Species Profile
Lilium sulphureum Baker ex Hook.f.,

History and taxonomy (Dr Jamie Compton)
Fl. Brit. India 6(18): 351 (1892)
Lilium wallichianum var. *superbum* Baker, Gard. Chron. Ser. 3(10): 480 (1891)
= *Lilium myriophyllum* Franch., J. Bot. (Morot) 6: 313 (1892).

In 1891 the Kew botanist John Gilbert Baker described a lily that had been introduced *ca*. 1888 from the Shan States of northern Burma (Myanmar) under the name *Lilium wallichianum* var. *superbum* Baker (Baker, 1891: 480). Baker described it as having primrose yellow flowers suffused externally with claret purple and that the plant had been introduced and cultivated in the nursery of the Scotsman Sir Hugh Low of Clapton north-east of Hackney which was then a small village near London. Hugh Low had spent 12 years in Perak, Malaysia as a British colonial administrator and had established over that time an extensive network of field workers who sent plants and seeds to him for his nursery in England. Many new introductions into the Messrs Low of Clapton nursery were then presented by the nursery to RBG Kew and several were figured in Curtis's Botanical Magazine, Gardener's Chronicle and in other similar works. Sir Joseph Hooker as director of RBG Kew, took up Baker's earlier suggestion that the plant which he had described as a variety of *L. wallichianum* may indeed be a new species and described it as *L. sulphureum* Baker ex Hook. f.

There is a single herbarium

The *Lilium sulphureum* type specimen (K000900780) which is kept in the herbarium at the Royal Botanic Gardens, Kew.

specimen at Kew K000900780 consisting of several pressed floral segments dated 23 October 1891 but without any collector information. The sheet is annotated 'Lilium wallichianum var. superbum Baker. Gard. Chron. 1891 p. 480, type specimen' and also in Baker's hand 'L. sulphureum Baker'. Under that name Hugh Low had already exhibited plants 'five and a half feet tall surmounted with clusters of pale buff-coloured blooms' at the Royal Horticultural Society in June 1889 where they were unanimously given an award.

The French missionary Adrien René Franchet described several new lily species that had been collected by his missionary colleague Jean-Marie Delavay from Yunnan Province, China. One of these he called *Lilium myriophyllum* Franch. the name being published only two months after the publication of *L. sulphureum* from Burma. It was later realised that these were the same species and Baker's name published as a new species by Sir Joseph Hooker has priority. The Delavay lectotype and isolectotype collections; Delavay 3273 (three sheets; P00730936, P0030937 and P00730938) from stony hillsides among scrub near Mo-so-yn [Eryuan] collected in flower on 29 July 1888 are preserved in the MNHN in Paris.

References

Baker, J. G. (1891). *Lilium wallichianum* var. *superbum*, *Gardener's Chronicle* series 3(10): 480.

Distribution and ecology (Assoc. Prof Yundong Gao)

Lilium sulphureum naturally grows in subtropical areas of eastern Asia, mainly in northern Myanmar and southwestern China. The distribution of this species in

photograph © Assoc. Prof Yundong Gao

Opposite, *Lilium sulphureum* growing in a fairly shady location and ***right,*** in a more open situation in China.

China is quite wide and consists of the provinces of Guangxi, Guizhou, Sichuan and Yunnan. This area possesses the greatest plant diversity in China.

The altitudinal range of *Lilium sulphureum* extends from 100 m to 1,900 m. In Yunnan Province, for example, the plant experiences precipitation of around 1,000 mm/year and the hottest month is June when temperatures average about 19–22 °C. In December, the coldest month, the mean temperature is 6-8 °C and the annual frost-free period is 300–330 days though there may be no frosts at all. This species' flowering time in its native habitat is from late June to July and the capsule matures in September, dehiscing septicidally.

In China, *Lilium sulphureum* has many natural populations. Due to its propagation methods, this species can either reproduce by the seeds (around 200–300 per fruit) or vegetatively by bulblets on distal leaves, it always has a huge population size in the field. It is not under threat, however, in recent years it has been the subject of harvesting of the bulbs for horticultural purposes in some places, such as in Yunnan Province.

Lilium sulphureum can be found in many kinds of habitats. It prefers openings in, and margins of, pine forests and open rocky slopes with miscellaneous shrubs. Its major populations are concentrated in river valley areas like those of the Yangtze and Mekong. The species prefers limestone soils and grows in acidic humous and leaf mold overlying the alkaline substrate showing considerable resistance to drought and heat. It is highly self-incompatible like other lilies and is pollinated exclusively by hawkmoths which are attracted by the strong fragrance during the night (Liu *et al*., 2019).

References

Liu C-Q, Gao Y-D, Niu Y, Xiong Y-Z, Sun H. (2019). Floral adaptations of two lilies: implications for the evolution and pollination ecology of huge trumpet-shaped flowers. *American Journal of Botany* 106: 1–11.

photograph © Mel Herbert

Bulb

The bulb, which when reaching flowering size measures around 5 or 6 cm in diameter, can grow to 10 cm or more with age. It is globose with ovate-lanceolate or lanceolate scales. These are dark purplish or plum in colour, paler and sometimes yellowish near the basal plate with the outer scales often being very dark. Basal roots are numerous and penetrate deeply into the substrate.

photographs © Assoc. Prof Yundong Gao

Stem and leaves

The stem of *Lilium sulphureum* is often around 0.8–1.2 m tall in its natural environment but can easily attain 2 m or even more, approaching 3 m, in cultivation. It is smooth and slightly ribbed and produces numerous stem roots in the zone just above the bulb. Green with variable amounts of purple staining or mottling, it carries many scattered leaves with bulbils in the axils of those in the upper half. These bulbils

A white-flowered individual typical of *Lilium sulphureum* from China and ***inset***, the wonderful yellow-flowered form.

can be green, dark brown or bicoloured (see photos, opposite) and sometimes produce a leaf whilst still attached to the stem. The many linear-lanceolate leaves, which are dark green but paler on the underside, can be up to 20 cm long and 1.2 cm wide in the upper part but less lower down the stem. They are one- to three-nerved with the mid-rib being prominent.

