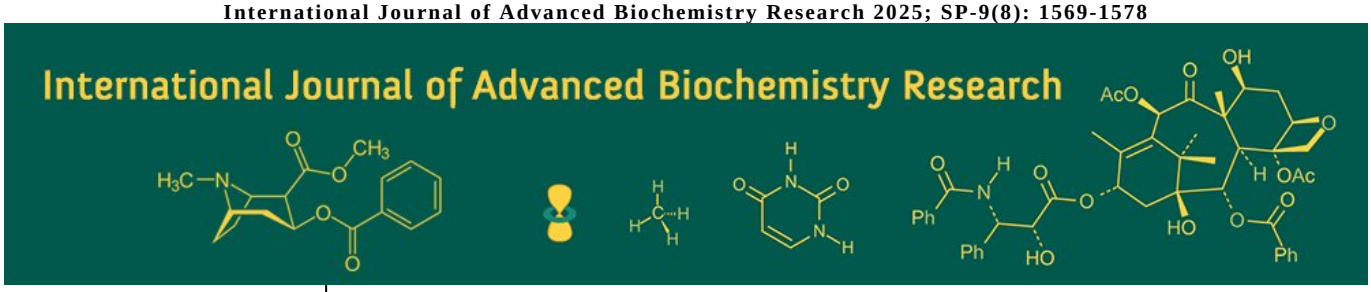

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Studies on phenotypic characterization of *Hibiscus Species* (Gudhal) in Chhattisgarh Plains Condition

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Abstract
The present investigation was conducted during the year 2024-25 at identified in-situ gudhal genotypes from Jhilga (Nawagarh, Bemetara), Bana (Dharsiwa, Raipur) and Jora (Dharsiwa, Raipur), C.G. and further analysis was done at Department of Floriculture and Landscape Architectures, College of Agriculture, Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattisgarh. The morphological observations were analyzed as per DUS guidelines of *Hibiscus species*. Morphological characters of *Hibiscus species* (Gudhal) exposed that, plant growth habit, current year branch colour, leaf blade shape, leaf blade incisions of margin, flower type, attitude of outermost petals, arrangement of outermost petals, flower eye zone, petal shape, petal main colour (colour group chart), eye zone length of extensions and floral formula and quantitative characters *viz*., petiole length (cm), leaf blade length (cm), leaf blade width (cm), flower pedicel length (cm), flower diameter (cm), petal length (cm), petal width (cm), yield of flower (No.) per plant per day and weight of flower showed significant variations with respect to parameters under present experiment.

Keywords: *Hibiscus species*, Morphological, CGG, Chhattisgarh Gudhal & characterization

Introduction
A garden or landscapes without any shrubs lost its beauty, charm and attraction. Even in small gardens where tree planting is not possible, some selected shrubs find a place. Hibiscus is used as ornamental flowering shrub in the garden and landscape as an informal hedges or screen, foundation plant or background for other garden plants. It can also be grown as potted plant, effective hedges or attractive and decorative road side planting. Hibiscus can be combined with other species and its combinations are endless. It is cultivated in garden throughout India.

The flowers are used for religious purpose, while leaves and flowers are used for medicinal purpose and is used in traditional remedies for various ailments (Kumar *et al.*, 2014) [10]. The flowers and leaves are used for the Menorrhagia, Bronchitis, Emmengogue, Demulcent, Cough (Jadhav *et al.*, 2009) [7]. The buds have a sweet odour and bitter taste. It is cooling and astringent in action, remove burning sensations of the body. It is given in urinary discharge, seminal weakness, piles, vomiting and intestinal worms. The flowers fried in ghee are used in excessive menstruation (Kirtikar *et al.*, 1987) [9]. The application of crushed flower soothes external wound and sores and protects alimentary tract and relives inflammation and lowers body heat, in fevers and in fusion of the flowers help to reduce the body temperature (Kurian, 1995) [11]. The roots are dried and sold in the shops as substitute for Althoea and its valuable in cough and leaves are considered emollient and aperients (Kirtikar *et al.*, 1987) [9]. Essential oil from this plant has antifungal properties and one of its constituents was found to be active against human cancer cell lines in several stages of cellular division. Hibiscus is rich in powerful antioxidants and promote liver health. Hibiscus dry petals are uses for making tea that is widely uses to lower blood pressure and increased levels of HDL (good) cholesterol and decreased levels of LDL (bad) cholesterol and triglycerides (Khristi and Patel, 2016). The leaves and flowers are useful in the healing of ulcers and also promoting hair growth activities and hair smoothening. The flowers of Gudhal are edible and used in salads in the Pacific Islands. The flower is used as an accessory particularly as a hairpiece. It is also used

to shine shoes in certain parts of India. It's deeply revered for its beauty and used in rituals and ceremonies, often symbolizing purity and devotion. Its vibrant red color is associated with the Hindu goddess Kali, Durga and Ganesha during worship. Hibiscus flowers are very attractive to butterflies and hummingbirds.

The genus hibiscus belongs to family Malvaceae and is believed to possess more than 300 species. It is native of tropical Asia (Vietnam and South china). Out of 300 species, only four main species of hibiscus having ornamental value and cultivated in tropics and sub-tropics and are *Hibiscus rosa-sinensis* L., *Hibiscus mutabilis* L. *Hibiscus syriacus* L. and *Hibiscus schizopetalus* Hook. Among these species, *Hibiscus rosa-sinensis* L. is with most beautiful flowers and widely cultivated in India. It is also called the Shoe flower or Chinese Rose. Hibiscus is one of the beautiful shrubs grown in tropical and sub-tropical region of the country and widely grown in our Indian gardens as it is easy forcultivation and produced flowers almost throughout the year. Commonly known as 'Dashman' in Chhattisgarh. It is grown in countries like Hawaii, USA. (Florida), Sri Lanka and India. Hibiscus is cultivated widely in Hawaii which is state flower. Gudhal is the national flower of Malaysia. Hawaii has the reputation of possessing the world's richest collection and being the center for evolving new varieties. Hibiscus is the type genus of the tribe hibisceae of family Malvaceae (Bruna *et al*., 2008) [3]. *Hibiscus rosa-sinensis* L. is believed to originate in China and was first cultivated for its showy flowers. This might have been the reason why it is referred as China rose. In Chhattisgarh, the Gudhal flower is significant both culturally and religiously.

