

## PREPRINT

Posted on 17/09/2020

DOI: <https://doi.org/10.3897/arphapreprints.e58764>

# *Lilium longiflorum* var. *longiflorum* (Liliaceae), a neglected lily of Taiwan

 Chien-Ti Chao

*Not peer-reviewed, not copy-edited manuscript submitted to:*

**Biodiversity Data Journal**

## Disclaimer on biological nomenclature and use of preprints

The preprints are preliminary versions of works accessible electronically in advance of publication of the final version. They are not issued for purposes of botanical, mycological or zoological nomenclature and **are not effectively/validly published in the meaning of the Codes**. Therefore, nomenclatural novelties (new names) or other nomenclatural acts (designations of type, choices of priority between names, choices between orthographic variants, or choices of gender of names) **should NOT be posted in preprints**. The following provisions in the Codes of Nomenclature define their status:

### International Code of Nomenclature for algae, fungi, and plants (ICNafp)

**Article 30.2:** "An electronic publication is not effectively published if there is evidence within or associated with the publication that its content is merely preliminary and was, or is to be, replaced by content that the publisher considers final, in which case only the version with that final content is effectively published." In order to be validly published, a nomenclatural novelty must be effectively published (Art. 32.1(a)); in order to take effect, other nomenclatural acts must be effectively published (Art. 7.10, 11.5, 53.5, 61.3, and 62.3).

### International Code of Zoological Nomenclature (ICZN)

**Article: 21.8.3:** "Some works are accessible online in preliminary versions before the publication date of the final version. Such advance electronic access does not advance the date of publication of a work, as preliminary versions are not published (Article 9.9)".

# *Lilium longiflorum* var. *longiflorum* (Liliaceae), a neglected lily of Taiwan

Chien-Ti Chao ‡

‡ National Taiwan Normal University, Taipei City, Taiwan

Corresponding author: Chien-Ti Chao ([ff8bahamut@gmail.com](mailto:ff8bahamut@gmail.com))

## Abstract

### Background

The genus *Lilium* comprises ca. 100 species and famous by its showy flowers. In Taiwan, four taxa were recorded in Flora of Taiwan, namely *L. callosum*, *L. formosanum*, *L. speciosum* var. *gloriosoides*, and *L. longiflorum* var. *scabrum*.

### New information

In this article, the author reported a newly recorded lily taxon, *Lilium longiflorum* Thunb. var. *longiflorum*. This variety is morphologically similar to the other two endemic taxa, *L. longiflorum* Thunb. var. *scabrum* Masam. and *L. formosanum* Wallace of Taiwan, and is often misidentified as such. However, *L. longiflorum* var. *longiflorum* is distinguished from them by having subglabrous stems, and tepals without purplish stripes. *Lilium longiflorum* var. *longiflorum* has only been found in the remote islands of Taiwan, such as Lanyu, Lutaο, and Pengchia Islet. The conservation status of the two varieties of *L. longiflorum* of Taiwan was re-evaluated and assigned as near threatened (NT).

### Keywords

Liliaceae, *Lilium longiflorum* Thunb. var. *longiflorum*, plant taxonomy, Taiwan

### Introduction

*Lilium* L. is the type genus of Liliaceae which comprises about 110 species distributed in subtropical to alpine regions of the northern hemisphere, especially in East Asia ([Chen et al. 2000](#), Tamura 1998). The characteristic species of this genus are bulbiferous perennial herbs, with sessile or sub-sessile leaves, terminal inflorescences of colorful, nectar-bearing flowers, 3-loculed superior ovaries with numerous ovules, and loculicidal capsules with

flattened seeds (Chen et al. 2000, Utech 2002, Ying 2000). In Taiwan, four taxa were treated in the second edition of Flora of Taiwan (Ying 2000), namely *L. callosum* Siebold & Zucc., *L. formosanum* Wallace, *L. longiflorum* Thunb. var. *scabrum* Masam., and *L. speciosum* Thunb. var. *gloriosoides* Baker. Among these, *L. formosanum* and *L. longiflorum* var. *scabrum* are similar in morphology and classified into section *Leucolirion*, which includes species with trumpet-shaped flowers, recurved tepals and filaments and a relatively large stigma (Comber 1949).

