

The Natural Habitat and Breeding of *Iris laevigata*

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INTRODUCTION

Kakitubata, *Iris laevigata*, a wild flower found in Japanese wet lands, has been appreciated for a long time; it is mentioned in the old anthology of Manyoushu as well as the old story Isemonogatari. However, there are fewer cultivars available than of *I. ensata*, and it has not become a commonly grown garden plant because the spread of cultivars and the culture technique were prohibited. I started the pot cultivation and breeding of *I. laevigata* in 1977 with the intention of popularizing the plant and at the same time I began investigating its natural habitats.

HABITAT

The natural habitats of *I. laevigata* are spread through Iwate, Nagano, Aichi, Siga, Kyoto, Hyogo, Tottori, Simane, and Yamaguchi prefectures, and it is specified as a nationally or prefecturally protected plant. It also grows in other places, Kushiro, Uryu, Oze, Iritanizato, Hiruzen, etc., from Hokkaido to the main island. Among these habitats, Iwate, Aichi, and Kyoto were flat lands and near cities, while the other sites were cool wet lands among mountains.

Flower color is normally purple, but a pink-purple flower was found in Aichi, and a white flower in Yamaguchi. The flowering season starts in early May in the flat land sites and is delayed according to altitude and latitude, ending in late June at Hyogo (Tyosigatani). There also exist continually flowering populations in some Japanese seaside areas (Tottori, Simane, and Yamaguchi). The largest flowers were found in Iwate. In Simane and Yamaguchi, it grows on the edge of a pond together with junsai (*Brasenia schreberi*).

CULTIVARS

Cultivars of *Iris laevigata* were described in two books of the Edo period, *Kadanchikinsyo* and in *Kakitubata Kafu* edited by Akira Hironaka, but they number less than 100. Purple-flowered cultivars are the most common, corresponding to the predominant color found in wild forms, followed by white, or white with purple splashes, and occasionally reddish-purple. The flowering season starts with the blooming of the white cultivars in late April; most cultivars are flowering by the middle of May and the last cultivar to bloom is 'Maikujaku' in late May. There are two flower types with three or six petals, the inner perianth stands up straight and outer perianth hangs down.

BREEDING

At first my aim was to breed flowers of a bright reddish-purple color, and then after 1990, white flowers with a solid perianth became another aim. Consequently, 60 cultivars were bred and 19 were patented (some are still being processed).

Reddish-purple and white-flowered cultivars were used as the parent plants as were flat-flowered cultivars. Although hand pollination is easy and seed production

is good, seed germination percentages were zero for some time. Higher germination rates have been achieved with white and purple-splashed white cultivars, but reddish-purple rates remain low.

Seeds germinate in May when sown in late March. Seedlings are transplanted to No.3 pots in June and transplanted again to a #5.5 pot for overwintering; flowering occurs the following May. Pots are kept in a 20-cm-deep water bed all year round. Flower stalks of the larger-flowered types frequently emerge diagonally, but this can be rectified over several generations of selective breeding.

Root Rot Caused by *Pythium helicoides* in Ebb and Flow Culture of Potted Roses

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Miniature roses growing in an ebb and flow watering system showed die back during the summer growing season in Gifu Prefecture.

The main diagnostic symptoms were leaf chlorosis and a brown water-soaked rot of the roots which finally caused die back. The root rotting occurred from August to September 1997. In a greenhouse in Kaizu, Gifu, the disease incidence peaked from the 18 Aug. until 13 Sep. However, no root rot disease was found when minimum temperatures fell.

Both B-5 and H-5 isolates from the rotted roots of the roses showed similar growth rates at all tested temperatures. They did not grow below 10C or above 45C. Hyphal growth increased with rising temperatures in the range of 15 to 35C. The optimal temperature was 35C and the growth rate was 34 mm per 24 h. There was a sudden drop to about 15 mm per 24 h in hyphal growth at 40C.

The sporangia were terminal, ellipsoidal, papillate, and proliferating inside and outside sporangia. Oogonia were terminal, lateral or intercalary, smooth and 30.5 ± 2.24 mm in diameter. The antheridia were lobulate, elongate, monoclinal or diclinal and 1 to 3 per oogonium. The oospores were aplerotic, smooth, spherica, 1 and 25.5 ± 1.93 mm in diameter. The isolates were identified as *P. helicoides* Drechsler on the basis of these characteristics.

Three representative isolates were used for pathogenicity tests on the miniature roses ('Lavender Parade'). The isolates showed severe pathogenicity on miniature rose. Seven days after inoculation, the leaves showed both chlorosis and necrosis. No symptoms were observed in the controls. The plants inoculated had 100% disease incidence, and all isolates showed severe pathogenicity. The same isolates were consistently re-isolated from the diseased roots.

Pythium helicoides was not isolated from the soil outside the greenhouse used for potted rose production.