

EVALUATION OF SOME ONCIDIUMHYBRIDS AT SIKKIM HIMALAYA

L.C. DE, RAJ KUMAR, N. SAILO & D.R. SINGH

ICAR-NRC for Orchids, Pakyong, Sikkim, India

ABSTRACT

Oncidium consists of 750 species of sympodial epiphytic orchids from America, Mexico and Argentina. Hybridization of *Oncidium* orchids with Brassia orchids, Miltonia orchids and *Odontoglossum* orchids resulting in an *Oncidium* orchid that has some warmth tolerance and beautiful flowers. Hybrids and some commercial species are used for cut flowers, hanging baskets and potted plants. The present investigation was carried out with 8 hybrids of *Oncidium* orchids which were grown with recommended package of practices under greenhouse condition. Observations were taken on 60 morphological characteristics which could be used in future for crop improvement programme for developing new *Oncidium* hybrids.

KEYWORDS: *Oncidium*, Morphological Characteristics, Cut Flowers

INTRODUCTION

Oncidium consists of 750 species of sympodial epiphytic orchids from America, Mexico and Argentina. The plants have either pseudobulbs or a fan of very thin leaves. They bear numerous number of attractive blossoms in various size and forms and are commonly called as 'Golden Showers' and 'Dancing Ladies' (De, 2014). The pseudobulbs are topped by one or more leaves which are small, soft, pencil like or very large, leathery and thick. Usually, single inflorescence is produced from a single growth or in some cases, two inflorescences may be produced. Inflorescences develop from the base of the pseudobulbs or from the axil of leaves. The flower size varies from 1cm to 12.5cm across. The flower colours are mostly shades of yellow and brown, in some cases are red, pink, magenta, green or white. In general, all three sepals are alike in size, shape and colour, in some cases, these vary. The two lateral petals are similar in size and shape while dorsal sepals are larger. *Oncidium* species are characterized by (i) presence of column wings (ii) presence of complicated callus on the lip (iii) pseudobulbs without or with one or three leaves (iv) several basal bracts at the base of pseudobulbs.

Oncidium species, their hybrids and inter-generic hybrids are suited to intermediate and warmer climates. The plants are epiphytic using hosts such as cactus plant and trees for support. Hybridization of *Oncidium* orchids with Brassia orchids, Miltonia orchids and *Odontoglossum* orchids resulting in an *Oncidium* orchid that has some warmth tolerance and beautiful flowers. Hybrids and some commercial species are used for cut flowers, hanging baskets and potted plants.

MATERIALS AND METHODS

The present investigation was carried out with 8 hybrids of *Oncidium* orchids comprising Sharry Baby Sweet Fragrance, Jairak Rainbow Orange Spot, Jairak Rainbow Pink Spot, Taka Yellow, Sweet Sugar, Popki Red, Wildcat Carmera and Wildcat Bobcat at ICAR-NRC for Orchids, Pakyong-737106, Sikkim during 2014-2015 and 2015-16. The experiment was conducted in CRD design with 5 replications and the plants were grown under protected condition with a light intensity of 2500 foot candles, 30-50 % shade, a temperature of 25-30°C during day time and 20°C in the night time.

Oncidium orchid hybrids prefer free compost that holds moisture rather than water. Water requirements vary with the type of orchid plant. Generally, *Oncidium* orchid plants with large fleshy roots or leaves require less-frequent watering than thin-leaved or thin-rooted plants. Watering should be thorough, and the medium should be allowed to dry at least halfway through the pot before watering again. This may be every 2 to 10 days depending on weather, pot size and material, type of orchid and type of potting medium. Plants not actively growing should be watered less. Humidity ranges should be between 50 and 60 percent. A potting mixture consisting of Cocochips + brick pieces + leaf moulds (1:1:1) was used for growth and flowering of the plants.

