



## The Flowering Capabilities of Three Water lily Hybrids

**PURIN AKKARAKULTRON\***

Faculty of Agricultural Technology, Rajamangala University of Technology Thanyaburi,  
Pathum Thani, Thailand  
Email: Purin4907@yahoo.com

**DOWROONG WATCHARINRAT**

Faculty of Agricultural Technology, Rajamangala University of Technology Thanyaburi,  
Pathum Thani, Thailand

**TONGMEE MOSOM**

Faculty of Agricultural Technology, Rajamangala University of Technology Thanyaburi,  
Pathum Thani, Thailand

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**Abstract** This research aims to examine the yields of water lilies belonging to the *Nymphaea* sp. (hybrid) for flowering capabilities purposes: *Nymphaea* ‘Chalongkwan’, *Nymphaea* ‘Khaomongkol’, and *Nymphaea* ‘Chompoomamiew’. The randomized complete block design (RCB) was implemented in which three sets of five experiments each were carried out. The data were collected three months after the cultivars had been grown for one month at the experimental plot of Rajamangala University of Technology Thanyaburi. The research results revealed that *N.* ‘Chalongkwan’ was the cultivars with the highest monthly yield, i.e. 14.48 flowers per clump, each with a flowers diameter of 18.89 cm and a stalk diameter of 1.56 cm. This was followed by *N.* ‘Chompoomamiew’, which produced a monthly yield of 11.86 flowers per clump, each with a flower diameter of 16.06 cm and a stalk diameter of 1.31 cm. The cultivars with the lowest yield was *N.* ‘Khaomongkol’, i.e. only 9.91 flowers per clump, each with a flower diameter of 15.09 cm and a stalk diameter of 1.35 cm. In addition, *N.* ‘Chalongkwan’ produced the highest yield per rai of 5,792 flowers, followed by *N.* ‘Chompoomamiew’ at 4,741 flowers, and *N.* ‘Khaomongkol’ at 3,962 flowers.

**Keywords** *Nymphaea*, water lily, lotus

### INTRODUCTION

Lotuses and Water lilies or Bua (Thai), aquatic plants commonly found in Thailand, have long been closely connected to the lifestyle of local people (Lekhukul, 1992). They are used for several purposes, such as treatment of diseases, consumption, commercial cutting, and decoration. Particularly notable is their use for paying respect to the Triratna, or the Three Jewels, namely the Lord Buddha, the Dharma, and the Sangha, as lotuses represent sacredness and purity.

Farmers nationwide grow lotuses for commercial cutting, being able to supply yields to the market all year round, since they are easy to grow and maintain. Lotuses in the genus *Nelumbo*, including *Nelumbo nucifera* Gaertn, are more popular than those in the genus *Nymphaea*, including Tropical water lily, Hardy water lily, Australian Giant water lily, *N.* ‘Jongkolnee’, and *N.* ‘Nangkwaug’.

As for water lilies in the *Nymphaea* sp. cultivars, they grow in varied beautiful colors and are fragrant, some with many layers of petal and strong stems, such as *N.* ‘Chalongkwan’, *N.* ‘Khaomongkol’, *N.* ‘Chompoomamiew’ and *N.* ‘Director George T. Moore’ Such qualities make them suitable for ornamental functions. It would be of interest, therefore, to examine how to maximize the yields of these three cultivars of water lily in the genus *Nymphaea*.

## OBJECTIVE

To examine the yields per plot of three cultivars of water lily belonging to *Nymphaea* sp., the size of flower for each cultivars.

## METHODOLOGY

Three sets of five experiments each were conducted following the randomized complete block design (RCB). The three cultivars of water lily, namely *Nymphaea* ‘Chalongkwan’, *Nymphaea* ‘Khaomongkol’, and *Nymphaea* ‘Chompoomamiew’, were grown in flowerpots for 1.5 months before they were transferred to the experimental plot in which four rows of water lilies were grown per 80 m<sup>2</sup> sub-plot. The growing interval, i.e. distance between rows and distance between trunks, was 2x2 m.

Prior to growing, the soil was prepared by ploughing once, and two tons of manure fertilizer was then added per rai. Fourteen days after planting the water lilies, three packs of 30 g 25-7-7 chemical fertilizer were added for each trunk in opposite directions. Then three packs of 30 g 25-7-7 and of 30 g 8-24-24 chemical fertilizer were added for each trunk at 30, 60, and 90 days after the planting. During this period, blemished leaves were removed, and pesticides were sprayed every 15 days. The data were collected one month after the water lilies were planted. Their growth, flower diameter, and stalk diameter, yield per month were recorded. The data analysis was carried out following the RCB. Additionally, Duncan’s new multiple range test (DMRT) was done to determine the differences between the three cultivars).

