



**LILIES**  
and Related Plants  
2017-2018



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## **Lilies and Related Plants**

Published by the RHS Lily Group  
80 Vincent Square, London SW1P 2PE, UK  
www.rhslilygroup.org

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ISBN 978-0992791827

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Subscriptions and membership:  
Irene Hopton-Scott

Typeset in Garamond and Frutiger by Rob Kirkham and  
printed at Four Way Print Limited, Launceston, Cornwall

Opinions expressed by authors are not specifically  
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- Front cover:** *Fritillaria delavayi*. Tianbaoshan, Shangri-la, Yunnan Province, China.  
(see pp. 38–45)
- Back cover:** *Lilium rhodopaeum* growing in northern Greece. (see pp. 20–25)
- Half title:** *Lilium chalcedonicum* photographed in northern Greece during the 2017 Lily Group trip to northern Greece. (see pp. 46–53)
- Royal Horticultural Society Lily Group page:**  
*Lilium michauxii*, one of the eastern American lily species that Jim Drake describes in his article. (see pp. 95–102)
- Contents page:** *Lilium bakerianum* var. *rubrum* (dark form). Huidong, Sichuan Province, China.  
(see pp. 38–45)

**LILIES**  
and Related Plants  
2017-2018

Editor  
Alan Mitchell

The Royal Horticultural Society  
LILY GROUP

# Royal Horticultural Society Lily Group



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# NOTES ON AUTHORS

**Dr Nuala Sterling** a niece of the market gardener and author Ethelind Fearon, almost chose Horticulture in place of Medicine. A short spell at Rothamsted was followed by a lifetime in medicine. Nuala enjoys growing plants from seed (bulbs to trees) and found joining the RHS Lily Group, in 2004, a revelation, inspiration and education.

**Nan Tang** was a PhD student in Wageningen UR. She is now working in Plateau Research Centre of Qinghai University in China. Since 2008, she has studied the incidence, diversity and genetics of *Lilium pumilum* on the Qinghai-Tibetan Plateau. Currently, she is studying the characteristics of the molecular evolution of *Lilium pumilum*.

**Daocheng Tang** is a professor at Qinghai University, China and group leader of the Plateau Research Centre. He has been working on the genetics and the breeding of ornamental plants for over 30 years and has been studying lilies since 1998.

**Jaap van Tuyl** is geneticist and breeder of bulbous and ornamental plants at the Plant Breeding Department of Wageningen University and Research Center, The Netherlands the last 40 years. His areas of expertise include interspecific hybridization, polyploidization, in vitro pollination and embryo rescue techniques, development of molecular marker techniques in lily and tulip, resistance breeding, flower longevity and genetic resources of bulbous plants.

**Pontus Wallstén** has a BA degree, in film and TV production, and a Master's degree in Journalism. He lives in Switzerland, where he runs a nursery specialising in *Lilium* species. (<http://pontuswallstenplants.smugmug.com>). Pontus Wallstén is the editor of the *Lily Group Newsletter* and has recently published a book: *The lily species and their bulbs*.

**Cheung Siu Ming** became interested in lilies when he was 15. He grows many rare species, which are difficult to obtain in Europe.

**Alan Mitchell** is an optimistic amateur gardener with a passion for growing lilies. He finds their difficulty a challenge and their diversity and beauty engaging and therapeutic.

**Dr Ki-Byung Lim** has a PhD in Horticulture from Kyungpook National University, Korea, and another PhD from Wageningen University, The Netherlands, in the field of Plant Genetics and Breeding for *Lilium* species. His major expertise are molecular and conventional cytogenetics, introgression breeding through interspecific hybridization, polyploid genetics and breeding via mitotic and meiotic polyploidization.

**Ahsan Akram** has a PhD from University of Agriculture Faisalabad, Pakistan and had PhD fellowship from Cornell University, Ithica, N.Y., USA and is a research professor and Post-Doctorate fellow in the Department of Horticultural Science in the College of Agriculture and Life Science at Kyungpook National University, South Korea.

**Charlie Kroell** has been enamoured with lilies since the mid 1960s and has dabbled in hybridising for nearly as long. For many years now his main interest has been Div. VI, the Trumpet/Aurelians...especially with regard to markings and adornments such as 'black' nectaries and heavy papillae. And, all species, the loveliest of lilies, nature's introductions.

**Jeff Stiller** my interest in lilies started when my grandmother gave me *Lilium lancifolium*. Joining NALS encouraged that interest and I have found the work of certain lily growers, for example Dr Robert Griesbach, to be an inspiration.

**Bjørnar Olsen** Why I like lilies... I've always liked plants, but my interest in species lilies probably started with the internet, and seeing pictures of the many, back then practically unknown, species offered for sale by Chen Yi in China. There are very few plants that can



rival the beauty and fragrance of species lilies, I can still remember the first time *Lilium majoense* and *Lilium gloriosoides* flowered in my old garden back in Norway.

**Duncan Coombs** has been interested in *Lilium* species, and cultivars, since the age of four. He has been involved in pharmaceutical and agrochemical research and lectured for 30 years. He has visited China a number of times, where he focused on studying the Flora of Yunnan. Recently retired, Duncan has more time for gardening and visiting China.

**Madeleine Tinson** describes lilies as the perfect plant, in that they are diverse, intriguingly beautiful, a challenge to grow and can fill the air with wonderful perfume.

**A. D. Cotton, OBE FLS VMH** (1879–1962) was an English plant pathologist, mycologist, phycologist and botanist, who co-wrote the first seven parts of the supplement to Elwes' Monograph of the genus *Lilium*.

#### **Leonid V. Averyanov, Noriyuki Tanaka and Khang Sinh Nguyen**

Leonid V. Averyanov. Komarov Botanical Institute, Russian Academy of Science, St. Petersburg, Prof. Popov Str. 2, Russia, RU-197376. Noriyuki Tanaka. 98-11, Otsuka, Hachioji, Tokyo 192-0352, Japan. Khang Sinh Nguyen. Institute of Ecology and Biological Resources, Vietnam Academy of Science and Technology, 18 Hoang Quoc Viet, Cau Giay, Ha Noi, Vietnam. Corresponding author, email: av\_leonid@mail.ru; av\_leonid@yahoo.com

**Caroline Boisset** is a member of The Lily Group's committee and edited *Lilies and Related Plants* from 1997 until 2007. She is currently Editor of the International Dendrology Society's *Yearbook* and is constructing a new garden in Bradford-on-Avon, in Wiltshire.

**Alisdair Aird** has been growing lily species from seed for several decades, and gardens mainly in Sussex, England. He is vice chairman of the RHS Lily Group and president of the Mediterranean Garden Society, and has been chairman of the Cyclamen Society and editor of its journal.

**Gene Mirro** has a scientific background that informs the painstaking detail he employs to grow his impressive collection of species lilies. His love of gardening, when combined with his rational mind, has resulted in success with even the most difficult species. Gene has also donated a lot of seed to the Lily Group over the years, a contribution that has unquestionably assisted with the conservation of many species.

**Jim Drake** became enamoured with lilies over fifty years ago during hikes and drives along higher elevations of the Southern Appalachian Mountains where beautiful *Lilium grayi* and *Lilium superbum* lilies were often seen. Later, he tried his luck growing several other varieties of lilies.

**Kate Kearns** At the Annual Show of the New Zealand Lily Society, in 1991, Kate Kearns was overwhelmed by the beauty and scent of massed lilies, an experience that encouraged her to grow lilies and join the New Zealand Lily Society. She is Secretary, Seed Supervisor, and *Bulletin* Editor for the NZ Lily Society, and involved in the Society's project to establish a wide-ranging collection of *Lilium* species in the Christchurch Botanic Gardens.

**Chris Hind** I have been growing lilies for 40 years, because they remind me of exotic oriental orchids and other delicate blooms. My main interest is in species lilies, of which I grow over 100 from the genus.

**Willem Wietsma** is a plant breeder based in the Netherlands and has been breeding fritillaries for almost 40 years. He produced together with Doede de Jong (V.O.F. de Keizerskroon, Midlum, NL) several new cultivars.

**Ronald van den Berg** is a former staff member of Wageningen University where he was responsible for teaching and research on the taxonomy of (wild relatives of) cultivated plants. He has co-authored a number of papers on *Fritillaria* with Willem Wietsma.

# From the Chairman

Every season brings the joys of horticultural routine, collecting seed for the Group seed list comes first. For my own lilies (grown almost entirely in pots) it is the annual repotting schedule. Ensuring fresh compost with plenty of leaf mould, the removal of unwanted pests, such as the occasional clutch of Vine Weevil larvae easily spotted with their curved white bodies and brown heads. Then dispatched in the microwave before feeding to the birds. Similar treatment to the Lily Beetle does not seem to tempt the birds into regarding them as prey! Inspecting those varied bulbs and recording proliferation is a real delight, such as the 12 bubils around the *Lilium leichtlinii* stem.



Nuala Sterling

The Bulb auction benefitted from a generous contribution of *Lilium pardalinum* from Brian Mathew, North hybrids from Madeleine Tinson and mixed orientpets from Vincent Graham. As in 2016 the LBA included a number of books inherited from past members Ian Boyd, Richard Dadd and the executor of Nick Boddy, including such treasures as Stephen Haw *Lilies of China* and Drysdale Woodcock & Wm. Stearn the 1950 edition *Lilies of the World* which greatly enhanced its reputation and value with advancements over the 1935 edition by H. B. Drysdale Woodcock and J. Coutts entitled *Lilies: Their Culture and Management*. Its reception published in the 1950 *Lily Year Book* stated ‘a botanical monograph of exceptional merit’. At the dinner it was praised but two members failed to agree with everything written—it was ever thus. Judge Woodcock during an eminent career had always loved plants especially lilies. Whilst on the Leeds circuit he lived in an hotel with a beautiful but neglected garden of which he found himself taking charge. His seven years of experiments and record keeping stimulated his enthusiasm for publishing including engaging a reluctant J. Coutts, former Curator of Kew. In this same edition I discovered the delicate line drawings of Ellen K. Field on ‘The comparison of Lily Bulbs’ which had always fascinated me. To gardeners used to narcissi, tulips and snowdrops with their smooth tunicated bulbs the range and variety of lily bulbs comes as a surprise. Her intricate line drawings and detailed account of some 20 bulbs in the 1950 *Lily Year Book* and 18 in 1954, shows their striking contrast and adds to those of W. A. Constable in the 1946 *Lily Year Book*. Today you can see the colour photographs of lily bulbs on the Pacific Bulb Society’s website and in Pontus Wallstén’s beautifully illustrated book, *The lily species and their bulbs*.

With great pleasure I handed over the Chair of the Lily Group to Jamie Compton at the AGM on 26 October looking forward to more time gardening, but taken aback when he suggested ways of preventing me doing that by arranging for me to accept the post of Vice Chairman of the Lily Group to share with Alisdair Aird.

Jamie is a botanist who trained at Askham Bryan College in Yorkshire, has worked in New Zealand, the Chelsea Physic Garden where he was head gardener for five years, then proceeding to a PhD in Botany at Reading University involved in DNA sequencing where he has recently been studying *Wisteria* in preparation for a monograph on the genus. A past member of the RHS Floral A committee and the Lily Group he is also a member of NATAG the RHS Advisory Group on Nomenclature and Plant Taxonomy as well as gardening advisor to *Gardens Illustrated* since 1973. Additionally, he is a plant hunter at heart and as I interviewed him for the post, we were constantly interrupted by visits to his garden to discuss plants found on his many expeditions. His wife Tania is a distinguished garden designer. You will understand our pleasure at his willingness to share his skills and agreement to become our new Chairman.

Reflecting on my six years in this position I am grateful for the constant support of committee colleagues, their knowledge and enthusiasm. The settlement of the RHS agreement along with the other RHS groups in 2012 and the conversion of our full set of *The Lily Year Book, Lilies and Related Plants 1932–2014* to a DVD has meant that other members from around the world have been able to enjoy the past history and historical contribution to this famous group.

Publication of *The Lily Year Book* was suspended by the RHS in 1971 on financial grounds, and maintained by a stalwart committee as *Lilies and other Liliaceae* until 1984, with the re-emergence of the now, biennial Yearbook. The travels at home and abroad, the seed list and bulb auction, the publications and website contribute to the RHS in wide sharing of knowledge and plants coupled with the fact that one third of our members are from overseas.

In this digital age our *Newsletter* and *Seed List* are delivered electronically for speed and efficiency. We plan to widen our website, and introduce a mentoring scheme. The Lily Group and the Bulb Committee are involved with the 2018–19 Lily Trial at Wisley of species and hybrids which has just commenced with the planting of the species. To ensure a suitable environment the Martagon section will be reduplicated in the woodland at the Savill Garden. The last trial only of hybrids, long since gone, was in 1966–67.

The LG visit to seek lilies in the mountainous region of Greece, organised by Chris Gardner, was very special, and reported on pages 46–53. It was my first experience in the wild and I was struck with amazement on how these beautiful plants could simply settle on the wind in ditches finding a supportive niche surrounded by other alpine flowers. Like Mrs Mary G. Henry with her ‘one swift

glance from a moving train in Massachusetts' ref: *Lily Year Book 1954* (p. 12), 'first sighting of *Lilium philadelphicum* spotting the bright scarlet flowers from a train' as we did likewise from a mini-bus on Mount Vermion of the beautiful *L. chalcedonicum*.

Our vain attempts at finding *Lilium rhodopaeum* in full flower were matched by other writers in the *Lily Year Book 1997–98* (pp. 36–40) where Derek Fox reports on his searching in the Rhodope Mountains in Bulgaria for the rarest lily in Europe. Then we had Alan Mitchell and Chris Durdin's follow up to Derek Fox's article and the conservation reports about *L. rhodopaeum*, by Vladimir Trifonov, in *Lily Year Book 2013–14* (pp. 44–47) and *Lily Year Book 2015–16*, pp. 115–118.

The loss of two significant senior members of the RHS Lily Group, Tim Whiteley and Bernard Tickner are recognised in appreciations of their contributions on pages 12 and 5 respectively.

We have recruited several new UK and overseas members this year. We welcome our two new committee members: Jamie Compton as Chairman and Chris Hind as Treasurer. Chris lives in Dundee—a great place for growing lilies which he does enthusiastically. He is a biomedical scientist in the NHS re-sponsible for an £8.8 million pound budget. So managing our resources should be a welcome distraction. Our special thanks go to Nataliya Cuttel for her efficient and precise managing of our accounts and hope she may rejoin us sometime in the future. We are indebted to each and every contribution made by committee members and the world-wide interest and support from members for their seed, knowledge and friendship.

★ ★ ★

## **Bernard Tickner MBE 1924–2017**

*an appreciation by Nuala Sterling*

In July 2014 Bernard Tickner, who had been a member of the Lily Group for 50 years, chose to celebrate his ninetieth birthday by inviting the RHS Lily Group to a buffet lunch in his beautiful garden. That wonderful day, in his magnificent garden of seven acres at Fullers Mill, was an inspiration to all those members of the Lily Group fortunate enough to be there. His garden, created over 55 years, was the achievement of a dream which enchanted us, as was his great enthusiasm—even at the start of his tenth decade! His example was an inspiration to each of us to attempt to emulate his achievements in our own gardening.

Born in Hadleigh, Suffolk in 1924 he inherited his love of gardening from his father. After military service he joined Greene King, became head brewer, later



**From left to right**, Colin Pope, Ang Pope, Sara Taylor-Balls, Meg McKnight, Anne Durbin, Cynthia Young, Mary Randall, Caroline Boisset, Bernard Tickner, Bettye Reynolds, Terry Young, Alisdair Aird, Nuala Sterling and Iain Ferguson.

Production Director and created the award-winning Abbot Ale, and the 1953 Queen Elizabeth Celebration Ale—legacies any man would be proud of.

Bernard Tickner was known for his determination and drive, characteristics that assisted him in the learning of Latin and Greek and, especially, in his interests in Botany and Gardening.

Selecting his, potential, woodland garden on the River Lark, in 1958, he paid special attention to the nature of the soils, which varied from moist loam to pure sand, with good drainage, ideal for his favourite lilies, e.g. *Lilium* 'Tulare', *L.* 'Golden Splendor Group' and *L. pardalinum*.

Always direct, his passionate support of wildlife and the preservation of the historic waterways was evident to the end of his life. In 2004 the charitable trust, he and his Norwegian wife Betzy had established, was activated to ensure the long-term future of the gardens and promote education in the sciences of Botany and Horticulture. In 2013 the Fullers Mill Trust was gifted to 'Perennial', the Gardeners' Royal Benevolent Society to extend that remit. Bernard Tickner's memoir *A scratch in the soil* was published in 2017.

In 2015 I visited Fullers Mill again, spending three days observing his involvement in sharing his love of gardening with visitors, the educational activities and his delight at the support from the Perennial gardening team preserving his garden. Bernard Tickner was most certainly an exceptional gardener and an inspiration.

# *Lilium pumilum* DC. on the roof of the world

*Nan Tang, Daocheng Tang and Jaap van Tuyl*

Plateau Flower Research Institute, Qinghai University, China

## **Introduction**

I was born in Xining, capital city of Qinghai province (China), located at an altitude of 2,295 metres on the Qinghai-Tibet plateau. From an early age, my favourite place was in my father's garden. I never thought that flowers would become such an important part of my life. I followed the steps of my father Daocheng Tang, who works as the leader of Plateau Flower Research Institute (PFRI) in Qinghai University, where I first started my research on lilies and tulips. About ten years ago, my father and his colleagues started collecting *Lilium pumilum* in Qinghai.

## **Qinghai-Tibet Plateau**

Qinghai-Tibet plateau, known as 'the roof of the world', is the highest and largest plateau. It has an area of 2,500,000 square kilometres and an average altitude of 4,500 metres. Qinghai province, is located on the northeastern part of Qinghai-Tibet Plateau, where the average altitude is over 3,000 metres. The province has an area of 722,300 square kilometres and its topography is diverse and complicated. It has an unique plateau continental climate, with strong solar radiation, reduced oxygen and is dry, windy and cold. The plateau receives more than 2,500 hours of sunshine per year. Solar radiation is high because it is located in the mid-latitude area, the total amount of radiation is 140–180 Kcal/m<sup>2</sup>, ranked only second to Tibet in China. The average annual temperature is -5.7 °C to -8.6 °C and there are large regional variations. The average temperature ranges from 5.3 °C to 20 °C in the hottest month, and from -17 °C to -5 °C in the coldest month. The entire province receives low precipitation throughout the year which varies annually from 15 to 750 mm in different regions. But in most parts it is below 400 mm.

## ***Lilium pumilum***

China has more *Lilium* species than any other part of the world. About half of the lily species are widely distributed throughout the country, especially Sichuan, Yunnan and the Tibet area. Due to the unique geographical and climatic conditions, *Lilium pumilum* DC. (Coral lily) is the only wild *Lilium* species that occurs in this region (see photos on page 8). Although it was recorded in *Flora of China* that *L. lancifolium* Thunb. (Tiger lily) also occurs in Qinghai, we haven't found a single plant in the wild during these years. We have only found a few





A typical *Lilium pumilum* habitat in Menyuan Hui Autonomous County, Qinghai Province.

A view of *Lilium pumilum* on a grass slope and a glimpse of its natural habitat in Huzhu, Haidong, Qinghai Province.







A closer look at *Lilium pumilum* and surrounding plants in its natural habitat.

plants in some farmers' courtyards. *Lilium pumilum* has a wide geographical distribution in Qinghai-Tibet plateau, especially in the southeastern part. Besides the beautiful flowers, the bulb is edible and has great medicinal values. It is rich in starch, protein, flavone and other alkaloids, which is good for our health. Also it helps to soothe the airways and provides some relief for coughs and asthma; as a result becoming a valuable resource on the Qinghai-Tibet plateau. Using the *Flora of Qinghai* and with the help of local people, a total of 28 *L. pumilum* natural populations have been collected to date (see photo, above).

According to the records, *Lilium pumilum* occurs in places where the altitude is between 1,900 and 3,000 m. However, we haven't found a single plant at an altitude below 2,000 m. The altitude of distribution in the region has risen over the years which may be due to climate change and human influence. *L. pumilum* can be found in various types of habitats including shrubs, grass slopes, forest margins, mountainsides, or even cliffs. It has a very high adaptability to all kinds of environments. The annual average precipitation of the distribution region ranged from 240 mm to 550 mm. Annual average temperature is between 2.3 °C and 7.5 °C and annual sunshine is 1,546 to 2,876 hours. We carried out a series of studies on the soil properties of different natural populations and we found that generally *Lilium pumilum* prefers alkaline and fertile soil. But it does not have a strict requirement for water content, nitrogen content or soil porosity. The soil properties of different populations are significantly different. Meanwhile, the

plant community of the habitat was investigated. A total of 34 family 49 genus plants were found in the plant communities in the habitats of *L. pumilum*. In most communities, *Stellera chamaejasme*, *Allium chrysanthum*, *Potentilla fruticosa* and different species of the genus *Pedicularis* were noted as being the dominant species. At the moment, we don't understand exactly the relationships between these dominant species and *L. pumilum*. But apparently these plants are easily recognizable and very helpful in finding *L. pumilum* growing in the wild.

### Population genetics

Habitat heterogeneity and natural selection often results in genetically distinct ecotypes within a species. This is also noticeable in *Lilium pumilum* populations growing on the Qinghai-Tibet plateau. A total of 41 morphological traits were evaluated, among which a hairy flower bud is one of the most distinctive characteristics. Flower bud is glabrous in some populations, however, others are piliferous (see photos, below). In July 2012, Jaap van Tuyl visited Qinghai to observe the natural populations of *L. pumilum* in Quinhai province (see photo, opposite).

Genetic analysis was performed using both morphological traits and molecular markers. Although different populations showed different gene diversity, the total diversity at the species level is rather high. The overall population differentiation was considerably high, which indicated the populations as being isolated. The 28 populations were clustered into four groups. It was observed that the clustering



Variations in morphology of *Lilium pumilum* flower buds.



Jaap van Tuyl visited Qinghai in 2012 to observe the natural populations of *Lilium pumilum* in Quinhai province. From left to right: Xiaoling Xing, Daocheng Tang, Jaap van Tuyl, Nan Tang, Xiuting Ju.

of populations has a certain correlation with annual mean precipitation. The investigated *L. pumilum* populations showed very strong genetic structure. There is little or no admixture between populations, which verified that the populations are highly isolated and there is no interbreeding between them. Although migration of plant populations can occur through dispersal of pollen and seed, a number of factors such as fragmented habitat can be the barrier to gene flow between populations. The Qinghai-Tibet plateau is a large, mountainous area with various ecosystems such as alpine, forest, and grassland. Alpine is the major geographic barrier which is difficult to overcome. Thus the populations are reproductively isolated since their pollen and seed dispersal is limited by the complicated topography which formed during the uplift of the plateau.

As previously mentioned, *Lilium pumilum* is a promising plant. It can be used as breeding material for its ornamental values as well as high disease and abiotic resistance. It can also be grown as food or used for the extraction of chemical substances. However, because of these qualities, large numbers of *L. pumilum* have been illegitimately harvested by local people over the years, which in turn is threatening their survival. The distribution of *L. pumilum* is decreasing year after year and nowadays one rarely sees a mountain slope full of the red-orange *L. pumilum* flowers. Measures to protect the wild resources are now urgently needed. PFRI has already started making efforts to preserve *L. pumilum* in Qinghai and in the meantime, crossings have been made between *L. pumilum* and some Asiatic lily cultivars as well as some LA hybrid cultivars. We hope that in the coming years we will obtain some hybrid plants that have beautiful flowers and can grow well in a plateau environment.

# Timothy Whiteley OBE DL VMM

## 1931–2017

*In the following recollections, Nuala Sterling and Pontus Wallstén pay tribute to a great plantsman, Tim Whiteley.*

On a beautiful June day in Tim's woodland we said farewell to a very special member of the Lily Group. A gifted and knowledgeable plantsman whose training started as a child, under the tuition of his father, MP for Buckingham, who grew daffodils and roses but was killed in a plane crash leaving Gibraltar in 1943. At both his prep school in Devon and at Eton, he had his own garden. Farming since the 50s, in 1980 he bought a 60 acre woodland to develop into his magnificent garden. A keen plantsman he had frequently inspected it on horseback knowing that where rhododendrons grow, there is acid soil. Many stands of beautiful lilies grow along the rides in the beautiful woodland setting, where the pH varies between 5 and 8. The renowned stand of *Lilium superbum* was dazzling. His creation, with his own hands, gave him the greatest sense of satisfaction.

Chairman of the Lily Group in the 1990s, I first met Tim during the 2004 Lily Conference which he had masterminded. The Conference was one of the very best with its mixture of worldwide lecturers, presentations, garden visits and exchange of knowledge between so many lily enthusiasts.

