

Species Profile

Lilium rubellum Baker, Gard. Chron. Ser. 3(23): 321 (1898)

History and Taxonomy (Dr Jamie Compton)

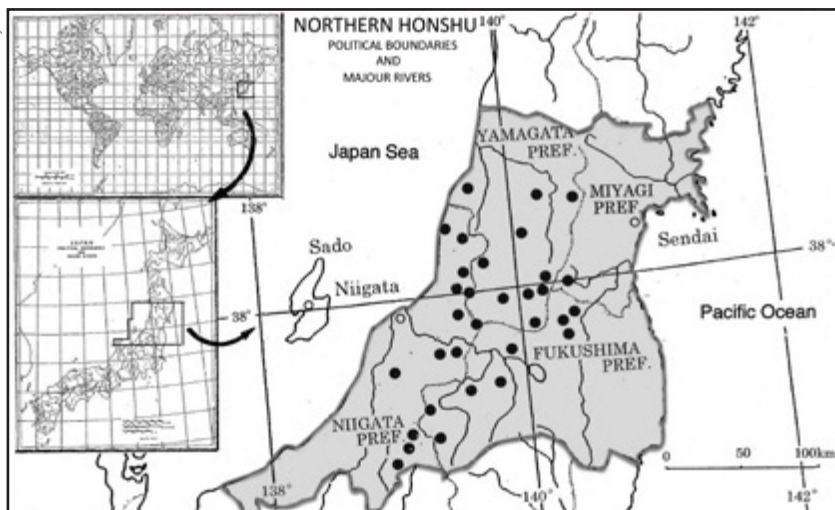
Lilium japonicum var. *rubellum* (Baker) Makino, Iinuma Yokusai (Ed.) Somokuzusetsu ed. 3 (5): 425 (1907).

John Gilbert Baker, keeper of the Herbarium at Royal Botanic Gardens, Kew described the beautiful Japanese pink trumpet lily as *Lilium rubellum* Baker in 1898. Baker stated that the lily had been illustrated in the *Honzo zufu (Illustrated Manual of Plants)* vol. 51, t. 6 published in the mid nineteenth century by the Japanese botanist Iwasaki Tsunemasa, known also as Kan-en (1786–1842). Baker also mentioned that the new species had been exhibited at the RHS great Temple Flower Show which was the forerunner of the Chelsea Flower Show eventually moving from The Temple Inns of Court to Chelsea in 1913. Baker added that

L. rubellum had been introduced from Japan by Messrs Bunting & Sons of Colchester and bulbs had been passed on to Messrs R. Wallace & Co. who put the plants up for award. A sketch of the flowers of *L. rubellum* was published on page 335 of *Gardener's Chronicle* dated 28 May 1898 entitled 'Lilium rubellum, flowers rosy-lilac, sketched at the Temple Show signed W.G.S.' The sketch is most likely to have been provided by Worthington George Smith an architect and draughtsman who contributed regularly to the *Gardener's Chronicle*. Messrs Bunting were nurserymen of Colchester suppliers of plants and seeds from 1820. Isaac Bunting (1850–1936) was a pioneer exporter of lily bulbs from the newly 'opened' Japanese city of

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Above, Figure 1. Distribution map of *Lilium rubellum* (●). The shaded area encloses the prefectures of Niigata, Miyagi, Yamagata and Fukushima.

Opposite, the herbarium sheet (K000464709) is held at Royal Botanic Gardens, Kew and hereby designated as lectotype for the name *Lilium rubellum* Baker.

Yokohama. He travelled to Japan in 1877 with his wife Sarah-Ann in order to export lily bulbs to England, running his business from 100 Yamate Bluff for many years.

There are two herbarium specimens at Kew that constitute original material; one K000464709 is labelled 'Lilium rubellum Baker n. sp. (Honzo zufu vol. 51 fig. 6) Japan, Bunting & Sons, Chelmsford, Feb. 1898.' The other K000464710 is annotated 'Lilium rubellum Baker, New Pink Lily (Japan) May 10 1898' on a label from R. Wallace & Co. Lily Growers, Colchester. The former, K000464709 is hereby designated as lectotype for the name *Lilium rubellum* Baker.

