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Guihaia in Cultivation: A Case of Mistaken Identities

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China is the source of so many of the world's ornamental trees and shrubs that we should not be surprised to learn that China has also given the world palms of great horticultural merit. *Trachycarpus* and *Rhapis* are familiar and widely cultivated genera, but one of China's newest gifts is *Guihaia*. It is a genus of two species of small fan palms of the subfamily Coryphoideae whose clos-

1. *G. argyrata* has erect, spine-like fibers at the base of the leaves. 2. *G. grossefibrosa* has confluent fibers at the base of the leaves. Note the glaucous petiole bases.

3. The beautiful leaves of *Guihaia argyrata* are deep green above and silvery white below. 4. The leaves of *Guihaia grossefibrosa* are divided nearly to the hastula.

Table 1. Vegetative characteristics of mature plants of Guihaia *in cultivation at Fairchild Tropical Garden.*

Characteristic	*G. argyrata*(n = 4)	*G. grossefibrosa*(n = 4)
Petiole length	72–100 cm	25–80
Petiole width	1.2–2.4 cm (base) 0.7–1.2 cm (apex)	0.6–1.7 cm (base) 0.4–0.9 cm (apex)
Petiole color	Green	Green, glaucous or chalky at base
Sheath fibers	Stiff, erect, separate	Soft, clasping, confluent
Blade diameter	68–99 cm	49–84 cm
Palman diameter	4.5–12 cm	<1–3.5 cm
Segment number	23–34	16–21
Segment length	33.5–49 cm	25.5–43.5 cm
Segment width	2.5–5.2 cm	1.2–2.8 cm
Abaxial indumentum	Dense	Sparse

est relatives are *Rhapis* and *Maxburretia* (Uhl and Dransfield 1987, Uhl et al. 1995).

Specimens of *Guihaia,* mistakenly identified as *Rhapis* and *Trachycarpus,* had been collected from southern China and adjacent Vietnam as early as 1929 (Dransfield et al. 1985). In the mid-1980s China began to open its doors to botanists, and it was in 1984 that one of us (JD) saw *Guihaia* in the wild and worked with Professor Lee Shu Kang and Mr. Wei Fa Nan to describe the genus as distinct from other Asiatic coryphoid palms (Dransfield et al. 1985). The two species, *Guihaia argyrata* (Lee & Wei) Lee, Wei, & J. Dransf. and *G. grossefibrosa* (Gagnep.) J. Dransf., Lee & Wei, grow in crevices of steep karst limestone hills; in this way, they strongly resemble members of the genus *Maxburretia,* which itself is almost unknown in cultivation. *Guihaia* is immediately distinguishable from *Maxburretia* in its leaf, which is divided into segments whose plication is reduplicate (/\ in cross section) rather than induplicate (\/ in cross section).

Once described, the genus became very much in demand, and batches of seeds were exported from China. At the same time, seeds of *Rhapis* species were being exported in large quantities from Chinese provincial agricultural and forestry agencies. These batches of seeds were imported by many commercial growers in the USA and Australia, but it soon became obvious that the seeds were neither those of *Rhapis excelsa* nor any other *Rhapis* species (McKamey 1989). As soon as the seeds germinated, the seedlings were identified as *Guihaia* (it was assumed, *G. argyrata*).

Fairchild Tropical Garden (FTG) acquired small plants of what were thought to be *G. argyrata* in 1987 and again in 1989. With the passage of time, the plants matured and thrived. While visiting FTG, one of us (JD) made an unexpected discovery: both species of *Guihaia* are in cultivation!

The two species, *G. argyrata* and *G. grossefibrosa,* occur in the Guangxi and Guandong Provinces in southern China, although it is not known whether both species co-occur in mixed populations. The seeds are similar (but not identical) in size and shape, so those of *G. grossefibrosa* could have easily masqueraded under the name "*G. argyrata.*" The mistaken identity was felicitous, because we now have both species growing side by side and available for comparison.