The record of *L. longiflorum* in Taiwan can be traced back to Henry (1896), who compiled the first comprehensive plant list of Taiwan. He recorded this species in Tamsui and the South Cape region. In 1906, Matsumura and Hayata (1906) confirmed Henry's record and reported specimens from Senton and Biōritsu. Kawakami (1910) recorded this species in Taiwan without location and specimen information. Hayata (1917) included *L. longiflorum* in his list of Taiwanese plants, stating that the specimen was not found by him, but that the record might have come from the survey of Matsumura and Hayata (1906). Sasaki (1928) and Masamune (1936) recorded this species on the east coast of Taiwan in Lutao and Lanyu. Masamune (1939) described a new variety *L. longiflorum* var. *scabrum* based on the presence of scabrous stems. Masamune (1954) made a new combination of this variety under *L. japonicum*, as *L. japonicum* Houtt. var. *scabrum* (Masam.) Masam. However, Liu and Ying (1978) and Ying (2000) did not accept this taxon and considered *L. japonicum* var. *scabrum* as a synonym of *L. longiflorum* var. *scabrum*. The records of *L. longiflorum* of Sasaki (1928) and Masamune (1936) were treated as misinterpretations of *L. longiflorum* var. *scabrum* by Liu and Ying (1978) and Ying (2000).

Upon visiting Lanyu for the first time in 2009, the author noticed a native lily that had white flowers without purplish stripes. This specimen was different from the other taxa native to Taiwan, and plants were collected for identification on a subsequent visit to Lanyu. After reviewing the relevant literature, this lily was identified as *L. longiflorum* var. *longiflorum*, and was mentioned only in some informal records provided by local plant enthusiasts in the online forum, Nature Campus (Ahsiang 2014), and on Facebook (Yang 2017). Although many photos and morphological comparisons were provided for identification, formal records with detailed morphological description, specimen examinations, distribution maps, and conservation status were needed for this taxon.

## Materials and methods

Study materials were obtained from herbarium sheets and field investigation. The following herbaria were examined: HAST, TAI, TAIF, TCF, TNM, and PPI, and the herbarium acronyms were those given by Thiers (2020). Voucher specimen were deposited in TCF and TAIF. Evaluation of conservation status of *L. longiflorum* var. *longiflorum* and *L. longiflorum* var. *scabrum* of Taiwan followed the criteria of Editorial Committee of the Red List of Vascular Plants of Taiwan (2017).