This species has some affinities with *L. japonicum* Thunb. ex Houtt. from southern and central Honshu and the rare endemic *L. nobilissimum* (Makino) Makino from Kuchinoshima.

Dr Kazuhiko Hayashi, Emeritus professor, Osaka Gakuin University, has commented that: The most prominent morphological features of this plant are similar to those of *Lilium japonicum* Thunb. (Makino, 1899.) but DNA sequences data shows that the species is related to *L. auratum* Lindley (Nishikawa, *et al.*, 2002) – Ed.

Distribution and ecology (Dr Kazuhiko Hayashi)

Lilium rubellum Baker is a small-flowered species of the sect. *Archelirion* (Comber, 1949; Hayashi, 2016). This plant is a narrow endemic species found



A single flowered white individual, **left**, and a three-flowered pink plant—both growing in the *Pinus densiflora* open forest of Yamagata prefecture at 250 m altitude.

in Northern Honshu, specifically in Yamagata Prefecture, Southwestern Miyagi Prefecture (Ueno, 1973), Fukushima Prefecture, and Northern Niigata Prefecture (Hayashi, 2016; Ikeda, 1968; Shimizu, 1951, 1987) (see Figure 1, p. 107).

Lilium rubellum Baker habitats are divided into two altitudinal regions by the *Fagus crenata* forest, and spread from the lower hills to the mountains, at altitudes between 50 m and 800 m above sea level, and between 1,500 m and 2,000 m, where there is deep snowfall. This species was reported growing several meters above sea level on the rocky seashore of the Japan Sea, approximately 40 years ago (Mizuno and Hirase, 1987; Shimizu, 1987) The species has been observed growing in three habitat types: first, steep and rugged slopes yielding snow slides; second, ridges of scree-covered slopes; and third, the open forest floor after regular mowing.

Lilium rubellum is a typical polycarpic perennial and similar to other *Lilium* species. The plant begins to elongate aerial shoots between mid- to late-April and early May. The anthesis begins from mid-May to early August. The flowering period ranges from mid- to late-May in the lower hills at altitudes of 200 m or lower, from mid to late June at 300 m, from late June to early July at 600 m or higher, from mid to late July at 1,000 m or higher, and from early August at 1,500 m or higher (Shimizu, 1987). When *L. rubellum* grows in lowland habitats, it produces between one and three flowers and is 40–120 cm in height. However, plants growing in high mountainous areas are 30–80 cm in height and usually produce only one flower.

Lilium rubellum produces flowers with small tubular corollas and lateral insertion of anthers. The flowers of this species are open during the early summer.



The stunning sight of hundreds of *Lilium rubellum* flowering in a natural population at 300 m altitude and at the edge of deciduous broad-leaved forest in Yamagata prefecture.

The main volatile substances that attract bumblebees are eucalyptol and β -ocimene (Oyama-Okubo, 2014). *L. rubellum* is pollinated by a variety of insects, such as nitidulid beetles and syrphid flies (Terashima *et al.*, 2013).

Seed dispersal from ripe capsules occurs late in the year, from mid- to late-September. In the lowland populations, most of the capsules are damaged at times by caterpillars of *Phthoeobroa pistrinana* Erschoff; thus, the success rate of seed production is seldom greater than 50 percent.

References

- Comber, H. F. (1949). A new classification of genus *Lilium*. *Lily Year Book*, R. H. S. 13: 85–105.
- Hayashi, K. (2016). *Lilium* L. In: Flora of Japan. Volume IVb Angiospermae Monocotyledoneae (b). (Ed. Iwatsuki, K., Boufford, D. E. & Ohba, H.). p.110–117. Kodansha, Tokyo.
- Ikeda, Y. (1968). Study on *Lilium rubellum* Baker I. On distribution and variation in Niigata prefecture. *Bull. Niigata Hort. Exp. Sta.* 3:51-64. (in Japanese with English summary).
- Makino, T. (1899). Contributions to the study of the flora of Japan. XIX. *Bot. Mag. Tokyo* 13: 295–298. (in Japanese).
- Mizuno, S. & Hirase, S. (1987). Habitat of *Lilium rubellum* Baker on the seashore of the Japan Sea. *Bull. Bot. Soc. Tohoku* 4:19–20. (in Japanese).
- Nishikawa, T., Okazaki, K. & Nagamine, T. (2002). Phylogenetic relationships among *Lilium auratum* Lindley, *L. auratum platyphyllum* Baker and *L. rubellum* Baker based on three spacer regions in chloroplast DNA. *Breeding Science* 52: 207–213.
- Oyama-Okubo, N. (2014). Fragrance of species lilies native to Japan. *TEAC* 58:323-326. (in Japanese with English summary).
- Shimizu, M. (1951). OTOME-YURI (*Lilium rubellum* Baker). *Lily Year Book*, N. A. 4: 66–71.

