Indian Journal of Agricultural Sciences **95** (10): 1218–1225, October 2025/Article
https://doi.org/10.56093/ijas.v95i10.163338

Descriptor-based morphometric diversity and palynological studies in Jasmine (*Jasminum* spp.)

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Received: 08 January 2025; Accepted: 09 September 2025

ABSTRACT

The study was carried out during 2019–20 at the College of Horticulture, University of Horticultural Sciences, Bagalkote, Karnataka to characterize morphometric traits and pollen biology of jasmine (*Jasminum* spp.) using DUS descriptors and multivariate analysis across 12 genotypes. The experiment was laid out in a randomized complete block design (RCBD) with three replications. The highest coefficient of variation for quantitative traits ranged from 11.57% (plant spread)–99.31% (flowers/inflorescence). Variability in qualitative traits ranged from dimorphic (growth type and habit) to polymorphic (flower colour). Significant positive correlations were observed between floral traits and yield attributes. Pollen viability was highest in *Jasminum auriculatum* (Bagalkote local) at 75.72%, followed by *Jasminum grandiflorum* cv. CO1 Pitchi at 69.39%, and *Jasminum nitidum* (TNAU) at 65.42%. Principal component analysis showed PC1 and PC2 accounted for 28.40% (leaf blade dimensions, bud diameter, petal count) and 23.73% (bud length, corolla tube length, inflorescences/plant) of total variation. These findings aid in selecting parent plants for jasmine improvement and protecting new varieties under the PPVFR Act, 2001.

Keywords: Diversity, DUS descriptor, Jasmine, Pollen viability, Principal component analysis

Jasmine (*Jasminum* spp.), an ancient fragrant flower member of family Oleaceae, is valued for its cultural, medicinal, aesthetic and ritual significance. In India, it is cultivated on 23.40 thousand hectares, producing 199.78 thousand metric tonnes annually (NHB 2022–23). Tamil Nadu leads in jasmine production, exporting to countries like Singapore, Malaysia, Sri Lanka, the Middle East, and the United States (Rani and Murugan 2020). Jasmine, a perennial heterozygous plant, is clonally propagated, which over time can reduce vigour, yield and adaptability. Despite the diversity in *Jasminum* spp., *J. sambac*, *J. grandiflorum* and *J. auriculatum* dominate commercial cultivation in India (Saripalle 2016), while lesser-known species like *J. nitidum*, *J. calophyllum* and *J. flexile* exhibit desirable traits such as year-round flowering, high yield, superior quality and pest resistance. Broadening the genetic base and characterizing diversity are therefore essential for identifying promising parents and designing effective hybridization strategies.

Genetic diversity in crops is evaluated through germplasm analysis using phenotypic, biochemical or molecular data, among these, morphological markers preferred for their cost-effectiveness, ease of assessment and rapid evaluation (Kumar *et al.* 2015). These markers, based on heritable traits, bypass the need for biochemical or molecular techniques. Morphometric assessment typically requires extensive growth trials under stable environmental conditions. Morphological traits are simple to observe, reliable, and widely used in biological research (Hiremath *et al.* 2023), while palynological studies are crucial in jasmine breeding as pollen viability, fertility and germination directly affect hybridization success. However, factors such as self-incompatibility, sterility, irregular seed set and a narrow genetic base limit breeding efficiency. Understanding pollen biology helps identify compatible parents and overcome these barriers (Hanif *et al.* 2013). Together, these approaches enable precise identification of superior genotypes, facilitate effective hybridization strategies and contribute to the conservation and sustainable improvement of jasmine (Ganga *et al.* 2020). Previous studies have explored genetic diversity and phylogeny of *Jasminum* spp. (Jeyarani *et al.* 2018, Chaitanya *et al.* 2020), but systematic characterization of reproductive biology across species remains limited. The present study addresses this gap by combining morphological and palynological approaches to evaluate variation across *Jasminum* spp. This integrated analysis is expected to provide a better understanding of

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their reproductive behaviour, assist in identifying superior genotypes, and support both breeding improvement and germplasm conservation.