Observations were taken on 60 morphological characteristics and those are plant type, plant size(cm), Pseudobulb length (cm) (at flowering), Pseudobulb width at broadest part (cm), Shoot numbers / plant, Pseudobulb shape, Pseudobulb groove, Number of basal leaves/ pseudobulb, Leaf length(cm), Leaf width(cm), Leaf shape, Leaf orientation, Leaf nature, Inflorescence type, Inflorescence length, Number of flowers / inflorescence, Anthocyanin coloration in peduncle, Flower length (cm) in front view, Flower breadth in front view (cm), Flower fragrance, Dorsal sepal length (cm), Dorsal sepal width (at middle) (cm), Dorsal sepal shape, Dorsal sepal curvature, Dorsal sepal twisting, Undulation of margin of dorsal sepal, Dorsal sepal main colour, Dorsal sepal colour pattern, Lateral sepal length(cm), Lateral sepal width(cm), Lateral sepal shape, Lateral sepal curvature, Lateral sepal twisting, Undulation of margin of lateral sepal, Lateral sepal main colour, Lateral sepal colour pattern, Petal length (cm), Petal width(cm), Petal shape, Petal curvature, Petal twisting, Undulation of margin of petal, Petal main colour, Petal colour pattern, Lip curvature, Lip length (cm), Lip width (cm), Shape of apical lobe of lip, Lip emargination, Size of lateral lobe in relation to apical lobe of lip, Undulation of margin of lip, Lip main colour, Lip colour pattern, Colour of middle part of callus, Colour of margin part of callus, Column length (cm), Column width (cm), Column orientation, Column main colour, Pedicellate ovary length (cm) and Longevity of flower on plant (days) (De *et al*, 2014).

RESULTS AND DISCUSSIONS

It is evident from Table 1 that there is significant variation in vegetative parameters such as plant size, pseudobulb length, no. of cataphylls/pseudobulb and leaf length. Out of 8 *Oncidium* hybrids, plants without pseudobulb were found in Popki Red, Jairak Rainbow Pink Spot and Jairak Rainbow Orange Spot. Plant size ranges from Popki Red (9cm) to Taka Yellow (27.40cm). Longest pseudobulb was recorded in Taka Yellow (8.5cm) and shortest in Sharry Baby Sweet Fragrance (6.3cm). Maximum pseudobulb was observed in WildcatCarmera (3.7cm) and minimum in Sweet Sugar (2.7 cm) and Wildcat Bobcat (2.7cm). Pseudobulb shape ranges from ovate (Sharry Baby Sweet Fragrance, Sweet Sugar) to elliptic (Taka Yellow, Wildcat Carmera, and Wildcat Bobcat). Number of cataphylls/pseudobulb was recorded highest in Jairak Rainbow Pink Spot (4.5). Leaf length more than 19cm was observed in Sharry Baby Sweet Fragrance, Taka Yellow and Wildcat Carmera. Leaf twisting phenomena was prominent in Sharry Baby Sweet Fragrance, Sweet Sugar, Wildcat Carmera, and Wildcat Bobcat).

Table 1: Important Vegetative Parameters in *Oncidium* Hybrids

Hybrids	Plant Type	Plant Size (Cm)	Pseudobulb Length (Cm)	Pseudobulb Width (Cm)	Pseudobulb Shape	No. of Cataphylls/Pseudobulb	Leaf Length (Cm)	Leaf Attitude
Sharry Baby Sweet Fragrance	With pseudobulb	19.4	6.3	2.8	Ovate	2.0	19.4	Twisting
Jairak Rainbow Orange Spot	Without pseudobulb	11.9	NA	NA	NA	4.0	8.5	Normal
Jairak Rainbow Pink Spot	Without pseudobulb	11.5	NA	NA	NA	4.5	10.8	Normal
Taka Yellow	With pseudobulb	27.40	8.5	3.5	Elliptic	2.0	19.1	Normal
Sweet Sugar	With pseudobulb	22.70	6.8	2.7	Ovate	2.0	17.4	Twisting
Popki Red	Without pseudobulb	9.0	NA	NA	NA	3.0	8.5	Normal
Wildcat Carmera	With pseudobulb	19.5	6.8	3.7	Elliptic	4.0	19.5	Twisting
Wildcat Bobcat	With pseudobulb	26.0	6.4	2.7	Elliptic	4.0	14.0	Twisting
SE m		0.56	--	--	--	0.61	0.61	
CD _{5%}		0.96	--	-	--	1.05	1.04	