## Taxon treatment

### *Lilium longiflorum longiflorum* Thunb.

#### Materials

- a. country: Taiwan; county: Taitung; locality: Lanyu Township, Tungching; year: 1976; month: 1; day: 11; fieldNumber: C.E.Chang 938; institutionCode: PPI
- b. country: Taiwan; county: Taitung; locality: Little Lanyu; year: 2003; month: 3; day: 21; fieldNumber: C. L. Yeh & C. R. Yeh 86; institutionCode: PPI
- c. country: Taiwan; county: Taitung; locality: Lanyu; year: 2015; month: 4; day: 5; fieldNumber: P. H. Chen 593; institutionCode: PPI
- d. country: Taiwan; county: Taitung; locality: Lanyu; year: 1962; month: 4; day: 22; fieldNumber: C. E. Chang 2877; institutionCode: PPI
- e. country: Taiwan; county: Taitung; locality: Lanyu; year: 1926; month: 6; day: 8; fieldNumber: S. Sasaki s.n.; institutionID: 29261; institutionCode: TAI
- f. country: Taiwan; county: Taitung; locality: Lanyu; year: 1920; month: 2; day: 7; fieldNumber: S. Sasaki s.n.; institutionID: 29264; institutionCode: TAI
- g. country: Taiwan; county: Taitung; locality: Lanyu; year: 1924; month: 5; fieldNumber: S. Sasaki s.n.; institutionID: 29265; institutionCode: TAI
- h. country: Taiwan; county: Taitung; locality: Lanyu; year: 1907; month: 4; day: 15; fieldNumber: S. Sasaki s.n.; institutionID: 29262; institutionCode: TAI
- i. country: Taiwan; county: Taitung; locality: Lanyu; year: 1984; month: 6; day: 15; fieldNumber: W. L. Chiou 11472; institutionCode: TAIF
- j. country: Taiwan; county: Taitung; locality: Lanyu; year: 1985; month: 4; day: 3; fieldNumber: T. Y. Yang 1610; institutionCode: TNM
- k. country: Taiwan; county: Taitung; locality: from RadWaste Administration's nuclear waste depository to Helmet Rock; year: 1993; month: 2; day: 28; fieldNumber: H. L. Ho 1113; institutionCode: HAST, PPI
- l. country: Taiwan; county: Taitung; locality: Lanyu Imororu; year: 1936; month: 4; day: 9; fieldNumber: H. Simada SH1344; institutionCode: TAI
- m. country: Taiwan; county: Taitung; locality: Chingching grassland; year: 2007; month: 2; day: 7; fieldNumber: Y. R. Chen & S. P. Chi 45; institutionCode: TAI, TAIF
- n. country: Taiwan; county: Taitung; locality: Chingching grassland; year: 2005; month: 3; day: 26; fieldNumber: T. Y. A. Yang 17241, 17242, 17243; institutionCode: TNM
- o. country: Taiwan; county: Taitung; locality: Chingching grassland; year: 1997; month: 7; day: 6; fieldNumber: T. Y. A. Yang et al. 8526; institutionCode: TNM
- p. country: Taiwan; county: Taitung; locality: between Dongching and Yeyin; year: 1983; month: 6; day: 8; fieldNumber: C. I Peng 5215; institutionCode: HAST
- q. country: Taiwan; county: Taitung; locality: Dongching; year: 1983; month: 6; day: 8; fieldNumber: C. I Peng 5187; institutionCode: HAST
- r. country: Taiwan; county: Taitung; locality: Yurenhsi to Hungtoushan; year: 1984; month: 5; day: 8; fieldNumber: C. I Peng 6623; institutionCode: HAST
- s. country: Taiwan; county: Taitung; locality: en route from Kaiyuan Port to Tank Rock; year: 1984; month: 5; day: 7; fieldNumber: C. I Peng 6607; institutionCode: HAST
- t. country: Taiwan; county: Taitung; locality: Hongtou Village; year: 1998; month: 5; day: 21; fieldNumber: T. Y. A. Yang 10432; institutionCode: HAST, TNM
- u. country: Taiwan; county: Taitung; locality: Yehyu Village, Pond Hsiaotienchi; year: 1997; month: 4; day: 21; fieldNumber: T. Y. A. Yang 7938 ; institutionCode: HAST, TNM