MATERIALS AND METHODS

Plant materials: The study was carried out during 2019–2020 at the College of Horticulture, University of Horticultural Sciences, Bagalkote (72°42'E longitude and 16°10' N latitude; altitude of 542 m amsl), Karnataka. Twelve Jasmine genotypes (*J. calophyllum*, *J. sambac* cv. Gundumalli, *J. nitidum, J. multiflorum* cv. Bagalkote, *J. auriculatum* cv. Bagalkote local, *J. sambac* cv. Mysore Malligae , *J. primulinum, J. grandiflorum* cv. CO.1 Pitchi, *J. multiflorum*,*J. multiflorum* Pink,*J. primulinum* cv. Bagalkote local and *J. rigidum*) were collected from local growers around Bagalkote and Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu. Rooted cuttings (10–12 cm) were planted under open field conditions in a pit of 45 cm^3 with topsoil and 15 kg FYM, spaced at 1.8 m × 1.8 m, using a randomized complete block design (RCBD) with three replications. During the studies the maximum temperature was 40ºC and minimum was 16.9ºC with a humidity level of 87.5–16.0% and average rainfall of 56 mm. Standard practices were followed, and morphological and palynological traits were recorded at the flowering stage from five random plants per replication.

Measurement of morphological traits: Morphological characters were recorded following DUS guidelines for *Jasminum* spp. by PPV&FRA, New Delhi. Qualitative traits, including growth type, habit, young shoot anthocyanin colouration, flower bud tinge, size, shape, colour, bearing habit, flower colour, and peak flowering season, were recorded according to stage for each trait. Flower bud and flower colour were recorded mid-day (12:00–1:00 PM) using the RHS (Royal Horticultural Society) colour chart. Quantitative traits such as plant height, spread (E-W and N-S), number of primary and secondary branches, internodal length, leaf blade dimensions, corolla length and tube length, flower bud length and diameter, flower diameter, petals/flower, inflorescences/plant, flowers/inflorescence, stamen, style, and stigma length were measured at full flowering.

Palynological observations: Pollen morphology was studied with a Trinocular Compound Photo Microscope (Labomed Model LX 300). The Haemocytometeric method (Sathiamoorthy 1973) was used to estimate pollen output. From each replication, three mature anther samples were collected just before dehiscence. Pollen grains were extracted using a needle into a vial containing 2.5 ml distilled water with a drop of teepol to ensure uniform suspension. The mixture was thoroughly shaken, and two drops were pipetted onto the counting chambers of an Improved Neubauer Haemocytometer (Rohem India Ltd.) Pollen viability of freshly dehisced pollen grains was evaluated using acetocarmine staining (Alexander 1969). Pollen grains that stained deep purplish-pink and round shape were considered viable, whereas shriveled or unstained grains were categorized as non-viable.

$$\text{Pollen viability \%} = \frac{\text{No. of stained pollen grains}}{\text{Total no.of pollen grains}} \times 100$$

Statistical analysis: To assess diversity in morphological and palynological traits among jasmine genotypes, statistical analyses was performed. Analysis of the variance for 12 qualitative and 23 quantitative traits was performed using R (version 4.2.0). Pearson correlation coefficients (r) for the 23 traits were calculated using the 'Corrplot' package. Box plots for quantitative traits were generated with 'Jamovi' (version 2.5, retrieved from https://www.jamovi.org). Principal component analysis (PCA) was conducted to evaluate variation and similarity among Jasmine genotypes.

RESULTS AND DISCUSSION

Descriptive statistics: Descriptive statistics of morphological and palynological traits for 12 jasmine genotypes' are presented in Table 1. Germplasm characterization reveals distinct traits, assesses heritability, aids classification and provides genetic information for conservation. Morphometric traits establish relationships among genetic characteristics and identify reliable traits for improvement. Phenotypic traits, expressed at the gene level, differentiate crop genotypes. In this study, the coefficient of variation (CV) for quantitative traits ranged from 11.57% (plant spread N-S) to 99.31% (flowers/inflorescence), with mean values ranging from 0.31 (stigma length) to 107.37 (plant spread N-S). Flower count/inflorescence and style length had CV values >60%, while pollen viability, number of inflorescences, internodal length, leaf blade width, flower bud diameter, and number of pollen grains/flower showed moderate CV values (30–60%). Other traits had low CV values (<30%). Nirmala and Champa (2018) reported a CV >100% for bud length and corolla tube length ratio, number of whorls, and petals in 48 jasmine genotypes. Skewness and kurtosis values indicated a nearly normal distribution for most traits. The coefficient of variation is crucial for selecting elite parents in flower crop breeding. Intra-specific genetic variation is essential for Jasmine breeding and stable, high yields. Nirmala *et al.* (2017) assessed morphological diversity in 48 Jasmine genotypes using cluster analysis. Similarly, Soundarya *et al.* (2022) characterized *J. grandiflorum* (L.) mutant genotypes phenotypically and biochemically. Kalaiyarasi *et al.* (2018) analyzed floral morphology in 22 *Jasminum sambac* genotypes, revealing that Arka Aradhana had the longest buds (3.85 cm) and corolla (2.11 cm), IIHR JS-5 had the longest corolla tube (2.29 cm), and Soojimalli produced the largest flowers (4.64 cm).