Hibiscus rosa-sinensis L. is a bushy evergreen shrub their small tree growing 2.5-5 m tall and 1.5-3 m wide. The plant has a branched taproot and stem is aerial, erect, green, cylindrical and branched, leaves are simple and petiolate with alternate phyllotaxy. The leaf shape is ovate while the tip is acute and the margin is serrated, venation is unicostate reticulate, leaf surfaces are glossy and free lateral stipules are present. Flowers are solitary (axillary) and symmetrical. Cultivars and hybrids have flowers in a variety of colors *viz.*, red, white, pink, orange, peach, yellow, blue and purple (Gilman and Watson, 2014) [6]. Some cultivars are having variegated foliage. The flowers have 4-5 petals and the showy stamens are fused into a central tube around the pistil. A green epicalyx surrounds the base of the petals. The flowers may be single or double depending on the hybrid or cultivar and vary in size from 5 - 25 cm in diameter. Flowers are bloom in summer and autumn. Hibiscus is propagated through vegetative means *i.e.* by cutting and layering. Sometime grafting technique is also used in hybrid varieties. In general, layering is done in monsoon, but it took more duration for rooting, also involving large amount of planting material. Propagation by means of cutting is comparatively less cumbersome efficient and cheaper. Ornamental Hibiscus prefers sunny situation, porous soil, moderate temperature and relatively high humidity. In poorly drained soils, the shrub is seriously affected. In heavy rainfall area planting should be done in winter months. Though the hibiscus plant is sun loving, few cultivars such as "Netaji" perform well under partial shade and also tolerate pollution and seashore conditions. *Hibiscus moscheutos* L. grows best in a moist, organic soil but tolerates a wide range of moisture conditions.

Nowdays, various new varieties have been cultivated and developed through cross breeding. These new cultivars bear all the blended characteristics and are increasing popularity as well. Different cultivars and hybrids have been produced and developed with flowers ranging in colors and other features. It was felt necessary to study the important qualitative and quantitative characters of local and exotic cultivars under cultivations. There is vast diversity in hibiscus flower in Chhattisgarh plains and there is no work on the characterization of Hibiscus in Chhattisgarh Plain condition.

Material and Methods

The research was conducted with different locations across Chhattisgarh *viz.* Jhilga (Nawagarh, Bemetara), Bana (Dharsiwa, Raipur) and Jora (Dharsiwa, Raipur) (C.G.) during the year 2024-25. The experimental materials used for the present experiment consists thirteen genotypes of *Hibiscus Species* (Gudhal) *i.e.* CGG-1, CGG-2, CGG-3, CGG-4, CGG-5, CGG-6, CGG-7, CGG-8, CGG-9, CGG-10, CGG-11, CGG-12 and CGG-13. The investigation was laid out using a Randomized Block Design (RBD) with 3 replications.

Table 1: List of genotypes and their geographical location

Genotypes	Location	Lattitude °N	Longitude °E
CGG-1	Jhilga (Nawagarh, Bemetara)	21.917273	81.817824
CGG-2	Jhilga (Nawagarh, Bemetara)	21.917277	81.818067
CGG-3	Jhilga (Nawagarh, Bemetara)	21.917292	81.817453
CGG-4	Jhilga (Nawagarh, Bemetara)	21.917306	81.817416
CGG-5	Jhilga (Nawagarh, Bemetara)	21.231926	81.707753
CGG-6	Jhilga (Nawagarh, Bemetara)	21.917300	81.817474
CGG-7	Bana (Dharsiwa, Raipur)	21.332451	81.558522
CGG-8	Bana (Dharsiwa, Raipur)	21.331590	81.555194
CGG-9	Bana (Dharsiwa, Raipur)	21.331021	81.554970
CGG-10	Bana (Dharsiwa, Raipur)	21.332347	81.558241
CGG-11	Jora (Dharsiwa, Raipur)	21.235591	81.712425
CGG-12	Jora (Dharsiwa, Raipur)	21.235365	81.711877
CGG-13	Jora (Dharsiwa, Raipur)	21.235398	81.712400

Result and Discussion

Morphological qualitative characters

The data showed in Table 2, revealed that the growth habit of plant for thirteen genotypes of gudhal was divided into three groups *viz*. spreading, upright and semi-upright. Out of thirteen genotypes, eight genotypes namely CGG-1, CGG-7, CGG-8, CGG-9, CGG-10, CGG-11, CGG- 12 and CGG-13 had spreading whereas, 3 genotypes *i.e.* CGG-2, CGG-3 and

