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EVALUATION OF RAMIE GERMPLASM

B. C. Deka and P. Talukdar

Department of Plant Breeding and Genetics,
Assam Agricultural University,
Jorhat (Assam)

The present investigation was carried out with forty diverse ramie genotypes to evaluate their performance for fibre yield per plant and other yield attributes. The mean performance estimates revealed that amongst the forty genotypes, four genotypes namely SC-12, R- 1420, SC-7 and R-67-34 exhibited high mean performance for fibre yield per plant over all the environments. The genotypes SC-12 and SC-7 also exhibited high mean performance for all other remaining traits. Of these, four genotypes, R-1420 recorded high mean performance for all the traits except number of leaves, fresh weight of plant and cane while the genotype R-67-34 exhibited high mean performance for all the traits except plant height, number of leaves and leaf area. These genotypes deserve consideration for further improvement and as parents in hybridization programme.

Key words : Ramie, *Bochmeria nivea*, fibre yield, mean performance, yield attributes

Ramie (*Boehmeria nivea* (L) Gaud) is a fast growing underexploited but promising fibre crop which is considered as the strongest among all the natural fibres (Roy, 1984). The ramie fibre has great commercial importance and possesses excellent fibre qualities and mainly used in textile industry for manufacturing different types of clothings by blending with synthetic and natural fibres (Ganguli and Sarma, 1982). Now-a-days ramie fibre has got importance as a commercial source of textile industry and industrial demand of ramie fibre is increasing day-by-day. Therefore, the present investigation was aimed at to assess the mean performance of the genotypes for fibre yield per plant and other related traits so that we can identify and exploit the superior germplasm of ramie for further improvement.

MATERIALS AND METHODS

The materials utilized in the present investigation comprised of forty indigenous and exotic ramie genotypes collected from Ramie Research Station (ICAR), Sorbhog, Assam and some other districts of Assam (Table 1). The trial was conducted in a randomized block design with three replications

Table 1. Ramie germplasm used in the experiment

S.No.	Designation	Name of genotype
1	G_1	R-1410 (*B. utilis*)
2	G_2	R-1411 (Florida common)
3	G_3	R-1412 (E 53-42)
4	G_4	R-1413 (E 51-71)
5	G_5	R-1414 (E 50-76A)
6	G_6	R-1415 (Pl. London)
7	G_7	R-1416 (E 50-59)
8	G_8	R-1417 (Tatsut Tall)
9	G_9	R-1418 (Kagasai)
10	G_{10}	T-1420 (E 50-21)
11	G_{11}	R-1421 (Miyasai 112)
12	G_{12}	R-1422 (Tatsut Short)
13	G_{13}	R-1424 (Kamargaon, Assam)
14	G_{14}	R-1425 (Jorhat, Assam)
15	G_{15}	R-1426 (Nowgoam, Assam)
16	G_{16}	R-1427 (J.A.R.I., W.B.)
17	G_{17}	R-1428 (Puna, Small leaf)
18	G_{18}	R-1429 (Puna, Large leaf)
19	G_{19}	R-1438 (J.A.R.I., Hyb. 9)
20	G_{20}	R-1445 (J.A.R.I., Hyb. 2757)
21.	G_{21}	R-1451 (Tat Lal Sel)
22	G_{22}	R-1452 (E 51-71 Sel)
23	G_{23}	R-67-45 (Sel)
24	G_{24}	R-68-34 (Sel E 50-76)
25	G_{25}	R-67-51 (Sel)
26	G_{26}	R-67-52 (Sel)
27	G_{27}	SC-3 (Collected from Banekuchi, 3 km west from Nalbari)
28	G_{28}	SC-4 (Collected from South Bongaigaon)
29	G_{29}	SC-5 (Collected from South Bongaigaon near North Salmara)
30	G_{30}	SC-7 (Nalbari, Barkhata, Dist-Goalpara (Dhiren Rava)]
31	G_{31}	SC-8 (Namati, Tihu, Dist.-Nalbari)
32	G_{32}	SC-9 (Mukaria, Dharamtala, Mayong Black, Dist. -Nowgaon)
33	G_{33}	SC-10 (Salmara, Abhoyapuri, Dist.-Goalpara)
34	G_{34}	SC-11 (Sonapur, Dumuria Black, Dist.-Kamrup)
35	G_{35}	SC-12 (Teragagaon, Dist. -Kokrajhar)
36	G_{36}	SC-14 (Bahalpur, Dist.-Goalpara)
37	G_{37}	SC-15 (Soulmari, Dist.-Barpeta)
38	G_{38}	SC-16 (Dool Hati, North Lakhimpur)
39	G_{39}	RH-1 (Philippines, Dr. D.P.Singh)
40	G_{40}	Philippines Var.

considering three dates of cuttings as three environments in the Experimental Farm of the Department of Plant Breeding and Genetics, Assam Agricultural University, Jorhat. For raising the crop, land was thoroughly and deeply ploughed and farm yard manure was applied @ 7-10 tonnes/ha. The rhizome cuttings were planted in the field maintaining a spacing of 45 cm × 60 cm in horizontal position in 5-6 cm deep furrow. After two months of planting a fertilizer mixture of N : P_2O_5 : K_2O was applied @ 20:10:10 kg/ha. Moreover, after each harvest/cutting fertilizer mixture of N : P_2O_5 : K_2O was applied @ 30 : 15 : 15 kg/ha (Sarma *et al.*, 1979). Observations were recorded for nine traits *viz.* plant height, number of effective canes, number of leaves, leaf area, basal stem diameter, fresh weight of plant, fresh weight of cane, fresh weight of fibre and dry weight of fibre. The mean data of each genotype for different traits over three environments were analyzed to study the mean performance of different genotypes.

