# 330. SOPHORA TOROMIRO

*Leguminosae-Papilionoideae*

Barbara Mackinder and Martin Staniforth

**Summary.** The history and taxonomy of *Sophoro toromiro* Skottsb. (Leguminosae), a native of Easter Island now thought to be extinct in the wild, are discussed; there is a full botanical description, a colour plate and other illustrations, and cultivation requirements are provided.

Some 3700 km west of the coast of Chile lies a bleak volcanic outcrop known as Easter Island (Rapa Nui). This low undulating basaltic plateau just over 150 square km in area supports a monotonous vegetation of about 100 species, the majority of which are widespread introductions by man. Indigenous trees and shrubs are almost wanting but Easter Island (Rapa Nui) has a botanical jewel in its crown, the leguminous tree *Sophora toromiro* Skottsb.

The genus *Sophora* consists of about 80 species of trees, shrubs and perennial herbs from the tropical and temperate regions of both hemispheres. *Sophoreae*, the tribe to which *Sophora* belongs is one of the least specialized of all the papilionoid tribes containing an assemblage of somewhat dissimilar genera. As a tribe its taxonomic position within the legume family has been contentious. In general papilionoid flowers have 10 stamens of which at least nine (if not all) are fused to some degree, forming a tube. In the *Sophoreae*, however, this is not the case. Indeed the 10 stamens are entirely unattached to each other or rarely minutely fused at the base. Linnaeus alluded to this interesting feature in *Hortus Cliffortianus* (Linnaeus, 1738) when he remarked that the name *Sophora* might signify 'of the wise men' (*sophorum*). He suggested the name brought both 'knowledge and warning' that plants which combine papilionoid flowers with free stamens, as is the case in *Sophora*, should not be regarded as forming a distinct class.

Though a relatively large and diverse genus, *Sophora* has long been considered divisible into sections. One such section was the subject of a paper by Sousa & Rudd (1993) in which the authors segregated four species of *Sophora*. The segregates were placed in the genus *Styphnolobium* which is distinguished from *Sophora* in having bracteate flowers, indehiscent fruits and a higher chromosome number (2n=28 instead of 2n=18). Furthermore, *Styphnolobium* is strictly arborescent whereas *Sophora* includes perennial herbs, shrubs and trees. *Styphnolobium japonicum* (L.) Schott (formerly *Sophora*

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*japonica* L.) is more commonly known as the JAPANESE PAGODA TREE and is much valued for its creamy flowers born in late summer and autumn.

A number of the most commonly cultivated species of *Sophora*, including *S. toromiro*, form part of section *Edwardsia* of the genus *Sophora* (Peña et al, 1993). Members of the Section *Edwardsia* are distinguished by a number of features: the stamens and stigma are exerted from the corolla; the wings and keel petals are similar in size and shape, the standard petal points forward (not reflexed) and the fruit is often 4-winged. This group includes *Sophora prostrata* Buch., *S. microphylla* Aiton, *S. tetraptera* J. F. Mill., *S. macrocarpa* Sm. and *S. toromiro* itself. *S. prostrata* is a small, sometimes prostrate shrub with brownish-yellow to orange flowers. The popular evergreen *S. microphylla* bears bright yellow flowers appearing early to late spring and is often confused with *S. tetraptera* (KOWHAI), the bright yellow somewhat tubular flowers of which appear in late spring. *Sophora microphylla* may be distinguished from *S. tetraptera* by the more numerous leaflets (20–40 as compared to 10–20 pairs) and leaflet shape, being relatively broader (obovate-oblong to almost orbicular in *S. microphylla*) as compared to elliptic-oblong in *S. tetraptera*. Furthermore *S. macrocarpa* is similar in appearance to *S. tetraptera* and is sometimes confused with it; *S. macrocarpa* however, may be distinguished from *S. tetraptera* by the unwinged pods and fewer leaflets (6–12 pairs). It is to *S. tetraptera* that *S. toromiro* is most closely related, differing from it in the whitish pubescence, yellowish-green leaflets and smaller, more globose yellow seeds.

After Captain Cook's return in 1771 from his first voyage around the world, another was soon planned. In Forster's journal of the second voyage he wrote that 'two stout vessels, the *Resolution* and the *Adventure*, were fitted as King's sloops for that purpose and the command of them given to Capt. James Cook and Capt. Tobias Furneaux'. Early on Monday 13 July 1772, the ships sailed out of Plymouth to explore the unknown delights of the Southern Hemisphere. At first they sailed south to the Cape of Good Hope, continuing on to New Zealand and then west to Easter Island (Rapa Nui) where *S. toromiro* was first seen. Forster described their first sight of this splendid leguminous tree: 'By resting several times we were at last enabled to reach the summit of the hill, from whence we saw the sea to the west and the ship at anchor. The hill (Hanga Roa) was covered with a shrubbery of the mimosa (*S. toromiro*), which


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*Sophora toromiro*

KAY REES-DAVIES

grew here to the height of eight or nine feet, and some of whose stems were about the thickness of a man's thigh'.