Always generous with sharing his knowledge and plants, his contribution to the Lily Group committee and the bulb auction has been one of devotion and support. Punctilious in attendance and giving wise counsel to the very last, when his final illness was impeding him. At pre committee lunches he was a source of historic reminiscences worthy of a book in its own life.

In 2009, Tim welcomed the Lily Group to hold a stand, amongst the horticultural trade during his first 'Lily Festival', to encourage potential new members. Roy Lancaster gave a sellout talk on his experience of plant hunting in China and Kate Donald, the Lily Registrar, joined to chat with the visitors. His enjoyment when showing visitors around was palpable. A cool and windy day, but a truly wonderful experience.

In 2011, he was awarded the Lyttel Cup which President Elizabeth Banks presented. See Caroline Boisset's account of his life<sup>1</sup> and Tim's account of his garden<sup>2</sup>.

When, in 2012, the new arrangements for the RHS Groups were settled and we reported to Council via the new Bulb Committee (formerly Daffodil Tulip and

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<sup>1</sup> Boisset, C. (2012). *Lilies and Related Plants 2011–12*. Timothy Whiteley. pp.74–77.

<sup>2</sup> Whiteley, T. (1995). *Lilies and Related Plants 1994–95*. Evenley Wood Garden. pp. 101–108.



One of Tim's hybrids, *Lilium martagon* 'Evenley Jane', above, left.

Snowdrop committee) Tim immediately proposed that the first meeting of the Bulb Committee should be held in Evenley Wood. He personally adorned the tables with a varieties of *Lilium martagon* from the garden, pointing out how difficult a task it was to select AGM amongst the species! He joined the committee for the day, giving a lecture on the garden plants, followed by a delicious lunch prepared by his wife Jane and Lady Anne Whiteley, then rounding off events with a personal guided tour.

Abroad, he supported the 1997 International Lily Conference in Tasmania.<sup>3</sup>

Throughout my six year term of office as Chairman of the Lily Group, he has always given me wise advise, personal encouragement and support. Tim and Jane became warm friends. What a special person. Our members worldwide offer their admiration and sympathy for his family.

*Nuala Sterling*



It was with great sadness that I received, in early January, the news of the death of my friend Tim Whiteley. Past chairman and longtime Lily Group member, I was first introduced to Tim at the 2005 Lily Group bulb auction. He gave me his card and said, in his calm, charismatic and gentlemanly voice, "Well if I can ever be of any help, do give me a ring".

Starting in the early 1980s, he had set up from scratch his fabulous woodland garden at Evenley, in Northamptonshire, where his *Lilium* collection, one of the biggest in the UK, thrived. In May 2007 I finally had time to visit Evenley

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<sup>3</sup> Whiteley, T. (1998). *Lilies and Related Plants 1997–98*. Pacific Region International Liliium Conference pp. 62–64.

Wood. Wearing his signature tweed jacket, Tim greeted me with a big smile at Bicester North station. It was a cold, wet day, but this did not dampen his enthusiasm for showing his collections to an eager fellow lily enthusiast. We walked from plant to plant, each one rarer than the one before: trees, shrubs and bulbs, plants that Tim had often received as exchanges or gifts from fellow plant explorers, or that he had grown from seed, obtained worldwide.

We walked from lily to lily, *Lilium chalcedonicum*, *L. wardii*, *L. majoense*, *L. canadense*, *L. szovitsianum*, and *L. martagon* var. *catanniae*. *Lilium* ‘Garden Society’ and *L. martagon* ‘Evenley Jane’ (are two hybrids that he himself had produced). All were in perfect condition. Tim’s labelling was impressive: almost every plant had a printed label. With careful attention to detail, Tim never failed to replace these when they got battered by the weather (or a passing strimmer!). That day was filled with delightful discussion and I was reluctant to leave. But I would return countless times in winter, spring, summer and autumn over the next ten years.

I was fortunate to work for two consecutive summers with Tim and his head gardener Mike Fisher, organising the lily collection, doing general garden tasks, taking pictures and making films for Tim’s website. I had the added pleasure of enjoying Jane’s excellent dinners; they left mouthwatering culinary memories of her unforgettable chicken à la king, kedgeree, pheasant breast, dumplings (Tim’s favourite), carved beef joint, toad in the hole and many more. These meals, that Jane would spend considerable time preparing, were very welcome after a long day’s work in the wood. In 2015, we worked together on a time lapse shoot of opening snowdrop flowers, our last big project together.

Tim was a well of fascinating stories: growing up in the 30s and 40s, post-university years in London, dinner parties, horse racing, hunting and plant trips with Jane and with the International Dendrology Society. They travelled the world over: Mexico, Brazil, Thailand, the list goes on. I have fond memories of listening to these stories in the evening after dinner, seated by the fire with a cup of tea and some chocolate at hand, and Lanta their dog dozing peacefully beside us.

Tim had a wonderful sense of humour. I recall with a smile one story he loved to tell: after visiting Mark Flanagan’s *Lilium superbum* at The Savill Garden, Tim went back to Evenley, knelt down by his own *L. superbum* (already about 3 m tall) and asked Jane to photograph him from the waist up. He sent the photograph to Mark captioned “I think that *Lilium superbum* really grows best north of Windsor!”.

In the last years of his life, Tim worked on the lilies with Sue Russell-Wilks and since his death, she has been in charge of the collection, and is doing a great job.

This wonderful English gentleman will be greatly missed by his worldwide network of friends. I, personally, have great memories of times spent with him and Jane over the past ten years. It was a privilege to have known him.

*Pontus Wallstén*



# The lilies of dream

***Cheung Siu Ming*** grows many very rare species *Lilium*, unobtainable in Europe. Here he discusses these, and in addition gives us an insight into the fabled, very rare and expensive 'lilies of dream' from Japan.

I have about 30 to 40 species (including varieties and seedlings) currently growing. Most of them come from Japan, mainland China and Taiwan.

Hong Kong is in a subtropical area that it is hot and rainy in summer and not very



cold in the winter; it is therefore not suitable for all lilies. My lily collection comes mostly from China and Japan, which are close to Hong Kong and, in consequence, these lilies are the ones that grow most easily in Hong Kong. My favourite collection is the oriental group which is both colourful and fragrant. Most of the oriental lilies need to be refrigerated for two months in Hong Kong (eg. *Lilium japonicum*, *Lilium auratum* and *Lilium speciosum* var. *clivorum*) but some of them do not need this.

The following lilies are examples of some of my favourites:

## ***Lilium speciosum* var. *gloriosoides***

My first native species is *Lilium speciosum* var. *gloriosoides*. I first saw a photo of this lily on the internet and someone from Taiwan kindly sent some seeds to



me. For me, the easiest oriental lily is definitely the Taiwanese form of *L. speciosum* var. *gloriosoides*. It blooms very well in Hong Kong because the weather in Taiwan is the same as in Hong Kong.

My Taiwanese friend grows a lot of *Lilium speciosum* var. *gloriosoides* in his garden. He has found a white form in his seedlings that I have never seen before. (see photo below, right)

The Taiwanese *Lilium speciosum* var. *gloriosoides* starts to grow in winter, not in the spring, because the winter in both Hong Kong and Taiwan is not cold. The bigger bulbs begin to grow earlier but the flower blooms later. If you have different sized bulbs of Taiwanese *Lilium speciosum* var. *gloriosoides*, you can enjoy flowering from July to October. As it is late flowering, my own *Lilium speciosum* var. *gloriosoides* usually starts to grow in late autumn, even before the old stem withers and the seed are fully-matured.

The mainland *Lilium speciosum* var. *gloriosoides* is quite different from the Taiwanese one. I need to refrigerate them to give them a cold winter rest before they break dormancy and the shape is also not the same as the one that I grow. The two are, indeed, basically different species. I hope in the future to grow the Chinese form of *gloriosoides* as well as the Taiwanese one.



**Above**, the Taiwanese forms of *Lilium speciosum* var. *gloriosoides* including the very rare white form of the same lily (**above, right**).



*Lilium alexandrae*



*Lilium alexandrae*

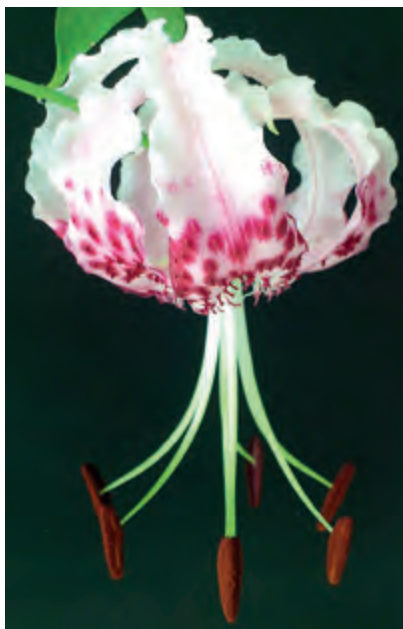
### **The lilies of dream**

I get most of my Japanese lilies from Japanese online auctions and online shops; I also exchange with some Japanese lily collectors. In Japan, they refer to the rarest lilies as ‘The lilies of dream’. These are difficult to find and have a high price.

The basic *Lilies of dream* are the red *Lilium auratum*, *L. alexandrae* (see photos above) and *L. nobilissimum*. These last two lilies are very difficult to find even in Japan and are two of the most expensive lily species there.

*Lilium alexandrae* and *Lilium nobilissimum* come from a few of the southern islands of Japan where the weather is most similar to that in Hong Kong; consequently they grow well in Hong Kong too. In my opinion, *Lilium alexandrae* is easier than *L. nobilissimum*. *L. alexandrae* is self-fertile so seeds can be obtained from only one plant. I ordered *alexandrae* and *nobilissimum* bulbs last year but the shop only supplied five bulbs of each species, and as they are rather expensive (about USD\$75 for one bulb), I have decided not to buy any more for the time being. The fragrance of *alexandrae* is wonderful, very similar to *Phalaenopsis bellina* in the daytime. I think *Lilium nobilissimum* is the most difficult *lilium* of the Oriental Section but even that is easier than the Chinese form of *L. gloriosoides*. *Lilium alexandrae* is certainly easier than the *L. nobilissimum*.

Other *Lilies of dream* are: *Lilium callosum* var. *flaviflorum*, *L. japonicum* var. *abeanum* (white-flowered form), *L. japonicum* ‘Hyuga form’, *L. maculatum* var. *bukosanense*, and *L. speciosum* var. *clivorum*. For *Lilium speciosum* var.



*Lilium speciosum* var. *clivorum*



*Above left, Lilium maculatum* var. *bukosanense* and *right, L. japonicum* var. *abeanum*.

*clivorum* (see photos opposite), the flower is about 7 cm in diameter and it smells like *Lilium sorbonne*.

I have a very interesting *Lilium auratum* which blooms like var. *pictum* in high temperatures and like var. *rubrovittatum* in low temperatures! Both are stunning flowers!

Other lilies that are very difficult to find include a number of striped lilies which are rare natural variations. These have beautiful golden lines on their leaves so as well as the flower, the leaves themselves are also very eye-catching.

Variations that are both pretty and extremely expensive include a spotless *Lilium auratum*, and a double-flowered *Lilium japonicum*. For example, I saw on the internet an attractive striped *L. auratum*; the Japanese blogger who uploaded the photo told me that he had paid one hundred thousand Japanese yen (about USD\$880) to buy the lily! It is not uncommon to see tiny rice grain sized bulbs of unusual forms of *Lilium auratum* (with pink flowers or white flowers with very few spots) going for over USD\$350 each on Japanese auction websites. The Japanese are certainly keen on plants with very special and unusual leaves or flowers! Among the most expensive I have heard of are a golden line leaved *L. auratum*. A flowering bulb of one of these might cost USD\$900. They are rarely seen on the market, and I certainly have never thought to buy them!

**Footnote** This article was previously published in the book, *The lily species and their bulbs* by Pontus Wallstén.



**Above,** The very rare *Lilium auratum* with yellow variegated leaves that sell for astronomical prices in Japanese bulb auctions.

# Following in Tony's footsteps

*In June/July 2016, Alan Mitchell criss-crossed northern Greece in search of species lilies, as he recounts in the following article.*

Social Media, specifically Facebook, has many critics, but it needn't always be used in the service of the banal, e.g. what I did on my holiday, it can be used for more serious pursuits, e.g. discussing lilies. To this end, Bjørnar Olsen, who was my guide on an unparalleled plant hunting trip to Yunnan, in 2014, created a Facebook page: Species *Lilium* and *Nomocharis* Enthusiasts, during June 2015. One of the, currently, 862 members who subscribe to this page is Tony Willis, who has posted some lovely photographs of species lilies from Greece, a country he has visited many times over many years, as his article in *Lilies and Related Plants 2013–2014* confirms. Tony and I don't just communicate virtually, we have actually met a few times and most recently exchanged pollen, which resulted in some seed of *Lilium* × *testaceum* (*L. chalcedonicum* × *L. candidum*). It was while Tony was visiting that I thought I would tap into his extensive knowledge of Greece and ask him to suggest an itinerary for a plant hunting trip with but a single focus, species lilies, which took place at the end of June and the beginning of July 2016. Essentially, it would have been very difficult to write this article without the guidance provided by Tony.

The flight, from Edinburgh to Thessaloniki airport, was uneventful. This was in direct contrast to my introduction to the adventurous way Greeks drive, as I made my way through Thessaloniki heading north east to Drama. One of the factors, that mitigated the tension-inducing local driving style, was the map application on my mobile phone, whose instructions I followed unswervingly as I criss-crossed northern Greece from Stavropouli in the east to Metsovo in the west (and all points in between). My favourite instructions were those that said something like: 'At the end of Adonis Avenue turn left and drive for 50 miles, before turning right'. To be fair, once I had left the chaos of cars in the towns the country roads were quite empty, which gave me time to relax and recover my equilibrium.

After eating and sleeping well, in Drama, I headed north to Mt Falakro (2,232 metres), which is the highest mountain in eastern Macedonia and Thrace. I felt quite confident about finding my first species, *Lilium martagon*, because Tony Willis had provided me with hand-drawn maps indicating where the various species were to be found. However, having searched for lilies in various parts of the world, I knew I would still have to keep my wits about me to spot the little points of colour, among the dominant tangle of greenery, which signifies success. Unfortunately, my 'wits' deserted me, as I overshot the track shown on





**Above, from left**, *Lilium martagon* var. *cattaniae* and *L. martagon* var. *sanguineo-purpureum* growing in Alan Mitchell's garden in Fife, Scotland. The red, unspotted form of *Lilium martagon* (**above, right**) photographed here on Mt Falakro.

Tony's map. Then, what can only be described as a malign miracle, occurred. As I was driving, fairly slowly, downhill I was aware that something was wrong, so I turned onto a track and stopped the car. Very quickly I found the cause of the problem, the wall of one of the tyres had disintegrated, as if scythed by the blade of a Roman chariot. Admittedly, there were some rocks on the road, but nothing that could have caused such catastrophic damage, so I concluded that the tyre must have been faulty. After changing the tyre, my attention was drawn to what might be described as a very small white church, or shrine, which stood a few metres from the car. Immediately, I thought of Tony's map, which, when consulted, pointed to a path—which was across the road—and some trees. As I walked along the path, through the trees, it wasn't long before the 'little points of colour' revealed a few plants of *Lilium martagon* and then a few more. The colour of the lilies was red, too pale to be *Lilium martagon* var. *cattaniae*. I would have said the lilies were more likely to be *Lilium martagon* var. *sanguineo-purpureum*, but the flowers were without spots and this variety is found in the former Yugoslavia and the Balkans, not Greece, apparently. It could, however, have simply been a local form, of this species, that just happens to be red. As I wandered back to the car I thought finding the lilies was a miracle (admittedly a small one) to compensate for such a malign start.

Those readers who like Western films will be familiar with the usually laconic description, 'It was a one horse town', which could be applied, I think, to Paranesti, which lies east of Drama. Unfortunately, my exploration of the country to the north of Paranesti produced not one lily, but perhaps that was because I didn't have one of Tony Willis's maps to guide me.

Travelling further east, I stopped in Stavroupoli, which is a pretty place with

a charming village square. My original intention, when planning the holiday, had been to meet Vladimir Trifonov, in southern Bulgaria, to visit sites where *Lilium rhodopaeum* grows. Vladimir is involved with the conservation of this endangered species, his endeavours having been recorded in the 2013–14 and 2015–16 editions of *Lilies and Related Plants*. However, having been misinformed by the car hire company that I could cross the border between Greece and Bulgaria simply by showing my passport, the meeting with Vladimir had to be cancelled. My wife, Michelle, has opined that my middle name should be ‘tenacious’—not Taylor—so I applied that characteristic to developing a Plan B, i.e. I would visit

one of the Greek sites where *Lilium rhodopaeum* is known to grow. The site I selected is north of Livaditis, in the Chaidou Forest part of the Rodopi Mountain Range National Park. Although I had, previously, researched the distribution of *Lilium rhodopaeum*, in Greece and Bulgaria, Moira (fate) intervened in the guise of Pantelis, who owned the guesthouse I was residing in (in Stavroupoli) and, also, worked as a Forester. For it was the hyper-energetic Pantelis who knew, precisely, where I would find *Lilium rhodopaeum* and, ever helpful, provided me with a hand-drawn map to help me find my beautiful objective. The drive north from Stavroupoli to Livaditis and then north east to the Forest Village of Erymanthus didn’t take long, so I was soon heading along the forest track towards the viewpoint (at approximately 1,600 metres), where Pantelis was certain I would find *Lilium rhodopaeum* in flower. The beautiful morning had turned into a baleful afternoon and, although I had found stems of *Lilium martagon*, I hadn’t found *Lilium rhodopaeum*. Then, after walking for over five miles and before the heavens opened to an accompaniment of thunder and lightning, there on a grassy slope (south east facing) were flowers of *Lilium rhodopaeum*. I quickly made my way to where the best plants were growing and took some photographs, while trying to ignore the intensity of the rain. The rich, almost glowing, yellow of the flowers seemed to defy the darkening day with their singular beauty. While admiring the flower shape and poise, of this lily, I was reminded of something Derek Fox wrote, that *Lilium rhodopaeum* “is every inch a cousin of the Caucasian species *Lilium*



*Lilium rhodopaeum* growing in northern Greece, near the border with Bulgaria.





*Lilium chalcedonicum* growing on Mt Vermion.

*monadelphum*" (Taxonomists take note!). It's difficult to be precise, but there might have been about two dozen plants growing on what was quite a large grassy area. I don't know how many more plants, of *Lilium rhodopaeum*, I would have found had I continued to the viewpoint, which is very near Mt Gyftokastro (1,828 metres) on the Greek-Bulgarian border. I did hesitate in turning back, but the driving rain, thunder, lightning and drop in temperature weakened my resolve, so I splashed my way back to the car elated and 'drookit', as the Scots say.

A long drive, west, to Naoussa, via Mt Pangeon (1,956 metres), which is near Eleftheropouli and where I found no lilies, was my base for searching for *Lilium chalcedonicum* on Mt Vermion (2,065 metres). Unfortunately, my map reading skills failed me, despite Tony Willis's clear directions, so a combination of desperation and tenacity (of course!) led me to follow a minor road that took me to a large car park beside a camp site. Then, with nothing to guide me but wishful thinking, I headed along a track until I saw a narrow path, which led, steeply, into the woods. Every time I stopped, to catch my breath, I looked intently at the wall of green plant life surrounding me for points of deep scarlet. Then I saw one, a single flower of *Lilium chalcedonicum*. There were stems of other plants, but they had already flowered. Looking around, I found a plant with an open flower and a bud that would soon open. The deep colour of the flower was enhanced by the lustre on the tepals and the red pollen. The stem was at least a metre long, with many silver-edged narrow leaves, which stopped where the long pedicels started

to grow. All of the plants were growing beside the path, where they could get some light in this quite heavily shaded environment. The soil was light and bone dry. With a number of photographs and video clips to contemplate I pondered if it was more than pure luck that led me to *Lilium chalcedonicum*? Then, I thought, that's not rational, which was true, but it didn't answer the question!

My next destination was Metsovo and the Katara Pass, which is south west of Naoussa. Driving to Metsovo was an enthralling experience (for a committed hillwalker), as each vista of the northern Pindus Mountains surpassed the one before. Although Metsovo has a bit of a tourist trap feel about it, it is still a pleasant place, in a fabulous setting, with good accommodation and good restaurants. The drive, from Metsovo to the Katara Pass (1,705 metres) had the same magnetic effect, on me, as the mountain scenery of the previous day. Tony Willis had indicated that *Lilium albanicum* had been found beside the minor road that leads to a disused radio station and so it transpired. However, all of the two dozen, or so, plants I found had flowered some weeks previously, as seed capsules were already developing. The plants which were quite short, the tallest being about half a metre, were growing through a low growing shrub, which looked like a species of *Buxus*. I have seen other species lilies taking advantage of the protection (from browsing animals) afforded by prickly plants, in Yunnan, where *Lilium souliei*



**Above, left**, it was too late to see *Lilium albanicum* in flower, and **right**, *Lilium albanicum* flowering in Alan Mitchell's garden.





*Lilium chalcedonicum* flowering Mt Olympus National Park.

was growing through *Rhododendron impeditum* and in California where *Lilium bolanderi* was growing through Manzanita plants, *Arctostaphylos*. I didn't feel disappointed, because I hadn't seen *Lilium albanicum* in flower. The main thing is I found it and can always return.

Travelling east from Metsovo to Litochoro, which sits beneath mighty Mt Olympus (2,917 metres), I wondered if I would, again, find *Lilium chalcedonicum*. The weather was perfect as I drove into Mt Olympus National Park and I felt quite confident about finding *Lilium chalcedonicum*, as I had a map, drawn by Tony Willis, which, despite my luck on Mt Vermion, had to be a better guide than wishful thinking. I did find one plant of *Lilium chalcedonicum*, which was in flower, and six plants that had already flowered, so I felt quite fortunate. As with the Mt Vermion plants, the environment was fairly shaded and the soil was light and bone dry. I used what I had learned about the natural habitat of *Lilium chalcedonicum* (degree of shade and the condition of the soil) when I planted some bulbs I had propagated from scales. Next summer will reveal whether, or not, I have simulated a suitable growing environment for this much sought after species.

While driving back to Thessaloniki airport, I reflected on what had been an enjoyable holiday and successful lily hunting trip and decided that returning to explore more areas, in northern Greece, was more of a certainty than a possibility, with or without Tony Willis's maps.

# Indigenous wild lily species of Korea

*In this article, Prof. Ki-Byung Lim<sup>1</sup> of Kyungpook National University, Daegu, Korea, provides information and expresses his views about *Lilium hansonii*, a member of the *Martagon* section and a native species of South Korea.*

Lilies have been known to various parts of the world since the most ancient times. The lily is a highly commercial flowering plant belonging to the *Liliaceae* family. The genus *Lilium* comprises more than 100 species and subspecies. Most of them are distributed in the Northern Hemisphere, especially in East Asia and North America.

In Korea, *Lilium hansonii* is commonly called ‘seom mal-nari’, which means ‘island lily’, and on Ulleung-do Island ‘cham-nari’, which translates as ‘real’ or ‘true lily’. In the Latin translation, it is known as Hanson’s lily. The first *L. hansonii* bulbs obtained in Europe came through East Asia. These first recorded bulbs were despatched in about 1868 to Philipp von Siebold in Leiden, The Netherlands. Some divisions of these bulbs from the Netherlands subsequently made their way to England, where it was flowered in 1871. Maximilian Leichtlin had contact with a correspondent who was a deeply enthusiastic lily aficionado in Brooklyn, New York, by the name of Peter Hanson. As a lily species had already been named for Leichtlin, he honoured his friend by calling it, *Lilium hansonii*.

