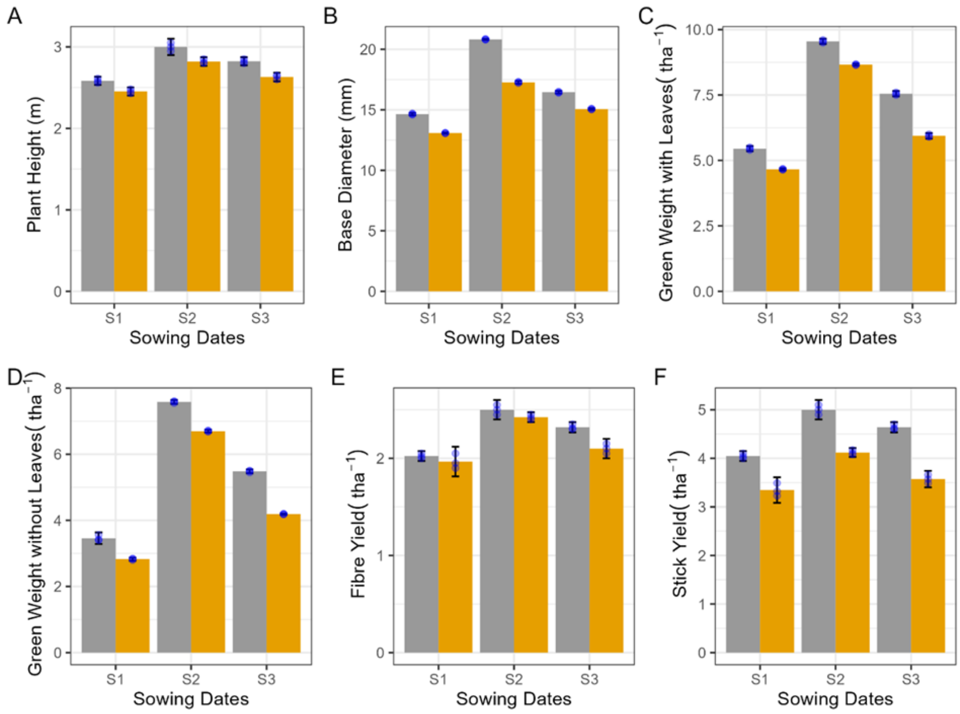

Fig. 2: Effect of sowing dates on fiber yield and yield contributing characteristics of an advanced breeding line of smooth Mesta (SM-2); Legends: S_1= 20th March, S_2= 30th March, S_3= 10th April

3.2.6. Stick Yield: According to the study's results, S_1, S_2, and S_3's mean comparisons differed statistically from one another (Fig. 2F). S_2 (4.56 tha^{-1}) yielded the highest stick yield, while S_3 (4.10 tha^{-1}) yielded the second-highest stick yield. S_1 had the lowest stick yield (3.70 tha^{-1}). The highest stick yield attained a result that was 18.85% higher than the lowest stick yield. Mesta produced higher biomass and stick yield sown for the month of March (Mamun et al. 2022; Bhattacharjee et al. 2007).

3.3. Interaction Effect of Advanced Breeding Line/Variety and Sowing Dates on Fiber Yield and Yield Contributing Characteristics of an Advanced Breeding Line of Smooth Mesta (SM-2)

3.3.1. Plant Height: The interaction effect of advanced breeding line/variety and sowing dates showed significant difference among the means of treatment combinations (Table 1). The highest plant height (3.00m) was found in LS_2 treatment combination. The second highest plant height (2.82m) was found in LS_3 & VS_2 treatment combination respectively. Sequentially the third highest plant height (2.63m) was observed in VS_3 which is statistically similar to LS_1 treatment combination. Moreover, the lowest plant height (2.45m) was obtained from VS_1 treatment combination. The highest plant height showed 18.33% better yield than the lowest plant height. Advanced breeding lines showed vigorous growth and reached height plant height than the local breed of Mesta when it sown on last part of March (Pushpa et al. 2013).