Buds and flowers

This is a fine trumpet lily. The buds, which are white stained to varying degrees with brownish-pink, can approach 25 cm in length and open to magnificent funnelform flowers. Generally one to five of these are borne horizontally but up to 15 have been reported in cultivation. The inflorescence being racemose or subverticillate apically. The white flowers are suffused with pale or deep yellow in the throat and strongly scented. A form with pure yellow flowers and lacking any pinkish flush was collected in the Shan States of Upper Burma during the period of British rule and again by collectors working for the late Sir Peter Smithers. The latter were cultivated in Sir Peter's garden in Vico Morcote, Ticino, Switzerland but sadly, it would appear that all of these Burmese stocks have been lost to cultivation. However, a yellow-flowered form from China has a tenuous hold in the collections of a few enthusiasts after bulbils were generously shared by the

importer. These flowers are held upon stout pedicels which are up to 20 cm long with five nerved leaflike bracts up to 4 cm wide and bracteoles about 1 cm wide positioned approximately half way along their length.

Many texts state that the stamens, which curve upwards towards the apex, are glabrous but recent field work conducted by Prof Gao in China has revealed that '...the filaments are not glabrous but always with a little pubescence...'. The filaments are 13–15 cm long and carry purplish yellow anthers which can be nearly 4 cm long and dehisce to release orange or orange-brown pollen.

The outer floral segments are oblong to oblanceolate, 17–23 cm long and up to 4 cm wide with the inner ones being spathulate and a little wider. Papillae are absent from the nectaries and the cylindric ovary is green, not purple as stated by many previous writers. The style is thickened towards the apex and terminates in a conical three lobed stigma which is purple or greenish.

Some plants with white flowers, pale yellow in the throat, and greenish on the outer surface of the tepals have been separated as *Lilium puerense* Y. Y. Qian on the basis of having papillose leaf margins, ovate bracts, and a greenish ovary as opposed to purplish. It was described from Southern Yunnan (Pu'er Xian), based on specimens collected in 1987, and is accepted as a valid distinct taxon by RBG Kew's Plants of the World Online (POWO). However, more recent field work has revealed this to be incorrect (Gao, 2021).

Seed capsule

The seed capsule of *Lilium sulphureum* is cylindric, up to 10 cm long and about 2.5 cm in diameter.

Seed and germination

The golden-brown seeds are obovate in shape, about 6 mm long and have a narrow wing which aids in their dispersal. Flowering under cover in the United Kingdom is to be expected in July or early August, with seed ripening in late October or early November. Seed is unlikely to be produced outside in cool climates and this has led to an over reliance upon propagation from the bulbils which are so abundantly produced. This brings with it all of the associated risks of viral infection being perpetuated and for this reason raising from seed is much to be preferred. The epigeal germination is usually quite rapid but can be sporadic if the seed has been stored rather than sown fresh. Seedlings will remain green through their first winter if conditions are suitable, with growth accelerating as temperatures rise in the spring. Even so, the grower should expect it to be at least four or five years before any flowers will be produced and, quite possibly, considerably longer.

photograph © Peter Shotter

Lilium sulphureum flowering successfully outside in Kent.

Below, *Lilium sulphureum* seedlings in August, about 20 weeks after sowing. Given a little gentle heat and protection youngsters like this will continue to grow slowly through their first winter.

photograph © Mel Herbert

Cultivation

This lily enjoys warmth and sunshine during its growing season. It is a late riser, not usually appearing above ground until mid-May, or even June, but then grows very rapidly to flower in August in southern Britain and early September further north (about a month earlier under glass). It is being successfully grown outside in Kent, flowering regularly, but garden cultivation becomes more difficult further to the west and north. In West Wales the species has grown and flowered in the ground outside but the buds and blooms are often damaged by fungal attack in the very wet climate. It is perhaps surprising that, provided the bulbs can be protected from excessive winter wet, low temperatures and frost appear not to be a great problem, the species having survived outside in cold continental winters such as those in Switzerland. Growing the large plants in pots is a very practical proposition, as is the use of greenhouse beds if sufficient headroom is available.

As with so many other species, excellent drainage is one of the main requirements of *Lilium sulphureum*. An acidic and very well drained compost is recommended whether the plants are growing in pots, beds under glass or in the open garden. It is particularly important that pot grown plants are watered very carefully in order to avoid any risk of over wetness. This can be a problem if pots are outside in high rainfall areas during the summer. Conversely, the bulbs must not be allowed to become completely dry during the winter but are happier with just a little residual moisture.

References

Fox, D. (1987). *Growing Lilies*. Christopher Helm, pp. 203–204.

Gao, Y. D. (2021). Taxonomic notes on the treatment of two Chinese species of *Lilium* L. (Liliaceae). *Lilies and Related Plants*. RHS Lily Group. pp. 82–88

Haw, S. G. (1986). *The Lilies of China*. Batsford, pp. 88–90.

Synge, P. M. (1980). *Lilies*. Batsford, pp. 129–133.

Woodcock, H. D. and Stearn, W. T. (1950). *Lilies of the World.* Country Life, pp. 285–287.

Members' contributions

Many thanks to the following growers who contributed observations, photographs and comments for this Species Profile: Steve Garvie, Mel Herbert, Peter Shotter.