CGG-5 had upright growth habit and remaining 2 genotypes CGG-4 and CGG6 were observed semi-upright under the present trial. Current year branch colour of all thirteen genotypes of gudhal was categorized into two groups *viz.* brownish and greenish. Out of the thirteen genotypes, six genotypes *viz.* CGG-2, CGG-5, CGG-7, CGG-8, CGG-10 and CGG-12 had brownish colour and remaining 7 genotypes have greenish colour which was CGG-1, CGG-3, CGG-4, CGG-6, CGG-9, CGG-11 and CGG-13 respectively. The leaf blade shape of all thirteen gudhal genotypes was classified into three distinct groups *viz*. rounded, acute and obtuse. From the 13 genotypes, 7 genotypes namely CGG-1, CGG-3, CGG-5, CGG-8, CGG-10, CGG-11 and CGG-13 had rounded type of leaf blade shape, while, CGG-4, CGG-6, CGG-9 and CGG-12 showed obtuse type of leaf blade shape and remaining 2 genotypes CGG-2 and CGG-7 were acute type under the present study. Leaf blade incisions of margin of all 13 genotypes of gudhal was categorized into three different categories *viz.* few, medium and many. It was observed that the 6 genotypes *viz.* CGG-1, CGG-3, CGG-9, CGG-11, CGG-12 and CGG-13 had few leaf blade incisions of margin. Moreover, the genotypes CGG-4, CGG-5, CGG-6 and CGG-8 having many leaf blade incisions of margin and CGG-2, CGG-7 and CGG-10 had medium leaf blade incisions of margin during the course of present study. The flower type of all thirteen genotypes of gudhal was grouped into single, double and semi-double. Out of the thirteen genotypes, eight genotypes namely CGG-2, CGG-3, CGG-5, CGG-6, CGG-7, CGG-9, CGG-11 and CGG-13 showed single type of flower however four genotypes *i.e.* CGG-4, CGG-8, CGG-10 and CGG-12 was found double type of flower and only one CGG-1 was observed semi-double type of flower under the present experiment. Attitude of outermost petals of thirteen genotypes of gudhal was divided into three groups *viz*. horizontal, moderately ascending and strongly ascending. Out of the thirteen genotypes, eight genotypes namely CGG-1, CGG-4, CGG-6, CGG-7, CGG-8, CGG-10, CGG-12 and CGG-13had horizontal type of outermost petals whereas three genotypes *i.e.* CGG-3, CGG-5 and CGG- 11 showed moderately ascending, while CGG-2 and CGG-9 had strongly ascending type of outermost petals. The arrangement of outermost petals of all thirteen genotypes of gudhal was categorized into strongly apart, strongly overlapping and slightly overlapping. From the thirteen genotypes, six genotypes namely CGG-1, CGG-5, CGG-7, CGG-8, CGG-11 and CGG-12 were found slightly overlapping while four genotypes *i.e.* CGG-2, CGG-3, CGG-6 and CGG-13 were strongly apart arrangement of outermost petals. The remaining three gudhal genotypes *viz.* CGG- 4, CGG-9 and CGG-10 showed strongly overlapping type of outermost petals. Flower eye zone of all thirteen gudhal genotypes was classified into two distinct groups *viz*. present and absent. Out of the thirteen genotypes, nine genotypes namely CGG-2, CGG-3, CGG-5, CGG-6, CGG-8, CGG-10, CGG-11, CGG-12 and CGG-13 was categorized in absent type while remaining four genotypes *viz.* CGG-1, CGG-4, CGG-7 and CGG-9 was recorded as present flower eye zone. Petal shape of all thirteen genotypes of gudhal was categorized into three different group *i.e.* slightly elongated, moderately elongated and very elongated. Out of the thirteen genotypes, six genotypes *viz.* CGG1, CGG-4, CGG-6, CGG-8, CGG-10 and CGG-12 was observed as slightly elongated petal shape. As well four genotypes namely CGG-3, CGG-5, CGG-7 and CGG-11 was seen as moderately elongated petal shape moreover 3 genotypes *i.e.* CGG-2, CGG-9 and CGG- 13 was recorded as very elongated petal shape under the present investigation. The genotypes *viz*. CGG-2, CGG-4, CGG-5, CGG-6, CGG-8, CGG-10, CGG-11, CGG-12 and CGG-13 were

grouped in Red colour with respective colour code of Red purple 58C, Red 42A, Red 40A, Red 40B, Red purple 58B, Red 44D, Red purple 73C, Red 45B and Red 50B. The genotypes CGG-1 and CGG-7 were categorized in Orange colour with respective colour code of Orange 29B and Orange 24C. Moreover, the genotype CGG-3 possess White colour group having colour code of White N155C and genotype CGG-9 confirmed Yellow colour with colour code of Yellow orange 21B under the present experiment. Eye zone length of extensions of all thirteen gudhal genotypes was classified into three distinct groups *viz*. absent, small and medium. Out of the thirteen genotypes, nine genotypes namely CGG-2, CGG-3, CGG-5, CGG-6, CGG-8, CGG-10, CGG-11, CGG-12 and CGG-13 was categorized in absent type while three genotypes *viz.* CGG-1, CGG-4 and CGG-9 was recorded as small eye zone length of extensions and only one genotype CGG-7 was medium type. Floral formula of all thirteen genotypes of gudhal was categorized into three different formulas *i.e.* Br Brl ⊕ ♂ K (5) C (5) + P A (∞) G (5), Br Brl ⊕ ♂ K(5) C 5 A(∞)G(5) and Br Brl ⊕ ♂ E 8 K(5) C 5 A(∞) G(5). Out of the 13 genotypes, 7 genotypes *viz.* CGG-1, CGG-4, CGG-6, CGG-8, CGG-10 and CGG-12 was observed as Br Brl ⊕ ♂ K(5) C 5 A(∞) G(5) floral formula. As well 5 genotypes namely CGG-3, CGG-5, CGG-7 and CGG-11 was seen as Br Brl ⊕ ♂ K (5) C (5) + P A (∞) G (5) floral formula moreover 1 genotype CGG-13 was recorded as Br Brl ⊕ ♂ E 8 K(5) C 5 A(∞)G(5) floral formula under the present investigation.