Table 1: Interaction effect of advanced breeding line/variety and sowing dates on fiber yield and yield contributing characteristics of an advanced breeding line of smooth Mesta (SM-2)

Treatments	PH (m)	BD (mm)	GWL (tha^{-1})	GWL_0(tha^{-1})	FY (tha^{-1})	SY (tha^{-1})
L: S_1	2.58c	14.65e	5.45e	3.46e	2.02cd	4.05c
L: S_2	3.00a	20.82a	9.55a	7.58a	2.50a	5.00a
L: S_3	2.82b	16.45c	7.55c	5.48c	2.32b	4.64b
V: S_1	2.45d	13.08f	4.66f	2.83f	1.97d	3.35e
V: S_2	2.82b	17.27b	8.66b	6.70b	2.42a	4.12c
V: S_3	2.63c	15.06d	5.94d	4.19d	2.10c	3.57d
LSD (0.05%)	0.05	0.08	0.07	0.08	0.09	0.16
% CV	1.04	0.29	0.62	0.86	2.19	2.17

Values with different letters are significantly different at $P<0.05$; Legends: L= Advanced Breeding line, V= BJRI Mesta -3, S_1= 20th March, S_2= 30th March, S_3= 10th April, PH= Plant Height, BD= Base Diameter, GWL= Green Weight with Leaves, GWL_0= Green Weight without Leaves, FY= Fiber Yield, SY= Stick Yield

3.3.2. Base Diameter: The data on base diameter pertained from the study showed that there were distinct distinctions in the means of treatment combinations when advanced breeding line/variety and sowing dates were taken into consideration (Table 1). The highest base diameter (20.82mm) was found in LS_2 treatment combination. The second highest base diameter (17.27mm) was found in VS_2 combination. Again, the third highest base diameter (16.45mm) was observed in LS_3 treatment combination. Moreover, the lowest base diameter (13.08mm) was obtained from VS_1 treatment combination. The highest base diameter showed 37% greater than the lowest base diameter. Late sowing in March produced significantly greater base diameter compared to local breed of Mesta (Anuradha and Rao 1999).

3.3.3. Green Weight with Leaves (GWL): There were significant distinctions in the interaction effect between advanced breeding line/variety and sowing dates (Table 1). The highest green weight with leaves (9.55 tha^{-1}) was found in LS_2 treatment combination. The second highest green weight with leaves (8.66 tha^{-1}) was found in VS_2 combination. Sequentially the third highest green weight with leaves (7.55 tha^{-1}) was observed in LS_3 treatment combination. Moreover, the lowest green weight with leaves (4.66 tha^{-1}) was obtained from VS_1 treatment combination. The highest green weight with leaves showed 51% better yield than the lowest green weight with leaves. Higher biomass was produced in *Hibiscus sabdariffa* for pulp in early sowing in April (Sarma 1999).

3.3.4. Green Weight without Leaves (GWL_0): Table 1. Demonstrated the significant differences in the interaction effect of advanced breeding line/variety and sowing dates for green weight without leaves (GWL_0). The highest green weight without leaves (7.58 tha^{-1}) was found in LS_2 treatment combination. The second highest green weight without leaves (6.70 tha^{-1}) was found in VS_2 combination. Sequentially the third highest green weight without leaves (5.48 tha^{-1}) was observed in LS_3 treatment combination. Furthermore, the lowest green weight without leaves (2.83 tha^{-1}) was obtained from VS_1 treatment combination. The highest green weight without leaves showed 62% better yield than the lowest green weight without leaves. Higher biomass produced higher dry matter in Mesta when it was sown in 30th March to 15th April (Anuradha and Rao 1999; Sarma 1999).

3.3.5. Fiber Yield: The interaction effect of advanced breeding line/variety and sowing dates revealed significant variations in the means of treatment combinations (Table 1). The highest fiber yield (2.50 tha^{-1}) was found in LS_2 treatment combination which was statistically identical to VS_2 combination. The second highest fiber yield (2.32 tha^{-1}) was found in LS_3 combination. Again, the third highest fiber yield (2.10 tha^{-1}) was observed in VS_2 which is statistically identical to LS_1 treatment combination. Moreover, the lowest fiber yield (1.97 tha^{-1}) was obtained from VS_1 treatment combination which was statistically identical to LS_1 combination. The highest fiber yield showed 21% better yield than the lowest fiber yield. The maximum air temperature throughout the vegetative period and the diurnal temperature range during the late vegetative period were found to have a strong positive connection in terms of fiber production (Rao et al. 2012). Favorable conditions prevailed when shown from March 30 to April 10. On the contrary it produce highest fiber yield when it sown on early part of July (Asante and Amankwafia 1991). Again, it gave lower fiber yield than that harvested at maturity. It was advised to harvest the crop at 120-130 days after sowing (Babalad et al. 2021).

