



World News of Natural Sciences

An International Scientific Journal

WNOFNS 26 (2019) 11-19

EISSN 2543-5426

Asian *Mokara* (Orchidaceae) hybrids used as cut flowers: Postharvest evaluation. Part 2

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ABSTRACT

Mokara is one of the widely cultivated orchid in the Pacific region, especially in the tropics. In this study we evaluated the longevity of inflorescences and flowers 10 *Mokara* cultivars: 'Bloonlong', 'Calipso', Chak Kuan', 'Chorcharood', 'Jenistar', 'Kitti', 'Pranee', 'Robin', 'Tammy' and 'Tangerine'. Cultivar 'Kitti' inflorescences were characterized by excellent vase life for more than three weeks. The highest longevity had the flowers of 'Bloonlong', 'Kitti' and 'Robin'. Spraying flowers of *Mokara* orchids with the OASIS® Clear Life preparation increased their quality depending on the cultivar.

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

1. INTRODUCTION

For several years, orchid cut flowers have been a very popular plant material in floristics. Orchids are often used for wedding bouquets and modern bouquets and arrangements in vessels. Individual flowers are also used in recently fashionable plant decorations like tiaras, necklaces or bracelets. Plants of the genus *Vanda* have the largest flowers among the orchids grown for cut flowers [1].

The homeland of species is mainly India, Laos and Thailand, where they grow on shrubs and trees as epiphytes. *Vanda* is offered on flower markets in all colors, and its price depends on the number of flowers in the inflorescence. Orchids from the genus *Arachnis* are colloquially called spiders or scorpions due flower shape [2]. Their flowers have narrow petals covered with

tiny spots. Ornamental qualities of inflorescences persist for 2-3 weeks. In turn, *Ascocentrum* are ornamental orchids with flowers in bright colors such as red, orange and yellow, gathered in rigid inflorescences on erect stems. Species of the genus *Ascocentrum* are found in Thailand, Laos, Vietnam, Malaya, Java and the Philippines [3-8]. A valuable ×*Mokara* hybrid has been obtained as a result of crossing *Arachnis*, *Ascocentrum* and *Vanda* orchids, and it is becoming an increasingly popular orchid on the cut flower market [9-15].

In practice, orchid inflorescences can be used in various exotic bouquets and plant arrangements. Single orchid flowers can be used in wedding bouquets and modern forms like earrings, necklaces, bracelets, but flowers often have no water access in these types of compositions.

In the literature there is no more information on the longevity of single orchid flowers. Therefore, the present studies were conducted to determine the effect of the OASIS® Clear Life preparation on ornamental value of the individual *Mokara* cut flowers.

2. MATERIALS AND METHODS

The first experiment evaluated the longevity of 10 following *Mokara* cultivars: ‘Bloonlong’, ‘Calipso’, ‘Chak Kuan’, ‘Chorcharood’, ‘Jenistar’, ‘Kitti’, ‘Pranee’, ‘Robin’, ‘Tammy’ and ‘Tangerine’. Inflorescences were imported from Thailand through the FLORAMOR. The tips of inflorescence shoots were immersed in vials of water. After removing from the packaging, the inflorescences were cut with a sharp knife at an angle of 45°, removing 2-3 cm of the shoot.

Subsequently they were placed in 500-ml beakers with water, 5 pieces each. The inflorescences were stored in a room with a natural photoperiod, in which air temperature and relative humidity were constantly monitored using a reader (**Table 1**). The longevity of inflorescence was determined in days on the basis of appearance. Withering and drying of flowers were considered as the moment of decorativeness loss. Within the variety, 20 inflorescences were assessed, each of which was a replication.