Lilies are categorized into seven sections (*Archelirion*, *Dauroilirion*, *Leucolirion*, *Pseudolirium*, *Liriotypus*, *Martagon* and *Sinomartagon*) on the basis of their morphological and physiological characteristics. South Korea comprises diverse geographical characteristics that include temperate and warm climatic areas that are fertile in *Lilium* species, and 15 naturally growing species have been identified (Kim, 2008). The first report about the distribution of species lilies in Korea was provided by E. H. Wilson in 1925. Lighty, 1969 reported that *Lilium* spp. originated from Korea and the adjacent region of Manchuria. Two sections of *Lilium* thrive in Korea, which include 11 species (*L. hansonii*, *L. tsingtauense* and *L. distichum* of section *Martagon*; and *L. lancifolium*, *L. amabile*, *L. leichtlinii*, *L. cernuum*, *L. pumilum*, *L. concolor*, *L. callosum*, and *L. dauricum* of section *Sinomartagon*). There are five species known from the *Martagon* section in the genus *Lilium* that are distributed around the world, but three species (*L. hansonii*,

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<sup>1</sup> Author: Prof. Ki-Byung Lim. Co-author: Dr. Ahsan Akram

*L. tsingtauense* and *L. distichum*) have natural habitats in Korea. *L. bansonii* is endemic to Korea, where it, naturally, grows only in the mountains of Ulleung-do Island (van Tuyl et al., 2011). This species has distinctive characteristics. For example, *L. bansonii* has downward facing flowers, which is a unique characteristic among the lilies of the *Martagon* section. *L. bansonii* is a species that isn't widely distributed in Korea. It grows in mountainous areas where all environmental conditions are satisfied, such as correct temperature, humidity, soil moisture and light intensity. *L. bansonii* is very sensitive to environmental conditions, especially the incidence of light. Light intensity during the growing period from spring to autumn is an important factor in its natural habitat.

In Korea, there is, specifically, an island about 80 kilometres off the eastern coast of the Korean peninsula that is the only certain home of *Lilium*

*bansonii*. That island is called Ullung-Do (it may also be spelled 'Ullreung-do' by the Koreans). It had been called Dagelet Island by Westerners. Lighty, 1970 said *Lilium bansonii* was what he would term a 'relict' species, which means it has retreated from a much larger geographical range and is presently in a geographically circumscribed, ecological niche. To compound the impression of scarcity or rarity, Korean botanists S. M. Roh and H. K. Choi, indicate the natives of Ullung-Do Island in past decades used the lily bulb as a food source. It was the main ingredient in a type of cake during periods of starvation. From one tiny island of the west coast of Korea, comes *L. bansonii*, a lemon-yellow martagon with a flower that opens flat and does not recurve much at all, so it is not technically a turkscap even though it is downward facing. It is understood that *Lilium bansonii* occurs naturally only on one Korean island. However, some sources speculate it may have occurred on at least one other island near to Ullung-Do earlier in the last century. That is believable, but not proven. Since *L. bansonii* is depicted as a lily in a final state of a receding habitat, e.g. a relict species, it



*Lilium bansonii*



**Figure 1. Distribution map of *Lilium hansonii* at Ullung-Do in South Korea.**  
 1 Baram-deungdae 2 Nari Dong 3 Maljandeung 4 Bbapjangyi-deungdae  
 5 Seong In Bong 6 Sadong-ri 7 Nari-ryeong 8 Naribunji basin

is possible that more colonies existed nearby in the recent past. Of course, the species has been transported to mainland Korea and is under cultivation there.

The Island of Ullung-Do is mild in summer and very cold during the winter. It is a region which receives heavy snows from December through to March. On Ullung-Do, *Lilium hansonii* flowers in mid-May. *L. hansonii* is only found in dense shade of about 50 percent light intensity. It is confined to very steep mountain slopes about 800 to 990 metres (2,600–3,200 feet) above sea level. The slopes imply excellent drainage. Ullung-Do, the native homeland of *L. hansonii*, was discovered by Westerners in 1916. Lighty, who reached Ullung-Do in 1966, found *L. hansonii* in much the same contexts that Wilson had described except he did not observe the ‘deep humus’. Indeed, (Lighty, 1968) indicated he found *L. hansonii* growing on slopes devoid of leaf or vegetative debris.

I visited Ullung-Do in early 2015. I visited most of the locations where *Lilium hansonii* is known to be found. Prominent ones are Maljandeung, Seong-In bong,



Professor Ki-Byung Lim with *Lilium Hansonii*, photographed here on Ullung-Do Island.



Nari-ryeong and Nari-bunji. From these locations, I obtained *Lilium hansonii* bulbs for further trials at M-1 Greenhouse of Kyungpook National University, Korea. All morphological attributes that are studied are characterized in Table 1.

**Table 1. Morphological characteristics of *Lilium hansonii* together with the elevation of habitats at Ullung-Do.**

Location	Maljandeung	Seong-In bong	Nari-ryeong	Nari-bunji
<b>Genome</b>	MM	MM	MM	MM
<b>Altitude (m)</b>	967.8	986.5	816.3	813
<b>Days to flowering</b>	71	83	74	72
<b>Height (cm)</b>	70	45.7	70	70.5
<b>Number of leaves</b>	17(6)	17(7)	18(7)	21(7)
<b>Leaf arrangement</b>	Circle	Circle	Circle	Circle
<b>Number of flowers</b>	5	2	4	5
<b>Flowering direction</b>	Pendant	Pendant	Pendant	Pendant
<b>Flower colour</b>	Bright yellow	Bright yellow	Bright yellow	Bright yellow
<b>Spots</b>	Yes	Yes	Yes	Yes
<b>Spot contribution</b>	Middle	Middle	Middle	Middle
<b>Fragrance</b>	Yes	Yes	Yes	Yes



As with most lilies, *Lilium hansonii* bulbs are easy to propagate. By breaking away some scales from the bulb and keeping the scales in a barely damp medium such as soil, sand or vermiculite, one can continually increase the number of bulbs. Also, one may get good natural, yearly bulb division by providing good care for the lily. Each season, each bulb divides as one becomes two and two becomes four and so on. Moreover, a bulb, if well nourished, will form many little bulblets as underground bulb offsets. A person who came into possession of one bulb, could within a few short years build up scores of mature bulbs through scaling, bulb offsets and division. All the bulbs, however, would have identical genes. All would be a clone of the original. They would be the same colour, have the same pattern of



*Lilium hansonii*, an impressive inflorescence

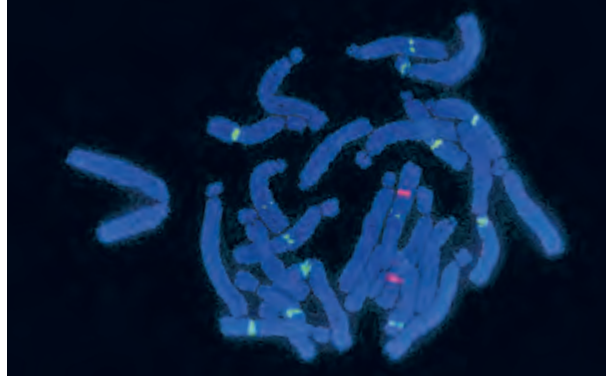
spots and possess uniform habits. Even though such plants would have complete flowers, i.e. female organs (pistils) and male organs (anthers), they would not be self-fertile to any degree. The genetic variability that comes from cross-pollination within the species or sexual reproduction via seeds would be absent.

*Lilium hansonii* is one of the important species from the *Martagon* section, not only for commercialization but also scientific research. For cytogenetic study, I used these samples for chromosomal analysis.

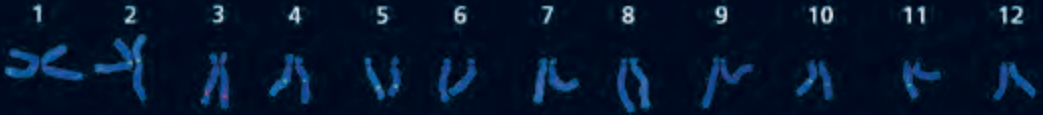
**Chromosome Analysis** The *Lilium* genome has 12 chromosomes and all wild species are diploid ( $2n=2x=24$ ), and few species such as *Lilium tigrinum* (a.k.a. *Lilium lancifolium*) is triploid ( $2n=3x=36$ ). The genus *Lilium* has one of the largest genome sizes (1C value 35.95pg) after *Fritillaria*, which is the largest genome (1C value 62.70pg) in the plant taxa. *L. hansonii* possesses 24 chromosomes showing eight loci of 45S ribosomal DNA domain. The conventional chromosome data where *L. hansonii* showed four sets of secondary restriction on chromosome No. 3, 4, 6 and 10, respectively.

**Karyotype of *Lilium hansonii*** FISH results using 5S and 45S rDNA as probes

Right,  
Figure 2



Below,  
Figure 3



are represented in (Fig. 2). *L. bansonii* possesses the highest number of 45S rDNA among Section *Martagon*, and the number is flexible by each plant individuals. The number of 45S rDNA in *L. bansonii* ranges from 12–17 signals. What caused this variable numbers of 45S rDNA is not identified yet. 45S rDNA signals were detected on the long arm of the chromosome No. 1, 3, 4, 5, 10 and 11, on the short arm of the chromosome No. 7. A pair of 5S rDNA signal was detected on the long arm of chromosome No. 3, below the 45S rDNA signal pair. (Fig. 3).

### Prospects

Prof. Lim is studying the breeding genetics and cytogenetics aspects of *Lilium bansonii*. He has raised a couple of hybrids by crossing the old original with the new progeny. This information offers base line information for the effective exploitation and recognition of *L. bansonii* resources for germplasm conservation and breeding.

### References

- Kim, T. J. (2008). *Wild flowers and resources plants in Korea*. SNU Press, Seoul, Korea. pp. 1-5.
- Lighty, R. W. (1968). Evolutionary trends in lilies. *Lily Year Book*, Royal Hort. Soc., London. 31: 40-44.
- Lighty, R. W. (1969). The lilies of Korea. *Lily Year Book*, Royal Hort. Soc., London. 31: 31-39.
- Lighty, R. W. (1970). The lilies of Korea. *Lily Year Book*, Royal Hort. Soc., London. 33: 102-105.
- Lim, K. B., Wennekes, J., De Jong, J. H., Jacobsen, E., van Tuyl, J. M. (2001). Karyotype analysis of *Lilium longiflorum* and *Lilium rubellum* by chromosome banding and fluorescence *in situ* hybridization. *Genome*. 44: 911-918.
- van Tuyl, J. M., Arens, P., Ramanna, M. S., Shahin, A., Khan, N., Xie, S., Marasek-Ciolakowska, A., Lim, K. B. and Barba-Gonzalez, R. (2011). *Lilium. Wild crop relatives: Genomic and breeding resources, Plantation and ornamental crops*. Kole, C. (Ed.). Springer-Verlag, Berlin, Heidelberg. pp. 161-183.
- Wilson, E. H. (1925). *The lilies of eastern Asia*. Dulau & Co., Ltd., London.

# End of an era

*The following two articles, by **Charlie Kroell** and **Jeff Stiller**, profile the work of Dr Robert Griesbach in hybridising lilies and how 4,500 of his bulbs were saved for posterity.*

The name “Dr. Robert A. Griesbach” is well known, not only among the NALS readership but around the planet. Professor emeritus of biology from DePaul University, Chicago, Bob has been a pioneer in ploidy conversion and tetraploid breeding in the genera *Gladiolus*, *Hemerocallis* and, especially, *Lilium*. He has written for the NALS Yearbook and *Quarterly Bulletin* and been a speaker at NALS annual conventions. The story of his breakthrough cross 4N ‘Black Beauty’ × 4N ‘White Henryi’ in 1979 is well documented and widely known. For any who might have access to the March 1984 *QB*, it would be well worth seeking out for review or a first-time examination.

The front cover is adorned with a stunning color photograph of the newly named and registered ‘Leslie Woodriff’, one of five seedlings resulting from some 400–500 crosses, yielding mainly chaff but also five viable seeds (embryo rescue was not required) found during a diligent, painstaking search. That of the five which



Robert Griesbach shows off some of his lilies in 2009.



This is a Griesbach OT that Bob says is a good pollen parent for crosses.

Bob judged to be closest to a “finished product” he chose, with permission, to name in honor of the legendary Leslie Woodriff, creator of both its ‘Black Beauty’ and ‘White Henryi’ parents at the diploid level.

Since its introduction, ‘Leslie Woodriff’ has become a garden favorite and the sixth hybrid to be voted into the NALS Hall of Fame. Intercrossing and backcrossing with succeeding generations, and as fertility was gradually restored, Bob has continued to work with this line. The results have been a stunning array of colors and patterns: bold and rich, nuanced and soft, sharply demarcated and aesthetically blended and some even endowed with (as Judith Freeman might say) “frilly papillae.”

### **Tetraploid Fireworks**

At the 1994 NALS Show/Convention in Portland, Bob was one of the featured speak-ers, presenting a narrative of the work that had, by now, already produced a range of extraordinary tetraploid orienpets.

It was the Fourth of July weekend, and Bob concluded his presentation with a slide that elicited spontaneous applause from the audience. It showed a collection of 12 florets upon a background of conifer boughs representing a sampling of what had already been accomplished. He had hoped they would be reminiscent of fireworks, and they most certainly were.

Later, at the awards banquet that Saturday evening Bob became the recipient of the E. H. Wilson Award for outstanding contributions made to the genus *Lilium*, the highest honor bestowed by the North American Lily Society.

### **Kids in a Candy Shop**

Whenever NALS conventions took place near Bob’s home in Delavan, Wis., (Chicago; Eau Claire Wis.; Bloomington, Minn.), it was not uncommon for those friends and fans of Bob who could work it into their schedule to include a visit to see him and, before her untimely death, his delightful and inimitable wife, Mary Lou.

This, of course, was at the time when his fields of lilies would also be at or near



Pollen was collected from this colorful lily on 18 July 2016.

their peak bloom. What a delight! It was a treat for all, like kids in a candy shop. This was eye candy, delicious to the beholder.

In 2009, Larry Diehl and I had a light-bulb experience. Why not plan a special trip to see Bob, aiming for the time when his renowned orienpets would be in bloom? It wasn't long before four others were on board: Rimmer de Vries, Warren Summers and Dick Bayerl joining us for the van trip out from Michigan; and Marianne Casey flying up from Virginia and driving from Milwaukee to join us in the fields on the second day.

This was an occasion never to be forgotten and for the most part defined the format for each of the seven annual trips that would follow. We would arrive about midafternoon, enjoy a first inspection walk-through of the gardens and then repair to a restaurant where, especially during the later trips, we would stay until the cleaning girl began vacuuming around our feet.

The following morning, bright and early, it was back to the fields, cameras and pollen collecting paraphernalia in hand. Bob, an exceedingly generous person, often would already have collected pollen for us that he believed might have special potential. There would be a break for lunch, often followed by a lively talk and Q-and-A session in the coolness of his living room. Finally, there would be a last turn around the fields followed by cleanup for dinner, affectionately dubbed our "last supper" at our beloved Duck Inn, a landmark dining emporium near Delavan. Then we would bid farewell to Bob and return to our motel. Next morning we were bound for home.

Over the eight years that we were privileged to enjoy these unforgettable occasions, 13 lily aficionados participated: In addition to our first "Gang of Six," were included Betty Sturley, Dick Kammer, Jeff Stiller, Jim Ault, Patrick Brown, Judith Freeman and Lane Spence from New Zealand.

Sadly, there will be no more such memorable moments. Our last trip was July 17–19. Jeff, who in October with the help of a few dedicated devotees to lilies and to Bob, made a concerted effort to save as many as possible of Bob's unique hybrid seedlings, has written an account of our last, bittersweet visit to Delavan and a concluding epilogue documenting "The Big Dig".



# Big Life Changes

*By Jeff Stiller*

A yearly pilgrimage of serious hybridizers, friends and followers convened at Dr. Griesbach's home in Delavan. Those of us fortunate to have become good friends with Bob and to have benefited from his lifetime of knowledge and experience.

We anticipated sharing stories, both past and present, of attempts to bring about new generations of lilies and talking of what has been accomplished and what is to be expected. We discussed soils, pests, rain and heat and how to improve and enhance what has been done. How can the bridges of lily divisions be crossed?

Then we went out to the fields, getting mud on our feet and pollen on our noses, to have a closer look at the details while Bob would explain.

This year, an unexpected situation arose. It was the golden opportunity of a new job for daughter Barbara and a warmer climate for all. The family decided to move a year earlier than had been planned, to a dreamed-of retirement setting in Cape Coral, Florida and to pack and move in a very short time. For Bob, there would be no more



Lily friends gather for a final outing to the Duck Inn near Delavan, Wisconsin. Seated in front from left: Bob Griesbach, Judith Freeman and Warren Summers. Standing in back from left: Charlie Kroell, Jim Ault, Rimmer de Vries, Dick Kammer, Patrick Brown, Larry Diehl and Jeff Stiller.



time to see new seedlings bloom, to make new crosses or to start a new generation of hybrids. There would be no more seed to send to the seed exchange or efforts to advance breeding. We listened to Bob's concerns of what a new owner might do with the property. Would his 60 years of work go under the plow, be sold as a commodity, trampled under the hooves of horses or lost in the weeds? Could someone new possibly understand the value of genetic material and all the succeeding generations of hybrids from Bob's breakthrough cross of almost four decades earlier? Could someone be ambitious and knowledgeable enough and have the desire to continue to develop generations of hybrids with new characteristics?

Discussion followed as to how best to save all or part of this invaluable material. Could the bulbs be dug in the middle of summer, foliage and all, cleaned and sent to serious hybridizers? Would the bulbs desensitize as in normal fall conditions? Would they change the starches to sugars needed for next year's growth? Then there would be the task of identification in a field of thousands with no plants in flower!

A conclusion was reached that it would be too harmful to attempt this in summer. Bulbs would be dug in a timely, proper manner in the coming fall and then sent to hybridizers who could continue working, as Bob has tirelessly done, toward new generations of developments, ensuring new seed continuing to flow into the seed exchange and improved varieties propagated for introduction. Bob also thought that his tetra Asiatic and trumpet developments had been taken as far as he could. It was now time for others to continue. There are bulbs and seed already available commercially or through the seed exchange.

After long and detailed discussions, we toured the fields for our last time, drilling Bob as to the history of his lilies, seeing his line breeding philosophy proven true and asking about bulb life cycles and what were his seed starting secrets.

Then it was time to get ready for dinner at the Duck Inn. Everyone but myself returned to the hotel to change pollen-stained clothes. I stayed behind to rest a bit with Bob. We talked of long-term breeding goals and what might be accomplished. We then rendezvoused with the others. At dinner, our voices echoed reflections past and present. We were all fortunate in having this opportunity to wish Bob the very best in his new home.

I returned a few weeks later, when the dust had settled. There was time to contemplate the situation. We agreed to mark, dig and send bulbs in the fall. A small group was formed to complete this task. Hopefully this story will be continued for many years to come. Best wishes to Bob and family!

### **Epilogue: The Big Dig**

Well it's done, and, like Bob, we could not look back, only forward. Others take vacations to the beaches, big cities or national landmarks. We went on a mission to rescue and preserve as many bulbs from Bob's yard as possible.



Digging forks designed by Patrick Brown and built by Jeff Stiller made digging clumps of bulbs much easier.

Organizing the undertaking was a challenge because of the uncertainty of what we would find and how the digging process would go. The plan was to keep each of many groups of bulbs (different specific crosses) separate for digging and then recombine for packing and shipping to each of numerous recipients.

About 320 lots were extracted with care (lifted as a mat), and at packing each recipient was given a good cross-section of the 4,500 bulbs dug. We likely only missed stems cut down by frost last spring or lost in the tall weeds. Items marked with tags during the summer were given priority in the digging process. In the end all visible lots were dug.

The digging forks (designed by Patrick Brown, built by Jeff) were a tremendous help in the heavy and sometimes very wet soil. They would lift and crumble soil while not damaging bulbs, allowing whole clumps to be brought up at once.

Cleaning the bulbs was a challenge because of the heavy soil packed tightly to the basal roots not washing off easily. There may have been a better way than the brute force method we used of spreading the bulbs in a bulb crate and spraying with a garden hose, but none was obvious for the conditions under which we were working. Washing in the dark with cold water led to wet shoes and mud splashing everywhere.

Volunteers were many but were intentionally limited to ensure digging and sorting would stay on track. With each new crew there was training on the process of digging while keeping clumps together and separated from other clumps. Each new person was quick to understand and invaluable to our mission.

The field was now full of holes (which we leveled before leaving) and overturned dirt. Three trailers were filled with carefully separated bulbs by nine worker bees, no longer pollen on their noses but dirt randomly smeared head to toe. A last lunch at the Countryside Restaurant, a concerned neighbor, and a friendly visit by the local sheriff added a touch of levity to our labor of profound love. With many thoughts coursing through our minds, and deep feelings of satisfaction, we took our leave.

A thank you to the indomitable crew: Patrick Brown, Jim Ault, Bill Bauer, Tracey and Pat Nelson, Forrest Peiper, Barbara Ronningen, David Whaley and yours truly.

#### **Footnote**

This article was first published in The North American Lily Society Quarterly Bulletin (March 2017) and is reprinted here by kind permission of the North American Lily Society.

# *Lilium stewartianum*—and plant hunting in modern day China

*Bjørnar Olsen* has a wide experience of plant hunting in western China, which is clearly reflected in this article.

For years now I have spent every summer exploring the mountains of South-West China. Sometimes I have headed to mountains and gorges at random, other times hunting down specific species. This summer's targets were *Lilium stewartianum*, *L. sempervivoideum*, *Fritillaria delavayi* and *Rheumobile*. I knew two of them would be easy, having already collected seeds of *F. delavayi* in 2015, and having a single GPS location for *Rheumobile*—the others would prove more far difficult.

The best time to see the wild flowers of the mountains of Yunnan and Sichuan is from June to early July, although many of the lilies don't flower until late July. A few species, like *Lilium primulinum* ssp. *ochraceum*, only start flowering in mid-August. I've often wondered why *Lilium stewartianum* was so little known, Xiangcheng is near Shangri-la/Zhongdian and paths well-trodden by numerous Western plantsmen and gardeners—and I suspect the fact that it flowers relatively late, from mid-July onwards, could be one reason. (The other, of course, and perhaps thankfully, that no Chinese wildflower 'nursery' ever offered it for sale.)

*Lilium sempervivoideum* is another enigmatic species barely known to us in the West. Its closest relative, *L. amoenum*, is much better known, from wild collected material exported over the last few years, the stock originating from rather low altitudes in Southern Yunnan near the Vietnamese border. It is also growing wild in open pine forests around Kunming, flowering towards the end of June if the dates found on the Chinese web page PlantPhoto.cn are to be trusted. Sadly it is not frost hardy, and best cultivated in a pot.

PlantPhoto.cn is also where you can find the only three photographs of *Lilium sempervivoideum* in the wild, albeit misidentified as *L. bakerianum*—the location given as ShuiluoYading in Muli county, Sichuan. Sadly, the sensitive 'political' situation (widespread poverty, Tibetan self-immolations and a huge police/military presence) in this area makes visiting it very difficult for foreigners. China Virtual Herbarium (cvh.ac.cn) had more clues to where it might grow, with a handful of collections dating from the 1950s and 1960s. The species seems to be limited in distribution to the warmer and dryer areas surrounding the Jinsha river flowing from Lijiang through Muli and the Liangshan area.

Knowing Muli might be problematic, I decided to explore some of the other locations listed on the old herbarium sheets. *Nomocharis pardantibina* or *Lilium lijiangense* had also been collected in nearby areas, and we hoped we might



**Above, left,** *Lilium bakerianum* var. *rubrum* (dark form). Huidong, Sichuan Province.  
**Above, right,** *Lilium bakerianum* var. *rubrum* (pale form). Dongchuan, Yunnan.

come across these as well. August Wu joined as translator, and we left Chengdu for Miya on 15 June. Miya belongs to Panzhihua, perhaps best known in the West for *Cycas panzhibuaensis*. In China, Miya is famous for its mangoes, which are planted everywhere. It's warm, very warm—even altitudes near 3,000 m are frost free in winter. Two days of exploring the mountains and some 500 kilometres of driving later, and the only interesting things we had seen were all Aroids—several *Arisaema* ssp. and a new species of *Sauromatum*. Some of the older locals claimed to have seen both *Lilium sempervivoideum* and *Nomocharis pardantbina* in the past, however the local government had sprayed their habitats with Roundup to plant monoculture pine- and walnut-plantations, in a reforestation project that is being touted as a huge success story by the Chinese abroad.

Looking at pictures on Google Earth it was clear that another of the locations, Lushan just south of Xichang city, had suffered the exact same fate. The pine plantations are something you see all over both Yunnan and Sichuan—and they are still being planted on a massive scale. The Chinese lily and orchid species native to grasslands and meadows at intermediate altitudes are now perhaps the most at risk of extinction, both from over-grazing by the omnipresent goats and from their habitats being ruined in the name of reforestation.

With Miya turning out to be a dead end, we made our way south eastwards to Huidong and the Sichuan-Yunnan border, meaning a whole day spent travelling by car, three different buses and a tuk-tuk. We spent two days in the area, both days reaching altitudes of near 3,000 m, talking to local farmers who often claimed to recognize the pictures we showed them, but both days coming up empty

handed. What we did find on our second day was a nice, deep pink *Lilium bakerianum* var. *rubrum*, quite different from the usual pale pink form. I have come across this lily many times before, it is common at lower altitudes in central and south Yunnan, always found in areas experiencing next to no winter frosts. Interestingly, all the specimens I have come across in the past, from Baoshan some 500–600 kilometres southwest, through Kunming to Dongchuan, a mere 65 kilometres south of Huidong, have been uniformly pale pink with a single (or, rarely two) fairly large trumpets.