Discussion

The wide variation in morphological qualitative characters might be due to the differences in the age of genotypes, agronomic practices, growing habitats and differences in environmental and edaphic factors. Difference in growth habit also might be associated with the variation in root distribution pattern of various gudhal genotypes which have influenced the absorption of water and nutrients from the soil (Tapkir *et al*., 2014) [15]. The results from the present study are similar with the findings of Choudhary *et al*. (2014) [10], Slamet (2018) [14] and Seemanthini *et al*. (2022) [13] in gudhal genotypes.

Table 1: Morphological qualitative characteristics of 13 *Hibiscus species* (Gudhal) genotypes as per DUS guidelines

Genotypes	Plant growth habit	Current year branch colour	Leaf blade shape	Leaf blade incisions of margin	Flower type	Attitude of outermost petals	Arrangement of outermost petals	Flower eye zone	Petal shape	Petal main colour (colour group chart)	Eye zone length of extensions	Floral formula
CGG-1	Spreading	Greenish	Rounded	Few	Semi-double	Horizontal	Slightly overlapping	Present	Slightly elongated	Orange 29B	Small	Br Brl ⊕ □ K (5) C (5) + P A (∞)G (5)
CGG-2	Upright	Brownish	Acute	Medium	Single	Strongly ascending	Strongly apart	Absent	Very elongated	Red purple 58C	Absent	Br Brl ⊕ □ K(5) C 5 A(∞)G(5)
CGG-3	Upright	Greenish	Rounded	Few	Single	Moderately ascending	Strongly apart	Absent	Moderately elongated	White N155C	Absent	Br Brl ⊕ □ K(5) C 5 A(∞)G(5)
CGG-4	Semi-upright	Greenish	Obtuse	Many	Double	Horizontal	Strongly overlapping	Present	Slightly elongated	Red 42A	Small	Br Brl ⊕ □ K (5) C (5) + P A (∞)G (5)
CGG-5	Upright	Brownish	Rounded	Many	Single	Moderately ascending	Slightly overlapping	Absent	Moderately elongated	Red 40A	Absent	Br Brl ⊕ □ K(5) C 5 A(∞)G(5)
CGG-6	Semi-upright	Greenish	Obtuse	Many	Single	Horizontal	Strongly apart	Absent	Slightly elongated	Red 40B	Absent	Br Brl ⊕ □ K(5) C 5 A(∞)G(5)
CGG-7	Spreading	Brownish	Acute	Medium	Single	Horizontal	Slightly overlapping	Present	Moderately elongated	Orange 24C	Medium	Br Brl ⊕ □ K(5) C 5 A(∞)G(5)
CGG-8	Spreading	Brownish	Rounded	Many	Double	Horizontal	Slightly overlapping	Absent	Slightly elongated	Red purple 58B	Absent	Br Brl ⊕ □ K (5) C (5) + P A (∞)G (5)
CGG-9	Spreading	Greenish	Obtuse	Few	Single	Strongly ascending	Strongly overlapping	Present	Very elongated	Yellow orange 21B	Small	Br Brl ⊕ □ K(5) C 5 A(∞)G(5)
CGG-10	Spreading	Brownish	Rounded	Medium	Double	Horizontal	Strongly overlapping	Absent	Slightly elongated	Red 44D	Absent	Br Brl ⊕ □ K (5) C (5) + P A (∞)G (5)
CGG-11	Spreading	Greenish	Rounded	Few	Single	Moderately ascending	Slightly overlapping	Absent	Moderately elongated	Red purple 73C	Absent	Br Brl ⊕ □ K(5) C 5 A(∞)G(5)
CGG-12	Spreading	Brownish	Obtuse	Few	Double	Horizontal	Slightly overlapping	Absent	Slightly elongated	Red 45B	Absent	Br Brl ⊕ □ K (5) C (5) + P A (∞)G (5)
CGG-13	Spreading	Greenish	Rounded	Few	Single	Horizontal	Strongly apart	Absent	Very elongated	Red 50B	Absent	Br Brl ⊕ □ E 8 K(5) C 5 A(∞)G(5)

Quantitative characters

The maximum petiole length (3.20 cm) was observed under the genotype CGG-4 which was followed by the genotype CGG-12 and CGG-10 having petiole length of (3.13 cm) and (2.81 cm) respectively. Whereas the minimum petiole length (0.66 cm) was received under the genotype CGG-11 under the present investigation. The maximum leaf blade length (8.63 cm) was registered under the genotype CGG-10 which was closely followed by genotypes CGG-4 and CGG-12 having respective leaf blade length of (8.12 cm) and (7.81 cm). Moreover, the minimum leaf blade length (2.63 cm) was confirmed under the genotype CGG-3. The maximum leaf blade width (7.60 cm) was registered under the supremacy of genotypes CGG-12 which was found significantly superior from rest of the other genotypes tested under the present experiment and followed by genotypes CGG-10 and CGG-4 having leaf blade width of (5.91 cm) and (4.79 cm) respectively. The minimum leaf blade width (1.83 cm) was recognized under the genotype CGG-3. Out of the thirteen genotypes the maximum flower pedicel length (8.06 cm) was perceived under the genotype CGG-10 which was closely followed by genotypes CGG-11 and CGG-4 having flower pedicel length of (7.13 cm) and (7.11 cm) respectively. However, the minimum flower pedicel length (3.34 cm) was noticed under the genotype CGG-6 during the present trial. The maximum flower diameter (10.84 cm) was registered under the excellency of genotype CGG-12 which was found significantly superior as compared to other genotypes and followed by genotypes CGG-11 and CGG-8 with respective flower diameter of (9.87 cm) and (9.81 cm) under the present research. While the minimum flower diameter (5.88 cm) was verified under the genotype CGG-2. The maximum petal length (8.18 cm) was registered under the superiority of genotype CGG-10 which was found significantly excellent from rest of the other genotypes and followed by genotypes CGG-6 and CGG-12 having respective petal length of (6.05 cm) and (5.64 cm). While, the minimum petal length (3.18 cm) was noted under the genotype CGG-4. The maximum petal width (4.86 cm) was registered under the supremacy of genotypes CGG-12 which was found significantly superior from rest of the other genotypes tested under the present experiment and followed by genotypes CGG-8 and CGG-9 having petal width of (4.31 cm) and (4.22 cm) respectively. The minimum petal width (1.69 cm) was recognized under the genotype CGG-4. Out of the thirteen genotypes, the maximum flower yield (29.50 per plant per day) was recorded under the genotype CGG-7 which was closely followed by genotypes CGG-11 and CGG-10 having flower yield of (27.00) and (25.00) per plant per day respectively. However, the minimum flower yield (10.50) per plant per day was noticed under the genotype CGG-6 during the present trial. Out of the thirteen genotypes, the maximum weight of flower (9.78 g) was recorded under the genotype CGG-12 which was closely followed by genotypes CGG-10 and CGG-8 having weight of flower of (7.30 g) and (6.94 g) respectively. However, the minimum weight of flower (0.94

