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Characterization of ridge gourd (*Luffa acutangula*) germplasm accessions for qualitative and seed quality traits

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ABSTRACT

The study was carried out during summer seasons of 2021 and 2022 at ICAR-National Bureau of Plant Genetic Resources, New Delhi to evaluate 200 ridge gourd [*Luffa acutangula* (L.) Roxb.] germplasm accessions from India's national genebank for 14 qualitative traits and three seed quality parameters. A significant level of diversity was observed in seed quality parameters (germination percentage and vigour index I) as well as qualitative traits (100-seed weight, early plant vigour, plant growth habit, fruit shape, ridge number and ridge pattern). All three fruit shapes, elongate, elliptical, and oblong were present in the germplasm, with 155 accessions showing continuous ridges numbering ten. Elongate shaped fruits at the marketable stage (83.5% of the accessions) with excellent ridge character make them visually appealing and well-suited to Indian conditions. Pearson's correlation analysis revealed that germination percentage showed a significant positive correlation with vigour index and early plant vigour. Shannon diversity index pointed to the existence of phenotypic variation across traits, ranging from 0.31 (ridge number) to 2.06 (vigour index I). Traits such as vigour index I, germination percentage, 100-seed weight, early plant vigour, and plant growth habit demonstrated high diversity indices (>0.5). Accessions IC 352782, IC 353319, IC 338527 and IC 344351 were identified as superior for seed quality traits, exhibiting high germination percentage (>95%) and vigour index I (>1800) in comparison to checks. These four accessions are expected to be good starting points in the ridge gourd breeding programmes.

Keywords: Ridge gourd, Plant vigour, Germination %, Vigour index, Shannon diversity index

Ridge gourd [*Luffa acutangula* (L.) Roxb.], a lesser-known member of the Cucurbitaceae family, serves as a popular summer vegetable with significant nutritional and economic potential (Varalakshmi *et al*. 2016). This species, with a lot of indigenous diversity and uses, offers promising opportunity for inclusion in dietary diversification strategies. In India, ridge gourd is a significant part of traditional food system offering diverse culinary and therapeutic applications. Young and soft ridge gourd fruits are enjoyed in a variety of dishes, including prepared salad, soup, curry, and chutney. The Indian subcontinent is recognized as the primary center of diversity for ridge gourd, with its wild progenitor, *Luffa graveolens*, being native to India. The natural variation in fruit morphology, including differences in size, shape and color, is captured in the India's national genebank that conserves as many as 398 *Luffa acutangula* accessions (in addition to other *Luffa* spp.). A comprehensive understanding of the morphological diversity (qualitative and quantitative traits) is crucial for initiating the breeding activity. Often, variation in qualitative traits and seed quality parameters are useful in assessing genetic variation (Mishra *et al.* 2022, Sharma *et al*. 2023). With an objective to identify promising germplasm accessions that can potentially enter ridge gourd breeding programme, evaluation of 200 ridge gourd germplasm accessions from India's national genebank was carried out during two consecutive spring summer seasons of 2021 and 2022 based on three seed quality parameters and 14 qualitative traits.

MATERIALS AND METHODS

The study was carried out during summer seasons of 2021 and 2022 at ICAR-National Bureau of Plant Genetic Resources, New Delhi. Two hundred ridge gourd germplasm accessions were accessed from India's national genebank housed in ICAR-National Bureau of Plant Genetic Resources, New Delhi. The experiment included germplasm collected from 22 different states across India along with three checks (Pusa Nutan, Swarna Uphar, and Swarna Manjari) (Supplementary Table 1). Fourteen qualitative traits and three seed quality parameters were recorded using the minimal descriptor developed by ICAR-National

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Bureau of Plant Genetic Resources, New Delhi, with minor adjustments made to meet the goals of the study. Visual scores for these agronomic traits were assessed throughout the vegetative growth, blooming, fruiting, harvesting, and germination phases. The NBPGR minimal descriptors developed by Mahajan *et al.* (2000) indicated that 14 qualitative traits were highlighted due to their indirect significance in the ridge gourd breeding programme. Early plant vigour, plant growth habit, leaf shape, leaf margin, stem pubescence, stem shape, presence of tendrils, tendril type, tendril branching, sex type, fruit shape, ridge shape, number of ridges/fruit, and ridge continuity were among the 14 qualitative traits that were investigated in this study (Supplementary Table 2). Additionally, three seed quality traits like germination percentage, vigour index, and 100-seed weight were also examined. For the experiment, an augmented block design was used. Three seeds per hill, spaced 60 cm between hills and 3.0 m between rows, were planted on ridges for each germplasm. Each experimental plot was subjected to fertilization application of NPK @250:100:100 kg/ha with 25–30 t/ha FYM. For interculture operation, manual weeding has been done in a week interval. In compliance with the NBPGR minimal descriptor, observations were made for five randomly selected plants at the suggested stage. In accordance with the International Seed Testing Association's (ISTA) rules, seed germination studies were carried out. The formula suggested by Abdul-Baki and Anderson (1973) was used to calculate the Vigour Index-I:

$$\text{Vigour Index-I} = \text{Germination \%} \times \text{Shoot length (cm)}$$

The model ($Y_{ijk}=\mu+Gen_i+Block(Rep_j)+e_{ijk}$) fitted by the restricted maximum likelihood (REML) approach in R 4.3.3 software was used to analyze the variance of phenotypic data. Furthermore, phenotypic diversity for all studied traits were evaluated using Shannon-Weaver diversity index (H')

$$H' = -\sum_{i=1}^{n} p_i \ln(p_i),$$

where 'n' represents the number of trait classes, and 'P_i' denotes the proportion of accessions in the i^{th} class (Perry and McIntosh 1991).

RESULTS AND DISCUSSION

Morphological variability: A crucial initial step in assessing the variability within and between genotypes is morphological characterization (Khadivi 2023). Based on the present findings, significant variation was observed for the important traits like fruit shape, ridge shape and structure, plant growth habit and early plant vigour (Table 1). Also, significant variation was observed for vigour index and germination % (Table 2). Throughout the growing seasons of 2021 and 2022, the observed attributes showed consistency and stability across all germplasm accessions. Outcomes showed three distinct fruit shape within the studied set of accessions i.e. elliptical (23), elongate (167 accessions) and oblong (10 accessions) (Fig. 1A).

Similar findings were observed by Choudhary *et al.* (2011), where substantial variability was found in fruit traits, including shape and size, within ridge gourd genotypes. Variability in ridge gourd fruit shape is essential for market attractiveness, crop improvement, and environmental adaptation. Furthermore, certain fruit shapes increase resilience by adapting well to different conditions (Panda *et al.* 2022). Moreover, traits like ridge structure influence fruit parameters such as its length, width, which are directly correlated with yield. Traits such as ridge number, its arrangement and continuity can impact marketability and overall fruit quality (Mitu *et al.* 2018, Panda *et al.* 2022). In the current study, the number of ridges varied between 9 and 11, with the majority of accessions having ten ridges. Additionally, most accessions exhibited fruits with continuous and intermediate grooves, suggesting a high level of market acceptability for these fruits (Fig. 1B). Furthermore, a notable degree of variation was observed for plant growth habits and early plant vigour. The present study showed, 28.5% accessions with long vines, 53.5% medium vines, and 18% had short vines (Table 1). Similar differences in vine length were noted in earlier research by Rathore *et al.* (2017), where the vine length ranged from short viny (2.90 m) to long viny (5.0 m). Selecting ridge gourd accessions with longer vines improves fruit yield and quality, as longer vines are linked to greater fruit size, weight, and volume. Also, longer vines, with increased nodes and leaves, enhance photosynthesis and fruit development, boosting crop performance. Over 50% of the germplasm accessions demonstrated overall