Among quantitative floral characters, significant variation was recorded in inflorescence length, number of flowers per inflorescence, flower width, width of dorsal and lateral sepal and lip width. Longest inflorescence was observed in Taka Yellow (81.4 cm) followed by Sweet Sugar (63.3 cm) and shortest in Jairak Rainbow Pink Spot (25cm) (Table 2). Highest number of flowers per inflorescence was noted in Taka Yellow (48.8) followed by Sweet Sugar (29) and lowest in Popki Red (5). Wildcat Bobcat had maximum flower length (6.3cm) and minimum in Jairak Rainbow Pink Spot (3.0). Broadest flower was recorded in Wildcat Carmera (5.9cm) and narrowest in Taka Yellow (2.3 cm). Maximum dorsal sepal width (1.4cm) and lateral sepal width (1.3cm) was found in Wildcat Carmera. Petal width was maximum in Wildcat Bobcat (1.3 cm) followed by Wildcat Carmera (1.1cm) and minimum in Taka Yellow and Sweet Sugar (0.6cm). Lip width ranges from 1.8cm (Sharry Baby Sweet Fragrance) to 4.2cm (Sweet Sugar). Column length of more than 1 cm was observed in Wildcat Carmera and Wildcat Bobcat (Table 2).

Table 2: Important Quantitative Floral Characters in *Oncidium*

Name of hybrids	Inflorescence length (cm)	No. of flowers/inflorescence	Flower length (cm)	Flower width (cm)	Dorsal sepal width (cm)	Lateral sepal width (cm)	Petal width (cm)	Lip width (cm)	Column length (cm)
SharryBaby Sweet Fragrance	35.0	11.8	3.8	3.2	0.8	0.7	0.8	1.8	0.7
Jairak Rainbow Orange Spot	27.8	6.3	3.2	2.5	0.5	0.4	0.8	2.5	0.5
Jairak Rainbow Pink Spot	25.0	9.5	3.0	2.3	0.4	0.3	0.7	2.0	0.6

Table 2 – Cond.,

Taka Yellow	81.4	48.8	3.6	2.3	0.4	0.3	0.6	2.6	0.5
Sweet Sugar	63.3	29.0	4.6	4.0	0.7	0.6	0.6	4.2	0.8
Popki Red	28.0	5.0	3.2	2.5	0.4	0.4	0.8	2.7	0.5
Wildcat Carmera	26.0	5.5	5.8	5.9	1.4	1.3	1.1	2.5	1.2
Wildcat Bobcat	28.5	7.0	6.3	5.6	1.3	1.2	1.3	2.6	1.3
SEM	1.45	1.01	0.28	0.30	0.12	0.13	0.13	0.32	0.14
CD _{5%}	2.54	1.73	0.48	0.51	0.21	0.22	0.23	0.55	0.25