g) was noticed under the genotype CGG-2 during the present trial.

Discussion

The variability in quantitative characters of different *Hibiscus species* (Gudhal) genotypes might be due to inherent characters of individual genotype, edaphic factors, management practices and acclimatization to varied agro-climatic conditions (Sabies *et al*., 2014) [12]. These results are also parallel with the results reported by Falusi *et al*. (2014) [5], Bharti *et al*. (2015) [2] and Allen *et al*. (2019) [1] in gudhal genotypes.

Table 2: Quantitative characteristics of 13 *Hibiscus Species* (Gudhal) genotypes

Genotypes	Petiole length (cm)	Leaf blade length (cm)	Leaf blade width (cm)	Flower pedicel length (cm)	Flower diameter (cm)	Petal length (cm)	Petal width (cm)	Yield of flower (No.) per plant per day	Weight of flower (g)
CGG-1	0.80	6.62	4.63	5.60	8.61	4.73	2.81	22.75	1.94
CGG-2	0.75	3.52	2.51	6.50	5.88	5.60	2.61	17.25	0.94
CGG-3	0.48	2.63	1.83	4.81	6.36	3.69	2.34	14.25	1.31
CGG-4	3.20	8.12	4.79	7.11	6.08	3.18	1.69	24.25	2.71
CGG-5	2.04	7.13	4.31	5.62	8.41	4.58	3.70	26.40	1.56
CGG-6	1.13	4.42	3.40	3.34	9.22	6.05	3.25	10.50	1.84
CGG-7	2.48	5.80	4.11	5.62	6.68	4.61	4.05	29.50	2.06
CGG-8	1.21	5.63	5.21	5.43	9.81	5.26	4.31	20.50	6.94
CGG-9	1.11	4.44	4.11	4.78	9.52	5.13	4.22	23.25	1.07
CGG-10	2.81	8.63	5.91	8.06	7.45	8.18	3.91	25.00	7.30
CGG-11	0.66	4.51	3.34	7.13	9.87	5.46	3.84	27.00	1.38
CGG-12	3.13	7.81	7.60	5.40	10.84	5.64	4.86	20.50	9.78
CGG-13	0.84	6.27	3.43	6.33	7.02	3.86	2.68	18.25	1.29
SE (m)±	0.07	0.08	0.02	0.09	0.23	0.03	0.02	1.02	0.01
C. D. at 5%	0.20	0.21	0.04	0.22	0.68	0.09	0.06	3.01	0.02
CV	8.77	2.54	0.67	2.43	4.47	1.20	1.22	9.96	0.35