- v. country: Taiwan; county: Taitung; locality: Yehyu Village, Pond Hsiaotienchi; year: 1999; month: 5; day: 4; fieldNumber: T. Y. A. Yang et al. 11847; institutionCode: TNM
- w. country: Taiwan; county: Taitung; locality: Yehyu Village, Pond Hsiaotienchi; year: 1998; month: 7; day: 1; fieldNumber: T. Y. A. Yang & C. C. Yen 10626; institutionCode: TNM
- x. country: Taiwan; county: Taitung; locality: Yehyu Village, entrance of Hsiaotienchih; year: 1998; month: 5; day: 19; fieldNumber: T. Y. A. Yang 10306; institutionCode: HAST, TNM
- y. country: Taiwan; county: Taitung; locality: Hungtou-Tienchih; year: 2002; month: 4; day: 7; fieldNumber: T. Y. A. Yang 14634; institutionCode: HAST, TNM
- z. country: Taiwan; county: Taitung; locality: Dragon-head Rock; year: 1988; month: 6; day: 2; fieldNumber: S. Y. Lu s.n.; institutionID: 120548; institutionCode: TAIF
- aa. country: Taiwan; county: Taitung; locality: Mt. Hongtou; year: 2015; month: 4; day: 18; fieldNumber: C. T. Chao 3756; institutionCode: TCF
- ab. country: Taiwan; county: Taitung; locality: Mt. Hongtou; year: 2020; month: 3; day: 31; fieldNumber: C. T. Chao 5055, 5056; institutionCode: TAIF
- ac. country: Taiwan; county: Taitung; locality: weather station of Lanyu; year: 2020; month: 3; day: 31; fieldNumber: C. T. Chao 5068; institutionCode: TAIF
- ad. country: Taiwan; county: Taitung; locality: Yehyu-Lighthouse; year: 2006; month: 4; day: 24; fieldNumber: T. Y. A. Yang et al. 17891; institutionCode: TNM
- ae. country: Taiwan; county: Taitung; locality: Yehyu-Lighthouse; year: 2005; month: 6; day: 27; fieldNumber: T. Y. A. Yang et al. 17547; institutionCode: TNM
- af. country: Taiwan; county: Taitung; locality: Yehyu-Lighthouse; year: 2001; month: 6; day: 3; fieldNumber: T. Y. A. Yang et al. 13697; institutionCode: TNM
- ag. country: Taiwan; county: Taitung; locality: Hungtou, 27.5 km of the no. 80 hsien road; year: 2006; month: 4; day: 24; fieldNumber: T. Y. A. Yang et al. 17885; institutionCode: TNM
- ah. country: Taiwan; county: Taitung; locality: Hungtou village, on the way of pond Tienchih; year: 2011; month: 4; day: 3; fieldNumber: C. H. Hong et al. 79; institutionCode: TNM
- ai. country: Taiwan; county: Taitung; locality: Hungtou village, on the way of pond Tienchih; year: 2007; month: 4; day: 4; fieldNumber: T. Y. A. Yang et al. 18880; institutionCode: TNM
- aj. country: Taiwan; county: Taitung; locality: Hsiaotienchih; year: 2006; month: 4; day: 3; fieldNumber: T. H. Lin et al. 403; institutionCode: TNM
- ak. country: Taiwan; county: Taitung; locality: Yehyu, Mt. Hsiangaishan; year: 2007; month: 4; day: 5; fieldNumber: T. Y. A. Yang et al. 18977; institutionCode: TNM
- al. country: Taiwan; county: Taitung; locality: central cross road; year: 1997; month: 4; day: 30; fieldNumber: S. T. Chiu & J. N. Chen 4174; institutionCode: TNM
- am. country: Taiwan; county: Taitung; locality: Hsiaolanyu; year: 2003; month: 5; day: 1; fieldNumber: T. Y. A. Yang & C. W. Huang 15669; institutionCode: TNM
- an. country: Taiwan; county: Taitung; locality: Tungching village, 26.5 km of no. 80 county road; year: 2000; month: 3; day: 28; fieldNumber: T. Y. A. Yang & C. H. Chuang 13083; institutionCode: TNM
- ao. country: Taiwan; county: Taitung; locality: Hungtou-kaiyuhangk & Shuang shih yen; year: 1985; month: 4; day: 2; fieldNumber: T. Y. Yang 1599; institutionCode: TNM
- ap. country: Taiwan; county: Taitung; locality: Hongtou village, pond Tienchi; year: 1997; month: 12; day: 17; fieldNumber: T. Y. A. Yang & K. C. Wang 9834; institutionCode: TNM
- aq. country: Taiwan; county: Taitung; locality: Tungching village, 12 km of no. 80 (assigned as no. 60 by the author) county road; year: 1998; month: 3; day: 23; fieldNumber: T. Y. A. Yang & C. N. Wang 10100; institutionCode: TNM
- ar. country: Taiwan; county: Taitung; locality: Langtao village; year: 1996; month: 5; day: 27; fieldNumber: T. Y. Yang et al. 6608; institutionCode: TNM