Main colour in dorsal sepal was found as grey purple in Jairak Rainbow Orange Spot, Sharry Baby Sweet Fragrance, Popki Red and Wildcat Bobcat; purple in Jairak Rainbow Pink Spot; yellow in Taka Yellow and yellow green in Sweet Sugar and Wildcat Carmera (Table 3). Shaded type of colour pattern of dorsal sepal was observed in Wildcat Bobcat, Jairak Rainbow Orange Spot, Popki Red and Sharry Baby Sweet Fragrance; uniform in Jairak Rainbow Pink Spot and brindled in Taka Yellow, Sweet Sugar and Wildcat Carmera. Lateral sepal main colour was recorded as Jairak Rainbow Orange Spot, Sharry Baby Sweet Fragrance, Popki Red and Wildcat Bobcat; purple in Jairak Rainbow Pink Spot; yellow in Taka Yellow and yellow green in Sweet Sugar and Wildcat Carmera. Shaded type of colour pattern of lateral sepal was observed in Jairak Rainbow Orange Spot, Popki Red and Sharry Baby Sweet Fragrance; uniform in Jairak Rainbow Pink Spot and brindled in Taka Yellow, Sweet Sugar and Wildcat Carmera and edged in Wildcat Bobcat. Main colour in petal was prominent as grey purple in Jairak Rainbow Orange Spot, Sharry Baby Sweet Fragrance, Popki Red and Wildcat Bobcat; purple in Jairak Rainbow Pink Spot; yellow in Taka Yellow and yellow green in Sweet Sugar and Wildcat Carmera. Petal colour pattern varied from shaded in Jairak Rainbow Orange Spot, Popki Red, Sharry Baby Sweet Fragrance and Jairak Rainbow Pink Spot; brindled in Taka Yellow, Sweet Sugar and Wildcat Carmera and edged in Wildcat Bobcat. Lip main colour was recorded as white in Sharry Baby Sweet Fragrance; grey purple in Jairak Rainbow Orange Spot and Wildcat Bobcat; red purple in Jairak Rainbow Pink Spot; yellow in Taka Yellow, Sweet Sugar and Wildcat Carmera and grey yellow in Popki Red. Oncidium hybrids viz. Popki Red, Jairak Rainbow Orange Spot and Sharry Baby Sweet Fragrance had shaded lip colour pattern; Jairak Rainbow Pink Spot, Wildcat Carmera, Sweet Sugar and Taka Yellow had blotched type lip colour pattern and Wildcat Bobcat with uniform lip colour pattern.

Column main colour was recorded as grey purple in Jairak Rainbow Orange Spot, Sharry Baby Sweet Fragrance, Popki Red and Wildcat Bobcat; purple in Jairak Rainbow Pink Spot; yellow in Taka Yellow and Sweet Sugar and green white in Wildcat Carmera (Table 3).

Table 3: Important Qualitative Floral Characters in Oncidium

Name of hybrids	Dorsal sepal main colour	Dorsal sepal colour pattern	Lateral sepal main colour	Lateral sepal colour pattern	Petal main colour	Petal colour pattern	Lip main colour	Lip colour pattern	Column main colour
Sharry Baby Sweet Fragrance	Grey purple	Shaded	Grey purple	Shaded	Grey purple	Shaded	White	Shaded	Grey purple
Jairak Rainbow Orange Spot	Grey purple	Shaded	Grey purple	Shaded	Grey purple	Shaded	Grey purple	Shaded	Grey purple
Jairak Rainbow Pink Spot	Purple	Uniform	Purple	Uniform	Purple	Shaded	Red purple	Blotched/spotted	Purple

Table 3

Taka Yellow	Yellow	Brindled	Yellow	Brindled	Yellow	Brindled	Yellow	Blotched	Yellow
Sweet Sugar	Yellow green	Brindled	Yellow green	Brindled	Yellow green	Brindled	Yellow	Blotched	Yellow
Popki Red	Grey purple	Shaded	Grey purple	Shaded	Grey purple	Shaded	Grey purple	Shaded	Grey purple
Wildcat Carmera	Yellow green	Brindled	Yellow green	Brindled	Yellow green	Brindled	Yellow	Blotched	Green white
Wildcat Bobcat	Grey purple	Shaded	Grey purple	Edged	Grey purple	Edged	Grey purple	Uniform	Grey purple