Box plots illustrating variability among 12 Jasmine genotypes for various quantitative traits and outliers are shown in Fig. 1. The plots revealed considerable variation in the selected germplasm, with genotypes exhibiting extreme variability identified as outliers. For morphological traits, outliers included plant height (*J. rigidum, J. grandiflorum*), plant spread (E-W: *J. grandiflorum*, N-S: *J. primulinum*), leaf length and width (*J. nitidum*, *J. sambac* cv. Mysore

Table 1 Descriptive statistics for morphological and palynological traits of Jasmine

Trait	Min.	Max.	Mean	SE	CV%	Skewness	Kurtosis
Plant height (cm)	58.00	121.40	96.37	6.01	21.63	-0.21	-1.37
Plant spread E-W (cm)	81.66	123.66	99.66	4.25	14.80	0.21	-1.67
Plant spread N-S (cm)	93.38	130.20	107.37	3.58	11.57	0.62	-1.17
No. of primary branches	5.26	9.33	6.69	0.35	18.29	0.58	-0.70
No. of secondary branches	13.80	31.46	21.46	1.61	26.11	0.49	-1.25
Internodal length	0.43	1.28	0.83	0.08	34.93	0.17	-1.60
Leaf blade length (cm)	2.45	8.71	5.64	0.53	32.69	0.03	-1.29
Leaf blade width (cm)	1.34	4.73	3.25	0.30	32.27	-0.29	-1.34
Flower bud length (cm)	1.74	4.32	2.83	0.20	25.15	0.28	-0.70
Flower bud diameter (cm)	0.32	0.79	0.51	0.04	32.21	0.528	-1.30
Corolla length (cm)	1.0	2.28	1.58	0.116	25.48	0.26	-1.26
Corolla tube length (cm)	0.71	2.38	1.51	0.15	34.48	-0.15	-1.27
Flower diameter (cm)	2.37	4.46	3.22	0.19	20.94	0.569	-1.13
No. of petals/flower	4.9	9.87	7.57	0.34	15.77	-0.33	0.38
No. of inflorescence/plant	6.60	30.07	18.82	1.94	35.74	-0.28	-1.02
Total no. of flowers/inflorescence	1.0	46.07	12.99	3.72	99.31	1.31	0.87
Length of stamen (cm)	0.28	0.57	0.44	0.026	20.79	-0.55	-0.93
Length of style (cm)	0.31	2.13	0.98	0.175	62.06	0.65	-1.23
Length of stigma (cm)	0.21	0.46	0.31	0.02	22.81	0.59	-0.57
No. of pollen grains/flower	1.86	7.96	5.89	5.28	31.03	-9.71	-2.81
No. of non-viable pollen	32.8	92.93	64.07	4.83	26.14	-0.09	-0.64
Non-viable pollen diameter	24.93	45.40	34.32	1.93	19.55	0.129	-1.41
Pollen viability %	18.53	129.93	77.47	10.93	48.88	-0.18	-1.49

Mallige), internodal length, number of primary and secondary branches, bud length, corolla tube length (*J. grandiflorum*), bud diameter (*J. sambac*), flower diameter (*J. nitidum*, *J. grandiflorum*), petal count (*J. nitidum*), inflorescence/plant (*J. calophyllum*), and corolla length (*J. nitidum*). A similar study by Safeena *et al.* (2017) found that J-6 had the largest leaves (12.5 cm × 5.93 cm), J-8 had the largest flower bud (1.14 cm diameter, 4.7 cm length), J-10 had the highest petal count (43), and J-14 had the longest corolla tube (2.70 cm).

