

## Hāpu‘u-‘ī‘i, Hawaiian treefern

*Cibotium chamissoi* Kaulf.

Treefern family (Dicksoniaceae)

Native species (endemic)

Large treeferns are among the most distinctive and most beautiful plants of Hawaii’s tropical rain forests. They are easily identified as ferns by their giant feathery or lacelike fern leaves (fronds) unrolling from a densely hairy coil and by the absence of flowers, fruits, and seeds. The unbranched trunks, leafy only at the top and evergreen, qualify as trees.

Six species of treeferns, all belonging to the genus *Cibotium*, have been distinguished as native in Hawaii. All have their powdery beadlike masses (sori) of microscopic spores in yellowish boxlike cups (indusia) in two rows on edges of under surface of leaf segments. Smaller trunked ferns, genus *Sadleria* with six or fewer native species, are treelike and have been included with an example, ‘ama‘uma‘u, *Sadleria cyatheoides*. These smaller ferns bear their spores along midvein between two long black folds or lines.

This species, the native treefern of largest size, is recognized by the rough leafstalks covered with long stiff, shaggy blackish hairs and by the broad thickened leaf segments with prominent veins often branching.

A small tree with trunk usually less than 10 ft (3 m) high, rarely to 23 ft (7 m), and with several very large erect spreading leaves adding as much as 10 ft (3 m). The unbranched trunks are covered in lower part with compact masses of fibrous blackish air roots as much as 2–3 ft (0.6–0.9 m) in diameter, usually much smaller.

Leaves (fronds) several, erect and spreading, the oldest dying and bending down along trunk, very large, feathery, divided three times (pinnate), mostly 6–12 ft (1.8–3.7 m) long and 3–5 ft (0.9–1.5 m) wide. Leafstalk or axis (stipe) to 3 ft (0.9 m) long, stout, green, rough, and warty, the enlarged base shaggy with long glossy reddish brown narrow flattened hairlike scales, beyond with coarse, long stiff black hairs or bristles often shaggy and forming dense cover. The main axis is rough and bears many pairs of branches (pinnae) to 2½ ft (0.8 m) long, further divided. Branches (pinnules) many pairs, narrowly lance-shaped, 5–10 inches (13–25 cm) long and 1–1½ inches (2.5–4 cm) wide, ending in very long narrow point, with very short stalk at base, divided or lobed ¾ to midvein. Segments or lobes many, nearly

paired, oblong rounded, to ½ inch (13 mm) long and ¼ inch (6 mm) wide, with edges turned under, slightly thickened, upper surface green and hairless with prominent veins often forked, lower surface paler and usually hairless.

Older leaf segments bear, on lower surface at ends of veins and on edges, two rows of seven or fewer yellowish boxlike cups (indusia), each containing masses of dark brown spore cases (sporangia), which shed masses of microscopic spores abundantly. These boxlike cups are ¼ inch (1.5 mm) wide, larger than in related species.

In cross section the trunk has a thick outer mass of compacted fibrous blackish air roots, next the small stem with hard outer wall. Within is the whitish soft pith containing scattered woody strands or leaf traces. Trunks of ferns are not divided into bark and wood and increase in diameter only slightly.

Fortunately, these treeferns are hardy. They withstand damage by cattle and when uprooted by wild hogs continue to grow, so long as the growing tip or ‘fiddlehead’ is not destroyed. A felled trunk can form many shoots. However, a few treeferns may be killed by shading of larger trees. Young plants of ‘ōhi‘a lehua, *Metrosideros polymorpha*, often begin growth from seeds that lodge and germinate among the moist leaf bases and air roots in the top of a treefern. Then roots are sent to the ground. Thus, some Hawaiians believed that the treefern was the parent.

This species is common and widespread in wet forests at low and middle altitudes of 800–6000 ft (244–1829 m) through the 6 large islands. It is a characteristic understory plant in ‘ōhi‘a forests and with other treeferns often forms dense undergrowth. The largest treeferns and best displays are on the Island of Hawaii, such as in the forests of Puna, Hilo, and Kohala Mountains.

### **Special areas**

Waimea Arboretum, Wahiawa, Volcanoes, Waiakea

### **Champion**

Height 35 ft (10.7 m), c.b.h. 15.8 ft (4.8 m), spread 24 ft (7.3 m). Honaunau Forest Reserve, Kailua-Kona, Hawaii (1968).