It is revealed in Table 4 that all the *Oncidium* hybrids varied in pseudo-qualitative characters and amongst them, narrow elliptic type of leaf shape was noticed in Sweet Sugar and Sharry Baby Sweet Fragrance; linear in Jairak Rainbow Pink Spot and Jairak Rainbow Orange Spot; lanceolate in Taka Yellow; narrow lanceolate in Popki Red and elliptic in Wildcat Carmera and Wildcat Bobcat. Simple raceme type of inflorescence was found in Sharry Baby Sweet Fragrance, Wildcat Bobcat, Jairak Rainbow Pink Spot, Popki Red, Wildcat Carmera and Jairak Rainbow Orange Spot whereas panicle type in Taka Yellow and Sweet Sugar. Dorsal sepal shape ranges from elliptic in Sharry Baby Sweet Fragrance, Taka Yellow, Wildcat Bobcat; spatulate in Jairak Rainbow Orange Spot and Popki Red; Obovate in Jairak Rainbow Pink Spot and Wildcat Carmera and oblong in Sweet Sugar. Moderately incurving type of dorsal sepal curvature was observed in Sharry Baby Sweet Fragrance, Wildcat Carmera, Jairak Rainbow Pink Spot and Jairak Rainbow Orange Spot; strongly incurving in Sweet Sugar and Popki Red and straight in Wildcat Bobcat. Lateral sepal shape varied from oblong in Sharry Baby Sweet Fragrance; curving obovate in Jairak Rainbow Orange Spot, Jairak Rainbow Pink Spot and Popki Red; narrow lanceolate in Taka Yellow; obovate in Wildcat Carmera and elliptic in Wildcat Bobcat. Lateral sepal curvature was noticed as moderately incurving in Sharry Baby Sweet Fragrance, Wildcat Carmera, Jairak Rainbow Pink Spot, Taka Yellow, Popki Red and Jairak Rainbow Orange Spot; strongly incurving in Sweet Sugar and straight in Wildcat Bobcat. Petal shape was studied as elliptic in Sharry Baby Sweet Fragrance, Wildcat Carmera, and Wildcat Bobcat; spatulate in Popki Red, Jairak Rainbow Pink Spot and Jairak Rainbow Orange Spot and oblong in Taka Yellow and Sweet Sugar. Petal curvature ranges from moderately incurving Sweet Sugar, Jairak Rainbow Pink Spot, Taka Yellow and Sharry Baby Sweet Fragrance and straight in Wildcat Bobcat, Popki Red., Wildcat Carmera and Jairak Rainbow Orange Spot. Petal twisting was found in Jairak Rainbow Pink Spot and Taka Yellow. Lip curvature was recorded as straight in all hybrids except in Sharry Baby Sweet Fragrance (incurving). Lip shape of apical lobe was observed as semi-circular in Taka Yellow and Jairak Rainbow Pink Spot whereas orbicular in Wildcat Bobcat, Jairak Rainbow Orange Spot, Sweet Sugar, Popki Red, Wildcat Carmera and Sharry Baby Sweet Fragrance (Table 4).

Table 4: Important Pseudo-Qualitative Floral Characters in Oncidium

Hybrids	Leaf Shape	Inflorescence Type	Dorsal Sepal Shape	Dorsal Sepal Curvature	Lateral Sepal Shape	Lateral Sepal Curvature	Petal Shape	Petal Curvature	Petal Twisting	Lip Curvature	Lip Shape Of Apical Lobe
Sharry Baby Sweet Fragrance	Narrow elliptic	Simple raceme	Elliptic	Moderately incurving	Oblong	Moderately incurving	Elliptic	Moderately incurving	Absent	Incurving	Orbicular
Jairak Rainbow Orange Spot	Linear	Simple raceme	Spatulate	Moderately incurving	Curving obovate	Moderately incurving	Spatulate	Straight	Absent	Straight	Orbicular
Jairak Rainbow Pink Spot	Linear	Simple raceme	Obovate	Moderately incurving	Curving obovate	Moderately incurving	Spatulate	Moderately incurving	Present	Straight	Semi-circular
Taka Yellow	Lanceolate	Panicle	Elliptic	Moderately incurving	Narrow lanceolate	Moderately incurving	Oblong	Moderately incurving	Present	Straight	Semi-circular
Sweet Sugar	Narrow elliptic	Panicle	Oblong	Strongly incurving	Ovate	Strongly incurving	Oblong	Moderately incurving	Absent	Straight	Orbicular
Popki Red	Narrow lanceolate	Simple raceme	Spatulate	Strongly incurving	Curving obovate	Moderately incurving	Spatulate	Straight	Absent	Straight	Orbicular
Wildcat Carmera	Elliptic	Simple raceme	Obovate	Moderately incurving	Obovate	Moderately incurving	Elliptic	Straight	Absent	Straight	Orbicular
Wildcat Bobcat	Elliptic	Simple raceme	Elliptic	Straight	Elliptic	Straight	Elliptic	Straight	Absent	Straight	Orbicular