Qualitative traits: Qualitative morphological traits, influenced by natural selection and human intervention, are key in diversity evolution and are summarized in Table 2. This study revealed significant variation among genotypes in vegetative, floral, and reproductive traits (Fig. 2 and 3). Vegetative traits included plant growth habit which revealed that most genotypes are shrubs, with a few climbers and plant growth type, ranging from semi-upright to strongly spreading. Only *J. nitidum* and *J. multiflorum* exhibited young shoot anthocyanin colouration, with medium intensity. The diversity in vegetative traits across genotypes can be used to select contrasting parents. These findings, consistent with Safeena *et al.* (2017) and Nirmala and Champa (2018), suggest that the phenotypic diversity in Jasmine is influenced by both genetic and environmental factors.

Floral traits in the study showed wide variability, including flower bud size (thin, bold, medium), shape (pointed, long, round, short), colour (white, purple, orange), tinge (present, absent), flower colour on opening (pinkish white, white, vivid yellow), and flower-bearing habit (solitary, clustered cyme, many-flowered cyme, 3–5 forked cyme). These variations align with the findings of Srivastava and Devaiah (1988), indicating natural differences in *Jasminum* spp. Flowers with shorter corolla tubes are preferred for essential oil extraction, while longer, softer corolla tubes, larger buds and better keeping quality are favoured in the fresh flower market. The observed variability in flower colour is likely due to genotype-specific pigment composition. The different flower colour genotypes could be used as contrasting parents for development of novel flower colour cultivars. These findings are consistent with Lakshmi and Ganga (2017), who reported various flower colours in *Jasminum* genotypes, including pink-tinged buds in *J. multiflorum*, *J. nitidum* and *J. rigidum*. Key economic traits like bud length, flower diameter, and corolla tube length were analyzed in 15 accessions of *J. sambac* by Khan *et al.* (1970), who suggested that differences in these traits could result from mutations, natural crossbreeding, or autopolyploidy.

Reproductive characters comprise of style type, stigma tip and peak season of flowering. As, the Jasmine is cross-pollinated crop, the exerted style may facilitate easy