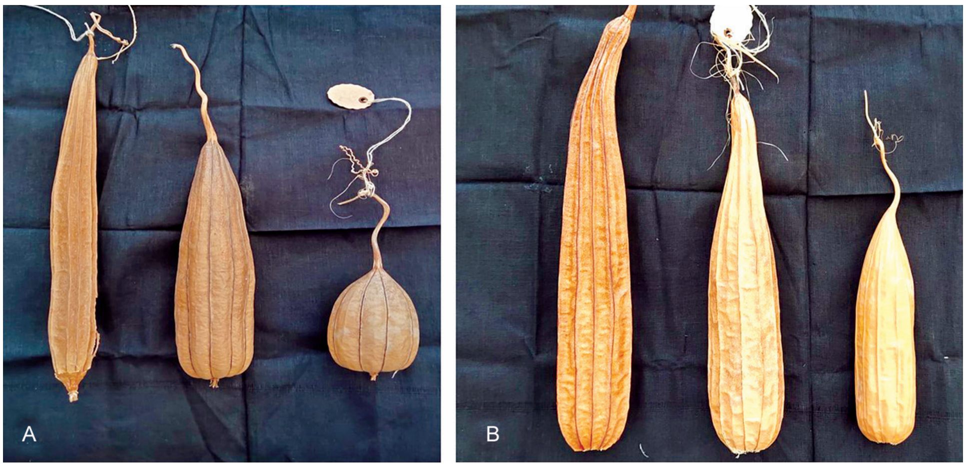

Fig. 1 Variation in the fruit shape and ridge shape of ridge gourd germplasm. A, Fruit shape variability (Left to right): Elliptical, elongate and oblong; B, Ridge shape variability (Left to right): Deeply grooved, intermediate and superficial.

Table 1 Estimates of qualitative traits in ridge gourd germplasm accessions

Trait	Observation	No. of accessions	% accessions	Type of assessment
Leaf shape	Cordate	200	100	VS
Leaf margin	Entire	200	100	VS
Stem pubescence	Pubescent	200	100	VS
Stem shape	Angular	200	100	VS
Tendril presence	Present	200	100	VS
Tendril type	Coiled	200	100	VS
Tendril branch	Branched	200	100	VS
Sex type	Monoecious	200	100	VS
Plant growth habit	Short viny	36	18	MS
	Medium viny	107	53.5	
	Long viny	57	28.5	
Early plant vigour	Very good	28	14	VS
	Good	82	41	
	Poor	90	45	
Fruit shape	Oblong	10	5	VS
	Elliptical	23	11.5	
	Elongate	167	83.5	
Ridge shape	Superficial	41	20.5	VS
	Intermediate	118	59	
	Deeply grooved	41	20.5	
Ridge continuity	Continuous	155	77.5	VS
	Discrete	45	22.5	
Ridge number	Nine ridges	7	3.5	MS
	Ten ridges	185	92.5	
	Eleven ridges	8	4	

VS, Visual score; MS, Measurable score.

good plant vigour in the field (Table 1). Among them, 28 out of 200 accessions fell into the category of very good plant vigour for consecutive years. These accessions should be highlighted for further use in plant breeding programmes.

All accessions exhibited uniformity in visually collected qualitative traits like leaf (shape and margin), stem (pubescence and shape), tendril (presence, type and branching) and sex type (Table 1). All accessions exhibited cordate-shaped leaves with entire margins. Throughout the flowering period, all accessions displayed a monoecious sex form. Regarding stem pubescence, all accessions showed the presence of hairs on their stems, which were angular in shape. Additionally, all accessions possessed branched and coiled tendrils throughout vegetative stage.

Three key traits related to seed quality were prominently analyzed in the study. Significant variation was observed in the vigour index I (VI), germination percentage, and 100-seed weight, all of which serve as critical indicators of seed quality. The germination percentage, with a mean of 79.81%, ranged from 66.5% (IC 347971) to 96.4% (IC 344351). The average VI was recorded at 1221.88, ranging from 647.9 (IC 549856) to 2017.16 (IC 353319). Furthermore, the mean 100-seed weight was 10.86 g, with values ranging from 4.4 g (IC 570385 and IC 410656) to 16.6 g (IC 385911, IC 394720, and IC 092689) (Table 2). Studies conducted on a variety of crops showed that more resilient seeds have better germination traits, produce seedlings with faster growth rates, and are more resilient to environmental stresses. These characteristics, such as early and consistent germination, higher germination percentage, increased plant height, and enhanced yield potential, greatly improve field performance. Rapid germination and strong seedling development are examples of early vigour qualities that are essential for competitive growth and effective plant establishment in the field (Barik *et al.* 2022).

