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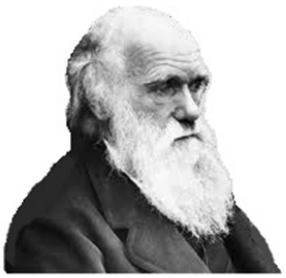

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Asian *Mokara* (Orchidaceae) hybrids used as cut flowers: Comparison of cultivars. Part 1

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ABSTRACT

The *Orchidacea* are one of the largest families of flowering ornamental plants in the Pacific region, especially in the tropics. Among this group plants, attention should be paid to the intergeneric hybrid *Mokara*. The following 10 cultivars of the *Mokara* hybrid were used in the experiment: 'Bloonlong', 'Calipso', Chak Kuan', 'Chorcharood', 'Jenistar', 'Kitti', 'Pranee', 'Robin', 'Tammy' and 'Tangerine'. The tested *Mokara* cultivars are distinguished by a wide palette of warm colors, including many shades of orange and red. These are very rare colors among other popular genera of orchids.

***Keywords*:** *Mokara,* Pacific region, cultivars, cut flowers

1. INTRODUCTION

In recent years, orchids have belonged to the most fashionable ornamental plants utilized in interior decoration. They owe marketing success to the great variety of flower colors and shapes as well as long-lasting flowering [1, 2]. In addition to popular potted orchids on the market, there is a very wide selection of exotic species and varieties cultivated for cut flowers. Thailand is their largest producer and exporter [3]. *Dendrobium* hybrids and cultivars constitute the largest proportion in the offer (about 70-80%). The rest of the assortment is complemented by orchids of the genera *Aranda, Ascocenda, Mokara, Oncidium* and *Vanda*. Among this group, attention should be paid to the intergeneric hybrid – *Mokara* – obtained in 1969 as a result of crossing orchids from the genera *Arachnis, Ascocentrum* and *Vanda* [4-8]. The varieties of this

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hybrid are characterized by original structure and flower colors and rigid inflorescence shoots [9, 10]. There is little information in the literature about the complete characteristics of individual cultivars of *Mokara* hybrids. Due to the great interest in *Mokara* hybrid on the market, it seemed reasonable to conduct research on the evaluation of decorativeness and post-harvest longevity of selected cultivars.

2. MATERIALS AND METHODS

The following 10 cultivars of the *Mokara* hybrid were used in the experiment: 'Bloonlong', 'Calipso', Chak Kuan', 'Chorcharood', 'Jenistar', 'Kitti', 'Pranee', 'Robin', 'Tammy' and 'Tangerine'. Plant material was imported directly from Thailand via Floramor (**Fig. 1**).

Figure 1. Orchids stored with the stem secured in a water tube.

After unpacking the plants, randomly selected 10 inflorescences from each cultivar were assessed for:

- shoot length – measured from the shoot base to the base of the first flower in the inflorescence;
- inflorescence length – measured from the base of the first flower to the base of the last bud in the inflorescence;
- peduncle length – measured from the place of growth from the shoot to the base of the flower;
- the number of flowers in the inflorescence – all flowers in the inflorescence were counted;

- flower diameter – measured at the widest point of the flower;
- flower color – established in a three-person team on the basis of the international RHS Colour Chart 2005.

The results of morphological measurements of inflorescences and flowers were statistically compiled by the analysis of variance. Tukey's confidence intervals were used to assess the differences between means at a significance level of 0.05%.

3. RESULTS AND DISCUSSION

Below is a description of individual cultivars of *Mokara* hybrid based on the results of measurements of inflorescence morphological features and observations using the color chart. Detailed statistical analysis of morphological features of inflorescences and flowers of 10 cultivars of *Mokara* hybrids are presented in **Table 1**.

Mokara 'Bloonlong'

Plants of this cultivar are characterized by inflorescence peduncle lengths of 24.7-26.0 cm and inflorescence lengths of 23.1-26.5 cm. They form 13.0-15.0 flowers in thick inflorescences on 2.8-5.0 cm long peduncles. Flowers, 5.2-6.5 cm in diameter, and the RHS 41B color (**Fig. 2**).

Figure 2. The appearance of *Mokara* 'Bloonlong' inflorescence.

Mokara ‘Calipso’

Orchids of this cultivar produce 22.0-24.5 cm long peduncles. They are characterized by dense 21.7-27.2 cm long inflorescences, in which 12.0-19.0 flowers are set on 5.1-9.9 cm long peduncles. Large flowers with a diameter of 7.4-8.1 cm, characterized by the RHS 74C color (**Fig. 3**).