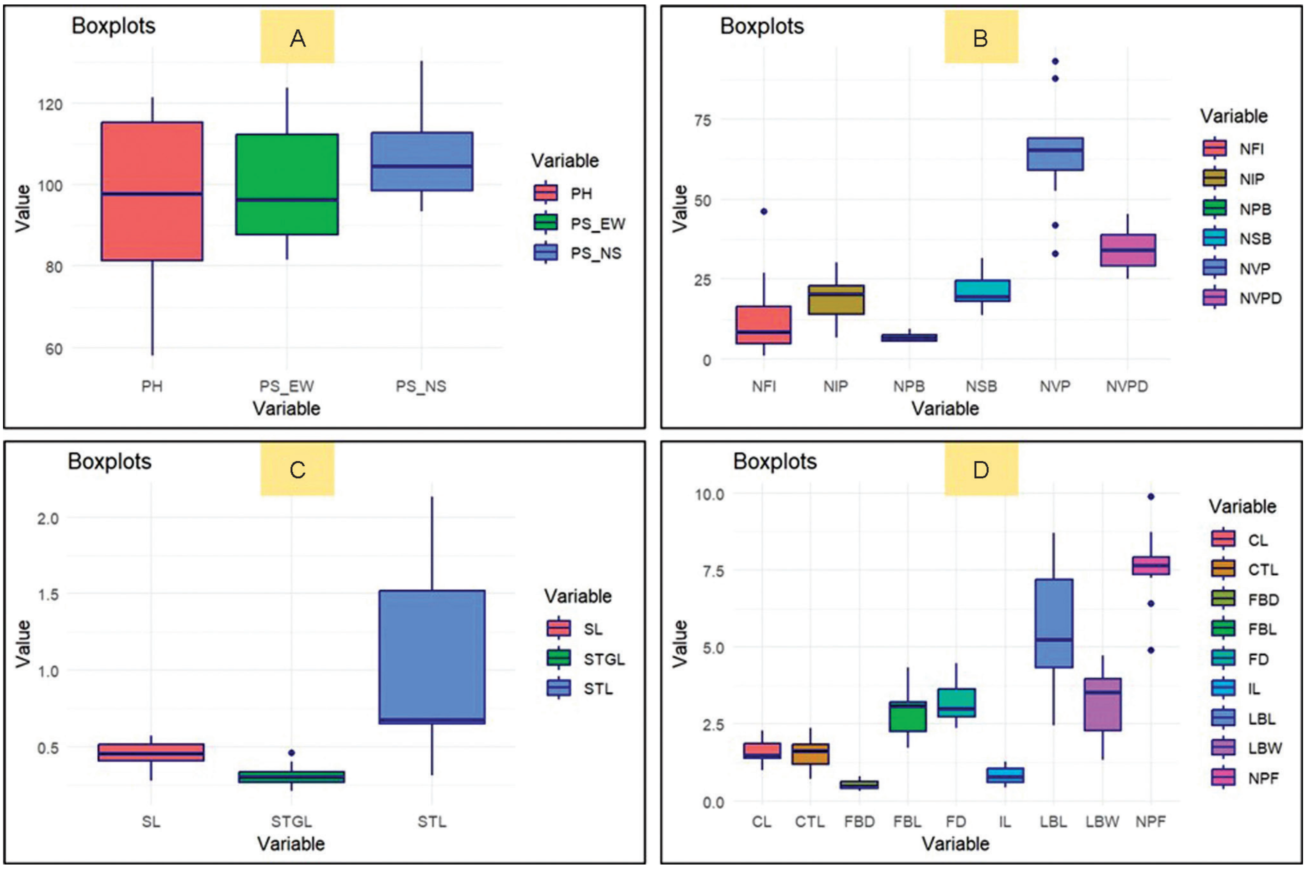

Fig. 1 Box plots showing variability in quantitative traits of Jasmine. Horizontal lines show medians, boxes represent interquartile ranges, bars denote extremes, and dots indicate outliers.
PH, Plant height; PS_EW, Plant spread east-west; PS_NS, Plant spread north-south; NFI, Number of flowers/inflorescence; NIP, Inflorescence/plant; NPB, Primary branches; NSB, Secondary branches; NVP, Non-viable pollen; NVPD, Non-viable pollen diameter; SL, Style length; STGL, Stigma length; STL, Stamen length; CL, Corolla length; CTL, Corolla tube length; FBD, Flower bud diameter; FD, Flower diameter; IL, Internodal length; LBL, Leaf blade length; LBW, Leaf blade width; NPF, Petals/ flower.

pollination and resulted in high fruit set. Similar findings by Lakshmi and Ganga (2017) showed that most species, except *J. multiflorum* (Pink), exhibited exerted pistils. Flower production of Jasmine crop is seasonal, the off-season or lean season (November-February). Off season flowering species like *J. multiflorum* and *J. calophyllum* can be utilized for planned crop improvement programmes. Usha *et al.* (2022) also explored floral traits and their impact on successful pollination and fertilization in *Jasminum* species.

Palynological traits: Palynological data are vital for plant breeding, as self and cross-incompatibility in Jasmine pose challenges to hybridization. Pollen viability, a key factor in successful fruit setting, varied among genotypes in this study. The highest pollen viability was observed in *J. auriculatum* Bagalkote local (75.72%), followed by *J. grandiflorum* cv. CO.1 Pitchi (69.39%) and *J. nitidum*-TNAU (65.42%). In contrast, the lowest pollen viability was found in *J. calophyllum*-TNAU (21.09%) and *J. sambac* cv. Ramananthapuram Gundumalli (27.36%) (Table 1 and Fig. 3). Genotypes with higher pollen viability may be selected as pollen donor parents for hybridization programmes. Variations in pollen viability may be influenced by germplasm, temperature, and their interactions (Sharma *et al.* 2022). Similarly, Pavithra *et al.* (2019), reported that *J. malabaricum* exhibited the highest pollen viability (96.57%), followed by *J. flexile* (84.92%), *J. auriculatum* (71.32%), and lowest in *J. sambac* (34.27%). *J. grandiflorum* cv. CO.1 Pitchi exhibited maximum pollen production (55,083 grains/ flower), followed by *J. multiflorum*-TNAU (53,507) and *J. multiflorum* Pink (53,003), while J. *calophyllum*-TNAU recorded the lowest (Table 1). Similarly, Ganga *et al.* (2020) found the highest pollen production in *J. rigidum* and the lowest in *J. sambac*.