*Lilium bakerianum* var. *rubrum* has a reputation for being difficult to grow, although I never found that to be the case when grown in a pot and kept dry and frost free over winter. Like *L. amoenum* it's frost tender, but should be easy to grow in the southern parts of the UK, with, perhaps, a little protection given in very wet winters.



*Lilium bakerianum* var. *delavayi*, Lijiang, Yunnan Province.

The other commonly encountered variety of *Lilium bakerianum* is *Lilium bakerianum* var. *delavayi*, which can be found growing wild around Lijiang north through Xianggelila up towards Sichuan. The plants in cultivation have, as far as I know, all been wild collected around Lijiang. While the areas and altitudes it grows wild in do experience some frosts, I still found it impossible in the open garden in Southern Norway, my home country. This could be due to a lack of hardiness or a lack of tolerance of winter wet, or perhaps both. Like *L. bakerianum* var. *rubrum* it's easily grown in a pot, kept dry and frost free over winter. There does seem to be some confusion surrounding this variety and *L. bakerianum* var. *aureum*, of which the useless key in Flora of China is of no help. *L. bakerianum* var. *aureum* was described in this very Yearbook back in 1939, and the main difference lies in the foliage. In *Lilium bakerianum* var. *delavayi* the leaves





*Fritillaria delavayi*, Tianbaoshan, Shangri-la, Yunnan Province.

are 2.5–3.5 cm long and 2–8 mm wide, much shorter than the 6.5–11 cm long and 6–11 mm wide leaves in *L. bakerianum* var. *aureum* (Sealy, 1950). I have not yet come across the latter variety in the wild, but it is apparently found growing wild, west of Lijiang; Laojunshan and the other mountains lying between the Yangtze (Changjiang) and Mekong (Lancangjiang) rivers.

A week after our trip to Liangshan I boarded a flight to Zhongdian, now better known as Shangri-la, in northwestern Yunnan, hoping I would have better luck there. Danzeng, my regular driver for the last six years, picked me up at the airport, and early next morning we were on our way to Tianbaoshan. Most of the fir forests there has been cut down, presumably illegally so, and there were plenty of yaks around to keep me company while I headed up the valley towards the limestone scree where *Fritillaria delavayi* grows. I feared mid-July would be too late in the season to find them in flower, but while many of the flowers had started fading, there were plenty around to photograph. Growing alongside it were *Cremanthodium*, *Corydalis bemedicentra* and *Meconopsis venusta*. It was clear from the fresh paths in the scree that other people had visited earlier in the year, so I'm sure some of them got far better pictures than I did.

Both Danzeng and I knew the next two days would be exhausting, he had to drive 290 km, half of which on unpaved roads, driving over two mountain passes, the highest being 4,350 m. I spent the entire trip looking out of the car window,



looking for lilies and other plants of interest growing along the road. Near the pass of Xiaoxueshan there is a huge population of *Cremanthodium rhodocephalum*, but being a late flowering species all I got to see were leaves. It is at its very best in mid-September, which make the seeds rather difficult to collect. *Lilium lankongense* proved quite common on the road between Xiaoxueshan and Daxueshan, as did *L. taliense*, but there were still no trace of *L. stewartianum*.

*Lilium taliense* is a very common and widespread species in China, found growing in deciduous forests at higher altitudes all the way from NW Yunnan through Sichuan, Chongqing and into Hunan and Guizhou. The typical form, well known in the west, is pure white with a few purple spots and black nectaries and flowers in late July in Xianggelila. The more Eastern forms in Chongqing, Guizhou and Hunan have yellow (or bicoloured yellow and white) flowers, and are perhaps best known to Western gardeners by the nickname 'var. Kaichen'. The form growing on Jinfoshan in S Chongqing was described as *L. jinfushanense* due to its yellow colour and heavy spotting. Gao (2014) synonymized *L. jinfushanense* with *L. taliense* after having studied plants from the type location and the type itself, and I completely agree with him.

*Lilium lankongense*, and its sister species, *L. duchartrei*, interestingly have the same distribution, and show the same wide variation. *L. lankongense* in NW Yunnan is pink and sparsely spotted. *L. duchartrei* around Kangding and Baoxing is white, sometimes shaded pink on the back, with the same sparse spotting, while those growing in Guizhou and Hunan are white and often very heavily spotted. Its habitat remains the same throughout the range: sunny rocky slopes and screes that offer little competition, and where its running habit is a huge advantage.

Armed with a single GPS reference point I asked the driver to park in a valley just down from the Daxueshan pass, and started the trek uphill towards where I hoped *Rheum nobile* would be growing. It had looked rather flat on Google Earth, but it most certainly was not, I would have to walk two kilometres starting from 4,300 m up to 4,600 m. I thought the path going uphill might follow the stream, but instead I ended up forcing my way through a thicket of



*Lilium lophophorum*, Daxueshan, Yunnan Province.



*Lilium lankongense*, Xiaoxueshan, Yunnan Province.

Rhododendron—finally reaching a plateau after an hour or so of wishing I had brought a machete. The plateau had an amazing view, and a couple of abandoned shepherd's huts, but I still couldn't see any signs of the *Rbeum*—just something scree-like in the distance. At 4,500 m breathing and moving starts getting difficult and heavy, but another cliff and 15 minutes walking later—and I could finally make out the 'yellow pagodas' in the distance. That single hillside must have had at least 20 plants in full flower, with numerous seedlings and younger plants around. I also came across *Eriophyton wallichii*, the very first time I have encountered this species in the wild.

We continued north towards Xiangcheng, making several more stops and walking up side valleys trying to locate *Lilium stewartianum*, but to no avail. It was getting late, but I wanted to explore the hills some 25 kilometres north of the town—and there, at 5 pm, I finally found it. To my great disappointment the flowers were still in bud, at least two weeks away from opening. The plants all seemed to grow in fairly open positions in moister areas of the pine forest, alongside sedges and small shrubs at an altitude of around 3,600 m.

The next day's drive would be equally long, and I felt disappointed to have



travelled so far, and to have come so close—only to fail at getting the pictures I wanted. We took a different route, going back to Zhongdian, heading west to the Mayi river, and then I suddenly noticed something yellow growing in huge numbers in the screes along the road—*Lilium stewartianum*! They were common from 3,700 m down to 3,400 m, growing in a habitat identical to that of *L. lankongense* and *L. duchartrei*—sunny and fairly dry, loose gravel slopes. The mountain itself looked dry when I was there in mid-July, although I suspect there is moisture

**Opposite and right, *Lilium stewartianum*** growing in the Mayi river valley, near Reda town, Xiangcheng, Sichuan Province.

seeping down earlier in the year. I checked a couple of bulbs, and they were bright yellow, growing some 10 cm deep in the limestone gravel. The stems do not run underground, but grow straight up from the bulbs.

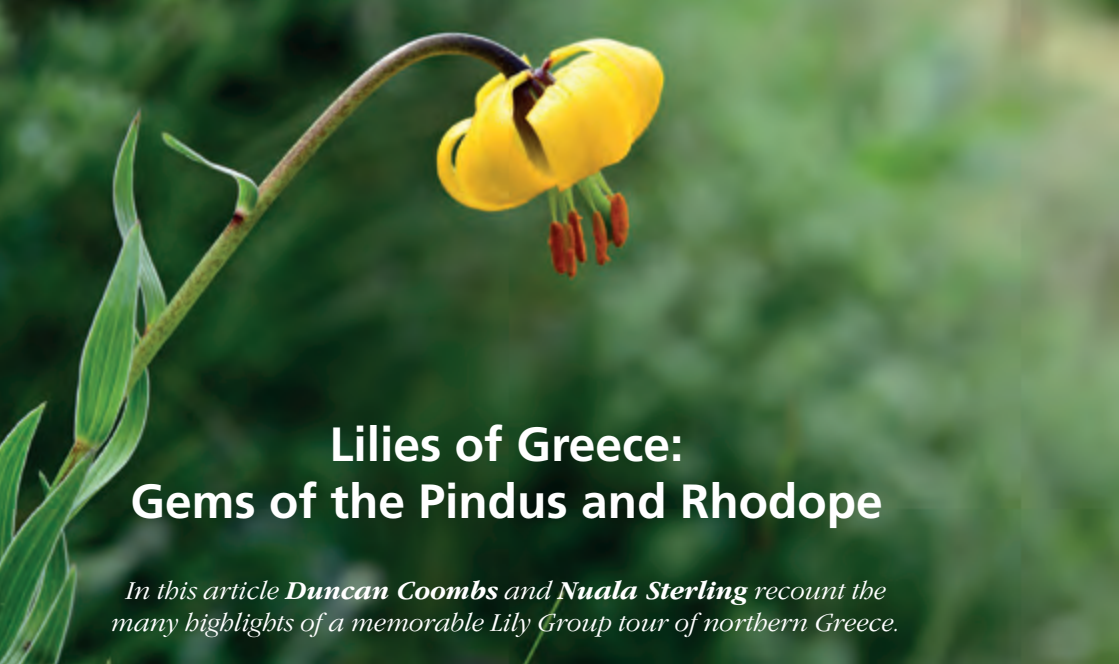
Yundong Gao synonymized *Lilium xanthellum* and *L. babaense* with *Lilium stewartianum* back in 2015, and while I am not familiar enough with *L. babaense*, only ever having seen it in leaf, I do believe he's correct. This species, like *Lilium sempervivoideum*, is also distributed along the Jinshajiang river (and its tributaries), but unlike *L. sempervivoideum* it seems both common and widespread with no immediate threats to its survival. We

revisited the population in late September, which luckily turned out to be the perfect time for seeds. The seed pods are similar to those of *Lilium lankongense*, rounded with darker stripes, although somewhat more elongated; the seeds unwinged. Judging by its habitat, and the altitude it grows at, I'm convinced *Lilium stewartianum* should prove both easy and hardy in a garden setting, given well-drained soil in full sun.

As I am writing this I am preparing to return to Huidong, the last field trip of the year—and I am already thinking about next year's trip. If there is interest August and I may arrange a small field trip to Nujiang in late June, to explore both sides of the valley and try to get a clearer picture of the genus *Nomocharis*—and try to find the enigmatic *Lilium henrici* var. *maculatum*. Another option would be to give *Lilium sempervivoideum* another visit and to explore the drier areas east of Lijiang and Dali—from where the more uncommon varieties of *L. bakerianum* were described. Eventually I hope I will have located every lily species growing here in mainland China, and have a better picture of some of the more confused groups, i.e. *Nomocharis* ssp. and the *nepalense/majoense/primulinum* and *bakerianum* complexes, but the cost of travelling in China is ever increasing and the distances massive. However, at least I can cross one more species off the list this year!







## Lilies of Greece: Gems of the Pindus and Rhodope

*In this article **Duncan Coombs** and **Nuala Sterling** recount the many highlights of a memorable Lily Group tour of northern Greece.*

This is an account of the tour undertaken by members of the RHS Lily Group, led by the botanist Christopher Gardner to see *Liliums* and other native plants in northern Greece from 1 July to 9 July 2017.

The group comprising leaders Chris Gardner and Kurt Vickery, Nuala Sterling, Chairman of the Lily Group, other Lily Group members Alisdair Aird, Duncan Coombs and Pontus Wallstén plus Christine and Roger Skelmersdale, Martin and Heather Angel and, soon to become friends, four Australian plant lovers namely Bob and Elaine Baxter and Bill and Arlene Garling.

Meeting at Thessaloniki airport with a temperature of 30 °C we were whisked off in our mini bus transport firstly to the delightful Hotel Jennifer at Taxiarches, near Drama and at 400 m, above sea level, a little cooler. The countryside between Thessaloniki and Drama consisted mainly of rolling low hills. Sunflowers were the main crop, and in flatter fields what little cereals that were grown had been already harvested. Numerous olive groves convinced me as a novice that we were indeed in Greece. Sensing our travel fatigue, Chris took us from the hotel up to a beautiful flowering meadow. Here the sheer diversity of flowering plants including *Cota tinctoria* (syn. *Anthemis tinctoria*), *Campanula spatulata*, *Anchusa azurea* and *Digitalis lanata* with its conspicuous white lip impressed immediately. Amongst these *Orlaya grandiflora* with masses of dainty white flowers reminded us of our gardens at home.

The next day we were off to Mount Falakro. The zoning of vegetation around the mountain was clear to the eye. Mixed farming was practiced in the lowlands.

**Opposite**, the potentially intermediate form between *Lilium jankae* and *Lilium albanicum*, on Mount Vournos.

**Right**, *Lilium martagon* var. *cattaniae*, growing in a forest of *Pinus nigra* on the lower slopes of Mount Falakro.

At approximately 1,000 m this gave way to beech (*Fagus sylvatica*) woodlands, whilst higher still, this changed to forests of native Austrian Pine (*Pinus nigra*) which finally changed to alpine vegetation above the tree line of about 1,800 m.

We began our exploration in the pine woods. These were comparatively open, having been thinned for timber as part of active forestry management. A fairly diverse flora was present in

between the trees. We found a scattered community of a dark form of *Lilium martagon* var. *cattaniae*, the flowers looking singularly beautiful, shining in the dappled sunlight. Other plants found included primroses (*Primula vulgaris*) in seed and the lesser butterfly orchid (*Platanthera chlorantha*) in flower. In a damp flush by the woodland edge *Anthericum liliago* and *Gladiolus palustris* were both flowering. In dappled shade beneath the pines, the white-flowered *Rosa arvensis*, the pink-flowered *Rosa pendulina* and the more familiar *Rosa canina* all contributed to a decorative scene.

Later we drove to the top of ski slopes on Mount Falakro and clambered over steep limestone rock strewn slopes. We were in the alpine zone. From a distance these slopes appeared devoid of many plants, but closer inspection revealed many alpine treasures. *Viola tricolor* subsp. *macedonica*, *Potentilla recta*, *Anthyllis aurea*, *Hypericum olympicum* and most impressively a large clump of *Globularia cordifolia* were all in full flower!

The third day, 3 July, saw the group heading into the Rhodope National Park, an area close to the Bulgarian boundary. This area has a high annual rainfall with snow and frost in the winter. We stopped at a viewpoint where we found patches of *Nepeta nuda* whose flowering gave a grey-blue colouration to the area.

Heading a little higher we started to travel through dense mixed forest comprising mainly beech, pine and birch. We met National Park Staff and were taken to a site where *Lilium rhodopaeum* grew. The site was still one of mixed forest, the lily growing with *Lilium martagon* amongst thick bracken (*Pteridium*







Lily Group members descending Mt Flega, following a steep uphill climb to reach a small population of *Lilium albanicum*.

*aquilinum*) with high tree cover. One finished-flowering stem in an open position was found, together with several seedlings in shade.

It was explained to us that the rare *Lilium rhodopaeum* relies on the natural seral succession of the vegetation for its survival. It flourishes in prairie-type conditions before full forest development. The lily is rare and endangered, the main threat to its survival thought to be intervention by man preventing natural succession in the forest and cutting of the flowers.

The population dynamics of this species are being studied. The bulbs have been found to be short-lived, each flowering bulb living, on average, for about 15 years and seedlings taking about 10 years to flower. Over the years the entire population has tended to ebb and flow, but the overall direction is downwards. This growing season (2017) has been very poor for the species, the area having had a very cold and dry spring. This had caused many bulbs not to emerge and many of those that did failed to flower. The specialists we spoke to were concerned that this was a consequence of climate change and did not bode well for the future of this species. Whilst in the reserve we were taken to a boggy area. Unfortunately, a large part of the bog had been drained and was planted with potatoes! Our Greek Reserve guides were very disturbed by this, but hoped that legal action whilst slow might prevent more exploitation of the reserve area. A distinctive endemic form

of *Sedum grisebachii* (syn. *Sedum kostovi*) was found growing on exposed granite rock within the bog, *Drosera rotundifolia* in acidic mud and *Erica spiculifolia* (syn. *Bruckenthalia spiculifolia*), an unusual member of the Ericaceae, in slightly raised, but still very wet, turf.

During our return to Taxiarches we found superb stands of *Verbascum speciosum* in full flower and large plants of *Tanacetum macrophyllum* with heads of white composite flowers and large pinnate foliage.

4 July saw us undertaking a long drive westwards to Agios Germanos via Mount Vermion. As we began to approach the mountains, at first there was Hungarian oak (*Quercus frainetto*) forest, but as we ascended to approximately 1,150 metres, there was an abrupt change to beech forest. Below this height it is too hot and dry for beech.

In ancient beech woodland we found *Cephalanthera rubra* and in less densely shaded areas by the road the beautiful cream-flowered and aptly named *Digitalis grandiflora*. Descending a little we found our ultimate quarry, *Lilium chalcedonicum*, our eyes being alerted by the dazzling red turkscap flowers. Consistently, we found plants with their roots in the shade of a variety of other herbaceous plants, but their head and flowers in bright sunlight. Surely a useful tip for would-be cultivators of this rare lily! The population of this lily appeared to be thinly spread and only conspicuous when in flower.

Many different tree species were present including lime (*Tilia* sp.), wild service tree (*Sorbus torminalis*), medlar (*Mespilus germanica*), Montpellier maple (*Acer monspessulanum*) and hazel (*Corylus avellana*). The natural occurrence of such a diversity of tree



The potentially intermediate form between *Lilium albanicum* and *Lilium jankae*, in its natural habitat, on a roadside on Mt Vournos.

species may indicate a long period without disturbance, favouring the existence of a bulbous species such as *Lilium chalcedonicum*. Travelling to a higher position on the mountain we found in flower both *Daphne oleoides* and *Digitalis ferruginea*.

For me, the following day on Mount Vournos was the most memorable and enjoyable of the tour. From our hotel in the delightful village of Agios Germanos we drove up to approximately 1,900 m, the last part of which was along a narrow, very rough track. We stopped about two thirds of the way up a south facing flank of the mountain which was filled with flowers from top to bottom. Not a sight to be forgotten! A pattern of vegetation was spread before us. Below our stopping point water flushed from the rocks and where the ground was not too wet unfortunately our 'old friend' perennial nettle (*Urtica dioica*) was present. High above us and below where the soil was thinner and drier a yellow turkscap lily was found. It may have been an intermediate between *Lilium albanicum* and *Lilium jankae*, as at least some of the plants had purple freckles. The lily always occurred on a steep slope and in full sun. In slightly drier open areas there was a preponderance of herbaceous plants including *Potentilla recta*, *Scabiosa columbaria* and *Verbascum longifolium*. Where the soil was a little thinner *Anthemis* sp., *Dianthus deltooides* and *Geranium subcaulescens* predominated together with large patches of prostrate *Juniperus communis*.

The reason for the presence of this *Lilium* sp. as a scattered population high in these mountains was discussed with our guides. A current theory is that the lily is a refuge species which is retreating up the mountains. As the climate has gradually warmed conditions have become unsuitable for the lily at lower levels and the species now only remains at this higher elevation. As it now grows near the top of this mountain range one can only fear for its long term future.

From where the mini bus stopped we elected to walk a little further along this rough track. Below us the vegetation changed to beech woodland and upon the edge we found in shade *Geranium macrorrhizum* and on the bank above the track in sun *Geranium aristatum* and the *Lilium* sp. The air was full of butterflies and day flying moths: A truly delightful walk.

On our return journey we stopped to photograph a memorable sight: Hundreds of yellow stately spires of *Verbascum speciosum* in full flower arising vertically out of rough grassland.

We then motored towards Mikri Prespa Lake which has been enlarged to form a large reservoir within which meet the national boundaries of Greece, Albania, and Macedonia. On fertile soil by the edge of the lake there was a large almost flat area, devoted to the intensive cultivation of stick beans. We learnt that the combination of a fertile alluvial, irrigated soil, coupled with the Grecian sun produced the ideal site for large-scale production of a wide range of beans that were subsequently dried and supplied in bulk to the surrounding population. Noted, by the irrigation



**Above, left**, the intermediate form of *Lilium albanicum* and *L. jankae*, on a roadside slope on Mt Vournos. **Above, right** (from left) Duncan Coombs, Kurt Vickery and Bill Garling, discuss potential higher elevation sites for more lily populations.

channels, were plants of the herbaceous *Sambucus ebulus*, a plant with an enormous natural range; the last time I had seen it was in the Province of Yunnan in western China.

Day six started with photographing the magnificent frescoes within the eleventh century section of the village church in Agios Germanos. A speedy motorway journey took us to the Pindus range of mountains. Where the geology was exposed it appeared to be of a highly stratified limestone which in places had weathered to form remarkable columnar structures. The area appeared to be one of ancient primary forest. This was indicated by the presence of a very diverse natural dwarf forest at approximately 1,300 m. During a very brief visit this was seen to consist of at least the following tree species. *Acer campestre* (field maple), *Crataegus laciniata*, *Betula* sp. (birch) *Ostrya carpinifolia* (hop hornbeam), *Quercus pubescens* (downy oak) and *Carpinus betulus* (hornbeam). Interesting plants found were *Ptercephalus perennis* with heads of pale purple flowers and *Aspodeline liburnica* with large yellow flowers. In addition we located a fine specimen of the lizard orchid *Himantoglossum caprinum*.

The Vikos Gorge, the deepest in Europe with a depth of 900 m from top to bottom did not fail to impress, various ledges and plants visible on the near vertical





Vikos Gorge, in the Pindus Mountains of northern Greece.

slopes of the gorge conveying something of the enormous scale of this geographic feature. By a prominent viewing point in full sun, an attractive white-flowered *Allium* species was spotted and in shade the yellow-green flowered *Umbilicus rupestris*. We stayed overnight in the attractive Zagorian village of Papingo at the Papaevangelou Hotel, the grounds of which provided a wonderful view of Mount Tymphi.

The next day was physically a hard one for many of us. We had intended to walk up much of Mount Smolikas. This would have involved a walk of several kilometres and gaining 600 m in altitude to reach 2,400 m where *Lilium albanicum* is known to grow. In the event we opted for the lower Mount Flega 2,100 m where this lily was also found to grow. Up to 2,100 m *Pinus heldreichii* (syn. *P. leucodermis*), the Bosnian Pine, made a remarkable sight with many of the trees being very old and gaunt. Long dead, still upright and numerous fallen trees were very conspicuous, their wood bleached white and deeply gnarled. There was, however, clear evidence of natural regeneration with seedling trees growing strongly. In the short turf between the conifers we found in flower both *Acinos alpinus* and *Dianthus baematocalyx*. Higher on Mount Flega we found *Lilium albanicum*, and we were fortunate in that many of the lilies were in full flower.

Five of the group opted to remain in Papingo, whilst the mountaineers explored Mount Flega, searching for *Lilium albanicum*. Relaxing after breakfast on the terrace overlooking the Vikos Gorge, a Cetonia Beetle (big green rose beetle) cheekily cut off each petal of a rose with precision. Then, the five who decided against searching for *Lilium albanicum* on Mt Flega, took the path up to the village of Mikro Papingo. Friendly walkers were a frequent encounter on this road, fringed



with hornbeams (*Carpinus betulus*) which led to the stream Potistres Rema which divides the adjacent hills descending down to join the Voidomatis river in the Vikos Gorge. In the 60s the locals created stone dams across the river at intervals creating an enchanting series of pools at Kolimbitrio amongst the huge limestone rocks a welcome delight of a cool swim after walking in the 35 °C heat of that day. Two keen walkers we met were Frances and Peter Annear, she having written a delightful guide to walks in the area *Exploring Papingo* published by Tandem Projects. On our return to Papingo via the main road, our lunch at the Astra restaurant, perched high above the gorge where cold water, wine and olives followed by a freshly prepared mushroom risotto, sourced from the garden, restored our energy to climb up through the cobbled streets of this beautiful village to hear the other accounts of the day.

Friday 8 July was our last day. In the Vikos–Aoös Geopark, around Kipi we found several arched stone bridges over the River Voidomatis. Several clumps of *Lilium candidum* were located, but only the wilting remnants of one flower remained!

In flower rich meadows around Aoös Lake we found *Dactylorhiza saccifera*, *Epipactis palustris* and *Geranium versicolor*, followed by masses of the insectivorous *Pinguicula crystallina* in a damp roadside flush.

The final evening was partly spent in the open centre of Metsovo watching young and old Greeks celebrate life and finally to a welcome bed in in the Katogi Averoff Hotel, with a head full of memories of flowers, plus Greek food and hospitality—wonderful!