Figure 3. The appearance of *Mokara* ‘Bloonlong’ inflorescence.

Mokara ‘Chak Kuan’

Figure 4. The appearance of *Mokara* ‘Bloonlong’ inflorescence.

The average length of inflorescence peduncles in plants of this cultivar is 20.1-25.8 cm. In turn, inflorescences grow up to 23.5-26.0 cm in length. An average of 9.0-13.0 flowers develop in inflorescences, densely clustered on 2.0-5.0 cm long peduncles. They are characterized by a diversified diameter of 5.0-9.1 cm and color (RHS 49D) and numerous spots scattered over the entire surface of the tepals. Most of the spots is concentrated in the central and apical part. Tepals of both whorls slightly sharpened at the tip and narrowed towards the base (**Fig. 4**).

Mokara 'Chorcharood'

Among the assessed orchid cultivar of the genus *Mokara*, plants of this variety form the shortest inflorescence peduncles of 13.4-17.0 cm. They are characterized in turn by the longest inflorescences, i.e. 27.9-38.3 cm. These orchids produce as many as 15.0-24.0 flowers in loose inflorescences on 2.2-3.4 cm long peduncles. Flowers, 5.4-6.3 cm in diameter, are characterized by a glowing white (RHS 155B) color and spots irregularly distributed on the entire tepal surface. Both the outer and inner tepal whorls are of the same width, rounded at the top, curl downwards, forming a tube (**Fig. 5**).

Figure 5. The appearance of *Mokara* 'Bloonlong' inflorescence.

Mokara 'Jenistar'

Plants of this cultivar are characterized by inflorescence peduncle lengths of 16.4-24.0 cm and inflorescence lengths of 24.0-29.2 cm. They produce an average of 14.0-22.0 flowers, densely set in inflorescences on 4.0-5.0 cm long peduncles. Flowers, 6.3-7.1 cm in diameter, and a pale-yellow (RHS 7D) color. Small spots are visible on the broad, rounded on tips tepals. They are scattered over the entire surface, however, the largest concentration is in the apical part (**Fig. 6**).

Figure 6. The appearance of *Mokara* 'Bloonlong' inflorescence.

Mokara 'Kitti'

Orchids of this cultivar produce 18.5-23.0 cm long peduncles and strongly concentrated 22.7-28.9 cm long inflorescences, on which 4.1-4.8 cm long flowers are set on peduncles. Flowers (12.0-17.0) are characterized by an 8.4-9.1 cm diameter and yellow (RHS 12A) color. Tepals without spots, broad, rounded at the tip, narrowed at the base, slightly curling towards the underside. The inflorescence shoots of this variety are characterized by the highest longevity (**Fig. 7**).

Figure 7. The appearance of *Mokara* 'Bloonlong' inflorescence.

Mokara ‘Pranee’

Orchids of this cultivar are characterized by 20.2-22.0 cm long peduncles. They develop inflorescences that highly vary in length. Their length ranges from 22.4 to 31.8 cm. Flowers, 7.5-8.7 cm in diameter, in the number of 14.0-19.0 are set on 4.0-5.4 cm long peduncles. They are distinguished by yellow (RHS 6A) color of sepals and many large spots scattered over the entire surface. Tepals of both whorls are broad, rounded at the tip, narrowing towards the base and curling towards the underside (**Fig. 8**).

Figure 8. The appearance of *Mokara* ‘Bloonlong’ inflorescence.

Mokara ‘Robin’

Figure 9. The appearance of *Mokara* ‘Bloonlong’ inflorescence.

Orchids of this cultivar are characterized by short 17.0-20.3 cm long inflorescence peduncles. They form 13.0-19.0 flowers in dense 19.8-25.7 cm long inflorescences. They are set on pale 3.3-4.8 cm long peduncles. Flowers reach 6.5-7.5 cm in diameter. They are characterized by the RHS 39B color, lack of spots and diverse perianth structure. Tepals of the outer whorl are large, wide along the entire length, while tepals of the inner whorl are smaller, wider at the tip and narrowed towards the base (**Fig. 9**).

Mokara 'Tammy'

Peduncles in this cultivar grow up to 23.9-28.6 cm in length. Plants produce loose inflorescences with a length of 19.1-23.7 cm. In inflorescences on 2.5-3.1 cm long peduncles, 8.0-12.0 flowers are set. Flowers, 6.2-7.7 cm in diameter, are characterized by a pale-yellow (RHS 7D) color. Large, few spots are visible on tepals, scattered irregularly over the entire surface. Tepals of both whorls are rounded at the tip and slightly narrowed towards the base. The edges of the petals curl downwards to form tubes (**Fig. 10**).