- as. country: Taiwan; county: Taitung; locality: Lutao Township, Hotspring Village; year: 2005; month: 4; day: 21; fieldNumber: G. P. Hsieh 2043; institutionCode: PPI
- at. country: Taiwan; county: Taitung; locality: Yeh-yu Village, at the hill of Wu-Kong Cave; year: 1978; month: 2; day: 4; fieldNumber: C. E. Chang 12071; institutionCode: PPI
- au. country: Taiwan; county: Taitung; locality: Isl. Kwasyoto; year: 1929; month: 1; day: 1; fieldNumber: S. Sasaki s.n.; institutionID: 29259; institutionCode: TAI
- av. country: Taiwan; county: Taitung; locality: Isl. Kwasyoto; year: 1927; month: 5; day: 5; fieldNumber: S. Sasaki s.n.; institutionID: 29260; institutionCode: TAI
- aw. country: Taiwan; county: Taitung; locality: General Rock; year: 2003; month: 3; day: 29; fieldNumber: H. P. Su & Y. T. Hsu s.n.; institutionID: 438128; institutionCode: TAIF
- ax. country: Taiwan; county: Keelung; locality: Pengjia Islet; year: 2005; month: 6; day: 7; fieldNumber: S. W. Chung 7796; institutionCode: TAIF

## Description

Perennial bulbiferous herbs. Bulbs subglobose, creamy white or tinged yellow. Stem erect, sparsely scabrous pubescent, 20-100 cm tall, 0.5-1 cm in diam., subglabrous, sparsely covered with papillae. Leaves alternate, lanceolate to oblong-lanceolate, 2-20 cm long, 0.3-1.3 cm wide, smaller toward apex, thick and somewhat fleshy, base truncate, sessile, margin entire, apex acuminate, glabrous on both surfaces, venation ternate. Inflorescence terminal, solitary or several flowers scattered, showy, fragrant. Flowers white, tepals 6, free, oblanceolate, recurved at apex, 11-16 cm long, 3-4 cm wide, glabrous. Stamens 6, opposite to tepals, filaments filiform, 9-10 cm long, ca. 2 mm in diam., pale-green, glabrous; anthers oblong, versatile, longitudinally dehiscent, ca. 6 mm long by 3 mm wide, yellow, glabrous. Ovary cylindrical, ca. 3 cm long, ca. 2.5 mm in diam., pale-green, glabrous; style straight, 7-8 cm long, ca. 2 mm in diam., pale-green, glabrous, stigma 3-lobed, ca. 1 cm in diam., slimy. Capsules erect, 5-9 cm long, 1-2.5 cm wide, brown. Seeds numerous, flattened, brown, glabrous (Fig. 1).

## Distribution

Distributed in Kyusyu (Yakushima and Tanegashima) and the Ryukyus of Japan (Hayashi 2016). In Taiwan, this variety is found in Lutao, Lanyu, and Pengchia Islet, in the exposed seashore and hills.