At that time *S. toromiro* formed scattered thickets on the island but its valuable timber had many uses, for building materials, household articles, canoes and carvings, so the natural groves steadily declined (Lobin & Bartholl, 1988; Alden, 1991). Later, introduced sheep and cattle further depleted numbers by stripping off the bark, until earlier this century only one rather inaccessible tree remained. Eventually this too was threatened. In 1955–56 the Swedish archaeologist Thor Heyerdahl collected seeds from this single specimen. He is believed to be the last visitor to Easter Island (Rapa Nui) to see *S. toromiro* in its natural habitat. It is from Heyerdahl's collection that the present European stocks of cultivated *S. toromiro* descend (see the following article by Mike Maunder).

Cultivation. [Kew Accession numbers 1994–2331, 1995–3394]. *Sophora toromiro* requires a temperate glasshouse for cultivation in Britain, with a minimum temperature of 12.5°C and a maximum of 22.5°C. As a native of the higher altitudes of Easter Island (Rapa Nui), this species tolerates high temperatures and experience at Kew of planting out specimens in the Temperate House shows they are intolerant of continually low soil and air temperatures of less than 10°C. Air humidity should be maintained at between 50 and 80 per cent relative humidity. In strong sunshine over 55 kilo lux, 45 per cent shade is provided. In these conditions the species will form a more or less evergreen much-branched shrub. The Kew plants have reached 78 cm whereas specimens at the botanical garden in Bonn, Germany, have reached a metre in height. As yet the Kew plants have not shown any inclination to flower, so the specimen for our colour plate was kindly provided by the Botanischer Garten, Bonn.

Plants should be cultivated in a well drained loam medium with a low base fertilizer and liquid feeding as required; they should be watered well and then the soil allowed to dry before thoroughly re-wetting. The greatest problem to successful cultivation is pest control. Glasshouse red spider mites, the presence of which is indicated by silver speckling of the foliage, is by far the worst problem and, when severe, will cause complete defoliation; these can be controlled effectively by biological predators *Phytoseiulus persimilis* and *Therodiplosis persicae*, in combination with cultural control by maintaining high humidity and spraying the foliage with water to break up any colonies. Chemical control with Fenbutin oxide may be

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used but *Sophora toromiro* is generally quite sensitive to chemicals that cause leaf burn or defoliation. Mealy Bug may become a problem but can be controlled by biological predators *Cryptolaemus montrouzieri* and *Leptomastix dactylopii*. In addition, treatments of the pesticide Buprofezin during the winter months will control immature stages.

Propagation may be achieved from seed which should be removed from the pod and given a hot water soak of 40–70°C for 24 hours to soften the hard seed coat, or alternatively it may be chipped. It should then be sown in a gritty compost and placed in a humid environment with 24°C bottom heat. Resulting plants can be pricked out into single pots when they have two true leaves. Vegetative propagation can be achieved by taking semi-ripe shoot cuttings, from mid-summer. These should be struck under mist with bottom heat at 21°C, using a 2500 ppm rooting hormone dip containing IBA/NAA at 0.5 w/w. After weaning, well rooted cuttings can be potted individually and grown on.

**Sophora toromiro** Skottsb., The Natural History of Juan Fernandez and Easter Island 2: 73 (1922). Type: Easter Island, Hanga Roa, *Fuentes* 688 (?GB).
*Edwardsia toromiro* R. A. Philippi in Bot. Zeitung 31(47): 743 (1873) *nom. nud.*
*Sephora tetraptera* auct. non J. Mill., Ic. Pl., t. 1 (1780), nec Ait., Hortus Kew. 2: 43 (1789).