- Shimizu, M. (1987). *Lilies in Japan, Wild and Cultivated Species*. Seibundo-Shinkosha, Tokyo. 182pp. (in Japanese).
- Terashima, H., Hirawatari, K., Hayashi, Y., Takahashi, M., Nakamura, A., Sato, T., Nakano, S., Yoshida, M. & Yokoyama, J. (2013). Flower visitor fauna of the narrow endemic lily, *Lilium rubellum* Baker in a lowland habitat in Yamagata, northern Japan. *Bull. of Yamagata Univ., Nat. Sci.* 17(4):27–34.
- Ueno Y. (1973). Notes on some plants of Miyagi Prefecture (1). *Miyagi no Syokubutu* 1: 29–33 (in Japanese).

Bulb

The bulb of *Lilium rubellum* (see below) is ovoid-globose and roughly 2–3 cm in diameter. The ovate-lanceolate scales are white but the outer ones are often stained dirty yellow or brownish.

Stem and leaves

The slender green stem, sometimes flecked brownish, rises directly from the bulb, generally in May, and is usually 30–75 cm tall but can be taller. Plants approaching a metre in height having been achieved in UK locations as far apart as Kent and Fife. The scattered, broadly lanceolate, smooth leaves, which are up to 10 cm long and 3.5 cm wide, have a somewhat obscure petiole and are rather conspicuously five- to seven-nerved.

Buds and flowers

The flower buds of *Lilium rubellum* develop quite rapidly after emergence of the stem and are ready to open in mid-June.



Above, left, this *Lilium rubellum* bulb was photographed ‘in situ’ in a garden in West Wales at a depth of about 10 cm. It went on to produce a single flower about four months later.

Above, right and **opposite**, the leaves and stem of *Lilium rubellum* with some specimens reaching 100 cm in height.



Above left, a *Lilium rubellum* bud, coloured up and ready to open in mid-June and **above**, the open flower a few days later.

The rose-flushed, funnellform flowers of *Lilium rubellum* are borne horizontally. Stems usually carry one to three of the fragrant flowers but sometimes up to seven, or even nine, adorn vigorous cultivated plants. The tepals are rose pink on both surfaces, unspotted or rarely speckled maroon only at the base. White



flowered plants are known but are very rare in cultivation. The floral segments are 5–7 cm long, oblong-lanceolate and with the tips being slightly recurved. Noticably narrower than the petals, which are around 2.5 cm wide, the sepals are slightly tinged green towards the base. The nectaries are glabrous. Oblong anthers with orange-yellow pollen are held on glabrous filaments, the whole being less than half the length of the perianth. The longer pistil is composed of a green cylindrical ovary, curved style and large capitate three-lobed stigma.

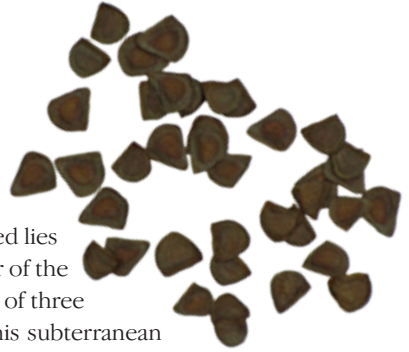
Seed capsule

The seed capsule of *Lilium rubellum* is up to 3.5 cm long and 2 cm in diameter, oblong-ellipsoid in shape with a rounded top and narrowed towards the base. Each capsule contains between about 100 and 160 seeds.



Left, the very rare white flowered form of *Lilium rubellum*.

Below, *Lilium rubellum* seed and **bottom**, the capsules of a natural population of *Lilium rubellum* in Yamagata prefecture.