## Identification keys

Key to <i>Lilium</i> taxa of Taiwan		
1	Flowers not trumpet-like, often nodding; tepals strongly recurved	2
–	Flowers trumpet-like, horizontal; tepals recurved only at apex	3
2	Leaves linear; flowers orange without reddish spots	<i>L. callosum</i>

–	Leaves lanceolate; flowers white with reddish spots	<i>L. speciosum</i> var. <i>gloriosoides</i>
3	Leaves linear; stems glabrous	<i>L. formosanum</i>
–	Leaves lanceolate, stems more or less covered with scabrous pubescence	4
4	Stems sparsely scabrous pubescent; flowers white, stems green, both without purplish stripes	<i>L. longiflorum</i> var. <i>longiflorum</i>
–	Stems densely scabrous pubescent; flowers and stems with purplish stripes	<i>L. longiflorum</i> var. <i>scabrum</i>

## Discussion

### Morphological comparison of Taiwanese *Lilium* sect. *Leucolirion*

*L. longiflorum* var. *longiflorum* is morphologically similar to *L. longiflorum* var. *scabrum* and *L. formosanum*, which all belong to sect. *Leucolirion* (Comber 1949, Nishikawa et al. 1999). *Lilium longiflorum* var. *longiflorum* differs from *L. longiflorum* var. *scabrum* in its smooth stem with sparse scabrous pubescence (Masamune 1939) and white flowers with purplish stripes. *Lilium longiflorum* differs from *L. formosanum* by its lanceolate and tri-nerved leaves and self-incompatible habit (Ascher and Pelouquin 1968, Hayashi 2016) (Fig. 2).

### Distribution and conservation status of Taiwanese *L. longiflorum*

According to the red list of vascular plants of Taiwan from the Editorial Committee of the Red List of Vascular Plants of Taiwan (2017), *L. longiflorum* var. *scabrum* was classified as data-deficient (DD), because there was insufficient data to precisely evaluate its rank. *Lilium longiflorum* had been misidentified as *L. formosanum* in many herbarium sheets and vice versa; thus, the population and distribution of *L. longiflorum* in Taiwan was not clear. The taxonomic status of the two varieties of *L. longiflorum* has been described in the present study, along with the distribution of *L. longiflorum* var. *longiflorum* in Lutao, Lanyu, and Pengchia Islet, the neighboring islands of Taiwan. In contrast, *L. longiflorum* var. *scabrum* was found in the north to northeast area of Taiwan and not in the other islands (Fig. 3). The two taxa shared similar habitats in grasslands, forest borders, rocky slopes and cliffs overlooking the seashore. Based on this distribution information, the conservation status was reevaluated following the criteria proposed by the Editorial Committee of the Red List of Vascular Plants of Taiwan (2017). The populations might have decreased because of development in these areas, but the regeneration is still considered good and the conservation status of the two varieties of *L. longiflorum* was evaluated as near threatened (NT) (A3).

Haw (1986) averred that *L. longiflorum* might be a naturalized plant rather than a native one in Taiwan, as this species was cultivated in a graveyard in the Ryukyus, and could have been introduced into Taiwan in the same way. However, the populations of *L. longiflorum* var. *scabrum* scattered on the coastal areas of northern Taiwan had scabrous stems, which is different from the Japanese plants, and thus could not be naturalized. The other taxon, *L. longiflorum* var. *longiflorum* was only found in a few islands. If this distribution pattern was formed by human activity, then some unique custom of this plant would have been expected to be found, but no such custom was found in these islands; therefore, the distribution pattern of *L. longiflorum* var. *longiflorum* could only be explained by natural colonization and not by human activity.

## Acknowledgements

The author is grateful to Mr. Han-Yu Lin, Mr. Wei-Fan Chiang, Mr. Chun-Yeh Huang for field assistance, to Dr. Chu-Chia Kuo for providing the base map of Taiwan and adjacent islands, and to Mr. Chih-Yi Chang for manuscript improvement. I would also like to thank Dr. Chiu-Mei Wang, Mr. Po-Hao Chen, Dr. Kuo-Fang Chung and Ms. Tsui-Ya Liu for their assistance in the examination of herbarium sheets in TNM, PPI, and HAST. I am grateful to the curator and staff of TAI and TAIF for their kind instructions for the herbarium examination. The manuscript was edited by Dr. Gary Bentley, an editor of Peerwith. The study was funded by the project grant no. MOST 108-2811-B-003-505 to Chien-Ti Chao.