Table 2 Estimates of seed quality traits in studied set of germplasm accessions

Accession No.	Germination %	Vigour Index I	100-seed weight
IC 354856	79.5	1184.55	14.08
IC 92600	77.8	1198.12	8.2
IC 146492	91.7	1513.05	12.68
IC 354869	73.8	678.96	7.6
IC 354854	74.9	704.06	15.8
IC 321215	91.5	1491.45	15.84
IC 345383	91.3	1406.02	11.6
IC 354864	88.9	1644.65	10.76
IC 385913	89.5	1718.4	13.6
IC 430121	68.3	840.09	13.2
IC 354868	78.8	882.56	14.0
IC 430122	91.8	1441.26	16.6
IC 354855	92.6	1546.42	12.24
IC 439260	70.3	1068.56	11.44
IC 354866	71.5	908.05	9.28
IC 430132	91.3	1506.45	11.28
IC 325864	72.1	944.51	9.68
IC 385912	88.2	1737.54	12.36
IC 392544	91.6	1777.04	11.52
IC 410147	68.1	898.92	15.2
IC 279432	86.9	1286.12	8.36
IC 385923	73.4	822.08	12.72
IC 521463	75.4	776.62	11.4
IC 272906	92.3	1652.17	10.0
IC 265027	88.9	1457.96	5.6
IC 538160	91.2	1495.68	11.6
IC 255456	88.9	1546.86	9.16
IC 430125	74.3	921.32	9.08

Contd.

Table 2 (*Continued*)

Accession No.	Germination %	Vigour Index I	100-seed weight
IC 257127	73.5	1117.2	8.76
IC 360759	89.6	1621.76	7.6
IC 360802	94.8	1905.48	8.4
IC 264830	86.9	1459.92	8.52
IC 392534	76.4	1008.48	9.08
IC 266792	76.8	883.2	12.56
IC 541207	81.2	1047.48	10.8
IC 276417	82.4	906.4	8.8
IC 264964	81.3	983.73	9.2
IC 352782	95.6	1892.88	8.8
IC 548584	93.5	1561.45	8.16
IC 604590	81.2	852.6	13.2
IC 265661	88.5	955.8	6.8
IC 606152	93.6	1460.16	7.6
IC 262202	76.5	787.95	12.72
IC 570341	94.7	1770.89	11.6
IC 336981	86.7	893.01	14.0
IC 259616	84.6	913.68	14.4
IC 257585	83.5	1010.35	12.8
IC 345216	84.2	1010.4	14.0
IC 335918	79.6	1066.64	10.8
IC 550664	88.7	1640.95	10.4
IC 570378	83.2	1356.16	8.4
IC 394721	85.6	1301.12	14.08
IC 338527	95.7	1933.14	8.2
IC 344351	96.4	1899.08	12.68
IC 329702	87.5	1417.5	7.6
IC 363871	75.6	997.92	15.8
IC 427676	79.5	906.3	15.84
IC 343156	88.6	1080.92	11.6
IC 538150	94.2	1770.96	10.76
IC 446607	72.3	889.29	13.6
IC 281087	71.2	954.08	13.2
IC 284899	79.5	1120.95	14.0
IC 385911	78.9	1120.38	16.6
IC 570374	87.9	1661.31	11.44
IC 398583	86.9	1512.06	9.28
IC 354858	77.8	941.38	9.92
IC 430135	83.5	935.2	8.4
IC 415696	80.3	891.33	11.28
IC 354853	94.2	1846.32	9.68
IC 427109	83.6	1463.0	12.36
IC 446605	76.2	1028.7	11.52
IC 297596	83.2	1539.2	15.2
IC 284957	75.6	854.28	8.36

Contd.

Table 2 (*Continued*)

Accession No.	Germination %	Vigour Index I	100-seed weight
IC 362477	78.6	903.9	12.72
IC 410585	77.5	945.5	11.4
IC 417715	88.9	1680.21	9.2
IC 373141	82.3	1621.31	9.6
IC 538118	83.6	1596.76	8.4
IC 345266	87.6	1454.16	10.0
IC 345665	88.5	1460.25	10.4
IC 398555	94.9	1907.49	12.8
IC 353319	95.6	2017.16	14.0
IC 298723	78.9	1215.06	13.6
DSAT 102	71.2	875.76	13.2
IC 438825	72.6	958.32	10.0
IC 340430	72.5	949.75	14.0
IC 281118	83.5	1285.9	12.56
IC 385914	84.5	1318.2	12.64
IC 345282	80.3	883.3	11.6
IC 417716	79.6	1042.76	10.8
IC 550669	95.4	1154.34	7.6
IC 265026	86.9	1320.88	14.4
IC 352808	75.6	929.88	13.6
IC 382686	85.6	1301.12	12.8
IC 345755	88.5	1345.2	11.2
IC 347971	66.5	1097.25	6.0
IC 347970	73.6	986.24	7.2
IC 259880	66.7	927.13	8.64
IC 383237	74.5	998.3	8.72
IC 259890	81.2	1607.76	8.8
IC 370352	80.3	1565.85	9.6
IC 329720	93.5	1916.75	11.2
IC 259825	74.3	988.19	14.4
IC 344007	85.2	1150.2	9.6
IC 316014	72.3	1048.35	8.4
IC 350310	70.2	793.26	8.8
IC 316010	76.9	1353.44	11.6
IC 398554	73.3	938.24	4.8
IC 398552	76.5	1354.05	6.0
IC 398556	70.3	963.11	9.2
IC 398562	79.6	1233.8	8.64
IC 432129	79.2	1211.76	10.0
IC 258003	78.8	1347.48	12.4
IC 256432	86.6	1706.02	13.2
IC 348001	85.7	1739.71	12.0
IC 265650	73.3	872.27	7.36
IC 409037	74.3	921.32	10.12
IC 345279	80.2	1323.3	10.4