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## *Lilium* × *testaceum*

*In this joint article, Nuala Sterling provides an informative background about Lilium × testaceum, which is followed by Madeleine Tinson's, current, experience of growing this rare hybrid.*

Belonging to a Horticultural Society, such as the RHS Lily Group created in 1931<sup>1</sup>, one is conscious of a history of plants both in terms of the intrepid explorers of the past, who collected them for the delight of our gardens, and the array of lily hybrids now cultivated in abundance. Yet some, once readily available to gardeners, may just be a memory—the reminiscence of times past, whilst others such as *Lilium*

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<sup>1</sup> [www.rhslilygroup.org](http://www.rhslilygroup.org)



*Lilium candidum*



*Lilium chalconicum*

*candidum*, the Madonna lily, have a history which goes back millennia and can still be found in our gardens.

Such envious reminiscences exist of the beautiful Nankeen lily (*Lilium* × *testaceum*) described in *Lilies of the World* (Woodcock & Stearn, 1950<sup>2</sup>) thus: “an outstanding aristocrat, one of the choicest of Lilies” and by Wallace “the finest garden plant the lily hybridist has ever raised”<sup>3</sup>. It has a purplish stem rising to 4–6 ft with 6–12 large fragrant recurved flowers of waxy texture. The colour is usually a pale maize yellow but can range from buff to orange with a few raised spots and rich orange pollen. We can reflect this is probably the very first lily hybrid and be glad to read of genetic evidence of its origin in the 1946 RHS Lily Year Book<sup>4</sup>.

Visiting historic gardens, such as Branklyn in Perth, created with seed from the Sino-Himalayan flora collected by Ludlow and Sheriff, we can delight in those plants which have flourished there. No longer can the great plant hunting expeditions of the past support our garden creations but seed can still be distributed around the world by such Societies as ours and patience rewarded. Further, modern methods of micro-propagation can increase selected clones by the million. Modern communication enables us to have DVD access to our horticultural history<sup>5</sup> and

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<sup>2</sup> Woodcock, H. D. and Stearn, W. T. (1950). *Lilies of the World*. p. 349.

<sup>3</sup> Wallace, R. W. (1932). *RHS Lily Year Book No. 1*. Hybrid Lilies, p. 44.

<sup>4</sup> Simmonds, A. (1946). *RHS Lily Year Book No. 10*. Origin of *Lilium* × *testaceum*, p. 94.

<sup>5</sup> RHS Lily Group DVD. (1932–2014). RHS Lily Group publications.

books to appreciate the personalities of the Lily World<sup>6</sup>. So why should a successful hybrid, once freely available disappear?

No absolute certainty exists for its origin in Erfurt<sup>7</sup> around 1836. Its long acceptance as a hybrid of *Lilium candidum* and *L. chalcedonicum* as exemplified by such repeat crosses as that of Clarke in 1880, Blackmore 1882<sup>8</sup> and Jones 1932<sup>9</sup> which produced a range of similar seedlings, supported this view. But the parentage was confirmed in an examination of chromosome morphology of five *Lilium chalcedonicum*, 16 *L. candidum* and six *Lilium* × *testaceum* from root tip smears by S. L. Emsweller and Maydelle B. Stewart published in the *Journal of Heredity* 1941<sup>10</sup>. Moreover it was possible to determine from which particular clones of *L. chalcedonicum* and *L. candidum* they arose.

In this same article, they observe that the stocks of *L. × testaceum* then available were all believed to be infected with a virus. Being relatively resistant to the effects of the virus they could persist for a very long time. It is noteworthy that vegetative production was the most frequent method of commercial propagation and even amongst amateur lily enthusiasts, repeating the cross and seed propagation was less common, *Lily Year Book*, 1933, Griffiths<sup>11</sup> and Stern<sup>12</sup>.

*Lilium testaceum* no longer appears in catalogues and colleagues who have grown it believe it has finally succumbed to virus. I understand that Bob Gibson of B&D Lilies, USA, who grew *L. × testaceum*, discontinued production in the mid 90s on the grounds of financial viability. Yet it might still be possible to repeat from the parentage, so I conclude that it is no longer competitive with modern hybrids. The original source of *L. candidum*, possibly way east of the Mediterranean was debated by Stoker in the 1933 and 1936 *Lily Year Book*<sup>13,14</sup> when a bulb from Herat on the Persian border of Afghanistan was presented to King George V by the Amir of Afghanistan. Perhaps Mongolian caravaneers to the Mediterranean were cultivating vegetable and medicinal supplies along their route! Through the much debated history perhaps some enthusiast might repeat the crosses between *L. candidum* and *L. chalcedonicum*? Alan Street of Avon Bulbs has recently propagated bulbs of *L. chalcedonicum*, so with *L. candidum*

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<sup>6</sup> McRae, E. A. (1998). *Lilies: a guide for Growers and Collectors*. Chapter 18, p. 347.

<sup>7</sup> Wallace, R. W. (1932). *RHS Lily Year Book No. 1*. Hybrid Lilies, p. 44.

<sup>8</sup> Krelage, E. H. (1933). *RHS Lily Year Book No. 2*. Oldest reference to *Lilium* × *testaceum*. p. 135.

<sup>9</sup> Jones, F. J. (1932). *RHS Lily Year Book No. 1*. p.115.

<sup>10</sup> Emsweller, S. L. and Stewart, M. B. (1944). The Origin of *Lilium testaceum*. *Journal of Heredity*, Vol. XXXV, No. 10

<sup>11</sup> Griffiths, D. (1933). *RHS Lily Year Book No. 2*. Vegetative propagation of the Lily. pp. 104–118.

<sup>12</sup> Stern, F. C. (1933). *RHS Lily Year Book No. 2*. Propagation of Lilies by Seed, p. 119.

<sup>13</sup> Stoker, F. A. (1933). *RHS Lily Year Book No. 2*. Notes 'Lilium candidum', p. 226.

<sup>14</sup> Stoker, F. A. (1936). *RHS Lily Year Book No. 5*. Lily from Herat 'Lilium candidum', p. 110.



*Lilium* × *testaceum* growing in Madeleine Tinson’s garden in Perth, Scotland.

growing in my garden for 25 years, perhaps I should, with Alan’s help, attempt that cross again?

#### **Footnote**

This article was published in the book, *The lily species and their bulbs* by Pontus Wallstén.

### ***Lilium* × *testaceum*, Perth, Scotland**

Madeleine Tinson, lily grower, living in Perth, Scotland and holder of the National Collection of North Hybrids, had the good fortune to find a small pocket of survivors, of *Lilium* × *testaceum*. An unexpected encounter she relates as follows.

Visiting a fellow gardener, and lily enthusiast, in Kinnaird, Scotland, I was drawn to this amazing, majestic, aristocratic beauty—words that fail to capture the thrill of my first sight of what I later learned was *Lilium* × *testaceum*. Unfortunately, since that memorable encounter, the lilies have been lost. However, having seen this lily in all its glory, I committed myself to finding some bulbs. After making some enquiries, about the source of the plants I had seen in the garden in Kinnaird, I discovered they had come from a garden in a small hamlet outside Forfar. While this information was helpful, it did not, immediately, enable me to source any bulbs—which according to my research, were likely to be unobtainable.

Then, as luck would have it, while I was asking about the Nankeen lily, as *Lilium*

× *testaceum* is also known, I was offered a pot full of bulbs, which had come from the original source, in Forfar. Not wishing to plant them in the ground and potentially, never seeing them again, I resorted to potting them up in my usual way.

In 2013, a single flower on a short stem, which was a sorry sight, appeared. However, one highlight was that for the first time I had been successful with scaling and had a flourishing pot of baby bulbs. There are many methods of scaling. The method I use, is to place the scales in a sealed plastic bag containing damp vermiculite and then place the bag on the floor of my greenhouse, secured with a stone. Perhaps it was the rarity of the parent bulb, but I felt a miracle had occurred when small bulbs appeared. However, losses were high on transferring the small bulbs to potting compost, but I did get a few to survive. With further scaling successes, since my first attempt, I have a healthy, younger generation of bulbs, which are doing well. I move my pots, of *Lilium* × *testaceum*, into the greenhouse, as the plants appear early in the season, to avoid frost damage. Apart from protecting the plants, I also wanted to see if they would do any better undercover.

Last year, 2016, I heard that the owner of the original source, in Forfar, was moving house. As a result of my interest, in *Lilium* × *testaceum*, I was invited to the garden to dig up any bulbs I might find. I cannot describe my excitement at being given the privilege to do this, as armed with my fork and spade I set off. To my delight, I was once again faced with the magnificence of two flowering stems of the Nankeen lily. No longer able to manage the beautiful garden she had created, which was full of plant treasures, Nora, the owner, told me she found the group flourishing in her garden and believes they had been established in the 1970s. Unfortunately, the plants then slowly dwindled over the years and, concerned with this development, she decided to move them. Nora said the bulbs never really recovered from being moved, but the two stems I saw looked healthy. The site was in shade till mid-day and in sun until 6pm. The soil was rich in humus and had good drainage. You would think my car was carrying nitro glycerine, given the care I took with my rare cargo as I drove home. I placed the bulbs in a pot of compost overnight, while I pondered on the very serious business, of how and where to plant them.

Given my negative experience of pot culture, I decided that the *Lilium* × *testaceum* bulbs would all be planted in the garden. I have a few raised beds, once used for vegetable growing, which I hoped would be suitable. However, not wishing to put all my eggs in one basket, I decided to, also, plant a pot full of bulbs in a border nearby. The soil there can be a little heavy and damp, so I dug in lots of grit. The plants did grow, but were not doing very well, so I dug them up. I noticed the root growth was poor, so I cleaned the bulbs before replanting with the others, which were growing well. To date, I have had two flowering stems and, given time, I hope to have all of the bulbs growing, flowering and producing seed, which all of you lily lovers may wish to form an orderly queue to request/receive.



# Supplement to Elwes' Monograph<sup>1</sup>

## III. *Lilium ochraceum*<sup>2</sup>

(Supplement, part 5, pp. 71–78, plate 19: 1937)

*Polymorphic, i.e. the condition of occurring in several different forms, is applied to 'Lilium ochraceum' (currently L. primulinum var. ochraceum), and its 'relatives', in the following article (from The Lily Year Book 1948). Almost 70 years later, the interest in these 'forms' has, if anything, increased, but so, arguably, has the confusion.*

Few species of *Lilium* exhibit such variation as is shown by the different forms of *Lilium ochraceum*, a species which was originally discovered by the French missionary Delavay on the Tali range. In the northern part of its geographical area—the high, dry land of north-west Yunnan—the plants are short, the leaves and flowers small, and the colouring poor, while in its south-western limit—the warm, wet mountains and valleys of Burma—the other extreme of the species is found, namely, tall and robust plants with long, often broad, leaves and large, well-coloured flowers. In the area between these two types of country other forms of the Lily occur, partly determined, no doubt, by the nature of the habitat. The extreme forms are connected by every type of intermediate, and botanists have wisely refrained from attempting to distinguish separate species.

The plant depicted on the plate represents the large-flowered form from Upper Burma, namely, var. *burmanicum*, which is the one best known in cultivation, though some of the medium-sized forms are also familiar. It has, as is well known, been much confused with *L. nepalense*, to which it bears a general resemblance, but, though a close series of intermediates between the smallest and the largest forms of *L. ochraceum* exists, none occur between *L. nepalense* and *L. ochraceum* var. *burmanicum*. The two Lilies differ in many particulars, and represent two distinct species.

In tracing the history of the plant as it has been grown in this country, the species in its widest sense must be considered, but, unless otherwise stated, the records cited refer to the large-flowered forms from Burma. The species was discovered by Père Delavay in 1883, It was not described, however, till nine years later, when

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<sup>1</sup> Continued from *Lily Year Book*, II, p. 17 (1947).

<sup>2</sup> In *Gardeners' Chronicle*, 3rd series 124, 12 (July 1948), Mr. W. T. Stearn called in question the validity of *L. ochraceum* as the correct name for this Lily. His reasons, which appear sound, are fully set forth in the article in question. (A. D. C., 1948.)



**Figure 8**, *Lilium ochraceum* var. *burmanicum* (From a drawing by Lilian Snelling for the Supplement to Elwes' Monograph of Genus *Lilium*. Part 5.)

Franchet dealt with it in his important paper “Les Lis de la Chine et du Thibet”. In the meantime, however, the plant had been introduced to Europe.

It was on 11th September 1888 that Hugh Low & Co. exhibited at a show in the old London Scottish Drill Hall, Westminster, a Lily received from their collector, Boxall, from Upper Burma, which flowered in their nursery at Clapton. The plant was referred by Baker to *L. nepalense*, and was awarded a First Class Certificate. The record will be found in the *Gardeners' Chronicle* for 13th October 1888, p. 412, and the specimen may be seen in the Kew Herbarium.

The plant was dealt with rather more fully in an article by “H. P.” published in *The Garden*, which was accompanied by a coloured plate prepared by the well-known horticultural artist H. G. Moon (19th January 1889, 54). It was stated that “few plants during the past year attracted so much attention at any meeting of the R. H. S. as did this rare Himalayan Lily”, but it was remarked that the flower differed from that figured by Elwes, and that its status as a *Eulirion* therefore required reconsideration.

Several bulbs evidently were imported, since soon afterwards the Lily was said to be flowering in more than one of our leading nurseries, including that of Messrs. Veitch. Repeated criticisms are to be found in the horticultural Press during the next few years as to the validity of Baker's identification. These were concentrated on the form of the perianth, which, it was pointed out, was more recurved than that shown in the *Monograph* by Elwes.

Baker, however, held to his opinion, and attributed the reflexion of the perianth to the flowers not having been drawn until some days after they had expanded. The plant was accordingly figured in the *Botanical Magazine* under Baker's name, an unfortunate error which is responsible for much of the subsequent confusion (t. 7043). The Lily, which at that date was without a valid name and should have been dealt with as a new species, was, in fact, a typical specimen of the plant now known as *L. ochraceum* var. *burmanicum*. This is clear from the descriptions, the various published illustrations, and from the dried specimen.

Three years later Franchet's paper appeared with the diagnosis of *L. ochraceum* sp.nov. The description is meagre, but botanists, aided by Delavay's dried specimens, have found no difficulty in recognizing the species. The plants were short, up to 3 ft. high, with short, narrow, mostly innerved leaves, and small yellow flowers of *Martagon* form. An examination of the original material in Paris shows that at least one specimen (No. 369) possessed the deep purple throat so characteristic of the species. The specimens are discussed in a short paper published in the *Kew Bulletin* (1937, 191). Franchet's descriptions were made available to a wider public when his paper, together with his interesting introductory paragraphs on Chinese Lilies in general, were translated into English and published in *The Garden* (21st January 1893, 40).

During the next decade many further references to the Lily appeared in horticultural journals, always under the name *L. nepalense*. Repeated introductions had taken place; it had been grown at Kew, and had evidently become fairly well known in horticultural circles. A few odd specimens are preserved in herbaria. Several small points were noted in those early days which incidentally confirm its real identity and show that it was not the Nepal species. "W. H. G.", for instance, points out that "this curiously coloured Lily which is now flowering at Clapton yields a delightful aroma in the evening"; and "H. P." states that it was "a late-flowering species unsuitable for outdoor cultivation" (*The Garden*, October 1889, 285, 324, 384).

It was during this period also that the self-coloured variety, described as *Lilium primulinum* Baker, was introduced—a plant which excited the attention of gardeners as well as botanists. The history of its introduction is given later under the general account of the variety.

With the opening up of Western China to botanical exploration at the end of last century, *L. ochraceum* was included in the plant collector's spoils. Augustine Henry found it near Mengtze in South-East Yunnan, where he was stationed from 1896-8, and W. Hancock had collected it previously in the same area (1895). These gatherings were duly recorded by C. H. Wright, again under *L. nepalense*, in "The Enumeration of Plants Known from China Proper" (*Journ. Linn. Soc.*, xxxvi, 133). In his paper read before the R. H. S. Lily Congress of 1901 HENRY speaks of the plant in the following terms: "*L. nepalense* is very common at Mengtze, not only in the rocky ravines, but also on the open grassy mountains, at elevations of 5,000 to 8,000 ft. It varies remarkably in size and colouring of the flower. The general groundwork of the colour is yellow, but the yellow may be very light or very deep in tint. The markings are also variable in extent. Bulbs of this Mengtze Lily sent to England have produced flowers which are similarly variable, almost looking as if they were new species." His note on the field labels runs: "Flowers yellow with purple eye." A set of Hancock's and Henry's specimens preserved in the Kew Herbarium shows that the leaves and flowers were small.

Wilson visited Yunnan in 1899. He reports the dispatch to Veitch of a hundred or so bulbs of *L. ochraceum*, but, though some of these were raised and flowered, he tells us, in *Lilies of Eastern Asia*, that his "Yunnan stock proved no more amenable to cultivation than that previously imported from Burma" (p. 62).

But Yunnan was Forrest's field. He collected a large number of herbarium specimens in that province and later in Upper Burma, which may be consulted at the herbarium at Edinburgh, and to a lesser extent at Kew and the British Museum. The material shows greater variety in form and size than that obtained by any other collector. He sent home also bulbs and seeds, the descendants of which can be found in several gardens. Amongst other forms which Forrest collected was the

plant showing flowers with the yellow ground densely spotted or streaked all over with pale brown maroon. This form, which has been grown by Mr Grove, by Major Stern at Goring, and by Col. E. H. Bolitho in Cornwall, may be distinct enough to warrant a varietal name, but, until its limits and variations are better known, it is preferably left as a colour-form.

The first botanist to explore the extreme north of Upper Burma was Capt. Kingdon-Ward. In 1914 he found the Lily growing amongst bracken to a height of 8 ft. in the Naung Chaung Valley (6,000–7,000 ft.). His specimens in the Edinburgh Herbarium show flowers of medium size, some of which, judging from the field labels, represented the self-coloured var. *primulinum*.

Farrer's expedition to Upper Burma took place in 1919–20. Around Hpimaw, the frontier outpost north of Myitkyina, on the Irrawaddy, a name familiar as a collecting-ground of botanical explorers, *L. ochraceum* occurred in plenty. Farrer's No. 1122, of which seed was sent home, is represented in the Edinburgh Herbarium by a fine plant with large leaves and several large flowers borne on long pedicels. It is *L. ochraceum* var. *burmanicum* at its best. Farrer notes on the field label that the Lily was "common on the open slope of Hpimaw Hill (7,800 ft.). The flowers are clear yellow, sweetly scented, with brown purple centre. It attains 7 ft. and handsomely emerges from amidst the bracken." The seeds, however, produced plants of unequal merit.

Amongst others who raised a stock was Mr Kenneth McDouall, of Logan, who, in a note to *The Garden*, wrote that many of the plants were 8 ft. high and bore ten to twelve flowers (7th November 1925, 629). The planting survives, though in diminishing quantity. No. 1122 has also been grown in the open by Lord Swaythling at Townhill Park, Southampton, where it still thrives and flowers freely, and by Major Stern, who, however, lost his plants after the cold winter of 1928–9 (*Lily Year Book*, 1932, 38). The Hpimaw gathering is referred to in *The Plant Introductions of Reginald Farrer*, where it is noted that it flourished both on calcareous and granitic slopes (p. 67).

Herbarium specimens testify that other collectors came across *L. ochraceum* in Yunnan, notably E. E. Maire (c. 1906), C. K. Schneider (1914), and J. F. Rock (1922–9). As is well known, the French priest L veill  published a very large number of new species of all kinds of plants based on dried specimens from Yunnan and Kweichow, and amongst these were several species of *Lilium*. The descriptions were mostly inadequate, and the specimens (which were purchased privately and generously presented to the Royal Botanic Garden, Edinburgh) are for the most part poor. L veill 's species have, in fact, been the bugbear of botanists. They have, however, been investigated by Sir William Wright Smith, and, as will be seen from the references at the heading of this article, we have followed him entirely with regard to those species of *Lilium* which he reduces to synonyms



of the present plant. We have, moreover, examined the original specimens of *L. Tenii* Léveillé, and we agree with Wilson that this also is a form of *L. obraceum*. As some of Léveillé's species were collected in Kweichow, they provide the most easterly record for the species.

In 1922 Sir William published his paper on Chinese Lilies, basing his researches on the wealth of material in the Edinburgh Herbarium. His conclusions with regard to *L. obraceum* as it occurs in China are unquestionable. He points out that the Lily has a wide distribution in Yunnan, occurring on the Tali and Lichiang ranges, on the Têngyueh side of the province, and also in the much drier eastern part near Yunnan-fu, extending from there into Kweichow, where it is a definite *Martagon* Lily. "This gives a considerable variation of habitat, starting from the drier Eastern Yunnan, passing through the moderately wet Tali and Lichiang areas, and ending in the wetter Têngyueh and the Upper Burma zone... The changes in the character of this Lily vary as the course is taken westwards" (p. 130). Sir William then draws attention to the variable series of larger forms which exist in the country running from Têngyueh over the Sino-Burmese frontier into Upper Burma. To these he gives the varietal appellation of *burmanicum*, and places them under *L. nepalense*. It must be remembered that in 1922 living specimens of the Nepal Lily had not been seen in this country, and that, judging by Wallich's old dried specimens of *L. nepalense*. Sir William's var. *burmanicum* appeared to be an exact intermediate between that species and *L. obraceum*. As explained under Plate 17, this is not the case. The distinctions between the two species have already been set forth (p. 61).

In *Lilies of Eastern Asia* Wilson dealt with *Liliutn obraceum* at some length, and he was, in the main, correct. He had the advantage of seeing recently collected dried material of the true *L. nepalense* from Almora, and was acute enough to realize that the species represented a trumpet Lily which was essentially distinct from the large forms of *L. obraceum*. We cannot, however, endorse his view that var. *burmanicum* is unworthy of varietal rank and should be reduced to a mere synonym of *L. obraceum*. The extreme forms are admittedly connected by intermediates which are difficult to place, but the Lily portrayed on the plate must be regarded as sufficiently distinct from the small *Martagon* form to deserve a name.

Wilson also dealt with *L. nepalense* as recorded from Siam. Prof. W. G. Craib, when identifying the Siam specimens, noted that bulbs had flowered in the gardens of Trinity College, Dublin, and Mr J. Cromar Watt informs us that at a later date they flowered in the Cruickshank Botanic Garden at Aberdeen (Kew Bulletin, 1912, 412). Wilson pointed out that the plant was *L. obraceum* and not *L. nepalense*, a determination which has been corroborated by examination of the dried specimens at Kew. It represents, in fact, a fairly large form of var. *burmanicum*. The species has recently been re-collected in several localities in Siam by Mr H. G. Garrett, who



Figure 9, *Lilium ochraceum*, see page 69.

contributed to the *Lily Year Book* for 1936 an interesting note on its occurrence in that country.

In concluding this resume of the history of *L. ochraceum* it may be pointed out that the general account in the volume by Woodcock and Coutts is correct, and that the photograph (Fig. 101) showing the strongly recurved flowers borne on long pedicels is typical of the species. The footnote on page 166, however, gives the older view, a classification which was also adopted in Dr Stoker's "List of Lilies and Synonyms" (*Lily Year Book*, 1935, p. 25).

No good purpose would be served by attempting to distinguish new varieties and to apply names to the many forms of *L. ochraceum*. Although these forms are, to a large extent, associated with distinct geographical areas and certain types of climate, this is not invariably the case. Henry comments, for instance, on the variability of the species around Mengtze, and Forrest's specimens from Burma show a large number of forms. It is well known that although all transitions may exist between two extreme forms of a species, this fact does not necessarily indicate that the plant is a homogeneous unit, or that the modifications exhibited are entirely due to the influence of climatic and edaphic conditions. Judging by analogy with genera which have been intensively studied, numerous fixed strains exist within the species of *Lilium*, and these may well be localized in their distribution. But, however much climate and soil-conditions may have played a part in their production, other factors also have almost certainly been partly responsible, particularly hybridity and the occurrence of mutations. Stout's work has shown that intra-specific hybridization (i.e. within the species) is widespread in the genus *Lilium*. On seeding, the hybrids may segregate into various forms, some of which would be true-breeding recessives. In attempting to classify such a medley of forms within a species the botanist cannot do otherwise, pending more accurate knowledge, than recognize the species as polymorphic, and, if subdivisions be desirable, he must resort to arbitrary criteria.

This is exactly the problem presented by *L. ochraceum*, and for this reason only the two varieties which have been already named, viz. var. *burmanicum* and var. *primulinum*, are here recognized. The former is distinguished from the small form by its longer and broader leaves and by its larger flowers, which are intermediate in form between *Martagon* and *Leucolirion* (see Wright Smith, loc. cit., 135). A more precise definition is, however, required, and the arbitrary figures of leaf measurements at least 4 in. long by ½ in. wide, and of a perianth length of 2½ in., have been chosen. When the segments of the perianth are longer than this the typical Turk's Cap shape tends to disappear, although the segments ultimately recurve from more than half their length.

