Information on the Green-Derived Maudiae Type Hybrids in *Paphiopedilum* (*Orchidaceae*)©

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Maudiae type hybrids refer to the offspring derived from *Paphiopedilum* (*Orchidaceae*) hybrids between *P. callosum* and *P. lawrenceanum*. The hybrids develop into attractive flowering plants which today are called Maudiae type but were previously called "mustache flower" because of the shape of the petals was similar to that of a soldier's mustache. While the flowers are not as showy as those of plants producing multiple flowers per stem or those with actinomorphic flowers, the flower colors and ease of handling have made them highly marketable and popular. *Paphiopedilum* 'Coloratum' which develops the three colors is the most important. Even though the hybridization from parental genera would be out of pure lines, these types can be distinguished as *P.* 'Coloratum', so the section becomes interestingly the most attractive.

Paphiopedilum 'Vinicolor', showing dark wine reddish color, is a high quality hybrid type which has a few specific colors from *P.* 'Coloratum'. Many offspring have been bred using this type and cultivated for enthusiasts rather than the common market. Green is a very highly desired character in the Japanese flower market; with striped flowers and with the conspicuous green stripes on dorsal sepals, it has been grown since 1940s. The color suits the atmosphere of summer season by virtue of its cool feeling. Therefore this hybrid became known very widely as a cultivated orchid with good flower standing despite a less pretentious quality.

Maudiae type hybrids were generated from hybridization between *P. callosum* and *P. lawrenceanum* in 1900 the final year of the 19th century by Joseph Charlesworth who was a wealthy man; *P.* Maudiae 'Magnificum' (Fig. 1) was first selected and has been employed in breeding as an important genetic resource with green stripes. The color green which is found in only rare selections, such as albino, has hardly ever been found earlier. The probability was as rare as only one in several hundreds or thousands in the case of this particular variety, so it is obviously remarkable as a historical achievement that green color attributed to rare varieties from both of *P. callosum* and *P. lawrenceanum* has been maintained even after crossing with some difficulties such as undeveloped tissue culture methodology and so forth.

Figure 1. Flower of *Paphiopedilum* Maudiae 'Magnificum.'

It was necessary to find a foundation stock or albino variety for further improvement of green germplasm. There have been many albino varieties in *P. callosum*

and *P. lawrenceanum* as well as *P. curtisii* which crossed with *P. callosum* or *P. lawrenceanum*, then generated *P.* Goultenianum (as registered in 1894) and *P.* Gowerianum (1893), respectively. They were called as No. 2 and 3 of green hybrids and contributed to the development of colored sections of orchid hybrids.

In comparison with Maudiae, which had a delicate flower with thin lines, *P. curtisii* has larger and a more gorgeous flower shape, and was then used as breeding material for green hybrids. From the beginning of the 20th century to the age of World War II, about 30 selections were produced from them. During this period, *P.* 'Alma Gavaert', *P.* ×*holdenii, P.* 'Emerald', *P.* 'Clair de Lune', and other famous hybrids were developed and some of them were introduced into Japan. Initially, those were only known among hobbyist. After 1970s, mass-production methods were applied to those hybrids in Japan because of their high economic value as breeding materials. In the 1980s, a lot of hybrids that had been obtained from them appeared in the flower markets in Japan.

Many albino-flowering forms derived from foundation stock such as *P. sukhakulii* and *P. venustum* were utilized in breeding, and green hybrids had more forms such as *P.* Makuli and *P.* 'Auroreum'.

Now in the 21th century, there are more than 300 different green hybrids. We can find selections derived from *P. mastersianum* and *P. acmodontum* which were initially thought to be valueless as breeding material for green hybrids. Others, such as *P. philippinense* and *P. primulinum,* have contributed their characteristics. Every hybrid shows noticeable attractive features. It is difficult to find all of them in the flower market, however the improvement of the green hybrid will continue in the future.