Contd.

Table 2 (*Continued*)

Accession No.	Germination %	Vigour Index I	100-seed weight
IC 345306	79.6	1568.12	9.12
IC 276304	78.5	1420.85	8.72
IC 343032	69.8	1200.56	8.08
IC 570367	78.9	1049.37	9.08
IC 331953	83.5	1695.05	9.56
IC 570368	81.5	1442.55	9.04
IC 350321	80.6	1329.9	6.8
IC 343155	74.2	912.66	9.84
IC 262188	72.5	819.25	10.28
IC 344008	78.6	1548.42	7.64
IC 526951	71.6	880.68	8.36
IC 208625	70.6	854.26	12.4
IC 344353	83.4	1651.32	8.4
IC 426986	68.9	757.9	11.6
IC 325953	69.9	859.77	8.76
IC 255450	70.8	927.48	11.2
IC 343447	71.2	946.96	4.4
IC 264794	69.8	711.96	12.56
IC 255424	76.8	1436.16	14.08
IC 262231	74.5	1378.25	12.24
IC 385601	73.6	1148.16	8.2
IC 262213	74.6	999.64	12.68
IC 549856	71.2	647.92	9.28
IC 373361	70.3	773.3	7.6
IC 545258	68.9	1295.32	15.8
IC 539714	67.5	830.25	9.92
IC 419993	69.8	1005.12	11.6
IC 326768	85.3	1706.0	11.4
IC 383210	80.3	1589.94	10.4
IC 339212	74.5	998.3	8.4
IC 383133	76.2	1280.16	13.76
IC 433706	77.2	1289.24	11.2
IC 383123	78.1	1210.55	15.2
IC 394720	69.8	781.76	16.6
IC 427584	70.3	688.94	14.4
IC 311134	74.6	1253.28	10.0
IC 427675	75.6	1164.24	13.6
IC 325952	78.4	1262.24	10.8
IC 383931	86.4	1693.44	11.6
IC 259496	84.5	1402.7	6.8
IC 394366	72.3	874.83	9.6
IC 354353	73.4	880.8	10.0
IC 336827	78.6	1399.08	7.6
IC 345259	77.4	1207.44	12.72
IC 415715	76.2	1104.9	11.4

Contd.

Table 2 (*Concluded*)

Accession No.	Germination %	Vigour Index I	100-seed weight
IC 392183	76.5	1139.85	10.0
IC 339166	84.5	1799.85	5.6
IC 335909	85.6	1720.56	11.6
IC 344625	78.9	883.68	14.0
IC 355974	77.8	1019.18	14.08
IC 392538	85.7	1276.93	8.2
IC 392531	70.9	801.17	12.68
IC 333171	71.2	797.44	7.6
IC 373325	78.9	1475.43	15.8
IC 339224	76.8	883.2	13.2
IC 354848	71.5	750.75	13.2
IC 354847	71.2	726.24	14.0
IC 092689	84.7	1710.94	16.6
IC 392230	77.5	968.75	12.24
IC 398580	85.9	1829.67	8.4
IC 541254	69.8	844.58	11.28
IC 354863	80.2	1251.12	9.68
IC 092671	79.1	1376.34	12.36
IC 092637	78.8	1071.68	11.52
IC 354860	67.5	756.0	8.36
IC 363885	76.4	1161.28	11.6
IC 353321	77.5	1433.75	9.16
IC 430116	77.9	1230.82	9.08
IC 430117	75.6	1239.84	8.76
IC 570385	86.3	1734.63	4.4
IC 570420	84.7	1719.41	7.6
IC 570434	73.6	1207.04	8.4
IC 570432	74.8	1241.68	11.6
IC 345388	83.6	1663.64	13.2
IC 394713	78.5	1460.1	12.68
IC 430128	79.1	1360.52	15.84
IC 279548	77.5	1379.5	13.2
IC 393305	76.8	1267.2	11.2
IC 410656	76.2	1242.06	4.4
IC 430133	68.9	1074.84	12.68
IC 354861	69.7	857.31	9.28
IC 354862	69.4	707.88	7.6
Check 1	98	2087.4	12.3
Check 2	95	1928.5	11.3
Check 3	91	1829.1	10.3
Min	66.5	647.92	4.4
Max	96.4	2017.16	16.6
Mean	79.8	1221.87	10.85
SD	7.483	334.85	2.66