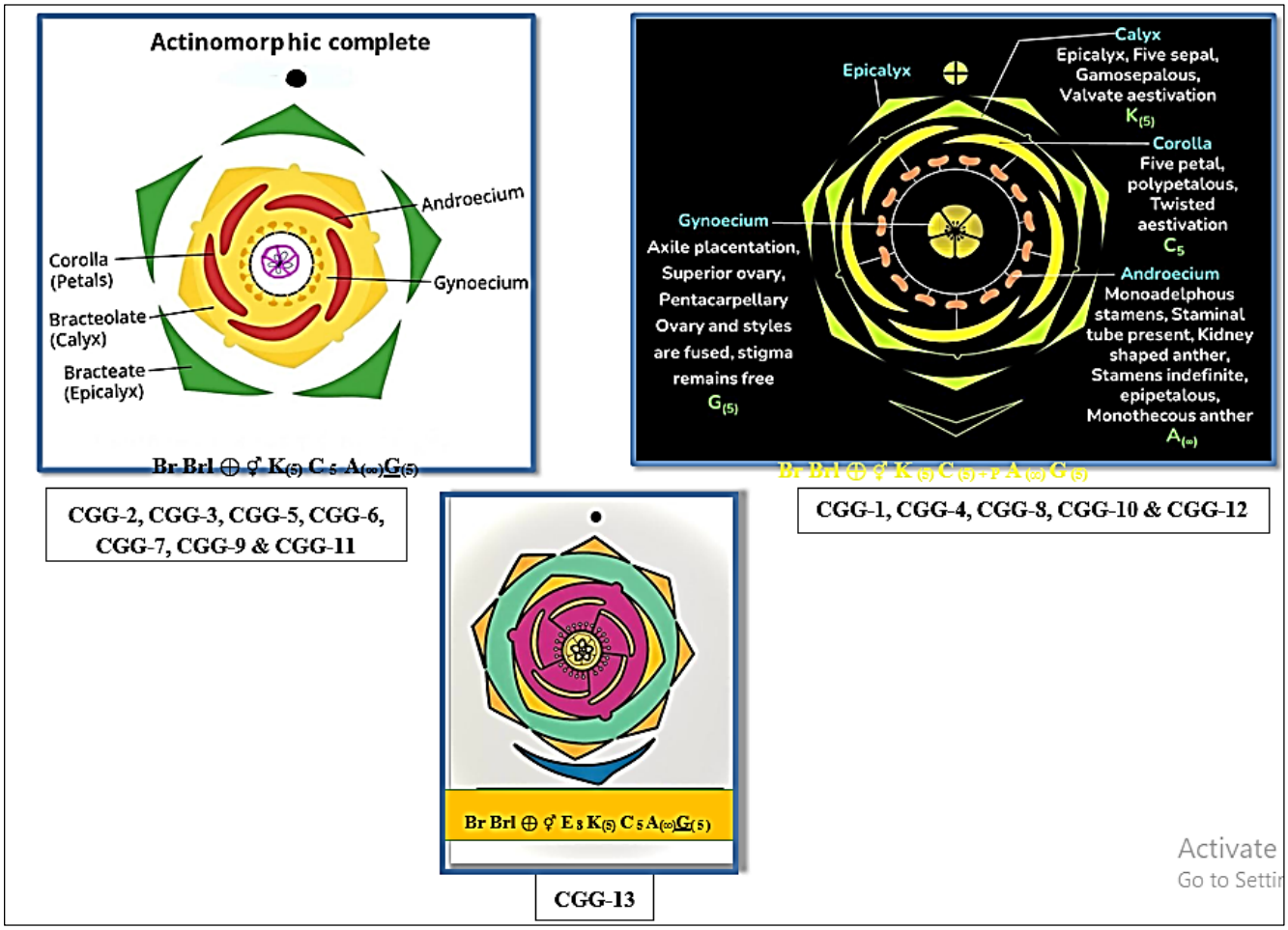

Plate 1: Floral formula of different *Hibiscus species*

Plate 2(a): Plant growth habits of different *Hibiscus species*

Plate 2(b): Plant growth habit of different *Hibiscus species*

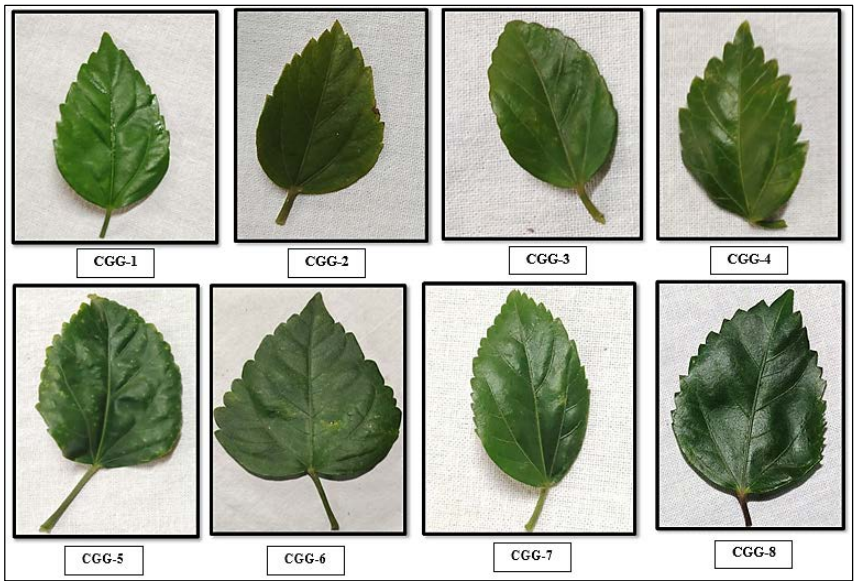

Plate 3(a): Leaf of different *Hibiscus species*

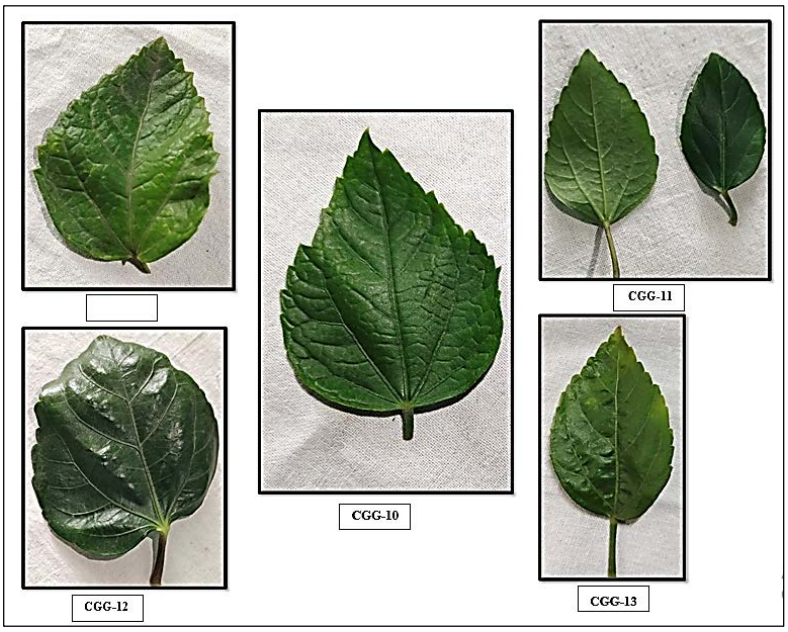

Plate 3(b): Leaf of different *Hibiscus species*

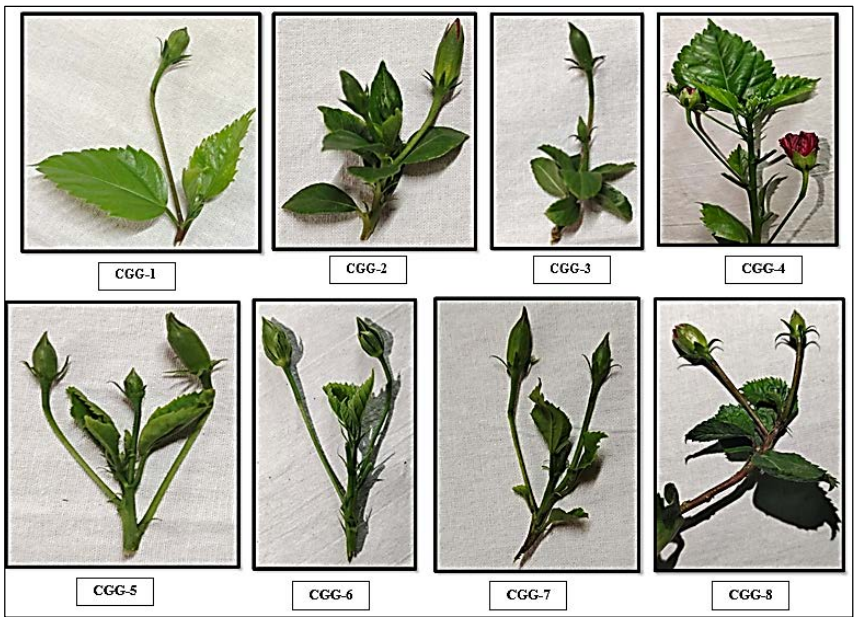

Plate 4(a): Petiole of different *Hibiscus species*

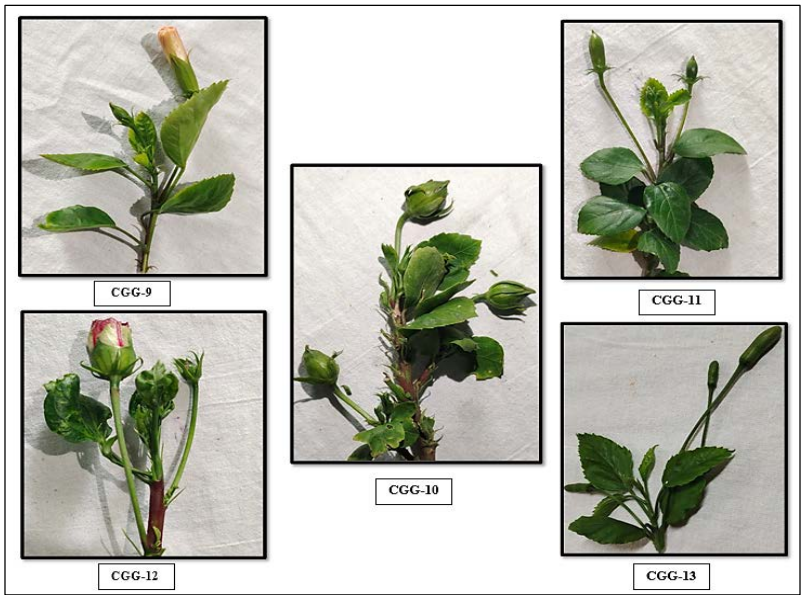

Plate 4(b): Petiole of different *Hibiscus species*

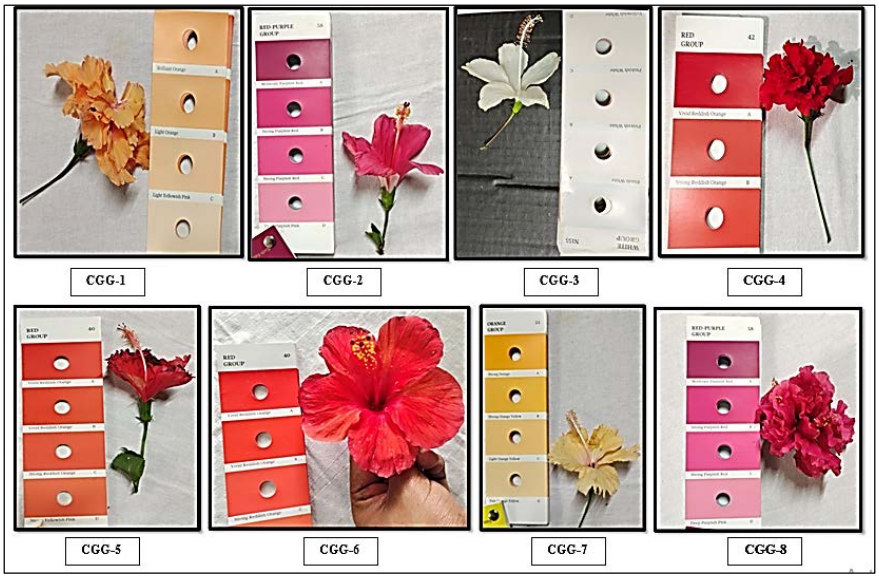

Plate 5(a): Flower of different *Hibiscus species*

Plate 5(b): Flower of different *Hibiscus species*

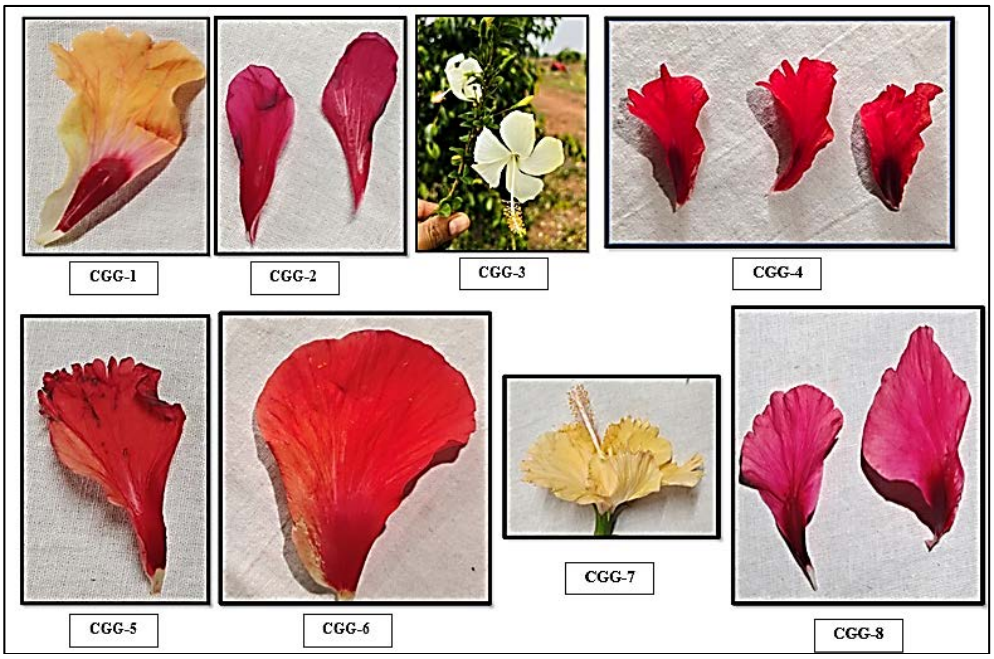

Plate 6(a): Petals of different *Hibiscus species*

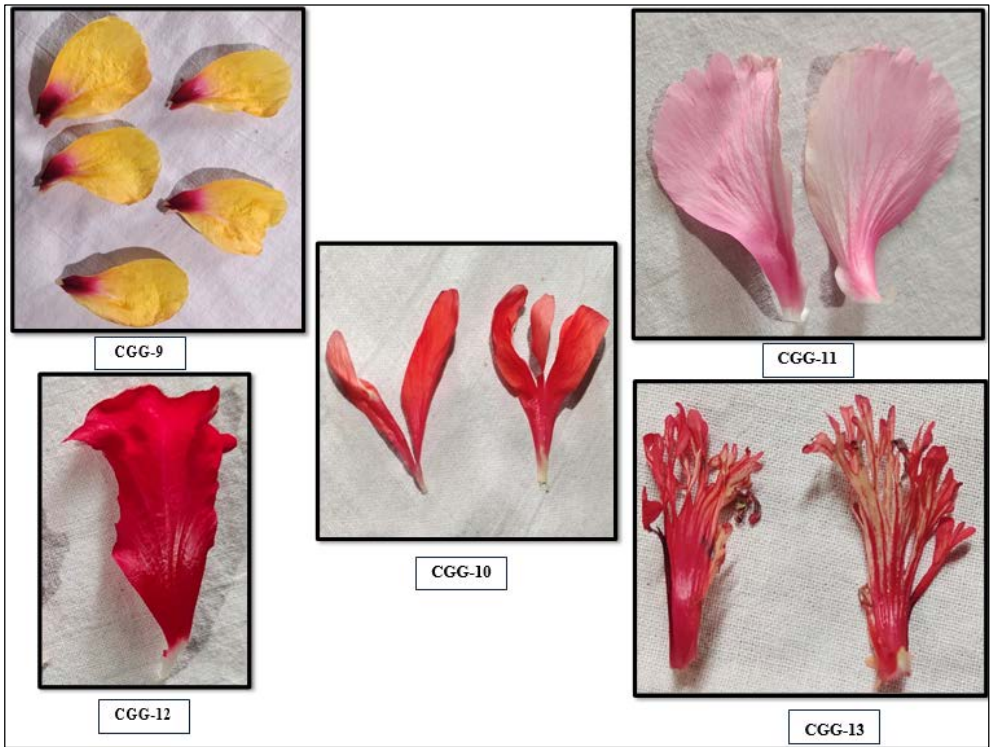

Plate 6(b): Petals of different *Hibiscus species*