Figure 10. The appearance of *Mokara* 'Bloonlong' inflorescence.

Mokara 'Tangerine'

The length of inflorescence peduncles in plants of this cultivar is 23.2-28.2 cm. In turn, the inflorescences reach a length of 19.1-24.0 cm. There are 10.0-12.0 flowers in loose inflorescences on 2.1-4.2 cm long peduncles. The flowers grow up to 5.8-7.7 cm in diameter. They are characterized by the RHS 15B color and numerous spots of different sizes, scattered over the entire surface of the petals. Tepals are wider in the upper part, slightly narrowing towards the base and curling towards the underside (**Fig. 11**).

Figure 11. The appearance of *Mokara* 'Bloonlong' inflorescence.

Table 1. Statistical analysis (ANOVA) of morphological features of inflorescences and flowers of 10 cultivars of *Mokara* hybrids.

Cultivars	Inflorescence length (cm)	Number of flowers per inflorescence	Flower diameter (cm)	Peduncle length (cm)
'Bloonlong'	24.880	12.400	5.920	4.160
'Calipso'	24.040	9.200	7.680	5.380
'Chak Kuan'	24.980	9.000	7.720	3.020
'Chorcharood'	31.180	9.600	5.720	2.840
'Jenistar'	26.380	13.800	6.660	4.440
'Kitti'	25.320	12.600	8.720	4.460
'Pranee'	27.200	12.000	8.080	4.480
'Robin'	22.560	14.800	6.920	4.200
'Tammy'	21.500	9.200	7.220	2.700
'Tangerine'	20.640	9.200	6.920	3.180
$LSD_{0.05}$	5.009	2.157	1.449	1.411

4. CONCLUSION

It can be concluded on the basis of the results obtained in this study that individual *Mokara* cultivars clearly differ in the length of shoots and inflorescences and the number of flowers. The tested *Mokara* cultivars are distinguished by a wide palette of warm colors, including many shades of orange and red. These are very rare colors among other popular genera of orchids. All evaluated cultivars can be a valuable material for bouquets and floristic compositions.

References

[1] Runkle E., Wang Y, Blanchard M, Lopez R. The orchid grower. *Greenhouse Grower* 23 (2005) 6467

[2] Wei S, Shih CC, Chen NH, Tung SJ. Value chain dynamics in the Taiwan orchid industry. *Acta Horticulturae* 878 (2010) 437-442

[3] Thammasiri K. Current status of orchid production in Thailand. *Acta Horticulturae* 1078 (2014) 25-33

[4] Dalayap RM, Torres MAJ, Demayo C.G. Landmark and outline methods in describing petal, sepal and labellum shapes of the flower of mokara orchid varieties. *International Journal of Agriculture and Biology* 13 (2011) 652-658

[5] Sharma KP, Jaroenkit T, Usahatanonta S, Khamsee Y. Postharvest physiological changes in different maturity stages of ‘Mokara Madame Panne’ cut orchid. *Journal of Agricultural Science* 39 (2008) 124-127

[6] Khandaker MM, Rasdi MZM, Naeimah NN, Mat N. Effects of naphthalene acetic acid (NAA) on the plant growth and sugars effects on the cut flowers Mokara chark kuan orchid. *Bioscience Journal* 33 (2017) 19-30

[7] Sartpetch J, Jitareerat P, Uthairatanakij A, Obsuwan K. Postharvest physiology of harvested *Mokara* inflorescences. Acta Horticulturae 878 (2010) 405-410

[8] Almasi P, Mohamed MTM, Ahmad SH, Kadir J, Hassan F. Postharvest responses of six cut *Mokara* spp. Hybrids to exogenous ethylene. *Australian Journal of Crop Science* 7 (2013) 894-899

[9] Aiamla-Or S, Jitareerat P, Uthairatanakij A, Buanong M. BA improves the postharvest quality of Mokara Orchid flowers cultivar 'Nora Pink'. *Acta Horticulturae* 1078 (2014) 201-204

[10] Rahman MM, Ahmad SH, Mohamed MTM, Ab Rahman MZ. Improving the vase life of cut Mokara red orchid flower using leaf extracts with silver nanoparticles. *Proceedings of the National Academy of Sciences, India Section B: Biological Science* (2018) 1-8