Where, check 1- Pusa Nutan; check 2-Swarna Upahar; Swarna Manjari

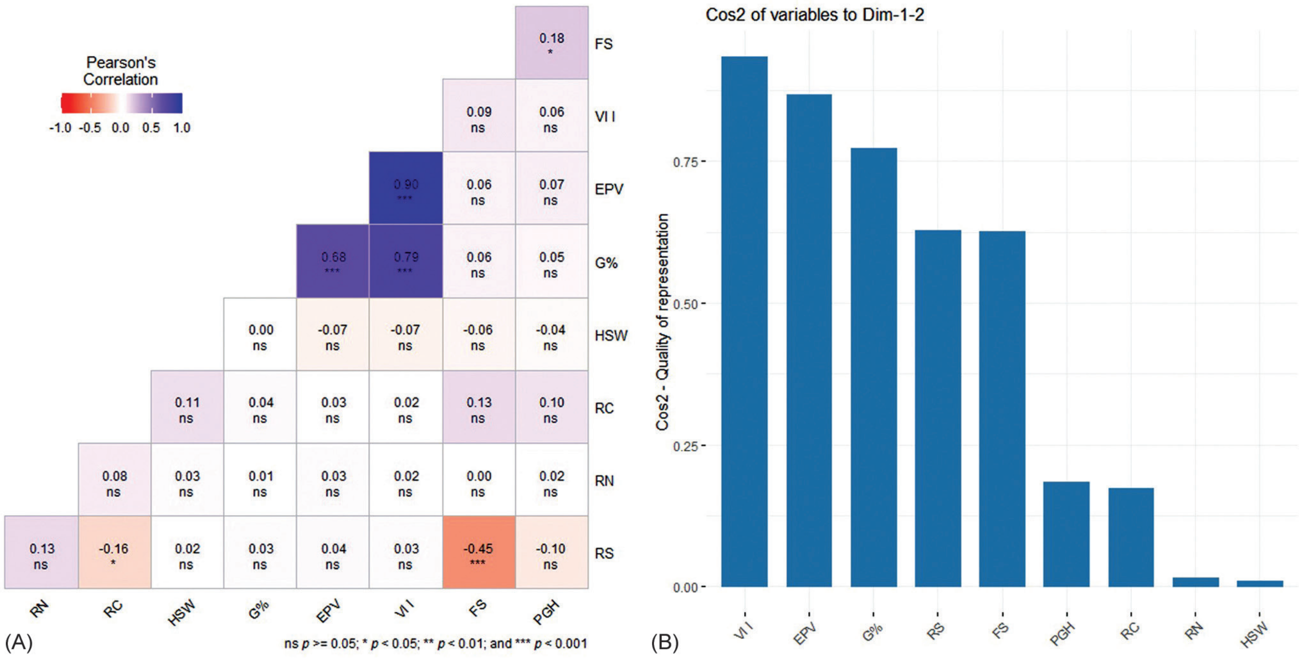

Fig. 2 A, Pearson correlation matrix; B, Principal component analysis for eight traits and 200 germplasm accessions of ridge gourd. RN, Ridge number; RC, Ridge continuity; HSW, 100-seed weight; G%, Germination percentage; EPV, Early plant vigour; VI1, Vigour Index 1; FS, Fruit shape; PGH, Plant growth habit; RS, Ridge shape.