The second experiment studied the effect of the OASIS® Clear Life preparation on the ornamental value of the following 10 *Mokara* cultivars: ‘Bloonlong’, ‘Calipso’, ‘Chak Kuan’, ‘Chorcharood’, ‘Jenistar’, ‘Kitti’, ‘Pranee’, ‘Robin’, ‘Tammy’ and ‘Tangerine’ (**Fig. 1**). The OASIS® Clear Life agent present in the aerosol is dedicated, according to the SMITHERS-OASIS manufacturer, to limit water evaporation from cut flowers, resulting in a longer longevity. Individual flowers cut off the shoots using a knife were sprayed with OASIS® Clear Life for 2 seconds at a distance of 40 cm. The control consisted of flowers not treated with the preparation. Each flower was treated as one replication, and within each cultivar, 10 flowers in one variant were used.

The flowers were arranged on cardboard and stored in a room with a natural photoperiod, in which air temperature and relative humidity were recorded (**Table 1**). After 5 days, the assessment of the ornamental value according to the five-point scale was conducted in a three-person group: (1 – indicated visible shrinkage of the petals and the lowest attractiveness, 5 – the maximum ornamental effect, expressed by the lack of flower drying symptoms).



Mokara 'Boonlong'



Mokara 'Calipso'



Mokara 'Chak Kuan'



Mokara 'Chorcharood'



Mokara 'Jenistar'



Mokara 'Kitti'



Mokara 'Pranee'



Mokara 'Robin'



Mokara 'Tammy'



Mokara 'Tangerine'

Figure 1. *Mokara* cut flowers of 10 cultivars evaluation.

Table 1. Mean, maximum and minimum relative humidity (RH) and air temperature during experiment.

Days	Relative humidity			Air temperature (C°)		
	Mean	Maximum	Mnimum	Mean	Maximum	Mnimum
1	45,9	47,6	44,2	24,5	26,1	23,6
2	48,1	48,8	47	23,4	24,4	22,7
3	50,1	53,5	48,9	23,4	24,3	22,4
4	48	49,7	46,7	22,7	23,7	22
5	50,2	52,1	49,1	20,6	21,3	20
6	45	49,3	41,3	20,8	22,6	19,8
7	42,3	43,3	41,1	22,3	23,1	21,4
8	41,2	42,9	38,8	22,3	23,1	21,7
9	40,4	43,2	38,2	22,2	23	21,8
10	45,6	49	43,3	22,5	23,4	21,8
11	44,3	45,6	42,2	23,3	26,1	22,1
12	45	46,2	43,6	23,9	25,1	23,1
13	47,1	49,7	46,1	23,8	24,7	23,3
14	43,5	46,1	39,3	24,6	39,3	23,1
15	43,2	44,1	39	24,5	27,9	23,3

16	43,7	44,2	40,8	24,4	26,8	23,8
17	44	45,3	40,2	24,7	28,2	23,6
18	46,6	48	45,7	24,6	48	24,1
19	45,7	46,1	44,4	23,9	24,5	23,1
20	46,8	61	42,8	23,3	24,6	23,1
21	40,1	42,6	37,9	22,4	24,5	21,9
22	40,2	40,9	38,6	22,2	23	21,7
23	41,1	43	39,8	21,6	22	21,3
24	41,7	43	36,8	22,2	25,9	21,2
25	44,5	47,3	41,9	22,3	23,4	21,8
26	45,9	46,1	47,9	22	23,2	21,9

The results were statistically compiled by the analysis of variance for univariate experiments in a completely randomization scheme. Tukey’s confidence intervals were used to assess the differences between means at a significance level of 0.05%.

3. RESULTS AND DISCUSSION

Table 2. Vase life of 10 cultivars *Mokara* hybrids. Data are presented as means (\pm standard errors) in column with the different letter are significantly different according to Tukey test at $P \leq 0.05$ (n = 20)

Cultivars	Vase life (days)
‘Bloonlong’	16.0 \pm 0.73 b
‘Calipso’	5.8 \pm 0.17 c
‘Chak Kuan’	7.5 \pm 1.15 c
‘Chorcharood’	16.7 \pm 0.29 b
‘Jenistar’	8.05 \pm 0.33 c
‘Kitti’	22.0 \pm 0.17 a
‘Pranee’	16.2 \pm 0.50 b