Description. *Shrub or small tree* up to 5 m high. Main stem 10–20(50) cm in diameter; bark reddish-brown, longitudinally fissured. *Leaves* 4.2–7.4 cm long, imparipinnate, petiole 0.5–0.9 cm long; rachis 3.7–6.5 cm long; secondary stems, petioles and leaf rachises densely white sericeous; leaflets 1.0–1.5 × 0.3–0.5 cm, narrowly elliptic, opposite to subopposite, subsessile, moderately white sericeous above, more densely so below, papery, yellowish to bright green when fresh. *Flowers* 1.5–3 cm long, solitary; calyx tube ± 7 mm long with 5 short triangular lobes up to 2 mm long, oblique, broadly campanulate, densely white sericeous. *Corolla* yellow; standard 2.7 × 1.8 cm, obovate; wings 2.7 × 0.9 cm, narrowly elliptic, shorter than the keel; keel 3.0 × 0.9 cm, narrowly elliptic. *Stamens* 10, free. Ovary shortly stipitate; stipe ± 2 mm long, ovary 1.6 cm long, linear oblong, densely white sericeous. *Fruits* not seen. [Description of fruit from Skottsberg, 1922: *Pod* up to 10 cm long, long-stipitate, brown, typically with 4 narrow striate wings 1.5 mm wide, with fairly thin walls and up to 7 chambers separated by papery septa. *Seeds* ovoid to globose, 4–5 × 3.5–4 mm, yellow.]

Distribution. Endemic to Easter Island (Rapa Nui).


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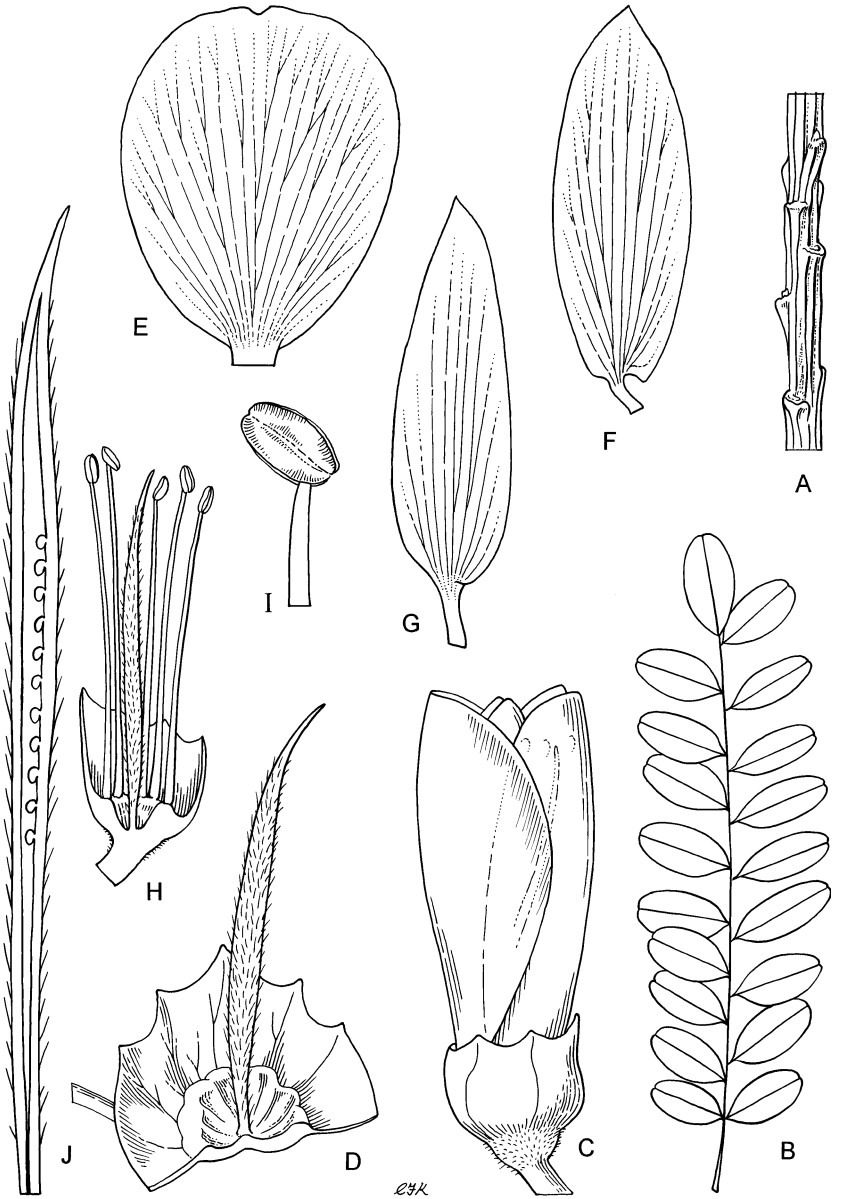


**Sophora toromiro.** A, young stem, × 2; B, leaf, × 1; C, flower, × 2; D, calyx and gynoecium, × 2; E, standard petal, × 2; F, wing petal, × 2; G, keel × 2; H, flower, longitudinal section with petals removed, × 2; I, anther, × 8; J, ovary longitudinal section, × 4. Drawn by Christabel King.

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