3.3.6. Stick Yield: The interaction effect of advanced breeding line/variety and sowing dates was highly significant for stick yield (Table 1). The highest stick yield (5.00 tha^{-1}) was found in LS_2 treatment combination. The second highest stick yield (4.64 tha^{-1}) was found in LS_3 combination. Sequentially the third highest stick yield (4.12 tha^{-1}) was observed in VS_2 which is statistically similar to LS_1 treatment combination. Moreover, the lowest stick yield (3.35 tha^{-1}) was obtained from VS_1 treatment combination. The highest stick yield showed 33% better yield than the lowest stick yield. Early sowing before monsoon period (June-September in subcontinent) produced higher biomass, dry matter that produced highest stick yield in Mesta (Kundu 1964).

4. CONCLUSION

Advanced breeding lines and sowing dates had a significant effect on plant height, base diameter, green weight with leaves, green weight without leaves, fiber yield and stick yield. The outcomes of the present study concluded that advanced breeding line (SM-2) and the control SAMU-93 gave highest fiber and stick yield when sown on 30th March compared to 20th March. The second highest fiber and stick yield were found when SM-2 was sown on 10th April. The outcomes of this study indicate that SM-2 can be sown from last week of March to first week of April for better fiber and stick yield.

Authors' Contributions

Ahmed M performed the investigation, data interpretation, and formal analysis and adopted the methodology. Tanni JF was involved in the manuscript writing and adding scientific suggestions. Kader K, Mamun MSA, Mitra

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S, Hasan A, and Sarkar YU did a formal analysis and revision of the manuscript. All the authors looked through the manuscript for accession.

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Conflict of Interest: The authors declare that there are no conflicts of interests.

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REFERENCES

Ahmed M, Tanni JF, Parvej SMS, Jui SA, Mamun MSA and Mitra S, 2023. Assessment of Yield and Yield Attributes of Tossa Jute as Affected by Variety and Field Duration. Bangladesh Agronomy Journal 26: 18–27. https://doi.org/10.3329/baj.v26i1.52461

Mamun MA, Mostofa MG, Saha CK, Hossain MS, Haque SMA and Polan MS, 2022. BJRI Kenaf-4: A Newly Released Improved Variety of Hibiscus Cannabinus L. International Journal of Agrochemistry 8(2): 10-15.

Ali MS, Hoquemm, Gani MN and Islam, 2017. Variation in inorganic fertilizer is an important regulator of yield potential in BJRI Mesta-3. American Journal of Environmental Engineering and Science 6: 78-84.

Anuradha T and Rao VM, 1999. Phenotypic Stability of Fiber Yield in Mesta (Hibiscus Sabdariffa L.). The Andhra Agricultural Journal 46(1): 85–86.

Arpita D and Kumar S, 2014. Developing descriptors of Mesta (Hibiscus Spp.) genotypes for germplasm characterization and evaluation. Annals of Agri-BioResearch 19(4): 713–718.

Asante AK and Amankwafia YO, 1991. Effects of Different Dates of Sowing on the Growth and Fiber Yield of Rosette, Hibiscus Sabdariffa L in the Guinea Savanna Zone of Ghana. Ghana Journal of Agricultural Science 24: 69–76.

Babalad HB, Guggari AK and Pattanashetti VA, 2021. Response of Mesta (Hibiscus spp.) genotypes to stages of harvesting under rainfed conditions. Journal of Eco-Friendly Agriculture 16: 61–66. https://doi.org/10.5958/2582-2683.2021.00011.3

Bangladesh Bureau of Statistics (BBS), 2023. Statistical Yearbook Bangladesh 2022: pp 122-123.

Bhattacharjee AK, Sen HS, Sitangshu S, Roy A and Nayak P, 2007. Improved Production Technology of Mesta. Central Research Institute for Jute and Allied Fibers (ICAR) Barrackpore, Kolkata, India, July 2007, pp: 1-20.

Ghorai AK, Mazumdar SP and Datta D, 2021. Jute and Mesta Stick Charcoal Production using Smokeless Fire in Kon-Tiki-Kiln, an Open Earth Pyrolysis Process. International Journal of Current Microbiology and Applied Sciences 10: 2319-7706.

Gomez KA and Gomez AA, 1984. Statistical Procedures for Agricultural Research. 2nd Ed. John Wiley and Sons Inc, New York, USA, pp: 304-307.

Guggari AK and Sheelavantar MN, 2004. Effect of Time of Sowing, Stage of Harvest and Plant Population on Fiber Yield and Quality of Mesta (Hibiscus Sabdariffa) under Dryland Condition. Indian Journal of Agronomy 49(4): 288–292.