RESULTS AND DISCUSSION

The mean performance of different genotypes over different environments is presented in Table 2. The studies revealed that for plant height the mean performance of the genotypes ranged from 68.88-138.19 cm. The maximum plant height of 138.19 cm was recorded for the genotype G_{10} (R-1420) followed by G_{23} (R-67-46), G_{35} (SC-12), G_{30}(SC-7), G_{13} (R-1424), G_{34} (SC-11), G_{14} (R-1425), G_{15} (R-1426) and G_{33} (SC-10). The number of effective canes ranged from 5.58-13.83. The maximum number of 13.83 was noted for G_{35} (SC-12) followed by G_{10} (R- 1420), G_{30} (SC-7), G_{15} (R-1426), G_{18} (R-1429), G_{14} (R-1425), G_{26} (R-67-52), G_{24} (R-67-34) and G_{34} (SC-11). For number of leaves, the range was 62.92-108.17. The highest number of 108.17 was recorded for the genotype G_{35} (SC-12) followed by G_{30} (SC-7). The leaf area ranged from 1551.48-7388.65 cm^2. The highest leaf area of 7388.65 cm^2 was exhibited by the genotype G_{35} (SC-12) followed by G_{30} (SC-7), G_{10} (R-1420) and G23(R-67-46). The mean performance for basal stem diameter ranged from 0.99-1.28 cm. The maximum diameter of 1.28 cm was revealed by the genotype G_{30} (SC-7) followed by G_{24} (R-67-34), G_{35} (SC-12), G_{10} (R-1420), G_{23} (R-67-46) and G37)SC-15). The fresh weight of plant of the genotypes ranged from 236.92-1043.54 g. The highest fresh weight of 1043.54 g was exhibited by the genotype G_{35} (SC-12) followed by G_{24} (R-67-34), G_{30} (SC-7) and G_{33} (SC-10). The range for mean fresh weight of cane was 149.42-565.33 g. The genotype G_{35} (SC-12) showed maximum fresh weight of cane of 565.33 g followed by G_{30} (SC-7) and G_{33} (SC-10). The range for mean fresh weight of cane was 149.42-565.33 g. The genotype G_{35} (SC-12) showed maximum fresh weight of cane of 656.33 g followed by G_{30} (SC-7), G_{13} (R-1424), G_{34} (SC-11), G_{15} (R-1426), G_{24} (R-67-34), G_{29} (SC-15), G_{18} (R-1429) and G_{14} (R-1425). The fresh weight of fibre of the genotypes ranged from 11.21-36.21 g. The maximum of 36.21 g was recorded for the genotype G_{35}

Table 2. Mean performance of forty ramie genotypes for fibre yield per plant and other yield attributes over three environments

Genotype	Plant height (cm)	Number of effective canes	Number of leaves	Leaf area (cm^2)	Basal stem diameter (cm)	Fresh weight of plant (g)	Fresh weight of cane (g)	Fresh weight of fibre (g)	Dry weight of fibre (g)
G_1	76.94	5.92	74.00	1960.34	1.13	260.17	159.42	15.21	6.29
G_2	77.19	6.92	68.71	2132.93	1.13	253.96	253.96	149.42	16.58
G_3	104.47	8.67	69.04	2800.44	1.17	547.96	246.09	19.34	9.00
G_4	91.33	8.75	68.08	2498.52	1.05	315.63	196.17	20.46	11.46
G_5	68.88	5.58	65.38	1551.48	0.99	236.92	162.59	11.21	5.21
G_6	108.08	9.33	70.96	3241.11	1.15	548.65	266.54	19.76	8.59
G_7	82.09	10.25	67.04	3013.28	1.18	383.63	207.29	26.09	11.88
G_8	106.7	9.58	72.95	3147.82	1.19	576.69	270.08	26.08	14.17
G_9	105.32	10.17	66.75	2944.81	1.11	430.67	221.75	19.25	10.21
G_{10}	138.19	13.50	84.71	6494.42	1.26	644.94	304.38	30.17	17.92
G_{11}	115.06	10.67	80.38	4087.65	1.20	627.00	278.00	20.30	11.75
G_{12}	101.04	7.00	62.96	2543.06	1.13	204.88	188.34	17.50	8.88
G_{13}	124.07	10.67	75.96	4070.34	1.21	622.17	478.43	20.88	11.09
G_{14}	121.78	12.08	82.04	4522.38	1.22	692.46	431.13	24.83	12.58
G_{15}	120.55	12.83	79.55	4375.01	1.22	794.05	456.25	26.25	14.30
G_{16}	92.15	9.42	72.21	3298.75	1.04	327.13	193.42	12.84	7.34
G_{17}	101.54	7.50	64.50	2972.76	1.00	289.29	177.13	13.88	6.71
G_{18}	111.42	12.58	86.73	4225.99	1.20	772.88	437.67	26.17	15.79
G_{19}	99.29	7.42	69.58	3108.63	1.03	321.29	199.75	12.21	7.75
G_{20}	96.85	5.67	65.38	3036.06	1.00	297.29	181.42	21.50	8.05
G_{21}	88.64	9.83	70.96	3409.63	1.15	339.92	195.98	21.92	12.00
G_{22}	102.99	11.33	68.33	3098.20	1.17	393.92	256.55	26.54	14.25
G_{23}	135.82	11.83	83.19	6014.95	1.26	628.38	349.96	27.38	16.96
G_{24}	119.82	12.00	81.54	4392.47	1.27	957.00	442.34	28.92	17.00
G_{25}	90.88	8.83	63.38	2213.67	1.17	330.59	184.29	22.67	11.54
G_{26}	111.77	12.08	74.54	3082.38	1.19	538.21	266.30	27.46	14.21
G_{27}	111.19	10.92	74.96	3003.19	1.20	785.58	320.17	27.42	14.59
G_{28}	112.11	10.42	84.63	4808.55	1.17	607.50	363.63	22.54	12.67