The status of var. *primulinum* is more easy to define. The plant was described as





## ‘A medley of forms’ (and a lily classifier’s nightmare)

**A, E and F** *Lilium primulinum* var. *ochraceum* on the Cangshan, Yunnan Province, China (note the variation); **B** *Lilium primulinum* var. *burmanicum*, Pianma, Lushui, Yunnan Province; **C** *Lilium poilanei*, Northern Vietnam; **D** *Lilium primulinum* ‘Rock’s’ variety, north-west Yunnan Province.



**G** *Lilium nepalense* (Bhutan, India, Nepal, Southern Tibet, Western Yunnan Province).  
**H** *Lilium majoense* (Guizhou Province, SW China).

*continued from page 65*

*L. primulinum* by Baker in 1892 from material imported from the Shan States and grown by Messrs. Hugh Low & Co. of Clapton. In the firm’s nursery it had been given the MS. name of *L. claptonense*, and had been exhibited under that name at a R. H. S. meeting the previous year. It was figured in the *Botanical Magazine* (t. 7227), and the plate shows at once that the plant was a large self-coloured form of *L. ochraceum* var. *burmanicum*. This conclusion can be confirmed by an examination of the original specimen in the Kew Herbarium. Other specimens at Kew show that the Lily had been cultivated by the above named firm for two or three years. These had been seen by W. B. Hemsley, who regarded them as coming within the range of *L. nepalense*, but one specimen he referred to as “*L. neilgherriense* var.”, an error which accounts for the inclusion of that species



in Collett and Hemsley's paper "The Plants of Upper Burma and the Shan States" (*Journ. Linn. Soc.*, xxviii).

This yellow variety figured little in subsequent literature, and it was only in course of time that it arrived at its correct botanical position. Sir William Wright Smith reduced it to varietal rank in 1922, but as it was a self-coloured form of his var. *burmanicum*, he naturally placed it under *L. nepalense* as defined by him. Wilson, equally naturally, treated it as a variety of *L. ochraceum*, and Woodcock and Coutts have rightly followed him. The plant is rarely seen in cultivation, though an almost self-coloured specimen has recently been received from Mr. F. J. Rose, Lord Swaythling's gardener at Townhill Park, Southampton. It is evident, therefore, that transitional forms occur.

There are two small points concerning the root system which must be noticed. It is the general experience of those who have grown var. *burmanicum* that, in marked contrast to *L. nepalense*, it does not produce a stoloniform stem. Wilson, on the other hand, speaking of the Yunnan form, states that "the underground portion is creeping and stoloniferous". There is some evidence that the intermediate and small forms are more inclined to "run" than the larger, but the matter is one which needs further observation. The second point concerns bulb colour. Wilson states that the bulbs are creamy white, and contrasts this with previous statements which record them as almost black. Forrest informed one of us verbally that the Burmese form was darker than the Yunnan form, and this may well be the case. There is no doubt that imported bulbs of var. *burmanicum* are dark and that home-grown bulbs rapidly develop a purple colour. The young home-grown bulbs are, however, white, and it would appear that shallow planting, and even a short exposure to light (such as may happen in ordinary cultural operations), is sufficient to lead to the development of purple pigment.

As to the hardiness of *L. ochraceum*, it is known that the smallest forms from Northern Yunnan, though they have seldom been grown, are hardy in this country. "In 1920 it came up very strongly and flowered freely. During the five years it has been kept in a comparatively exposed position in the Rock Garden (at Edinburgh) and has received no special attention" (Wright Smith, loc. cit., 131). The medium-sized forms, including certain types of var. *burmanicum*, also survive an ordinary winter. Examples of var. *burmanicum* from Forrest's seed (No. 15827), as grown in the Duke of Bedford's garden at Endsleigh, in the Tamar Valley, have been illustrated in the *Gardeners' Chronicle* (see GROVE, 24th January 1925, 59, Fig. 24; 22nd January 1927, 67, Fig. 35). It has also been grown for several seasons by Sir John Ramsden, both at Bulstrode and at Muncaster (Cumberland), and by Lord Swaythling in light woodland at Townhill Park, Southampton, including Farrbr's

1122, which withstood the cold winter of 1928–9 (*Journ. Roy. Hort. Soc.*, 1936, 355). Farrer's No. 1122 has also, as already mentioned, existed for many years at Logan. Possibly the highest tribute to the hardiness of the medium-sized form lies in the fact that it flourishes at Richmond, Yorks, where the Hon. Robert James informs us that he has had it in the open for three years. The black and white drawing by Miss Snelling reproduced here is from a specimen received from him in August 1936 (Fig. 9 on page 64).

The species does not appear to be fastidious as to soil; both the small and large forms thrive in various types of soil in English gardens, but it is probable that the former, from the limestone ridges of Yunnan, is more tolerant of dry conditions. The Countess Raben writes that the large form does well with her on the Bath oolite at Box, the soil being very stony and strongly alkaline. A well-drained site is essential, and light woodland gives the flowers useful protection from sun or early frost.

*L. ochraceum* is a late-flowering species, and newly imported bulbs often do not flower until November or even December. The flowers, however, are tough and will withstand wind, rain, and even several degrees of frost. It is curious that the small forms flower earlier than the larger Burmese forms, a fact which may perhaps be due to the response by bulbs from high mountain ranges to the warmth of a more genial climate.

There is no doubt that, when well grown, *L. ochraceum* is a fine garden Lily, and excellent specimens have been seen in England. It will probably also prove useful elsewhere. Dr Lemperg's note in the *New Flora and Silva* (1931, 128) shows that it can withstand the conditions of Austrian winters, and Capt. Neil Mceacharn's exhibit from his garden at Pallanza (Lake Maggiore) was awarded a Diploma of Honour at Rome in 1935. Bulbs in their third year after planting produced with him over twenty flowers apiece when grown in a border of stony soil free from lime and in full sun (*Gardeners' Chronicle*, 30th November 1935, 393, Fig. 149; *Gardening Illustrated*, 14th November, 1936, 669).

The specimen of *Lilium ochraceum* var. *burmanicum* illustrated on the plate (Fig. 8 on page 59) was grown at Colesboume, and was provided by the late H. J. Elwes in 1915 (the uncoloured "leaf" to the left is a bract). The black and white text figure, with medium-sized flowers, was drawn from a specimen forwarded by the Hon. Robert James, of St. Nicolas, Richmond, in 1936. The bulb and seeds (nat. size), from plants of var. *burmanicum*, were kindly furnished by the Burnham Lily Nursery.

A. D. Cotton

#### Footnote

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# New species: *Lilium procumbens* and its allies in the flora of Vietnam

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(Manuscript received 23 August 2015; accepted 15 February 2016)

## Abstract

*Lilium procumbens*, a new species discovered at a limestone ridge in northern Vietnam is unique in having a slender procumbent stem. This paper presents a detailed taxonomic account of the species including a description, illustrations, information on the type, ecology, phenology and distribution, affinity with other congeners, and expected conservation status. A key to all the known *Lilium* species from Vietnam and an annotated list of them are also provided.

## Introduction

The genus *Lilium* L. consists of approximately 100 to 175 species distributed over the temperate zone of the Northern Hemisphere and mountainous areas of the subtropics and tropics in continental Southeast Asia and Philippines (Mabberley, 2000, Liang and Tamura, 2000, Govaerts, 2011). The number of species of *Lilium* is the largest in eastern Asia, particularly in China. Lilies become uncommon towards the south and only a small number of species occur in the tropics where they are more or less confined to high mountains. So far three native species, *L. brownii*, *L. eupetes* and *L. poilanei*, and three cultivated and occasionally naturalized species, *L. concolor*, *L. lancifolium* and *L. longiflorum*, have been recorded from Vietnam (Gagnepain 1934, Nguyen Thi Do, 2005).

In our field survey in northern Vietnam, we found a very unusual lily not matching any of the known congeners. After a thorough study, we found a new lily species, namely *Lilium procumbens*. Unlike other lilies, the new species has a slender procumbent stem. In this paper, we describe this species with illustrations and provide data on its ecology, phenology, distribution and affinities to other congeners. A key to all the known *Lilium* species from Vietnam, including the new one, and an annotated list of them are also provided.

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## Taxonomic Treatment

*Lilium* L.1753, Sp. Pl. 1: 302; Gagnep., 1934, Fl. Indo-Chine 6, 6: 808–811; Ohwi, 1965, Fl. Japan, Engl. ed.: 296–298; Lee T. B., 1989, Illustr. Fl. Korea: 206–209; Ying S. -S., 2000, Fl. Taiwan 5: 49–52; Ho P. H., 2000, Ill. Fl. Vietnam 3: 480–481, fig. 9618–9622; Liang S. Y., Tamura M. N., 2000, Fl. China 24: 135–149; Nguyen Thi Do, 2005, Checklist Pl. Sp. Vietnam 3: 455.

Lectotype: *L. candidum* L. (N. L. Britton, A. Brown, 1913, Ill. Fl. N. U.S. ed. 2. 1: 502).

115–120 species. Temperate zone of the Northern Hemisphere, subtropical and tropical highlands of mainland Southeast Asia and Philippines, with the highest species diversity in continental East Asia. In Vietnam four native species, three species cultivated and occasionally naturalized.

## Key to known *Lilium* species from Vietnam

The name of cultivated species is marked with an asterisk\*

- 1 a. Plant epiphytic . . . . . 2. *L. eupetes*
- 1 b. Plant terrestrial or lithophytic . . . . . 2
- 2 a. Flowers directed upwards . . . . . 5. *L. concolor*\*
- 2 b. Flowers horizontally spreading or nodding . . . . . 3
- 3 a. Stem slender, less than 6 mm in diam. near base, procumbent, climbing or pendulous; pistil shorter than stamens . . . . . 1. *L. procumbens*
- 3 b. Stem moderately thick or stout, more than 6 mm in diam. near base, erect or suberect; pistil longer than stamens . . . . . 4
- 4 a. Bulbils formed in distal leaf axils . . . . . 7. *L. lancifolium*\*
- 4 b. Bulbils not formed in leaf axils . . . . . 5
- 5 a. Tepals shorter than 10 cm. . . . . 3. *L. poilanei*
- 5 b. Tepals longer than 13 cm . . . . . 6
- 6 a. Stem ca. 0.7–2 metres tall; tepals white, tinged purple externally; nectary glands (on inner side of tepals) papillose; filaments usually puberulous below . . . . . 4. *L. brownii*
- 6 b. Stem ca. 0.3–1 metre tall; tepals white exclusively; nectary glands glabrous; filaments glabrous . . . . . 6. *L. longiflorum*\*

### 1. *Lilium procumbens* Aver. & N. Tanaka, sp. nov.

The plant was collected in northern Vietnam ("Cao Bang province, Nguyen Binh district, Ca Thanh municipality, Ta Pin village, around point 22°43'56.4"N, 105°51'16.4"E, primary coniferous forest with *Pseudotsuga sinensis* along highly eroded rocky limestone ridge at elevation about 1,400 m a.s.l., terrestrial or lithophytic climbing vine-like unbranched herb with a slender shoot to 2 m long on



**Figure 1**, the scenery and habitats of *Lilium procumbens*.

**Figure 2**, (opposite) *Lilium procumbens* sp. nov. Digital epitype, L. Averyanov CPC 5359a/TM 1035. Photos, correction and design by L. Averyanov.

shady very steep mossy rocky slope, rare, 3 October 2013, L. Averyanov, N. T. Hiep, L. M. Tuan, N. S. Khang, T. Maisak, L. Osinovets, CPC 5359a/TM 1035"). Herbarium type specimen was prepared from cultivated plant in July 2015. Type ("27 July 2015, L. Averyanov, CPC 5359a/TM 1035") – LE (Holotype). (Fig's 1, 2, 3, 4A).

Herb terrestrial or lithophytic, bulbiferous, perennial. Bulb situated at 8–12 cm below the surface of the ground, subglobose to ovoid, (2)2.5–3(4) cm in diam., without a tunic; scales many, narrowly ovate to broadly lanceolate, white, fleshy, imbricate, (1.5)2–2.5(3) cm long. Aerial stem slender, unbranched, procumbent, pendulous or climbing, 1–1.5(2) m long, 3–5(6) mm in diam., leafy throughout, sparsely papillose in apical third, with whorls of many dense roots and few bulbs at nodes above the bulb; internodes (1.5)2–4(5) cm long. Leaves many, alternate, distant, more or less horizontal (to stem), broadly lanceolate to narrowly ovate, (6)8–16(18) cm long, (1.5)2–2.5(2.8) cm wide, glabrous, abaxially with three prominent veins, apex attenuate or acute, base sessile or subsessile, often narrowed into short petiole (1)2–5(6) mm long, 1.5–2 mm wide. Flowers solitary (or 2 to 3 in terminal raceme), campanulate-funnel form, nodding, slightly zygomorphic, white with green tint, rarely with very few sparse purple marks along margin near the base of outer tepals (sepals). Tepals 6, free, spatulate or narrowly obovate, (4.6)4.8–5.2(5.4) cm long, (1.3)1.4–1.5(1.6) cm wide; in adaxial proximal half involute laterally and medial longitudinal narrow part (midrib zone) green, glabrous and nectariferous; in distal half nearly flat and not strongly recurved; the inner 3 (petals) slightly wider than the outer 3 (sepals); medial portion prominently keeled abaxially; the keel rectangular in cross section. Stamens 6; filaments





light greenish to almost white, filiform, glabrous, recurved distally, 3.5–4 cm long; anthers narrowly oblong-ellipsoid, slightly arcuate, dorsifixed, rotatable, brown-orange, 6–7 mm long, 2.5–3 mm in diam. Pistil slightly shorter than stamens; ovary erect, straight, narrowly conoid, longitudinally shallowly grooved, 9–10 mm long, 1.5–2(2.5) mm in diam. near base, 3-loculed; ovules many per locule; style slender, gradually slightly broadened towards apex, slightly curved upward, 2.2–2.4 cm long; stigma subcapitate, apically subtruncate, 3-lobed, 4–4.5 mm across, light greenish to white, densely papillose. Fruit a light brownish capsule; seeds numerous, flat, winged around.

**Etymology** The specific epithet refers to the procumbent habit of the plant.

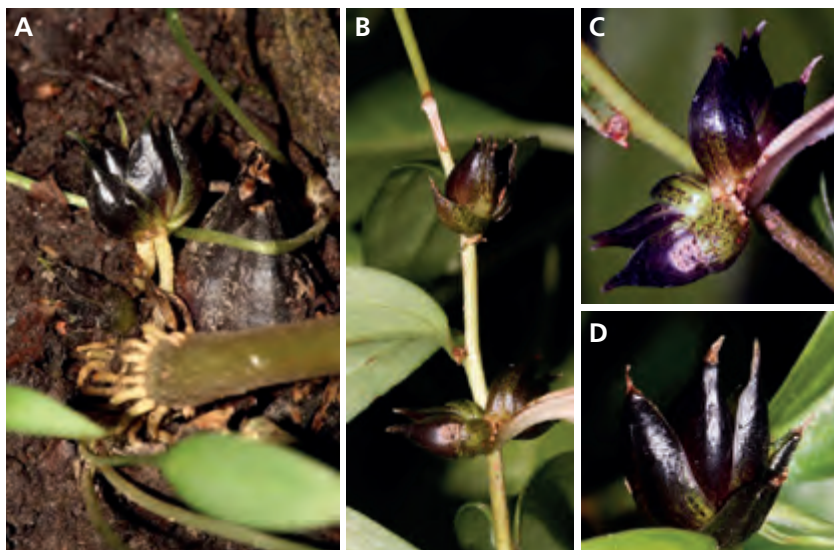
**Distribution** Endemic to VIETNAM, Cao Bang province (Nguyen Binh district, Ca Thanh municipality). (Fig. 4A).

**Habitat, phenology and conservation status** Terrestrial or lithophytic, bulbiferous herb with a climbing or procumbent to pendulous slender stem. Primary mixed forests of broad-leaved trees and conifers like *Pseudotsuga sinensis* on karstic rocky limestone, common on very steep rocky slopes and on shelves of shady cliffs near mountain tops. 1,300–1,500 m a.s.l. Flowers in July in cultivation. This species is rare and is regarded as endangered (EN) according to IUCN Red List criteria. (Fig. 1).

**Notes** *Lilium procumbens* is morphologically similar to *L. poilanei* Gagnep. described from northwestern Vietnam and northern Laos and also to *Lilium primulinum* var. *ochraceum* (Franch.) Stearn known from Guizhou, Sichuan and NW Yunnan in China (Liang and Tamura, 2000). It markedly differs from them in having a more slender, procumbent stem, and smaller, white, stellately campanulate-funnel form flowers with slightly or moderately recurved, narrowly obovate tepals and a pistil shorter than the stamens. In natural habitats, the new species grows on very steep rocky slopes and on shelves of vertical cliffs of limestone near mountain tops. The slender stem was climbing among dense shrubs or procumbent or drooping among mossy cliffy rocks. The slender, procumbent habit of the stem is stably retained in cultivation. Sterile stems to the end of vegetative period commonly form persistent bulbils in axils of apical leaves (Fig. 2).

**2. *Lilium eupetes* J. M. H. Shaw, 2008, *Plantsman n.s.*, 7: 39.**

Described from NW Vietnam (“Lào Cai province”). Type (“22 Nov. 2006. B & S Wynn-Jones 11721”) – WSY (Holotype) [WSY0101055]. (Fig. 4B).



**Figure 3, *Lilium procumbens*.** A: Bulbils developing at the nodes of aerial stem above the bulb, B: Apical part of stem with bulbils; C, D: individual bulbils in the leaf axils at the end of vegetative period (L. Averyanov CPC 5359a/TM 1035).

Photos, correction and design by L. Averyanov.

**Distribution** Endemic to VIETNAM, Lao Cai province (Hoang Lien Son Range).

**Habitat, phenology and conservation status** Bulbiferous epiphytic herb with an erect stem occurring in mosses on vertical trunks and horizontal branches of large forest trees well above the ground at altitudes of 1,900–2,000 m. Primary montane forests of broad-leaved trees on granite. Flowers in October in cultivation. This is very rare and is regarded as endangered according to IUCN Red List criteria.

**Notes** A fairly unique species for its epiphytic habit and axillary bulbils which are buoyed on air currents by the dead leaf serving as a wing (Shaw, 2008). This rare species is known until now only by type collection.

**3. *Lilium poilanei* Gagnep., 1934, Fl. Indo-Chine 6: 810, fig. 80, 1; Syngé P. M., 1980, Lilies: 152; Ho P. H., 2000, Ill. Fl. Vietnam 3: 480, fig. 9620; Nguyen Thi Do, 2005, Checklist Pl. Sp. Vietnam 3: 455.**

Described from northern Laos and northwestern Vietnam (“TONKIN: kilom. 8, au col de Lo-qui-ho, près Chapa (Poilane). – LAOS: entre Muong-het et M. Seng

(Poilane)”). Syntypes (“Laos, entre Muong-het et M. Seng, 1,400 m alt., 12-9-1929, Poilane 16929” [P-P00730969] and “Tonkin, Lo qui Ho près Chapa, 1,400 m alt., 4-8-1926, Poilane 12811” [P00730970; P-P00730971]) – P. (Fig. 4C).

**Distribution** VIETNAM: Cao Bang province (Bao Lac district, Ca Thanh municipality); Ha Giang province (Dong Van district, Sinh Lung municipality; Meo Vac district, Shung Cha municipality; Quan Ba district, Can Ty municipality; Yen Minh district, Lao Va Chai municipality); Lai Chau province (Sin Ho district, Xa De Phin municipality); Lao Cai province (Sa Pa town); Son La province (Moc Chau district, Van Ho municipality). LAOS: Houaphanh, Oudomxai, Louangphabang and Luang Namtha? (Fig. 4C).

**Habitat, phenology and conservation status** Terrestrial or lithophytic, bulbiferous herb with an erect stout stem to 2 m tall. Primary or secondary mossy mixed forests of broad-leaved trees and conifers (like *Pinus wangii*, *Podocarpus pilgeri*, *Pseudotsuga sinensis* and *Tsuga chinensis*) on karstic rocky limestone, common on very steep rocky slopes and on shelves of shady cliffs near mountain tops, 1,200–1,600 m a.s.l. Flowers in June–August under cultivation. This species is rare and is regarded as endangered according to IUCN Red List criteria.

**Notes** *Lilium poilanei* is a rare, integral element of highly endangered coniferous forests on limestone. It is very sensitive to logging and highly endangered by the quick loss of its habitats. Besides, the bulbs of this plant have often been collected from natural habitats for exports to China where they are medicinally used. These factors are plunging the species into the verge of extinction. Photographs of this rare species are available on the website ‘The Genus *Lilium*’, <http://www.the-genus-lilium.com/images/Lilium/poilanei06.jpg-09.jpg>, (Hohenegger, 2011).

This species was once collected at “entre Muong-het et M. Seng” (syntype) in Laos. This habitat is presently not precisely located, but may be in Houaphanh, Oudomxai, Louangphabang or Luang Namtha province. It was casually overlooked in the latest treatise of the Laotian flora by Newman et al. (2007).

**Studied specimens** VIETNAM: Lao Cai province – Chapa, 1,600 m a.s.l., July, 1925, Pételot sine no (P); Chapa, 1,500 m a.s.l., July, 1930, Pételot 3738 (P); Chapa, 17 May 1961, sine coll. no 2283 (LE); Cao Bang province, Nguyen Binh district, Ca Thanh municipality, about 3 km to SW from Yen Lac village (22°44'N 105°50'E), about 42 km to NW from Cao Bang town, 1,400–1,450 m a.s.l., 18 November 1998, Averyanov L., P. K. Loc, N. X. Tam, CBL 383 (HN, LE, MO, P); Ha Giang province – Yen Minh district, Lao Va Chai municipality, vicinities of Ngan Chai village, 6 km to W of Yen Minh town (23°07'N 105°08'E), 1,500–1,600 m a.s.l., 1 May 1999, P. K. Loc,

**Figure 4**, The distribution of wild *Lilium* species in northern Vietnam.

**A:** *Lilium procumbens* (square dot).

**B:** *L. eupetes* (cross).

**C:** *L. poilanei* (round dots).

**D:** *L. brownii* (triangular dots).

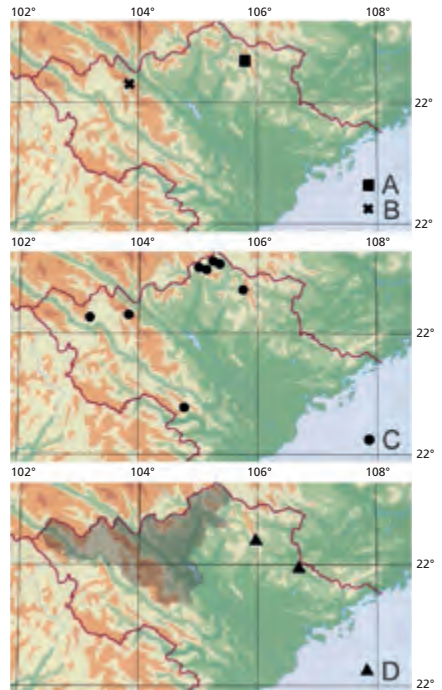
Black marks designate localities verified by herbarium specimens, the shaded portion designates the area of *Lilium brownii* distribution reported without a citation of herbarium material.

P. H. Hoang, Averyanov L., CBL 1961 (HN, MO); Meo Vac district, Shung Cha municipality, Lo Loi Phin village (23°11'N 105°17'E), 1,200–1,250 m a.s.l., 5 October 1999, N. T. Hiep, N. Q. Binh, L. Averyanov, P. Cribb, NTH 3332 (HM); Quan Ba district, Can Ty municipality, in the vicinity of Lung Vai village at left side of Mien River, 23°05'09"N 105°03'23"E, 1,440 m a.s.l., 8 May 2002, P. K. Loc, L. Averyanov, N.

T. Vinh, HAL 1438 (HN); Dong Van district, Sinh Lung municipality, vicinities of Ha De village around point 23°12'23"N 105°17'18"E, 1,450 m a.s.l., 15 December 2005, L. Averyanov, T. V. Thao, P. V. The, HAL 8617 (HN); Lai Chau province – Sin Ho district, Xa De Phin municipality, Mao Xa Phin village, 22°18'49"N 103°15'18"E, 1828 m a.s.l., 8 June 2006, P. K. Loc, N. T. Vinh, N. S. Khang, P. N. Quan, T. A. Suu, HAL 8738 (HN, MO); Son La province – Moc Chau district, Van Ho municipality, Hua Tat village, 20°46'16"N 104°47'44"E, 1,200–1,350 m a.s.l., 29 October 2006, N. T. Hiep, L. Averyanov, P. V. The, HAL 9363 (LE).