Large number of *Oncidium* species is utilized for production of spectacular hybrids and most important species in this respect are *henekenii*, *intermedium*, *lanceanum*, *leucochilum*, *marshallianum*, *pulchellum*, *retemeyerianum*, *splendidum*, *sylvestre*, *triquetrum*, *vericosum* and *variegatum*. The genus is cross compatible with other genera like *Aspasia*, *Brassia*, *Cochlioda*, *Comparettia*, *Gomesa*, *Macradenia*, *Miltonia*, *Odontoglossum*, *Rodriguezia*, *Trichocentrum*, *Trichopilia* etc. and hence many multi-generic hybrids have been evolved. Some of the outstanding hybrids which have proved as proven parent plants for production of more and more attractive hybrids are ‘Angnes Ann’, ‘Ann Rosa’, ‘Catherine Wilson’, ‘Delight’, ‘Golden Glow’, ‘Helen Brown’, ‘Lovely’, ‘organ Mountains’, ‘St. Anne’, and ‘Waikiki Sunset’ (Bhattacharjee and De, 2003).

A variant can be registered if it essentially fulfils the criteria of Distinctiveness, Uniformity and Stability (DUS) which means that the candidate variety must be distinguishable by at least one essential characteristic from a variety which is sufficiently uniform in expression of its essential characteristics which should remain fixed even after repeated multiplication. The variety should also have a single and distinct denomination (Henke, 2008).



Figure 1: Important Oncidium Hybrids Used for Cut Flowers

CONCLUSIONS

The present investigation was carried out at ICAR-NRC for Orchids, Pakyong, Sikkim in 2014-15 and 2015-16 with 8 hybrids of *Oncidium* orchids which were grown with recommended package of practices under greenhouse condition. Observations were taken on 60 morphological characteristics which could be used in future for developing new traits in *Oncidium* hybrids. Among vegetative parameters such as plant size, pseudobulb length, no. of cataphylls/pseudobulb and leaf length and among quantitative floral characters, significant variation was recorded in inflorescence length, number of flowers per inflorescence, flower width, width of dorsal and lateral sepal and lip width which could be utilized in crop improvement programmes.

REFERENCES

1. Bhattacharjee, S. K. and De, L. C. 2003. In: *Advanced Commercial Floriculture*, Part I, Aavishkar Publishers, Distributors, Jaipur, India, 330P.
2. De, L. C. 2014. '*Production Technology of Commercial Flowers*': In 2 volumes Pp. 599. Published by Pointer Publisher, Jaipur, Rajasthan (ISBN: 978-81-7132-771-3).
3. De, L. C., Rao, A. N., Rajeeva, P. K., Dhiman, S. R., Srivastava, M. and Chhetri, Geetamani 2014. DUS Test Guidelines in *Oncidium* orchids. *International Journal of Applied Bioresearch*, 22:1-8.

4. Henke de Greef, 2008. Details about D. U. S. Testing for Plant Breeders Rights in Orchids in Europe. Abstracted in Taiwan International Orchid Symposium.