One of the most striking features of *Guihaia* is the morphology of its leaves, which have reduplicate plication. Induplicate plication is the rule in the Coryphoideae, so the anomalous condition of *Guihaia* is all the more peculiar. Close inspection reveals, however, that the leaves of *Guihaia* are fundamentally no different from those of other coryphoid genera. Early in the development of the leaf, the divisions that define the leaf segments are superimposed on an undivided, plicate leaf primordium. In most genera, the divisions occur at the upper folds, but in *Guihaia* the divisions fall along the bottom folds. Thus, each segment (except those at the margins) has a reduplicate fold. The marginal segments are either half-segments or one-and-one-half segments. Occasionally, one can find a half-segment on one side and a one-and-one-half segment on the other side.

Elsewhere in the subfamily, variations to the induplicate theme are found in only a handful of genera. *Rhapidophyllum* and *Rhapis* have leaf segments that are not divided exactly on the upper fold; in these two genera, many of the divisions fall between the upper and lower folds, creating segments that are really one-and-a-quarter segments or two-and-three-fourths segments. In *Licu-*

ala leaf division is also unusual. In all except the entire-leaved species, the blade splits along the bottom folds to give segments that usually consist of several folds but that have reduplicate plication.

FTG's *Guihaia* palms are still young, and none of the plants has a stem more than a few centimeters tall. Despite their small stature, a few plants have flowered and borne fruit. The taller stature of *G. grossefibrosa* (stem ca. 1 m tall vs. <0.5 m in *G. argyrata*) noted by Dransfield et al. (1985) is not yet apparent on FTG's plants. Some individuals of both species are producing shoots at the base of their trunks, indicating that they are caespitose (clustering) palms.

One of the most obvious differences is in the leaf sheath fibers that clothe the stem (Figs. 1–2). In *G. argyrata* the fibers are usually stiff, erect, and sharp, reminiscent of the fibers of the needle palm, *Rhapidophyllum hystrix*. The fibers of the margin of the leaf sheath are usually free and distinct. In contrast, *G. grossefibrosa* has sheaths in which the marginal fibers are confluent and appressed to the stem, not free and projecting. A small number of FTG's plants with the facies of *G. argyrata* have the soft, clasping fibers of *G. grossefibrosa*.

In young plants, the base of the petiole is green in *G. argyrata*, whereas it has chalky white indumentum in *G. grossefibrosa*. With these characteristics, one can identify even young, sterile palms. As the plants get older and larger, the coloring of the petiole becomes less pronounced. Plants with large leaves have thicker petioles than plants with small leaves. The petiole sometimes bears scales along the edges of its underside, but this character is highly variable.

The leaves of the two species are quite variable in size (Figs. 3–4). The leaf blades of FTG's plants growing in light shade are about twice the size of those in full sun. The smaller, sun-grown plants also have fewer segments per leaf (16–19), while those in the shade have as many as 34 segments per leaf. The segments of *G. argyrata* are wider than those of *G. grossefibrosa* (Table 1). Sun-grown plants of both species tend to have strongly folded segments, while those of shade-grown plants are nearly flat. In *G. grossefibrosa*, the segments are free almost to the hastula, but in *G. argyrata*, the segments are not as deeply divided (Table 1).

The underside of the blade is conspicuously silvery or bronzy in *G. argyrata* but less so in *G. grossefibrosa*. The color is caused by multicellular scales on the underside of the leaf. The two species differ in scale density, but there does not appear to be any fundamental difference in scale type. In *G. grossefibrosa*, the green surface of the leaf is visible between the scales, but in *G. argyrata* it is completely obscured.

Along with the peculiarity of reduplicate plication, *Guihaia* exhibits another curious trait: the central segment of the leaf usually has two folds. This character can be seen in the plant illustrated on the cover of *Principes*, vol. 29(1). Most of the plants in cultivation at FTG have the double-fold central leaf segments, although sometimes one or more leaves are produced in which the central segment has only a single fold.

The problem of FTG's exceptional plants, like a *G. argyrata* with soft leaf sheath fibers, calls into question the origin of the plants and the possibility of hybridization. These species have not been thoroughly studied in the wild, so we cannot say whether the variation we see in FTG's plants is natural, nor do we know if these plants hybridize, either in their natural habitats or in gardens. Until we have genetic proof of hybridization, we can only surmise that both species of *Guihaia* are somewhat variable and that within each species no two individuals are exactly alike.

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