(Table contd. on next page)

Genotype	Plant height (cm)	Number of effective canes	Number of leaves	Leaf area (cm^2)	Basal stem diameter (cm)	Fresh weight of plant (g)	Fresh weight of cane (g)	Fresh weight of fibre (g)	Dry weight of fibre (g)
G_{29}	114.48	10.17	78.54	4107.65	1.17	719.88	438.21	19.88	12.67
G_{30}	126.92	13.08	103.63	6746.81	1.28	940.99	560.81	29.09	17.38
G_{31}	97.04	8.08	68.84	3886.65	1.13	389.71	272.75	15.59	6.97
G_{32}	113.32	11.58	68.50	4193.76	1.21	610.50	346.80	21.71	12.30
G_{33}	120.36	11.42	78.33	4564.80	1.24	851.30	394.42	24.96	14.30
G_{34}	124.03	12.00	81.46	4982.52	1.24	706.59	462.21	24.42	14.50
G_{35}	127.03	13.83	108.17	7388.65	1.27	1043.54	565.33	36.21	22.58
G_{36}	105.31	9.08	73.00	3245.34	1.19	663.67	385.63	16.80	8.46
G_{37}	113.59	10.33	78.63	4078.91	1.25	779.88	338.25	23.29	13.00
G_{38}	115.40	10.75	79.75	4324.21	1.15	611.88	338.21	22.79	13.80
G_{39}	106.25	10.75	71.79	2945.02	1.20	406.85	273.38	23.25	13.42
G_{40}	109.95	11.50	76.63	3635.37	1.19	574.71	340.59	24.79	12.46
Range	68.88-138.19	5.58-13.83	62.96-108.17	1551.48-7388.65	0.99-1.28	236.92-1043.54	149.42-565.33	11.21-36.21	5.21-22.58
SED	3.41	0.76	3.48	183.61	0.03	47.35	22.97	1.48	1.24

(SC-12) followed by G_{10} (R-1420), G_{30} (SC-7), G_{24} (R-67-34), G_{26} (R-67-52), G_{27} (SC-3) and G_{23} (R-67-46). A range of 5.21-22.58 g was recorded for dry weight of fibre. The maximum dry weight of fibre of 22.58 g was observed for the genotype G_{35} (SC-12) followed by G_{10} (R-1420), G_{30} (SC-7) and G_{24} (R-67-34).

The estimates of mean performance analysis revealed that amongst the forty ramie genotypes high fibre yield per plant of 22.58 g, 17.92 g and 17.00 g respectively was recorded for the genotype G_{35} (SC-12), G_{10} (R-1420), G_{30} (SC-7) and G_{24} (R-67-34). The two genotypes G_{35} (SC-12) and G_{30} (SC-7) also exhibited high mean performance for the remaining traits. Of the four genotypes, G_{10} (R-1420) showed high mean performance for all the traits except number of leaves, fresh weight of plant and fresh weight of cane and the genotype G_{24} (R-67-34) also recorded high mean performance for number of effective canes, basal stem diameter, fresh weight of plant, fresh weight of cane, fresh weight of fibre and dry weight of fibre. Among these four genotypes, R-1420 and R-67-34 are improved varieties while the other two are collection from Nalbari, Barkhata, Dist. Goalpara(SC-7) & Tergagaon, Kokrajhar(SC-12). There is scope for further improvement of these genotypes particularly the local collections. These four genotypes, viz. SC-12, R-1420, SC-7 and R-67-34 deserve consideration as parents in hybridization programme for crop improvement.

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