Conclusion

From the above results and discussions it can be concluded that the morphological qualitative characterization of Hibiscus genotypes revealed that, characters like plant growth habit, current year branch colour, leaf blade shape, leaf blade incisions of margin, flower type, attitude of outermost petals, arrangement of outermost petals, flower eye zone, petal shape, petal main colour on inner side, eye zone length of extensions and floral formula were varied phenotypically and showed significant variations. Other than above mentioned characters, quantitative characters viz. petiole length (cm), leaf blade length (cm), leaf blade width (cm), flower pedicel length (cm), flower diameter (cm), petal length (cm), petal width (cm), yield of flower (No.) per plant per day (up to 5 days) and weight of flower (g) are highly significant to their characters and showed significant variation. The flower diameter ranged from 5.88 cm (CGG-2) to 10.84 cm (CGG-12). Large-sized Gudhal (CGG-12) are highly valued for ornamental landscaping and garden beautification due to their striking appearance. Small-sized Gudhal (CGG-2) are ideal for potted plants and balcony gardens, their compact size makes them easy to handle and process. The flower yield of hibiscus showed significant variation among genotypes ranging from 10.50 (CGG-6) to 29.50 (CGG-7) flowers per plant per day. The higher yielding genotype CGG-7 holds great importance for commercial flower production due to its potential for increased economic returns, while lower yielding types like CGG-6 may be explored for specific traits such as flower size, color or medicinal value. This variation highlights the

scope for selecting and promoting superior genotypes to enhance productivity and profitability in hibiscus cultivation.

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