

# The science behind the blooms

Gardens by the Bay is celebrating the creation of its first orchid hybrid that can bloom in both indoor and outdoor temperatures. **Jose Hong** explains the painstaking and lengthy process of orchid hybridisation.

## 1 PARENT PLANTS SELECTED

- The research team chose the Pigeon orchid as the father orchid, and the *Dendrobium victoriae-reginae* as the mother.
- *Dendrobium* orchids mature in two to three years, which is short compared with some orchid hybrids that can take up to seven years.
- In *Dendrobium* orchids, offspring tend to take after the mother more than the father, which is why the team hoped for *Dendrobium Kiat Tan* to inherit the mother plant's colours and longer-lasting blooms.



**Father**  
**Pigeon orchid**  
**(*Dendrobium crumenatum*)**

- Native to Singapore
- Small white flowers (4.5cm x 5.5cm)
- Blooms occur all at once, and last only for one day
- Releases a jasmine-like scent in the morning



**Mother**  
***Dendrobium victoriae-reginae***

- Native to the Philippine highlands
- Small purple flowers (3cm x 3.5cm)
- Blooms occur at different times on several spots of the plant, and can last up to a month
- Scentless

## 2 POLLINATION

- The team transfers pollen from the father plant to the mother using a toothpick, and removes the pollen from the mother flower to ensure that the mother plant does not self-pollinate.
- They take care not to damage the flowers, or else abortion might occur.



## 3 SEED POD FORMATION

- If pollination is successful, a seed pod forms within 2½ to three months, and the team has to wait between 2½ and three months for the pods to mature.
- The team becomes very protective of the seed pods, and maintains close watch over them to ensure they harvest the seeds as soon as they are ready.



**Generic**  
***Dendrobium***  
**seed pod**

## 6 THE MATURE HYBRIDS FLOWER ARE SELECTED

- Finally, once the hybrids flower, the team studies the different hybrids to see which flower ticks the criteria they originally set out to achieve years before.
- They register the flower in the International Orchid Register, a global database managed by the

Britain-based Royal Horticultural Society.

- The team began cloning the hybrid early this year. Orchid hybrids can be reproduced only through cloning in the lab, and once this process is started it is an unofficial stamp of approval that the hybrid is a success.

### SUCCESSFUL HYBRID: DENDROBIUM KIAT TAN

Named after the **chief executive of Gardens by the Bay**

Will only be seen in Gardens by the Bay **in 2019**

First successful plant bloomed in **early 2015**

Can bloom in temperatures that range from **18 deg C to 33 deg C**

Lasts between **5 and 7 days** outdoors, and between **7 and 9 days** indoors



### Scentless flowers

- Flowers a blend of purple, blue and white
- Bloom size is 6cm x 6cm, larger than both parents (though this was not planned)

## 5 SEEDLINGS MATURE INTO FLOWERING PLANTS

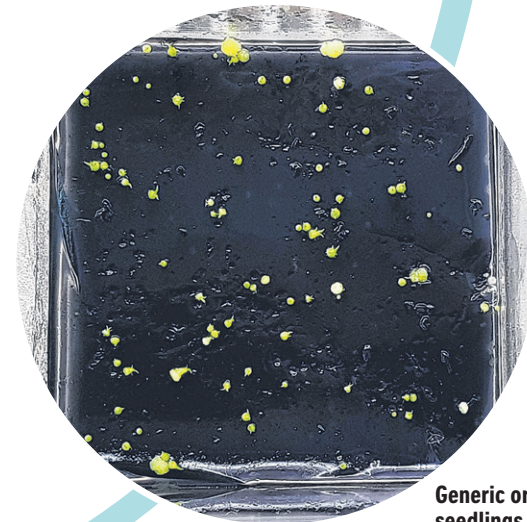
- Once the seedlings are ready, they are sent back to Gardens by the Bay where they will mature.
- They are kept in high humidity and allowed to acclimatise to the environment.
- It takes about two to three years for the seedlings to produce flowers. In all this time, the team still does not know if its hybrids are successful.



**Generic**  
***Dendrobium***  
**seedlings**

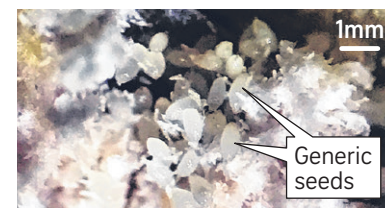
## 4 SEEDS ARE GROWN IN THE LABORATORY

- The harvested seed pods are sent to a laboratory at HortPark to be germinated, in a process that lasts about 10 months for this hybrid.
- When this hybrid was first being germinated, the HortPark laboratory was not yet ready, so the seedlings were germinated at an external laboratory.



**Generic orchid**  
**seedlings**

- If they harvest too early, the seed pods will not provide viable seeds. If they wait too long, the seed pods will split and all the seeds – each pod contains millions of dust-sized seeds – will be lost to the wind.



**Generic**  
**seeds**