## References

- Ahsiang (2014) 09-9. Liliaceae (from Canton, Liliaceae branch) (Liliaceae (narrow sense) 12 (09-9-1). Lilies 2-2. *Lilium longiflorum* var. *longiflorum*, Easter lily. <http://nc.biodiv.tw/bbs/showpost.php?p=714579&postcount=286>
- Ascher PD, Peloquin SJ (1968) Pollen tube growth and incompatibility following intra- and inter- specific pollinations in *Lilium longiflorum*. American Journal of Botany 55: 1230-1234.
- Chen XQ, Liang SY, Xui JM, Tamura MN (2000) Liliaceae. In: Wu ZY, Raven PH (Eds) Flora of China. 24. Missouri Botanical Garden Press and Science Press, St. Louis and Beijing, 190 pp.
- Comber HF (1949) A new classification of the genus *Lilium*. The Lily Year Book 13: 86-105.
- Editorial Committee of the Red List of Vascular Plants of Taiwan (2017) The Red List of Vascular Plants of Taiwan, 2017. Endemic Species Research Institute, Forestry Bureau, Council of Agriculture, Executive Yuan and Taiwan Society of Plant Systematics
- Haw SS (1986) The Lilies of China. Batsford, London.
- Hayashi K (2016) *Lilium*. In: Iwatsuki K, et al. (Ed.) Flora of Japan IVb: Angiospermum-Monocotyledoneae (b). Kodansha, Tokyo, 8 pp.
- Hayata B (1917) General Index to the Flora of Formosa, Supplement to Icones Plantarum Formosanarum VI. Bureau of Productive Industry Government of Formosa, Taihok.



- Henry A (1896) A list of plants from Formosa. Transactions of the Asiatic Society of Japan 24: 111-8.
- Kawakami T (1910) A List of Plants of Formosa. Bureau of Productive Industry Government of Formosa, Taihoku.
- Liu TS, Ying SS (1978) Liliaceae. In: Li HL, Liu TS, Huang TC, Koyama T, DeVoi CE (Eds) Flora of Taiwan. Epoch Publishing Co., Ltd., Taipei, 45 pp.
- Masamune G (1936) Short Flora of Formosa. Editorial Department of KUDOA, Taihoku.
- Masamune G (1939) Miscellaneous notes on the flora of the eastern Asia XI. Transactions of the Natural History of Taiwan 216-219.
- Masamune G (1954) A List of Vascular Plants of Taiwan. Hokurikuno Shokubutzunokai Press, Taihoku.
- Matsumura J, Hayata B (1906) Enumeratio plantarum. The Journal of the College of Science, Imperial University of Tokyo, Japan 22: 1-702.
- Nishikawa T, Okazaki K, Uchino T, Arakawa K, Nagamine T (1999) A molecular phylogeny of Lilium in the internal transcribed spacer region of nuclear ribosomal DNA. Journal of molecular evolution 49 (2): 238-49. <https://doi.org/10.1007/pl00006546>
- Sasaki S (1928) List of Plants of Formosa. Natural History Society of Formosa, Taihoku.
- Tamura MN (1998) Liliaceae. In: Kubitzki K (Ed.) The families and genera of vascular plants III: Flowering plants Monocotyledons Liliaceae (except Orchidaceae). Springer-Verlag, Berlin Heidelberg.
- Thiers B (2020) Index Herbariorum: a global directory of public herbaria and associated staff. <http://bluegum.nybg.org/science/index.php>
- Utech FH (2002) Liliaceae. In: Flora of North America Editorial Committee (Ed.) Flora of North America North of Mexico. 26. 298 pp.
- Yang KC (2017) Taiwan lilies are in bloom in the northeast corner. 4-2 , Taiwan lily with hairless stems, reddish-brown pigments and narrow leaves; flowering is gradually delayed to the west or to higher altitudes. <https://www.facebook.com/photo.php?fbid=1438581466202412&set=a.102117576515481&type=3&theater>.
- Ying SS (2000) Liliaceae. In: Editorial Committee of Flora of Taiwan (Ed.) Flora of Taiwan. 2. Editorial Committee of Flora of Taiwan, Department of Botany, National Taiwan University, Taipei, 10 pp.