**4. *Lilium brownii* F. E. Brown ex Miellez, 1841, Cat. Expos. Soc. Hort. Lille; id., 1845, Ann. Soc. Roy. Agr. et Bot. Gard. (1845), pl. 41; Elwes, 1880, Monogr. Lilium, pl. 19; Wilson E. H., 1925, Lilies East. Asia: 28; Syngae, P. M., 1980, Lilies: 61; Gagnep., 1934, Fl. Indo-Chine 6, 6: 808; Liang S. Y., Tamura M. N., 2000, Fl. China 24: 146; Ho P. H., 2000, Ill. Fl. Vietnam 3: 480, fig. 9619; Nguyen Thi Do, 2005, Checklist Pl. Sp. Vietnam 3: 455.**

Described from China ("... plant was introduced to Europe from China, as long ago as 1804, by Capt. Kirkpatrick of the East-India Company's service ..."). Type – location unknown. (Fig. 4D).





**Distribution** VIETNAM: Bac Kan (Ngan Son district, Ngan Son town); Ha Giang?; Kon Tum (Ngoc Linh mountains); Lai Chau?; Lao Cai?; Lang Son (Cao Loc district, Dong Dang town), Yen Bai. MYANMAR. CHINA (Anhui, Fujian, Gansu, Guangdong, Guangxi, Guizhou, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Shaanxi, Shanxi, Sichuan, Yunnan, Zhejiang), KOREA. (Fig. 4D).

**Habitat, phenology and conservation status** Terrestrial bulbiferous herb with an erect stout stem to 1.5 m tall. Secondary thickets or scrub, wet grasslands on alluvial hill slopes along ravines or streams usually in lime-soil areas. 800–900(1,000) m a.s.l. Flowers in May–June. This species is rare and is regarded as vulnerable according to IUCN Red List criteria.

**Notes** Records of *Lilium brownii* from Lai Chau, Lao Cai (Sa Pa), Yen Bai and Ha Giang provinces without a citation of voucher specimens (Ho, 2000; Nguyen Thi Do, 2005,) remain questionable. Gagnepain (1934) cited specimens from “Tonkin: Dong-dang, sur les collines” (Balansa), and “vers Langson et Longtcheou [Longzhou]” (Simond). These habitats are located in Lang Son province in Vietnam bordering on China. Unfortunately, we have been unable to locate the specimens. Furthermore, data on the occurrence of this species in Myanmar and Korea is provided by a database e-Monocot: <http://e-monocot.org/taxon/urn:kew.org:wcs:taxon:280724>, [accessed on 13 August 2015]. However, we have not seen any materials of this species from these countries.

In Vietnam and China, the bulbs of *Lilium brownii* are exploited for eating and medicinal purposes. The plant is now becoming rare due to overcollecting. The rapid degradation of its habitat is also endangering it.

**Studied specimens** VIETNAM: Lang Son province – Cao Loc district, Dong Dang town, May 1908, d’Alleizette, sine no (P); Bac Kan province, Gio Pass on car road from Hanoi to Cao Bang city near Ngan Son town, 800–900 m a.s.l., 28 May 1997, L. Averyanov, N. T. Hiep, VH 4995 (HN, LE); Kon Tum province – Ngoc Linh mountains, 1 December 2015, Vo Van Cong, L. Averyanov, T. Maisak, AL 133 (LE).

**5. *Lilium concolor* Salisb.\*, 1806, Parad. Lond. t. 47; Wilson E. H., 1925, Lilies East. Asia: 56; Ohwi J., 1965, Fl. Japan, Engl. ed.: 297; Syngé P. M., 1980, Lilies: 66; Lee T. B. 1989, Illustr. Fl. Korea: 207; Liang S. Y., Tamura M. N., 2000, Fl. China 24: 139; Ho P. H., 2000, Ill. Fl. Vietnam 3: 481, fig. 9622; Nguyen Thi Do, 2005, Checklist Pl. Sp. Vietnam 3: 455.**

The origin of authentic specimens is unknown (“... no other collection yet than the Right Honble Charles Greville’s, who does not know from whence he received it.”). Type not located (BM?).

**Distribution** VIETNAM (occasionally cultivated as an ornamental plant in northeastern provinces). RUSSIA (Far East, Eastern Siberia). MONGOLIA. CHINA (Hebei, Heilongjiang, Henan, Hubei, Jilin, Liaoning, Shaanxi, Shandong, Shanxi, Yunnan). KOREA JAPAN.

**Habitat and phenology** In the native area it grows in open humid forests, scrub, or moist meadows. 300–2,200 m a.s.l. Flowers in May–July.

**6. *Lilium longiflorum* Thunb.\*, 1794, Trans. Linn. Soc. London 2: 333; Wilson E. H., 1925, Lilies East. Asia: 23; Ohwi J., 1965, Fl. Japan, Engl. ed.: 298; Synges P. M., 1980, Lilies: 96; Lee T. B., 1989, Illustr. Fl. Korea: 209; Ying S. -S., 2000, Fl. Taiwan 5: 52; Liang S. Y., Tamura, M. N., 2000, Fl. China 24: 148; Ho P. H., 2000, Ill. Fl. Vietnam 3: 480, fig. 9618; Nguyen Thi Do, 2005, Checklist Pl. Sp. Vietnam 3: 455. – *L. candidum* auct. non L.: Thunb., 1784, Fl. Japonica: 133.**

Described from southwestern Japan (“Crescit in Nagasaki, Miaco, alibi”). Type – UPS-THUNB 8140 [V-008140].

**Distribution** VIETNAM (widely cultivated throughout the country, particularly in Central Highlands). JAPAN. TAIWAN.

**Habitat and phenology** In the native area it grows in open scrub, or moist meadows. 0–500 m a.s.l. Flowers in May–July.

**7. *Lilium lancifolium* Thunb.\*, 1794, Trans. Linn. Soc. London 2: 333; Ohwi J., 1965, Fl. Japan, Engl. ed.: 297; Ho P. H., 2000, Ill. Fl. Vietnam 3: 480, fig. 9621; Nguyen Thi Do, 2005, Checklist Pl. Sp. Vietnam 3: 455. – *L. tigrinum* Ker Gawl. 1809, Bot. Mag. 31: t. 1237; Synges P. M., 1980, Lilies: 135; Lee T. B., 1989, Illustr. Fl. Korea: 209; Liang S. Y., Tamura M. N., 2000, Fl. China 24: 146. – *L. bulbiferum* auct. non L.: Thunb., 1784, Fl. Japonica: 134.**

Described from Japan with no locality. Type - UPS-THUNB 8139 [V-008139].

**Distribution** VIETNAM (occasionally cultivated as an ornamental plant in northeastern provinces). CHINA (Anhui, Gansu, Guangxi, Hebei, Henan, Hubei, Hunan, Jiangsu, Jiangxi, Jilin, Qinghai, Shaanxi, Shandong, Shanxi, Sichuan, Xizang, Zhejiang). KOREA. JAPAN.

**Habitat and phenology** In the native area, it grows in open scrub, or moist meadows. 400–2,500 m a.s.l. Flowers in July–August.

**Notes** In China the plant is widely cultivated for eating, medicinal use of its bulbs.

## Acknowledgements

The authors cordially thank the Director of the Center for Plant Conservation, Hanoi (Vietnam Union of Science and Technology Associations), Dr. Nguyen Tien Hiep for organization of field works which were partly supported by investigation programs of USA National Geographic Society (“Exploration of primary woods along constructed highway Hanoi – Ho Chi Minh for their sustainable conservation in limits of Ha Tinh and Nghe An provinces of central Vietnam”), Rufford Small Grant for Nature Conservation (“Mapping and assessment of *Xanthocyparis vietnamensis* subpopulations in Cao Bang, Ha Giang and Lang Son provinces, Vietnam, 2014-2015”) and Russian Foundation for Basic Research (“Plant taxonomy, geography and biology in local floras of eastern Indochina”), 15-04-00419. Authors are highly indebted to growers of the Botanical Garden department of the Komarov Botanical Institute, Mrs Z. Zaitseva and Mrs I. Kutuzova who skillfully kept our living collections for our research. Laboratory works were carried out in the framework of institutional research project of the Komarov Botanical Institute of the Russian Academy of Sciences.

## References

- Britton, N. L. & Brown, A. (1913). *An illustrated flora of the northern United States and Canada*. From Newfoundland to the parallel of the southern boundary of Virginia, and from the Atlantic Ocean westward to the 102d meridian. 2<sup>nd</sup> ed., C. Scribner’s sons, New York.
- Gagnepain, F. (1934). 19. *Lilium* L. – In: H. Lecomte and H. Humbert (eds), *Flore Générale de l’Indo-Chine*. 6, 6: 808-811. Masson et Cie, Paris.
- Govaerts, R. (2011). *Lilium*. World Checklist of Selected Plant Families. Facilitated by the Royal Botanic Gardens, Kew. [http://apps.kew.org/wcsp/namedetail.do?name\\_id=280381](http://apps.kew.org/wcsp/namedetail.do?name_id=280381) [accessed 15 August 2015].
- Ho, Pham-Hoang. (2000). Liliaceae. *An illustrated flora of Vietnam*. Vol. 3: 473–486. Nha Xuat Ban Tre. Tp. Ho Chi Minh.
- Hohenegger, M. (2011). The genus *Lilium* & allied genera *Cardiocrinum* & *Nomocharis*. <http://www.the-genus-lilium.com> accessed at 15 August 2015 [accessed 20 August 2015].
- Liang, S. Y. & Tamura, M. N. (2000). *Lilium* Linnaeus. – In: Wu, Z. Y. and Raven P. H. (eds), *Flora of China*. Vol. 24: 135–149. Science Press; Miss. Bot. Gard. Press, Missouri.
- Mabberley, D. J. (2000). *The Plant-Book*. Cambridge Univ. Press. Cambridge.
- Newman, M., Ketphanh, S., Svengsuksa, B., Thomas, P., Sengdala, K., Lamxay, V., and Armstrong, K. (2007). *A checklist of the Vascular Plants of Lao PDR*. Royal Botanic Garden Edinburgh. Edinburgh.
- Nguyen, Thi Do. (2005). 229(10). 1. *Lilium* L. 1753. – HOA LOA KEN. In Danh Luc Cac Loai Thuc Vat Viet Nam [Checklist of Plant Species of Vietnam]. Tap 3: 455. Nganh Moc Lan – Magnoliophyta (Nganh Hat Kin – Angiospermae). Agriculture Publ. House, Ha Noi (in Vietnamese).
- Shaw, J. M. H. (2008). Three new Crùg Farm introductions. *The Plantsman* n. ser. 7, 1: 39–43.

## Footnote

This article was previously published in *Taiwania* 61(1): 1-7, 2016  
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# Dr Nuala Sterling CBE FRCP

*Caroline Boisset writes about the life and achievements of the Lily Group Chairman from 2011 until 2017 who was awarded the Lyttel Cup for 2016.*

On 26 October 2017, having been presented the Lyttel Cup for 2016 by Tim Upton, Director of Horticulture of the Royal Horticultural Society, Nuala Sterling stood down as Chairman of the Lily Group after six years of unstinting service to the Group.

Nuala was born in Ireland. Her father, Fred Bradbury, a Yorkshire man born a Victorian in 1865 (sic) was Professor of Textile Industries at the Municipal Technical Institute Belfast and previously of Halifax. Her mother, Jane, née Ratcliff, met him during an unanticipated Women's Institute visit to Ulster to learn about the flax industry. She was a talented weaver and spinner who dyed her own wool; she was artistic and gifted, also a potter, painter and singer. She was striking, and very intelligent, so he fell in love with her immediately.

Ireland being neutral, there were no blackouts, but the extensive ship building in Belfast was targeted and the city suffered heavy bombing during three nights in 1941, which damaged the Bradbury's house, and they spent the last three and half years of the war living in one room of a magnificent house in County Down. A blissful country childhood with her father, who was too old for military service, so present throughout the war, was a blessing for Nuala.

The family came to England when Nuala was nine, her sister seven and her brother six. Living in Thaxted, Essex where her mother was born, near Nuala's grandfather and aunt, she got a scholarship to the Friends School Saffron Walden. Her father died when Nuala was 12 and her mother being too young to be awarded a widow's pension had no income. Nuala remembers a very frugal childhood; Jane used her talents to generate funds, setting up a small café and craft shop before moving to Cornwall on a whim in the early 1950s where she started another craft shop, 'The Spinning Wheel' much as she had done in Essex before she left to marry.

Nuala learnt early an interest in plants. Her aunt and godmother, Ethelind Fearon, was a tremendous influence that she has told me is still with her, "when I have grown a plant of which Ethelind would approve, I feel an extra sense of achievement". Ethelind trained as a horticulturist, ran a market garden during the war and was a talented gardener and designer; and a fantastic cook. A widow, she was a successful writer including *The Making of a Garden* (1948), *The Reluctant Gardener* and *The Reluctant Hostess* (1953). Renting a winter house in old Cannes, knowing Vita Sackville West, the holidays there were a further horti-



cultural influence.

It was unusual for girls to read medicine then but with a protestant father who, unusually for his age, considered education of girls as important as boys and attending a co-educational Quakers' School, where justice and equality was paramount, she was encouraged to study sciences. Every child had some gift and talent was to be used. Problems were not barriers but issues to be resolved. She learnt very early on to be considerate to everyone.

Nuala believes that this Quaker upbringing had a formative bearing on her sense of justice and equality, that the mores of one's childhood influence stay with you, and fairness

has permeated her whole life. Northern Ireland riven by religious differences contributed to your seeing things from different angles.

At school she was very good at sciences: maths, chemistry, physics, botany and zoology and usefully also took Latin at O'Level. Taking charge of the rock garden which had been inadequately attended for several years she has been left with a sense of reluctance to repeat the experiment. A member of the Natural History Society visiting Rothamsted Experimental Station, at tea, she requested an interview anticipating a 'gap year' before university. There she worked for a couple of months analysing seedling Scots pines.

Observant as a child, she had seen her father die without what one would consider proper medical attention, then watch her grandfather die of heart failure and felt she could do better, striving to be a surgeon. Hesitating between horticulture (even applying to Reading University) or medicine, her physics master suggested that she make medicine her career and horticulture a hobby. She has never regretted that decision.

### **Medical career**

The gap year never materialised and at 18 she went to Kings College London for pre-clinical studies and then St George's Hospital Medical School, Hyde Park Corner. Small and personal, it had only five girls in 120 students, you could not escape being known! SW1 was stylish and the balls at the Hyde Park Hotel were



fantastic where consultants wore tails and the students wore DJs. Like the era of Lister and Lane.

Nuala met Graham on the pantomime stage in their first clinical year, he having come down from Cambridge. She singing as 'Alice in Slumberland' and he was the Cheshire Cat. They were married four years later in 1961. Junior jobs at St George's were followed by a failed Part 1 FRCS so she abandoned surgery and took to part-time General Practice. But in 1966 against the odds, she was appointed Medical Registrar and Resident Medical Officer at St George's Hospital and she, Graham and three year old Charles moved into her residence, a flat at 19 Knightsbridge.

At the end of 1967 a move to Oxford where Graham was doing pulmonary physiology research and thence to the Cardiovascular Institute in San Francisco, enabled Nuala to experience American medicine as a part-time lecturer at the Moffat Hospital. The USA unlike England allowed a choice of 10% to 50% for part-time work.

In 1970, Graham, Senior Lecturer at the new Southampton Medical School, Nuala and the two children moved to Southampton, where her senior medical training followed with research in immunology and publications in medicine and part time medical training for women. In 1979 she was appointed Consultant Physician in Geriatric Medicine to Southampton General and Lymington Hospitals so they moved to live in the New Forest to a house with a derelict field garden. Three further sons were born in 1974, 1977 and 1981 — lively handful. But a lot of fun.

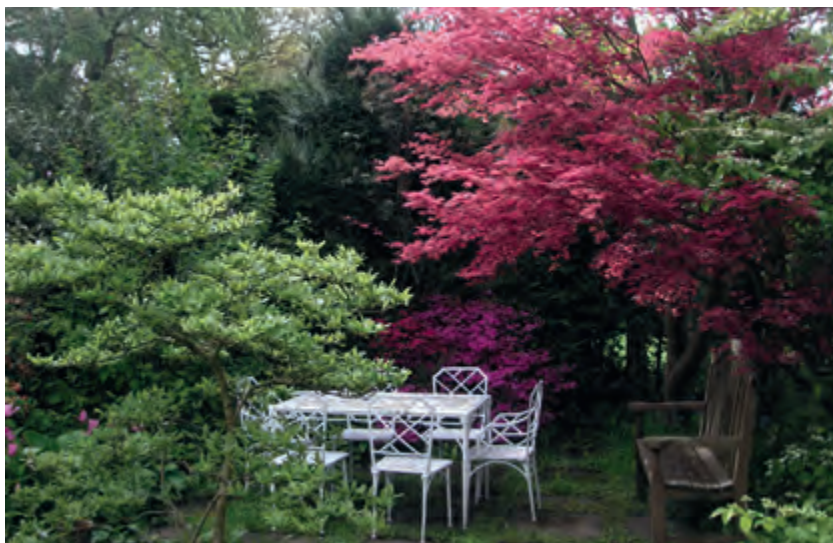
Her administrative experience began with the Medical Women's Federation and the College of Physicians. The BMA and Department of Health involvements triggered many improvements in Medicine like her *Lancet* Paper in June 1976 "Part time Senior Registrar posts: Wessex Reviewed" which accompanied the Leader entitled "the Pleasing punishment women bear" encouraging better employment amongst women. In 1989 she was elected President of the MWF.

Her Chairmanship of the Standing Medical Advisory Committee to the Secretary of Health (1990–94) was the most fascinating, meeting many influential people at a politically tense time for health, such as Ken Clarke dealing with the BMA when Mrs Thatcher was PM! She considers that her report on services for cystic fibrosis a disease moving from childhood into adulthood and co-editing the advisory report on Nurse prescribing (1989), were the most important of her tenure.

Throughout her career Nuala has been an inspiration to younger doctors, her professionalism, enthusiasm and kindness encouraged many to progress and persist in difficult circumstances. Nuala did not just strive to excel at being a good doctor, she wanted to promote good practice, improve the working conditions, particularly for women and also ensure that research was put to good use nationally.

She was awarded a CBE for services to medicine in 1993.

Nuala's other interests have been painting, collecting china, watching cricket,



Nuala's garden showing: *Tulipa* 'China Pink', *Magnolia stellata*, yew, blue azalea (*Rhododendron*), *Acer palmatum* 'Sango-Kaku' and *Viburnum plicatum* 'Mariesii', photographed in May 2015.

rowing, choral singing, music, violin and piano. Relearning this as an adult helped her neurological research into strokes as she understood that the first time you learn a piece of music the brain tells fingers what to do but that the second time the fingers already have musical memory, using a lower part of the brain.

### **Gardening and plants**

And then there were the plants. Given a cymbidium flower on her wedding day her first special interest was orchids, she kept a potted *Cymbidium* on her balcony in San Francisco. Returning to the UK in the 1970s micropropagation meant she was able to start growing orchids seriously. With a botanist friend she joined the Bournemouth Orchid Society and her most recent prize was for a *Cattleya*.

*Lilium regale* seed from her botanist friend encouraged her to grow more, and from *Metasequoia glyptostroboides* seed she grew ten trees. Today her once derelict field garden by the edge of the Beaulieu Medieval Banks is a treasure trove. Her early plantings were trees and bulbs from Hilliers, de Jaegers, Walkers, Bloms and later Hydes. There were yews (now 35 years old), *Parrotia persica*, *Sequoia sempervirens*, Seville oranges and an *Acer* seeded from school 30 years ago by her youngest son, Tom. Among her favourites are silver birches, an *Acer palmatum* that is pink in spring, green in summer and red in autumn, and two

unnamed white magnolias purchased for £1 in 1980. She acknowledges her love of plants flowering throughout the year snowdrops, violas, crocuses, colchicum, cyclamen, crocosmias, nerines and the many background shrubs and then the wonderful lilies.

Long a member of Royal Horticultural Society, the Bournemouth Orchid Society and the Beaulieu Horticultural Society which she served as secretary from 2002 to 2010. After reading *Gardens Illustrated* she joined three of Kirsty Fergusson's Garden Tours in Northern France—another inspiration. She finally left work in 2004 (although subsequently completing locums in the North and South Islands of New Zealand, until 2011, she wondered what she was going to do? Pat Huff's 2003 article on a Lily Group visit to Spetchley Park to see the Martagon lilies intrigued her, and she joined in 2004. The interesting conference that year was the best she had ever attended, members were so friendly, and the lectures, presentations and garden visits, enchanting; she was smitten. Dr Ian Boyd, a committee member, proposed she join the committee and following Richard Beale's formal invitation she accepted. It has been a revelation, inspiration and an education.

The rest as they say is history. Nuala became chairman in 2011, at a time when relations with the Royal Horticultural Society were at a low ebb. But following Pat Huff's initial negotiations, through her determination, attention to detail, understanding and charm, she steered through the storm and the Lily Group has come out the other end, a respected organisation with close ties to the RHS. Nuala through charity contacts, arranged with Alan Pryke a simple paged website in 2012 after the earlier destruction, encouraged PayPal and the electronic delivery of the Newsletter and Seed List, masterminded the digitisation of the complete run of yearbooks and with Richard Hyde is one of the members of the Bulb Committee, a Vice Chairman since 2013 supporting Jan Pennings in cooperative joint visits, deputising for him on the Horticulture Board. She will be the Forum Chairman on the new *Lilium* Trial at Wisley and The Savill Garden. Her last action has been to select a Botanist, Dr Jamie Compton, as successor. We all owe her a great debt.



This orchid, for which Nuala was awarded a first prize at the Bournemouth Orchid Society's Show in September 2017, is an unnamed *Cattleya* hybrid.

# Australia's giant lily

*Although *Doryanthes excelsa* has been removed from Liliaceae, it is still a fascinating plant, as **Alisdair Aird's** article reveals.*

“What on earth is that?” I wondered, as I stared up at a mass of red lily-flowers topping a stem that towered too far above my head for me to make them out clearly. It turned out to be the giant lily, *Doryanthes excelsa*. It's also known as the flame lily, Illawarra lily, signal lily, spear lily and gymea lily—gymea being the name in the dialect of the area's Aboriginals, who used the leaf fibres for making cords and bags, and the stem and other parts as bush food. It belongs to a unique Australian genus with only one other species, the less lofty *D. palmeri*. As you can see from my photo (*opposite*), taken that Sunday afternoon in the Royal Botanic Gardens Melbourne, in Victoria, southern Australia, the flower spike soared above not only me but also the Gardens' substantial Rose Pavilion.

The giant lily is of course not actually a lily, except in the very broadest sense. *Doryanthes* has indeed until fairly recently been included in the Liliaceae family, but some 50 years ago a strong case emerged for separating this relatively recently evolved plant into its own unique family, Doryanthaceae, and that family name, formally published in 1985 (Dahlgren & Clifford in Dahlgren, Clifford & Yeo, Fam. Monoc.: 175; 1985), is now generally accepted. Molecular studies suggest that despite superficial appearances the giant lily is probably more closely related to irises than to lilies.

But what a plant this is. It takes some years to establish its substantial ever-green tussock of fibrous ribbed sword-shaped leaves, up to a metre or even two metres long. It grows wild only in the central coastal strip of New South Wales, in dry scrub or woodland. Rainfall here can be very limited, but the rosette of leaves channels any available moisture straight down to the feeding roots. As the sandstone soil itself dries out, other contractile roots gradually pull the stout succulent rhizome deeper and deeper. Plants take five, ten or even 20 years to reach flowering size. Unlike many Australian plants, it thrives on abundant feeding.

Eventually when conditions are right in winter, a stout flower stalk starts to emerge from the clump of leaves. It thrusts upwards quite quickly, and by spring or summer reaches a height of up to four or five metres, being topped by a flowering head. This starts as a spear-shaped bud and eventually opens into a crown some 70 cm across, consisting of up to a dozen or sometimes several dozen individual flowers, usually bright red. Each flower has six rather narrow tepals and bright green stamens, and develops a central pool of nectar that is a magnet for wattlebirds, honey-eaters and brilliantly coloured rainbow lorikeets.