Correlation analysis: Correlation estimates among 19 quantitative traits highlight their interdependence, guiding trait selection in hybridization programmes (Fig. 4). Correlations coefficients with absolute values greater than 0.59 and 0.73 were significant at 5% and 1% levels, respectively. Significant positive correlations were observed between plant height and spread E-W (r = 0.72) and N-S (r = 0.76), primary and secondary branches (r = 0.65, 0.67), and internodal length (r = 0.57). Stigma length showed a strong negative correlation with plant height (r = -0.60). Growth traits such as height, spread, branch number, and

Table 2 Phenotypic variability for qualitative characters in different Jasmine genotypes

Genotypes	Growth type	Growth habit	Young shoot anthocyanin colouration	Boldness of flower bud	Flower bud shape	Flower bud colour	Tinge on flower bud	Flower bearing habit	Flower colour on opening	Style type	Stigma tip	Peak season of flowering
J. calophyllum (TNAU)	C	SS	A	T	PL	Yellowish White (155 B)	A	Clustered cyme	White (NN155 B)	E	D	March–October
J. sambac cv. Gundumalli	S	I	A	B	RS	Yellowish White (155 B)	A	3-5 forked cyme	White (NN155 B)	I	D	March–August
J. nitidum (TNAU)	S	SU	P	M	PL	Moderate Purplish Red 58(A)	P	Clustered cyme	Pinkish White (N155 B)	E	UD	August–April
J. multiflorum cv. Bagalkote local	S	SU	A	M	PL	Yellowish White (155 D)	A	Clustered cyme	White (NN155 D)	E	UD	September–December
J. auriculatum cv. Bagalkote local	S	SU	P	T	PL	Yellowish White N (155 B)	A	Many flowered cyme	Greenish White (155 C)	I	D	April–September
J. sambac cv. Mysore Malligae	S	I	A	B	RS	Yellowish White N (155 B)	A	3-5 forked cyme	White (NN155 B)	I	D	March–August
J. primulinum (TNAU)	S	SS	A	B	RS	Strong Orange Yellow (N25 D)	P	Solitary cyme	Vivid yellow (9A)	E	D	April
J. grandiflorum cv. CO.1 Pitchi	S	S	A	T	PL	Pinkish White (N155 B)	P	Many flowered cyme	Pinkish White (N155 B)	E	D	July–January
J. multiflorum (TNAU)	S	SU	A	M	PL	Yellowish White N (155 B)	A	Clustered cyme	Greenish White (155 C)	I	UD	September–December
J. multiflorum Pink	S	I	P	M	PL	Deep purplish pink (N 57 D)	P	Clustered cyme	White (NN 155 D)	I	D	September–December
J. primulinum cv. Bagalkote local	S	SS	A	B	RS	Strong Orange Yellow (N25 D)	P	Solitary cyme	Vivid yellow (9A)	E	UD	April
J. rigidum (TNAU)	C	SS	A	T	PL	Pink (186 B)	P	Clustered cyme	Pinkish White (N155 B)	E	UD	March–June

S, Shrub; C, Climber; SS, Strongly spreading; I, Intermediate; SU, Semi upright; S, Spreading; A, Absent; P, Present; T, Thin; B, Bold; M, Medium; PL, Pointed and long, RS, Round and short; E, Exerted; I, Inserted; D, Divided; UD, Undivided.