'Robin'	7.5 ± 0.44 c
'Tammy'	7.5 ± 0.29 c
'Tangerine'	7.2 ± 0.58 c

It was found on the basis of statistical analysis of research results that orchid cultivars of the genus *Mokara* very clearly differed in the longevity of inflorescence in water (**Table 2**). Of the 10 cultivars evaluated, the cultivar 'Kitti' has retained its ornamental qualities for an average of 22 days. The variety 'Calipso' had the shortest inflorescence longevity – an average of 6 days, but it was not significantly different in the tested trait compared to the varieties 'Tangerine', 'Tammy', 'Robin' and 'Chak Kuan'. Sartpetch et al. [12] have reported that vase life of *Mokara* 'Panee', *Mokara* 'Red', *Mokara* 'Nora Yellow', *Mokara* 'Chark Kuan Pink' and *Mokara* 'Nora Pink' was 13, 11.6, 12.4, 12.4 and 12.7 days, respectively. Sharma et al [10] reported that different maturity stages of *Mokara* inflorescences had no effect on vase life (11-13 days). Statistically confirmed differences between particular cultivars were demonstrated comparing the quality of flowers cut off from inflorescences and dry-stored in an ambient conditions. The highest grade was awarded to flowers of 'Bloonlong', 'Kitti' and 'Robin' cultivars, irrespective of the applied preparation. Flowers of the cultivar 'Chocharood' were characterized by the lowest quality.



Figure 2. The effect of the OASIS® Clear Life preparation on quality of the individual *Mokara* cut flowers (left – control; right - OASIS® Clear Life).

Table 3. Impact of OASIS® Clear Life preparation on the ornamental value of the individual *Mokara* cut flowers (the five-point scale; 1 – indicated visible shrinkage of the petals and the lowest attractiveness, 5 – the maximum ornamental effect, expressed by the lack of flower drying symptoms). Data are presented as means (\pm standard errors) with the different letter are significantly different according to Tukey test at $P \leq 0.05$ (n = 10)

Cultivars	Treatment	
	Control	OASIS® Clear Life
‘Bloonlong’	5.0 \pm 0.00 a	5.0 \pm 0.00 a
‘Calipso’	4.0 \pm 0.00 b	4.7 \pm 0.13 a
‘Chak Kuan’	3.7 \pm 0.13 b	4.7 \pm 0.33 a
‘Chorcharood’	1.7 \pm 0.33 b	3.33 \pm 0.13 a
‘Jenistar’	4.0 \pm 0.22 a	4.0 \pm 0.11 a
‘Kitti’	5.0 \pm 0.00 a	5.0 \pm 0.00 a
‘Pranee’	4.0 \pm 0.00 b	4.7 \pm 0.33 b
‘Robin’	5.0 \pm 0.00 a	5.00 \pm 0.00 a
‘Tammy’	2.7 \pm 0.20 b	4.7 \pm 0.73 a
‘Tangerine’	3.3 \pm 0.33 b	4.7 \pm 0.33 a

The effect of the OASIS® Clear Life preparation on the quality of orchid flowers depended on the cultivar (**Fig. 2**). OASIS® Clear Life spraying significantly increased flower quality in ‘Calipso’, ‘Chak Kuan’, ‘Tangerine’, ‘Tammy’ and ‘Chorcharood’ cultivars (**Table 3**). The application of OASIS® Clear Life did not have a significant impact on the evaluation in the case of other taxa. At the same time, no signs of phytotoxic effects of OASIS® Clear Life on the tested flowers were observed.

4. CONCLUSION

In summary, it can be stated that the particular *Mokara* varieties clearly differed in the longevity of inflorescences. ‘Kitti’ inflorescences were characterized by excellent longevity for more than three weeks. The flowers of *Mokara* varieties without water retained ornamental qualities depending on the variety. The highest longevity had the flowers of ‘Bloonlong’, ‘Kitti’ and ‘Robin’ varieties and it is worth recommending them for specific floristic compositions,

such as earrings, tiaras, necklaces, etc. Spraying flowers of *Mokara* orchids with the OASIS® Clear Life preparation increased their quality depending on the cultivar.

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