### **Range**

Hawaiian Islands only

### **Other common names**

hei‘i, hāpu‘u ii

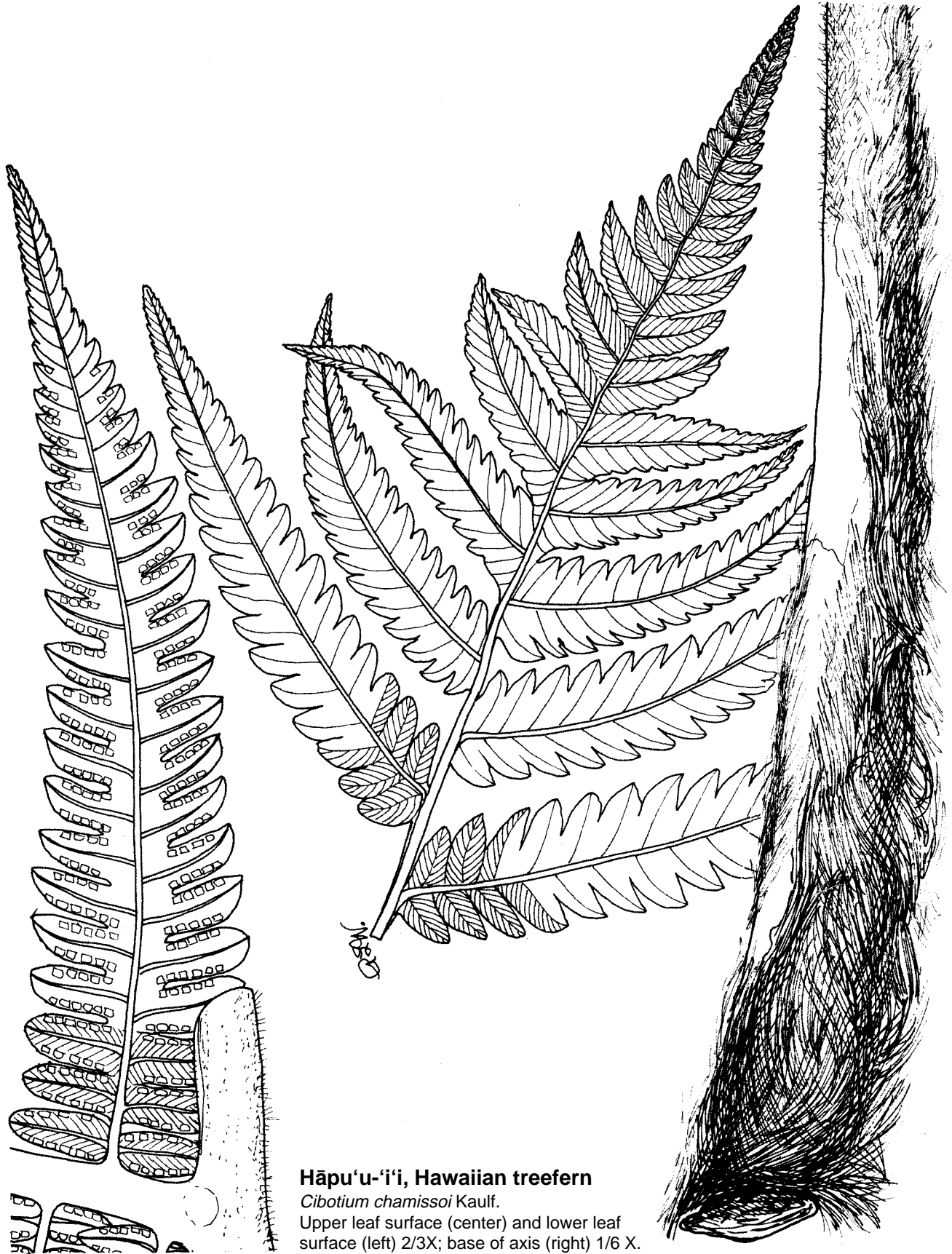
**Botanical synonym**

*Cibotium menziesii* Hook.

This largest native treefern for many years was known as *Cibotium menziesii* Hook. At the same time the name *Cibotium chamissoi* was misapplied to the species now called *Cibotium splendens* (Gaud.) Krajina. This species honors Ludolf Adalbert von Chamisso (1781–1838), German naturalist and explorer.

Treeferns were utilized for their trunks in the 1960s (Nelson and Hornibrook 1962). The outer part, like bark, consisting of tightly packed fibrous blackish air roots, was sawed in narrow widths like slabs of bark or lumber. These sawed pieces of fibrous roots (called “poles”) were shipped to the mainland for use as media or bases for growing orchids and other air plants. Some cutting of treeferns for this purpose continues. Chunks of treefern trunk are widely used as a rooting medium, and “pots” made of short cross sections have been a mainstay of the vanda orchid industry. This logging does not destroy the resource so long as the tops are left on the ground to grow again. The tops survive for long periods while forming new root systems. This is the preferred species for “pole” manufacture because of its acidity and moderate density.

The durable cut trunks of treeferns have served in corduroy trails across swamps, as water bars across mountain trails for drainage, and also for posts. The horizontal trunks usually sprout at one end to form a hedge of young leaves.



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Upper leaf surface (center) and lower leaf surface (left) 2/3X; base of axis (right) 1/6 X.