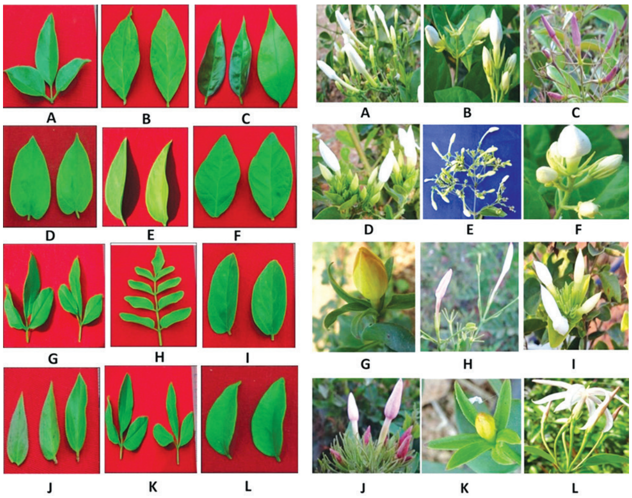

Fig. 2 Variability in morphology of leaf and flower buds in selected jasmine genotypes.
(A), *J. calophyllum* (TNAU); (B), *J. sambac* cv. Ramananthapuram Gundumalli; (C), *J. nitidum* (TNAU); (D), *J. multiflorum* cv. Bagalkote Local; (E), *J. auriculatum* cv. Bagalkote Local; (F), *J. sambac* cv. Mysore Mallige; (G), *J. primulinum* (TNAU); (H), *J. grandiflorum* cv. CO.1 Pitchi; (I), *J. multiflorum* (TNAU); (J), *J. multiflorum* Pink; (K), *J. primulinum* cv. Bagalkote Local; (L), *J. rigidum* (TNAU).

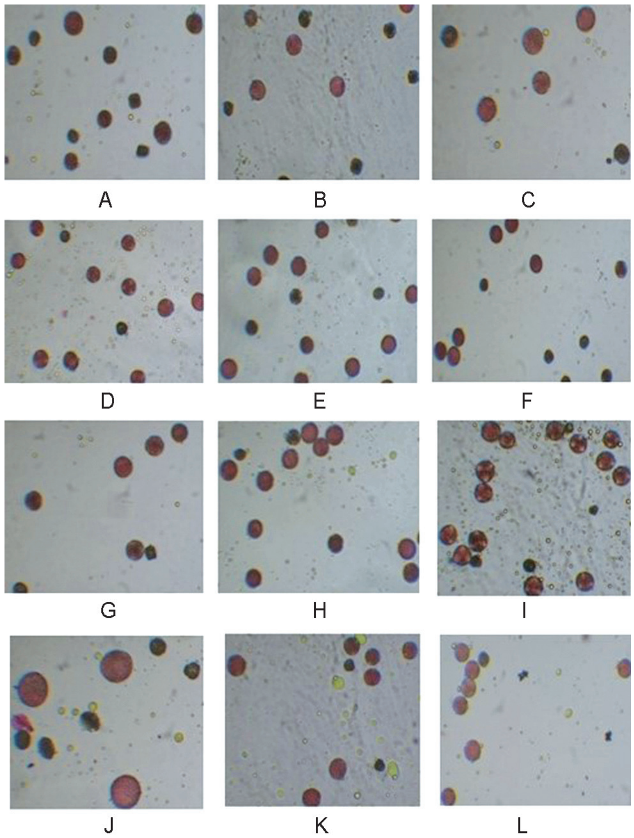

Fig. 3 Variability in palynological characters in selected jasmine genotypes.
(A), *J. calophyllum* (TNAU); (B), *J. sambac* cv. Ramananthapuram Gundumalli; (C), *J. nitidum* (TNAU); (D), *J. multiflorum* cv. Bagalkote Local; (E), *J. auriculatum* cv. Bagalkote Local; (F), *J. sambac* cv. Mysore Mallige; (G), *J. primulinum* (TNAU); (H), *J. grandiflorum* cv. CO.1 Pitchi; (I), *J. multiflorum* (TNAU); (J), *J. multiflorum* Pink; (K), *J. primulinum* cv. Bagalkote Local; (L), *J. rigidum* (TNAU).

internodal length were interrelated. Leaf blade length and width positively correlated with petal count, likely due to photosynthate accumulation enhancing petal formation. Selecting plants with larger leaves may indirectly boost yield by increasing petal count.

Significant correlations were observed among floral and yield parameters, including bud length, corolla length, corolla tube length, flower diameter, inflorescence number per plant and flowers per inflorescence. Flower bud length showed negative correlation with bud diameter but positive correlation with corolla length, tube length, flower diameter, inflorescence number, flowers per inflorescence and style length. Long corolla tubes, preferred for harvesting and garland tying, showed positive associations with yield-related traits such as the number of inflorescences per plant and number of flowers per inflorescence. Thus, selecting genotypes with longer corolla tubes may indirectly enhance yield. Reproductive traits like stamen length negatively correlated with number of flowers per inflorescence, while style length positively correlated with bud length and diameter. Stigma length positively correlated with leaf blade length and flower diameter but negatively with plant height and spread. Corolla tube length was positively correlated to bud weight, internode length and flowering duration. Srivastava and Devaiah (1988) reported strong positive correlations between flower weight and traits like diameter, petal dimensions and bud size.