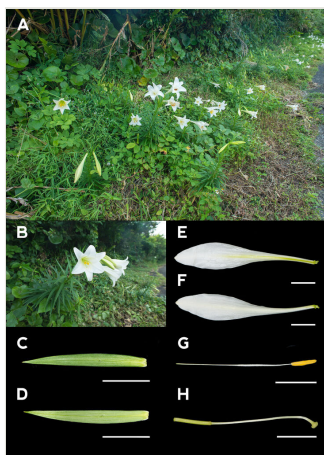


Figure 1.

*Lilium longiflorum* Thunb. var. *longiflorum*. **A** habitat **B** habit **C** leaf adaxial surface **D** leaf abaxial surface **E** tepal adaxial surface **F** tepal abaxial surface **G** stamen **H** pistil. Scale bar = 3 cm.

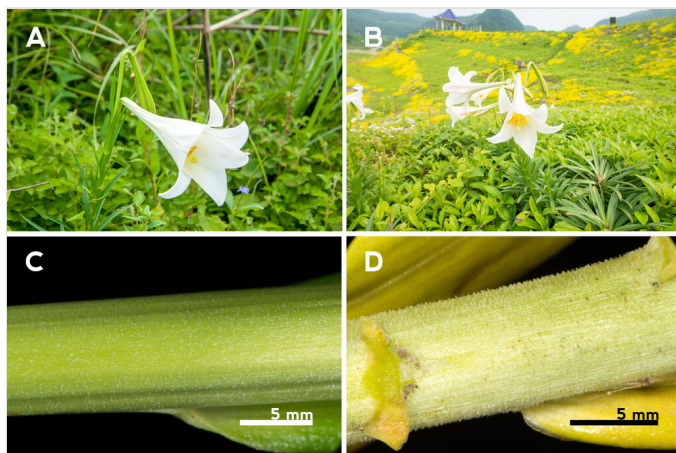


Figure 2.

*Liliium longiflorum* Thunb. var. *longiflorum*. **A** habitat **B** habit **C** leaf adaxial surface **D** leaf abaxial surface **E** tepal adaxial surface **F** tepal abaxial surface **G** stamen **H** pistil. Scale bar = 3 cm.

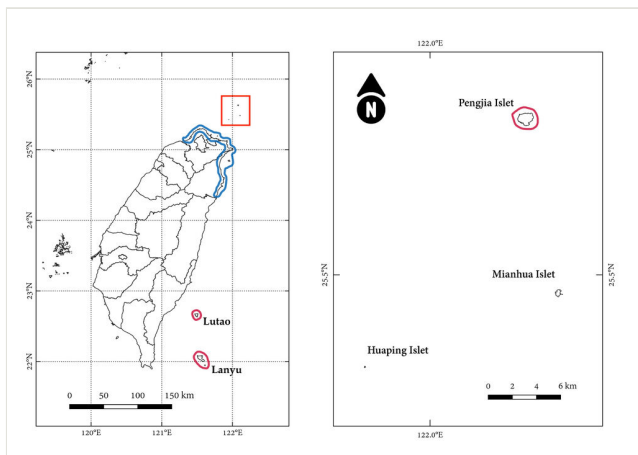


Figure 3.  
Distribution map of *Lilium longiflorum* var. *longiflorum* (red), and *L. longiflorum* var. *scabrum* (blue).