Seed and germination

The dark brown seeds of *Lilium rubellum* are about 6 mm long with narrow wings. Germination is of the delayed hypogeal type. After autumnal dispersal the seed lies dormant with germination occurring during September of the following year. It has been reported that a warm period of three to six months at around 20 °C is required to initiate this subterranean germination and that fertility rates are usually high, around 70% or more.

Dr Hayashi has very kindly provided the following detailed description of the germination and subsequent development of *Lilium rubellum*:

The embryo first pushes out a radicle, which grows down into the ground and then an almost indiscernible node, the future bulb, is formed. The nutrients stored in the endosperm around the embryo are then transferred to the tiny bulb. During the second spring, the first leaf of the plant appears above the ground and a second is produced during the third spring. Stem formation occurs during the fourth spring with most plants flowering by the fifth.



Cultivation

Lilium rubellum grows particularly well in cool moist climates provided that drainage is adequate. In West Wales it is happy in half shade in an acidic loam and has survived for more than 15 years with little attention beyond mulching, watering in dry spells and protecting from excess winter wet. Like so many lilies establishing mature bulbs can be demanding with apparent initial success followed by disappointment.

A very accomplished Scottish grower reported that: ‘My *Lilium rubellum* came from Yuzawa-Engei nursery about 6/7 years ago. I bought two bulbs, one more strongly coloured than the other. Both grew well in a raised acid, pumice bed along with my *L. auratum*. I decided to move them as the *auratum* took over. Both sulked the year after moving—they were in a deep raised bed with high cover but the soil mix was more ‘organic’. By the end of the second year after transplant it was apparent that they weren’t doing well—particularly the darker coloured plant so I dug up the bulbs, cleaned some rot off them and placed the darkly-coloured



Germination occurs during September of the year following dispersal. This is when cotyledons are produced (Fig. 2-1A) and small bulbs (Fig. 2-1B,) form underground (Fig. 2-1). During the second spring, the first leaf of the plant appears above the ground (Fig. 2-2). The second leaf is produced during the third spring (Fig. 2-3). Stem formation occurs during the fourth spring (Fig. 2-4). Most plants flower by the fifth spring (Fig. 2-5).

bulb in a large pond plant basket with lots of perlite and pumice. The other I re-planted in more gritty soil. The darkly coloured plant did a lot better and now grows strongly but the other bulb rotted away.' Another Scottish enthusiast has similarly experienced some difficulties with *L. rubellum*. He selected a place in the garden with dappled shade and prepared the soil with generous amounts of ericaceous compost, horticultural grit and bone meal. The mature bulbs initially did well but gradually, the bulbs lost their vigour and disappeared.

It has also been reported to have grown successfully in a peat garden in Denmark and a grower in south-east England has had great success with the species in a raised bed of composted bark in part shade, with grit and ericaceous compost incorporated at planting. These plants having reached nearly a metre in height.

Other growers have found the species more difficult in containers, probably as a result of more fluctuating temperatures at the roots, though it is not impossible and plants grown from seed by a grower in Washington State have flowered in about four years.

References

- Fox, D. (1987). *Growing Lilies*. Christopher Helm, pp. 194–195.
- Hayashi, K. & Kawano, S. (2007). Life history characteristics of *Lilium auratum* Lindl. (Liliaceae). In: *Life history monographs of Japan plants*. Volume III summer plants No.1. (Ed. Kawano, S.). pp. 17–24. Hokkaido University Press, Sapporo. 112pp. (in Japanese with English summary).
- Rockwell, F. F. (1961). Propagation of Lilies. In: *The Complete Book of Lilies*. (Ed. Rockwell, F. F., Crayson, C., & de Graaf, J.) pp. 173. Table 4. Doubleday & Company, Inc., New York.
- Syngé, P. M. (1980). *Lilies*. Batsford, pp. 122–123.
- Woodcock, H. D. and Stearn, W. T. (1950). *Lilies of the World*. Country Life, pp. 329–330.

Members' contributions

Many thanks to the following growers who contributed observations, photographs and comments for this Species Profile: Steve Garvie, Mel Herbert, Gordon Hogenson, Karl Kristensen, Alan Mitchell, Peter Shotter and Pontus Wallstén.



photograph © Peter Shotter

Some magnificent *Lilium rubellum* in Kent which are living proof that the species can be grown very successfully in drier climates such as that in the south east of England.