Principal component analysis (PCA): This study identified key traits contributing to variability and highlights trait-specific germplasm for breeding. Twenty-three significantly correlated morphometric traits were used to generate principal components explaining most of the variance. A scree plot showing the contribution of each principal component towards variability in Jasmine germplasm is presented in Supplementary Fig. 1. It revealed that out of the 12 principal component axes, six had Eigen values>1, and all together account for 90.89% of the total variability. Principal Component 1 (PC1) explained 28.40% of the variation, strongly associated with leaf blade length, width, bud diameter and petal count. PC2 accounted for 23.73%, linked to bud length, corolla tube length, and inflorescence count. PC1 and PC2 contributed the most variation, making them ideal for selecting individuals for breeding programmes targeting high-variability traits.

The first two principal components, explaining the highest variance, were used to create a PCA-based biplot. Thus, the genotypes showing contrasting results for the traits which were contributing more in the PCA biplots i.e. leaf blade width, flower bud diameter, plant spread N-S, number of secondary branches, flower bud length, corolla tube length could be selected for further crop improvement

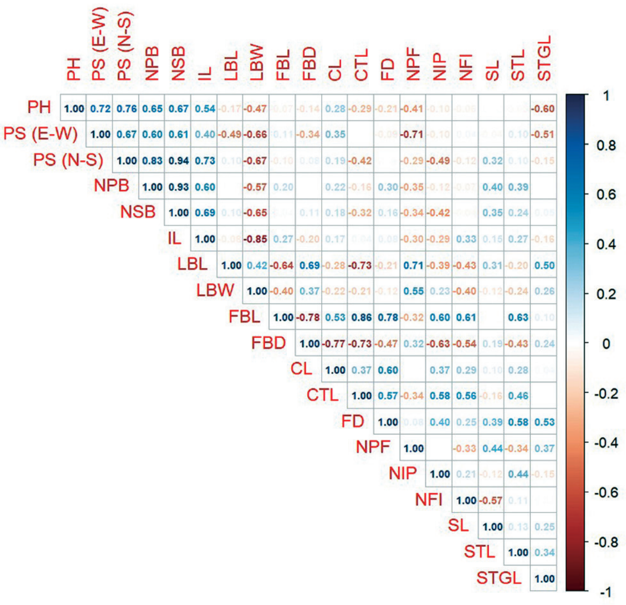

Fig. 4 Correlation coefficient analysis for 19 quantitative traits of Jasmine genotypes.

PH, Plant height; PS_EW, Plant spread east-west PS_NS, plant spread north-south; NFI, Number of flowers/ inflorescence; NIP, Inflorescences/plant; NPB, Primary branches; NSB, Secondary branches; NVP, Non-viable pollen; NVPD, Non-viable pollen diameter; SL, Style length; STGL, Stigma length; STL, Stamen length; CL, Corolla length; CTL, Corolla tube length; FBD, Flower bud diameter; FD, Flower diameter; IL, Internodal length; LBL, Leaf blade length; LBW, Leaf blade width; NPF, Petals/flower.

programmes. Venkatesha *et al.* (2022) identified bud dimensions, calyx teeth count, stamen number and corolla length as key contributors to variability in Mysore Mallige collections. Kartheka *et al.* (2021) reported significant variation in traits like leaf margin undulation, flower and corolla lobe shapes, petal tip, bud shape and length, leaf blade undulations and root suckers.

The study concluded that despite growing demand for this crop, only a few cultivars have been developed so far. Research on morphological and reproductive traits is vital for selecting parent plants for hybridization. The coefficient of variation for quantitative traits ranged from 11.57% (plant spread) to 99.31% (flowers/inflorescence). Qualitative traits varied from dimorphic (growth type, habit) to polymorphic (flower colour). Significant positive correlations were observed between floral and yield traits. Pollen viability was highest in *J. auriculatum* (Bagalkote local, 75.72%), followed by *J. grandiflorum* cv. CO.1 Pitchi (69.39%) and *J. nitidum*-TNAU (65.42%). Principal components 1 and 2 explained the maximum variation among germplasm. The findings aid in selecting parent plants for jasmine crop improvement and support new variety protection under the PPV&FR Act, 2001.

ACKNOWLEDGEMENT

The authors express sincere gratitude to the Indian Council of Agricultural Research for the Junior Research Fellowship for supporting this research.

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