Correlation coefficient analysis: A correlation matrix generated using eight parameters across 200 accessions of ridge gourd revealed strong positive Pearson correlations among related traits. Notably, early plant vigour exhibited a highly significant positive correlation with vigour index I (r = 0.90, $p \leq 0.001$), germination percentage showed a significant positive correlation with early plant vigour (r = 0.68, $p \leq 0.001$), and germination percentage was also strongly correlated with vigour index I (r = 0.79, $p \leq 0.001$) (Fig. 2A).

Shannon diversity index: Estimation of phenotypic diversity is an important component for effective conservation and utilization of plant genetic resources. Shannon diversity indices (H') for various qualitative and seed quality traits ranged from 0.31 (ridge number) to 2.06 (vigour index I). High phenotypic diversity was observed in all traits of the germplasm set except ridge number (0.31) (Table 3). Important traits like vigour index I, germination %, 100-seed weight, early plant vigour, plant growth habit exhibited high indices. Earlier studies showed that selection of accessions that can promptly establish under a variety of climatic conditions is made possible by variation in these seed quality traits, such as germination percentage and early plant vigour. This results in faster field establishment and improved performance under stress (Reed *et al.* 2022). Furthermore, greater variation in 100-seed weight and vigour index I makes it possible to identify accessions that yield more, higher-quality seeds, which increases the survival rates of seedlings and creates more robust plants (Massimi 2018).

Principal component analysis: Six main components, which together account for about 80.6% of the variance, were kept from the principal component analysis (PCA) of nine qualitative traits across 200 ridge gourd germplasm

Table 3 Estimates of the phenotypic diversity observed for studied set of qualitative and seed quality traits

Qualitative traits	Phenotypic class (*i*)	Frequency of each phenotypic class (P*i*)	Diversity of each class	Shannon diversity index (H')
Plant growth habit	SV	36	0.3087	1.0011
	MV	107	0.3346	
	LV	57	0.3578	
Early plant vigour	VG	28	0.2753	1.000
	G	82	0.3656	
	P	90	0.3593	
Fruit shape	Oblong	10	0.1498	0.549
	Elliptical	23	0.2487	
	Elongate	167	0.1506	
Ridge shape	Superficial	41	0.3249	0.963
	Intermediate	118	0.3113	
	Deeply grooved	41	0.3249	
Ridge continuity	Continuous	155	0.1975	0.531
	Discrete	45	0.3356	
Ridge number	9	7	0.1173	0.318
	10	185	0.0722	
	11	8	0.1288	
Germination %	65–70	17	0.085	1.78

Contd.

Table 3 (*Concluded*)

Qualitative traits	Phenotypic class (*i*)	Frequency of each phenotypic class (P*i*)	Diversity of each class	Shannon diversity index (H')
	71–75	44	0.22	
	76–80	55	0.275	
	81–85	31	0.155	
	86–90	31	0.155	
	91–95	17	0.085	
	96–100	5	0.025	
Vigour Index I	647.92–784.92	13	0.157	2.062
	784.93–921.92	36	0.325	
	921.93–1058.92	32	0.294	
	1058.93–1195.92	17	0.184	
	1195.93–1332.92	28	0.261	
	1332.93–1469.92	25	0.247	
	1469.93–1606.92	15	0.164	
	1606.93–1743.92	21	0.222	
	1743.93–1880.92	6	0.100	
	1880.93–2017.92	7	0.108	

SV, Short vine; MV, Medium vine; LV, Long vine; VG, Very good; G, Good; P, Poor.

accessions based on eigen values and scree plot observations. Traits like early plant vigour, vigour index and germination % contributed maximum towards the total variance observed among these accessions (Fig. 2B). Similar results were found in sesame by Verma *et al.* (2019).

India is the center of origin of *Luffa* spp. and as many as seven of the nine *Luffa* spp. found worldwide are native to India. A great deal of diversity can be expected in traits related to adaptation as well as consumer preference. There exist many traditional cultivars and modern varieties. Developing varieties tolerant to insects and diseases is the focus of ridge gourd breeders. However, poor germination and vigour pose a serious practical challenge. Screening of ridge gourd germplasm to identify superior accessions for seed quality parameters adds to the efficiency of the *Luffa* breeding. Our evaluation study, carried out across two seasons using 200 ridge gourd germplasm accessions, revealed significant variability in qualitative and seed quality traits. On one hand, the traits that exhibited strong correlation could be identified and strategically employed in future breeding programmes. On the other hand, the study identified four superior accessions that could immediately enter *Luffa* breeding programme. Our work is expected to enhance the utilization of ridge gourd germplasm conserved in the national genebank.

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