Islam, 2019. Varietal advances of jute, kenaf and Mesta crops in Bangladesh: A review. International Journal of Bioorganic Chemistry 4(1): 24-41. https://doi.org/10.11648/j.ijbc.20190401.15

Islam S and Ma W, 2016. Lupine. Toldrá. Oxford: Academic Press, pp: 579–585.

Kundu BC, 1964. Mesta in India. Second International Kenaf Conference, Palm Beach, Florida, pp: 249–263.

Lavanya AK, Sharma L, Kar G, Satya P, Roy S, Ghosh S and Majumdar B, 2022. Bioethanol production from jute and mesta biomass: prospects and challenges. Sustainable Microbial Technologies for Valorization of Agro-Industrial Wastes 5: 199-220.

Lavanya AK, Sharma A, Choudhary SB, Sharma HK, Nain PKS, Singh S and Nain L, 2020. Mesta (Hibiscus spp.)–a potential feedstock for bioethanol production. Energy Sources, Part A: Recovery, Utilization and Environmental Effects 4: 2664-2677.

Li D and Siqi H, 2013. The Breeding of Kenaf: A Multi-Purpose Crop for Several Industrial Applications: New insights from the Biokenaf Project. Springer, pp: 45–58.

Mostofa MG, Mamun MA, Nur IJ and Akter N, 2017. BJRI Mesta-3: A newly released improved variety of Hibiscus sabdariffa L. International Journal of Agricultural and Applied Sciences 2: 82-86. https://doi.org/10.52804/ijaas2021.2213

ISSN: 2708-7182 (Print); ISSN: 2708-7190 (Online)
Open Access Journal

Naik RK, Mazumdar SP, Majumdar B and Behera MS, 2018. Mechanical Extraction of Jute and Mesta for Quality Fiber Production. Journal of the Indian Society of Coastal Agricultural Research 36(1): 9-12.

Pushpa K, Krishna MK and Krishna RM, 2013. Growth and yield Parameters of Mesta varieties as influenced by spacing and nutrient sources. Journal of Agricultural Science 5(3):105.

Rajasekhar SB, Hari SB and Amarajyothi P, 2018. Impact of Sowing time and Fertilizer doses on the Incidence of Mealy bug (Maconellicoccus hirsutus Green) in Mesta. Bulletin of Environment, Pharmacology and Life Sciences 7: 58-61.

Rao B, Bapuji U, Triveni N, Harisatyanarayana PL, Latha N, Rao V and Rao VUM, 2013. Influence of Weather on the Fiber Yield of Mesta (Hibiscus Sabdariffa) in the North Coastal Zone of Andhra Pradesh, India. Archives of Agronomy and Soil Science 59(7): 989–999.

Rao B, Bapuji U, Nair NL, Harisatyanarayana PL and Rao VUM, 2012. Assessment of Influence of Weather Parameters on Mesta (Hibiscus Sabdariffa) in North-Coastal Zone of Andhra Pradesh. Indian Journal of Dryland Agricultural Research and Development 27(2): 26–30.

Sadhineni M, Sreelatha T and Mitra S, 2022. Effect of integrated weed management practices on fiber yield of rainfed Mesta in North Coastal Andhra Pradesh. International Journal of Bio-resource and Stress Management 13: 1374-1380. https://doi.org/10.23910/1.2022.3154

Sadhineni M, Sreelatha T and Mitra S, 2023. Effect of integrated weed management practices on fiber yield of rainfed Mesta in North Coastal Andhra Pradesh. Annals of Agricultural Research 44(1): 115-119.

Sarma TC, 1999. Effect of nitrogen on pulpable biomass yield of Roselle (Hibiscus Sabdariffa). Indian Journal of Agronomy 9: 27-36.

Sengupta S and Debnath S, 2022. Effect of processing parameters of Mesta sheet for use as eco-friendly agrotextiles. Journal of Scientific & Industrial Research 79: 256-260. https://doi.org/10.56042/jsir.v79i3.68657

Sharma HK, Choudhary SB, Kumar AA, Maruthi RT and Pandey SK, 2017. Combining ability and heterosis analysis for fiber yield and quality parameters in roselle (Hibiscus sabdariffa L.). Journal of Applied and Natural Science 9: 2502-2506.

Singh MV, Kumar N and Singh RK, 2013. Effect of Sowing Time and Fertilizer Management on Seed Yield of Mesta in Eastern Uttar Pradesh. Haryana Journal of Agronomy 29(1/2): 53–55.

UNDP and FAO, 1988. Land Resources Appraisal of Bangladesh for Agricultural Report No. 2. Agro-Ecological Region of Bangladesh. United Nations Development Program in Food and Agriculture Organization, pp: 212-221.

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