## RESULTS

As shown in Table 1, the flower diameter of *N.* ‘Chalongkwan’ was the largest with an average size of 18.89 cm, followed by that of *N.* ‘Chompoomamiew’ (16.06 cm) and *N.* ‘Khaomongkol’ (15.09 cm). In terms of stalk size, the numbers were 1.56 cm, 1.35 cm, and 1.31 cm for *N.* ‘Chalongkwan’, *N.* ‘Khaomongkol’, and *N.* ‘Chompoomamiew’, respectively. Regarding to the yield, *N.* ‘Chalongkwan’ produced 14.48 flowers per clump per month. In second time, *N.* ‘Chompoomamiew’ produced 11.86 flowers per clump per month. The observed cultivar with the lowest yield was *N.* ‘Khaomongkol’, producing 9.91 flowers per clump per month. DMRT indicated statistical significant between the three cultivars in all aspects.

**Table 1 Flower diameter, stalk diameter and no. of flowers/clump/month**

Cultivars	Flower diameter	Stalk diameter	No. of flowers/clump/month
<i>N.</i> ‘Chalongkwan’	18.89 a <sup>1</sup>	1.56 a <sup>1</sup>	14.48 a <sup>1</sup>
<i>N.</i> ‘Khaomongkol’	15.09 c	1.35 b	9.91 c
<i>N.</i> ‘Chompoomamiew’	16.06 b	1.31 c	11.86 b
F-test	**	**	**
C.V. (%)	1.81	1.00	2.69

<sup>1</sup>Similar vertical numbers indicate no statistical significant at  $df = 0.95$ .

**Table 2 Average yield of flowers 1 to 3 month after plant/rai**

Cultivars	Yield of flowers after plant		
	1 month after plant	2 month after plant	3 month after plant
<i>N.</i> ‘Chalongkwan’	5776.0 a <sup>1</sup>	5696.0 a <sup>1</sup>	5904.0 a <sup>1</sup>
<i>N.</i> ‘Khaomongkol’	3712.0 c	4192.0 c	3984.0 c
<i>N.</i> ‘Chompoomamiew’	4448.0 b	4816.0 b	4960.0 b
F-test	**	**	**
C.V. (%)	5.99	4.34	3.39

<sup>1</sup>Similar vertical numbers indicate no statistical significant at  $df = 0.95$ .

Table 2 shows that each cultivar had a relatively high yield. The cultivar with the highest yield was *N. 'Chalongkwan'*, producing between 5,696.00 and 5,904.00 flowers per month. *N. 'Chompoomamiew'* produced the second highest yield of between 4,448.00 and 4,960.00 flowers per month. *N. 'Khaomongkol'* was the least productive cultivars, producing only 3,712.00 to 4,192.00 flowers per month. DMRT demonstrated that the yields of the three cultivars were statistically different.

## DISCUSSION

According to the study, the flowering capabilities of three hybrids water lily. The results indicate that *N. 'Chalongkwan'* was the cultivars with the largest flower diameter and stalk diameter, as well as the highest number of flowers per clump per month, i.e. 18.89 cm 1.56 cm and 14.48 flowers. The *N. 'Khaomongkol'* was the least flower diameter and number of flowers per clump per month, i.e. 15.09 cm and 9.91 flowers. The results that average yield of flowers per rai, the *N. 'Chalongkwan'* was the cultivars with the highest average yield of flowers per rai, followed by *N. 'Chompoomamiew'* and *N. 'Khaomongkol'*. This experiment shows that the water lily flowers of three cultivars grown in the same environment. The flowering indicated statistical significant between the three cultivars. This is consistent with Techapinyawat (2001) found that the process was flowers are factors involved in the regulation of flowering many factors. Different species and even in the same environment with the ability to create a different flower, depending on the plant itself and external factors also contribute to the promotion and inhibition of flowering. Also Qichao and Xingyan (2004) found that lotus plants are long day, and the intensity of the light affects the growth and flowering. The hardy water lily varieties Gladstone when adding the aperture will be extended and accelerated the bloom (Kelly and Frett, 1986). This is consistent with Wasuwat (1997) found that the water lily or lotus is the need of a period of full bloom and the sun varies.

*N. 'Chalongkwan'* is propagated from shoots or rhizomes. As one shoot or rhizome can grow into several clumps, it is necessary to plant them separately; otherwise, the flowers will become smaller in size. In contrast, *N. 'Khaomongkol'* and *N. 'Chompoomamiew'* are bred from shoots growing in the middle of leaves. Such leaves need to be trimmed in order to allow new shoots to develop. In addition, if left to grow in an uncontrolled manner, the leaves will get densely layered, leading to possible damage from pests such as *Erionotathrax*.

## CONCLUSION

Based on the findings, the *N. 'Chalongkwan'* was cultivars with the largest flower diameter and stalk diameter equaled 18.89 and 1.56 cm, respectively. Additionally, the number of flowers per clump per month was 14.48, and the average yield of flowers per rai was 5,792 flowers.

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