The tough leaves and deep rhizome make the giant lily fairly resistant to



**Above**, *Doryanthes excelsa* beside the Rose Pavilion, Royal Botanic Gardens Melbourne. **Inset**, flowering at the University of New South Wales.



wildfires. Indeed, the grass fires which are not uncommon in the area are thought to stimulate flowering the following winter. Jeremy Smith, an expert grower of native Australian plants at Wildflower Farm in Somersby NSW, has been known to use a blow-torch around the base of his giant lilies, to kick-start anthesis by producing ethylene. Alternatively, one might perhaps hope to get a similar ethylene stimulation by placing an apple in the centre of the leaf rosette, much as some pineapple growers do.

This remarkably statuesque flower is traded commercially, both internally within Australia and for export, cut when still in bud but not yet splitting open, with a stalk about one and three-quarter metres long. Once in the vase it can last for up to a month. Plants are quite widely available in NSW, in pot sizes between 14 L and 45 L. Anyone with a long enough life ahead of them to look forward to eventual flowering can find seed suppliers too, on the internet.

The giant lily is very rarely grown outside Australia, and not just because of any difficulty in meeting its cultivation requirements. Its sheer size rules it out for almost any private grower. When Kew Gardens were planting their then-new Australia House in 1952, they weighed the flowering-sized Giant Lily that they moved there from the Temperate House, and found that it tipped the balance at about one and a half tons.

In December 1800, when José Correia da Serra proposed the name of *Doryanthes excelsa* in a paper he read to the Linnean Society (Trans. Linn. Soc. London: 6: 211; 1802), he suggested that, among the many interesting plants to have emerged from Australia, this might be the most noteworthy of all, for “its beauty, its shape and elegance, and the tenacity of its vital powers”. (Correia, an enlightened and learned political liberal, and a protégé of Sir Joseph Banks, was at that time Secretary to the Portuguese Embassy in London, but not for the first time fell out with the Portuguese authorities before his paper was published, and fled to Paris in 1802. In later life he served Portugal, particularly in the fledgling United States, as an honoured diplomat and statesman.)

The plant was discovered in New South Wales in the closing years of the nineteenth century by George Bass, a young surgeon, naturalist and adventurer from Lincolnshire who made several important contributions to the exploration of Australia, as well as discovering the Bass Islands in French Polynesia, before he was lost at sea at the age of 32 while attempting an ill-advised South American trading venture—at that time still forbidden to non-Spanish merchants. Bass brought dried specimens to England in 1799 (now in the Australian National Herbarium, Canberra), and in 1801, after Correia presented his paper but before it was sent for printing, John Hunter, former Governor of New South Wales and recalled from there in undeserved and fortunately temporary disgrace, arrived at Spithead with further specimens preserved in alcohol, which Correia also put towards



José Correia da Serra,  
'On the Doryanthes,'  
Transactions of  
Linnean Society,  
Vol. 6 (1802),  
Plate 23 (p. 212)  
monochrome.

his published description of the plant. It was however a remarkable additional specimen which was what really earned his comment about the giant lily's vital powers. This was a cut stalk which had been brought from Australia by either Bass himself or his brother-in-law Henry Waterhouse, on a sea voyage that had taken many months, and given to Kew Gardens. This stalk was optimistically plunged in soil, probably in the Orangery which had been built 40 years earlier and at the time was the largest glasshouse in the world (it is still in use). Against all the odds, the buds on the naked stem began to swell and eventually produced at least one open flower, which was engraved by Gregorio Francisco de Queiroz for Correia's published paper. So, if you ever see a cut stem for sale in your neighbourhood flower shop, why not try Kew's 1799–1800 trick yourself?

# Engineering instincts and growing lilies

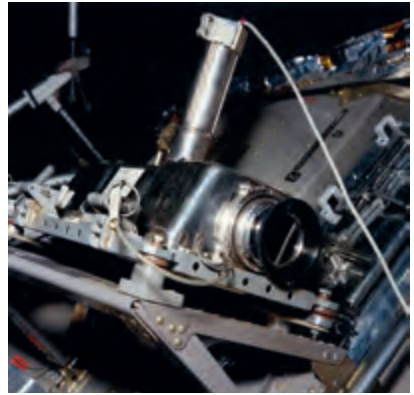
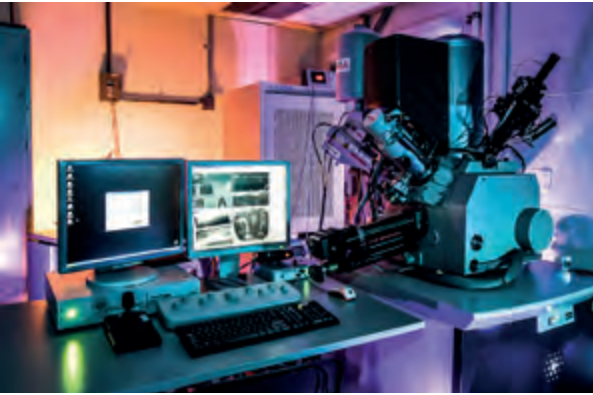
*In this autobiographical article, Lyttel Cup recipient **Gene Mirro**, provides insights into how he has achieved considerable success in growing species lilies.*

I was born in Pittston, Pennsylvania, and grew up in Lehigh Valley, eastern Pennsylvania. My gardening career started at the age of four, when I discovered that the neighbor's carrots were growing down into the soil, where you couldn't see them. So I replanted them with the carrots sticking out of the soil, as God intended. I could not understand why my neighbor was not grateful.

I continued to do a little gardening as I grew up. But I never grew lilies on the East Coast, and I never saw a lily in the wild there. I graduated from Lehigh University, Bethlehem, PA, with a BS in Electrical Engineering. I worked as an Electrical Engineer (EE) at RCA Space Center in New Jersey, then Princeton Plasma Physics Lab.



*Lilium kelloggii*, growing on the east side of my house. They get sun during the cool morning hours, and are shaded by the house in the afternoon heat.



**Above, left.** FEI Nova NanoLab™ 600 DualBeam electron microscope made by FEI. One of the systems I have worked on. Photo courtesy Ohio State University.

**Above, right.** The TV camera for the Apollo moon mission. One of the projects I worked on at RCA Space Center. One of the astronauts pointed it directly at the sun. It didn't work so well after that. Later designs were a bit more forgiving.

Photo courtesy NASA (Public domain), via Wikimedia Commons.

My old garden encyclopedia had many entries like this: “grows only in favored climates, such as the Pacific Northwest”. So in 1980 I moved to Oregon to grow rare plants, to get away from Northeastern winters, and to get close to beautiful scenery. I was a full-time student of Horticulture at Oregon State University in Corvallis, Oregon for one year. Later I worked as an EE for various companies in the Portland, Oregon area. I am now semi-retired, working as an EE consultant on electron beam and ion beam equipment for the semiconductor industry.

I discovered species lilies when I moved to Oregon, and was amazed to occasionally see *Lilium columbianum* and *Lilium washingtonianum* beside the country roads. In the garden, I started out with *L. pardalinum*, which



*Lilium columbianum* growing among giant redwoods, California coast



**Right**, lily and other seedlings growing under fluorescent lights indoors in winter.

**Opposite**, my fluorescent light setup for indoor growing in winter and late spring. This works best if temperature is 70 F (25 °C) or below. White insulating foam is used to reflect light back to the plants.

**Below**, *Lilium martagon album* with companion plants *Lychnis chalcedonica* and *Delphinium bellamosum*.



loved my heavy, wet soil. I then started growing various species from seed, often with 100% failure. I quickly discovered that growing lilies is not like growing perennials. My engineering instincts came in handy as I tried to identify all of the variables that needed to be controlled in order to grow difficult species. The challenge definitely motivated me, since I enjoy solving difficult problems. The lily experts said that the soil needed to be cool and shaded, so I learned how to do that, with mulch and companion plantings. I then discovered that slugs and mice had to be severely dealt with. I found that most species lilies like a humusy sandy loam soil, with regular fertilization. I have mixed many truckloads of sand into my planting beds. I learned that most lilies like fairly dry soil after blooming. Not completely dry! As time went on, more and more lily seedlings survived to flowering. I also learned about germination and growing on of the







young seedlings, and about long-term seed storage in the freezer.

My lily collection shifted into high gear when I joined the NALS and the RHS Lily Group. I also began writing articles for the publications. I have contributed seed to NALS, RHS Lily Group, SRGC and NARGS. In the internet era, I have written articles for the NARGS and SRGC forums, as well as the publications. Very recently, I have begun contributing to the “Species *Lilium* and *Nomocharis* Enthusiasts” Facebook page.

I start all of my seedlings indoors under lights or in the cool greenhouse. I found that lily seedlings grow very well under fluorescent lamps, in a cool place indoors in winter and early spring. Nearly all of my flowering plants are outdoors in the garden. The Pacific Northwest is a great place to grow lilies, but I cannot grow the *monadelphum* group, *Lilium nepalense*, or the Chinese alpine lilies here. It may be that I am doing something wrong, or it may be climate. Some species such as *L. speciosum*, *L. alexandrae*, and *L. nobilissimum* have to be grown in the greenhouse here, since their seed ripens so late.

I have made many lily-related posts in the SRGC forum. <http://www.srgc.net/forum/> You can find them by searching for my name Gene Mirro. They contain lots of photos. Other articles I have written on species lilies can be accessed using the links below.

I wrote three articles for the NALS: “Feeding your Lilies”, “Germination of the Western *Lilium* Species”, and “Long Term Storage of Lily Seed”. They appeared in the 1991 NALS Yearbook. They are combined under the title “Trials and Triumphs in the Lily Patch”, page 37. There is an article in the same issue, “Oregon Wild Lily

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### Some of my published articles about species lilies

Growing Lily Species in the Pacific Northwest, pages 103-110, *Lilies and Related Plants 2013–2014*. [http://rhslilygroup.org/2013-2014\\_IR.pdf](http://rhslilygroup.org/2013-2014_IR.pdf)

[http://www.srgc.org.uk/logs/logdir/2012Jul261343329301IRG31\\_July2012.pdf](http://www.srgc.org.uk/logs/logdir/2012Jul261343329301IRG31_July2012.pdf)

[http://www.srgc.org.uk/logs/logdir/2012Aug301346354548IRG\\_32\\_August2012.pdf](http://www.srgc.org.uk/logs/logdir/2012Aug301346354548IRG_32_August2012.pdf)

[http://www.srgc.org.uk/logs/logdir/2012Sep271348748134IRG33\\_Sept2012.pdf](http://www.srgc.org.uk/logs/logdir/2012Sep271348748134IRG33_Sept2012.pdf)

Sanctuary Visited” by Mary Hoffman, which recounts a visit to my place in Portland and a description of the gardens there.

The content is similar to an RHS Lily Group Yearbook article from 1992–93 on page 67, also called “Trials and Triumph in the Lily Patch”, but there are editing differences. “Long Term Storage of Lily Seed” is a separate short article on page 90 of the 1992–93 Yearbook.

Engineering is great preparation for growing the difficult species. I have spent my life taking things apart, analyzing them, and putting them back together. The species require patience, perseverance and commitment. Luckily for novice growers, there is a wealth of information on the web and in books. You don’t have to re-invent the wheel. I would like to see many more good species lily growers. I believe we are the best hope of preserving them. If each grower will build up a diverse population of the species that do well for him or her, the effects of inbreeding can be overcome, and there will be plenty of seed for the exchanges. That is my plan, and that is what keeps me motivated.



*Lilium mackliniae* dark form, growing in a raised bed of sandy loam soil.



*Lilium grayi*, a beautiful eastern American species.

# Wild native lilies of the eastern United States and Canada

*Much attention has been paid to western American species lilies. In this article **Jim Drake** considers the equally lovely eastern species.*

Growing up in the Southern Appalachian Mountains of the United States, a region highly diverse in flora, instilled in me an appreciation of wildflowers. My frequent walks among the mountains and valleys often resulted in interesting botanical finds and led to my choosing biology as an undergraduate major. After military service in the 1970s, I pursued a master's degree in environmental health, followed by a long career in that field. After an initial retirement, my interests in biology, particularly botany, returned with a high degree of vigor. I joined a number of botany-related organizations, began writing numerous articles, and published four books related to wildflowers, especially certain orchid genera, the gentian family, and lilies.

My formal introduction to lilies occurred several decades ago with my first glimpse of the rare Gray's lily on the grassy slopes of Roan Mountain in the states of North Carolina and Tennessee. This experience inspired a later quest to observe, photograph, and study the various species of native lilies within the eastern U.S. and Canada. From bushwhacking during the heat of southern U.S.



The author, Jim Drake, holding Yellow Canada Lily flowers (*Lilium canadense* var. *canadense*) seen growing in a moist area of his garden in north Georgia, USA during late May.

summers to cruising the cool scenic heights along the Blue Ridge Parkway and many other places, my search for often rare and always lovely wild lilies has been a rewarding experience. All lilies speak the universal language of beauty.

Although the name 'lily' is frequently applied to a number of plants, whether or not they are included within the genus *Lilium* or even the family Liliaceae, those described herein are 'true lilies' belonging to the genus *Lilium* and can be found in the wild and sometimes under cultivation within gardens. Common characteristics of the genus include erect stems arising from bulbs, terminal inflorescences, superior ovary, flower parts in threes or



*Lilium canadense* var. *canadense*



*Lilium canadense* var. *editorum*

multiples of three—three petals, three sepals (collectively, six tepals), three-lobed pistil, and six stamens. Most have showy or colorful flowers with tepals recurved to at least some degree exposing prominent reproductive parts which attract pollinators. These include, depending on the species of lily, a variety of bees, beautiful butterflies and other insects, and equally colorful hummingbirds. Some lily species even have ‘nectar guides’ to direct pollinators to a sweet reward.

This article highlights the eleven taxa in the genus *Lilium* that occur in the U.S. east of the Mississippi River and in the eastern half of Canada, including nine species, one of which has two varieties, and one hybrid. Individual descriptions focus on the unique characteristics, rather than a detailed account, of each taxon. More complete descriptions of the following plus other ‘lilies’ are included in my book *Lilies in the Wild and in the Garden*.

**Yellow Canada lily** (*Lilium canadense* var. *canadense*) and **Red Canada lily** (*Lilium canadense* var. *editorum* Fernald) are similar in a number of ways, and opinions differ among taxonomists whether separation into two varieties is even warranted. For example, both taxa produce non-fragrant pendent flowers with semi-reflexed tepals (sepals plus petals taken together). Filaments are yellow and anthers are tan to brown. Both varieties have whorled leaves. Flower color seems to be the major distinction separating the two varieties. Flowers of var. *canadense* are distinctly yellow whereas var. *editorum* are red to orange-red. Although quite variable, other features possibly separating the two include wider leaves and narrower petals in Red Canada lily. **Habitats** of rich moist woods, beside streams, in river bottoms, bogs, marshes and wet roadsides are similar in both varieties. **Ranges** for both include much of the eastern third of the U.S.



*Lilium catesbaei*



*Lilium philadelphicum*

into Canada and west into a few mid-western states. Red Canada lily may have a somewhat smaller range. Having examined a few specimens of both colors, this author believes that separating the species into varieties is the correct approach.

**Pine lily** (*Lilium catesbaei* Walter) produces non-fragrant, red to orange-red (rarely yellowish), relatively large, erect flowers. The upward facing, moderately recurved tepals are highly variable in width from plant to plant. The tepals narrow abruptly at the base into greenish-yellow claws, giving a spoke-like appearance to the flower when viewed from above. Yellow, maroon-spotted nectar guides are located just before the claws. The anthers are tan-orange to brown and the style is pale green. Leaves are non-whorled, scale-like, and often appear appressed to the stem. **Habitats** include pine savannas, seeps, and flatwoods. **Range** is limited to the Coastal Plain areas of a few southeastern U.S. states. **Note:** This is one of only two eastern native lilies with erect flowers.

**Wood lily** (*Lilium philadelphicum* Linnaeus) produces non-fragrant, relatively large, red to orange, rarely yellowish, erect flowers with one to three blooms per plant. The semi-reflexed tepals are strongly clawed at the base. Nectar guides are orange to yellow with maroon spots. The style is typically the same color as sepals and petals. Whorled leaves are narrowly elliptic to linear or oblanceolate with acute to slightly acuminate tips. **Habitats** include open woods, balds, prairies, roadsides. **Range** is fairly widespread, often in scattered locations throughout much of the eastern two-thirds of the U.S. into much of Canada. **Notes:** This is the other erect-flowered native lily of the eastern range. The other one, Pine lily, has entirely different leaves. The two species occur in distinct widely separated habitats.



**Gray's lily** (*Lilium grayi* S. Watson) has flowers that are non-fragrant, red to deep orange-red, pendent, bell-shaped flowers with flared, non-reflexed, barely recurved, tepals. Filaments and style are red. Anthers are somewhat magenta in color. The elliptic to narrowly elliptic to slightly lanceolate leaves are whorled around the stem. **Habitats** occur within higher elevation grassy balds, openings in spruce-fir forests, occasionally lower-elevation moist bogs, seeps, meadows. **Range** is very narrowly endemic, limited to higher elevations of the Roan Mountain complex and nearby mountains in northwest North Carolina, northeast Tennessee, and southwest Virginia. **Note:** This is an extremely rare lily, threatened not only by more aggressive species that are invading its habitat but also by the fungal lily spot disease.

**Hybrid lily** (*Lilium* × *pseudograyi* Grove). This name refers to red to dark red, nodding-flowered hybrids of *Lilium canadense* var. *editorum* and *Lilium grayi* which typically occur at scattered locations at lower elevations in the Southern Appalachians. Characteristics tend to be intermediate between the parent species. This is more apparent in the degree of reflex of the tepals which tends to be intermediate between the parent species. Distinguishing between *L. canadense* var. *editorum* and *Lilium grayi* is frequently difficult with habitat sometimes being an important differentiation.

**Turk's cap lily** (*Lilium superbum* Linnaeus). The specific name meaning 'superb' was certainly well applied to this the largest lily of eastern North America. Flowers are non-fragrant, typically orange, red-orange, yellow-orange to almost yellow pendants. Tepals are strongly reflexed and non-clawed. The shape of the flower gave rise to the term 'Turk's Cap'. A green nectar guide near the base of



*Lilium grayi*



*Lilium* × *pseudograyi*



**Above**, *Lilium superbum*

**Right**, *Lilium iridollae*



each tepal forms a six-pointed 'star' in the center of the assembled flower. Anthers are magenta to purple and the style is pale green with purple spots. Whorled, narrow to extremely elliptic, leaves are much longer than wide with the widest point near the middle. Distinguishing characteristics include a robust stem, often ten feet or taller, many leaf whorls, and numerous flowers (from 3 to 70). **Habitats** include rich woods openings, balds, roadsides, meadows, thickets, moist forests, and streamsides. **Range** encompasses much of the eastern U.S. Its strikingly beautiful inflorescences are frequently seen during mid-summer within its habitat in the Southern Appalachians and northern Atlantic coastal plain and as far north as New Hampshire and west to Missouri.

**Panhandle lily, Pot-of-Gold lily** (*Lilium iridollae* M. G. Henry) has non-fragrant, bright yellow to yellow-orange, typically solitary, pendent flowers that frequently have strongly reflexed tepals. As with Turk's cap lily, green nectar guides near the base of each non-clawed tepal form a six-pointed 'star' in the center of the assembled flower. Anthers are magenta and the style is pale green. Leaves are whorled and narrowly oblanceolate to obovate, elliptic to narrowly elliptic. The Panhandle lily is distinguished from the two previous lilies by the roughened texture of the leaf margins and veins on its lower leaf surface. **Habitats** include blackwater streamsides, acidic bogs and seeps, wet pine woods, and ditches through these habitats. **Range** is limited to the Gulf Coastal Plain of the Florida Panhandle and adjacent areas in southern Alabama. Once believed to be conspecific with *Lilium superbum* and *L. pyrophilum*, this species is geographically isolated from both.



*Lilium pyrophilum*



*Lilium michiganense*

**Sandhills bog lily** (*Lilium pyrophilum* M. W. Skinner and Sorrie) produces non-fragrant, typically orange-yellow to red-orange, pendent flowers. Tepals are strongly-reflexed. As in Turk's cap and Panhandle lilies, green nectar guides form a 'star' in the center of assembled flowers. Anthers are magenta to purple, the style light green. Whorled leaves are narrowly elliptic with the tips acute to slightly acuminate. **Habitats** include seepage bogs and pocosins, swampy peat bogs, and other frequently burned wetlands. **Range** of this very rare lily is limited to the Sandhill and Upper Coastal Plain regions of North Carolina, South Carolina, and Virginia and possibly within similar habitats in nearby states. **Notes:** Sandhills bog lily is similar to Turk's cap lily but typically has fewer flowers per plant, fewer leaf whorls, later blooming time, and other morphological differences. Also, Turk's cap lily occurs farther west and is not known from the Sandhills region. The ranges of the Sandhills bog lily and the Panhandle lily are widely separated.

**Michigan lily** (*Lilium michiganense* Farwell) has non-fragrant, bright orange to orange-yellow, pendent flowers with strongly reflexed tepals lacking the green nectar-guide 'star' in the center of the flower. Anthers are magenta, style red to partially red. The whorled leaves are narrowly elliptic to linear or slightly lanceolate with acute tips. **Habitats** include wet tallgrass prairies, streamsides, swamps, and flatwoods. **Range** includes much of the eastern U.S. northward into eastern Canada.

**Carolina lily, Michaux's lily** (*Lilium michauxii* Poiret) has, at maturity, noticeably fragrant orange to reddish-orange pendent flowers; it is the only fragrant native lily occurring east of the Rocky Mountains. Strongly reflexed tepals lack the green nectar-guide 'star' in the center of the flower. Anthers are typically rust colored and the style light green. The whorled leaves are oblanceolate to obovate, sometimes acuminate at the tip and pale green on the lower surface. **Habitats** include well drained soils in upland forests, along roadsides, and on slopes and ridges. **Range:** although relatively uncommon, it occurs in several south-eastern states west to Texas.

**Note:** This lily is sometimes seen growing in mature hardwood forests where it produces leaves but no flowers, presumably due to reduced sunlight.

While having a proclivity for studying lilies in natural environs, I have also enjoyed a measure of success growing a few of these in the garden. Gardening in the United States Department of Agriculture Georgia, Hardiness Zone 7, means having long summers and relatively mild winters. Except for an occasional drought, this region is typically favorable for gardening in general. Availability of stock is usually good since a number of native nurseries offer many varieties of plants for sale.

Other than occasional dry weather here, other drawbacks include visits from rabbits and 'suburban' deer which 'dearly' love to nibble on the tops of young lily plants. I have dealt with this to some degree by covering emerging plants with netting until they are larger and apparently less palatable and by enclosing with fences in certain cases. Rarely, voles can be a problem by eating lily bulbs.

In addition to my stalwart low-maintenance lilies such as *Lilium lancifolium*, *Lilium longiflorum*, and *Lilium regale*, which bloom profusely each year, a few natives have, in the past, performed very well. For example, for several years *Lilium canadense* var. *canadense* returned reliably producing almost two-meter tall plants with full racemes of yellow flowers during late spring. At about the



*Lilium michauxii*



View from approximately 1,800 meters elevation on the trail along the Roan Mountain massif (mountain group) in North Carolina and Tennessee. Gray's lily plants can be found growing along the trail during late June and early July.

same time, smaller plants of *Lilium canadense* var. *editorum* and *Lilium michiganense* produced beautiful blooms. A lonely plant of *Lilium michauxii* in a wooded area produced leaves year after year and never bloomed. After being transferred to a more sunlit area, it began producing lovely blooms the following spring. A photo of this plant's flowers appears on the front cover of my lily book.

### References

- Chafin, L. G., Nourse, H. & Nourse, C. (2016). *Field Guide to the Wildflowers of Georgia*. University of Georgia Press, Athens.
- Drake, J. (2009). *Native Lilies (Genera Lilium) of the Eastern United States*. *Tipularia* 24:8–16.
- Drake, J. (2014). *Lilies in the Wild and in the Garden*. Breath O'Spring, Inc. Suwanee, Georgia.
- Ingram, R. J. (2012). Demography and Disease of Gray's Lily on Roan Mountain. *BotSoc News, Newsletter of the Georgia Botanical Society* 87(5): 1, 3–5.
- Skinner M. W. *Lilium*. In: *Flora of North America Editorial Committee*, eds. 1993+. *Flora of North America North of Mexico*. 20+ vols. New York and Oxford. Vol. 26. 172–197. [http://www.efloras.org/florataxon.aspx?flora\\_id=1&taxon\\_id=118558](http://www.efloras.org/florataxon.aspx?flora_id=1&taxon_id=118558) [Accessed August 2017].
- United States Department of Agriculture. Natural Resources Conservation Service. Plants Profile. *Lilium*. <https://plants.usda.gov/core/profile?symbol=LILIU> [Accessed August 2017].
- Weakley, A. S. Flora of the Southern and Mid-Atlantic States. Working Draft of 21 May 2015. 181–183. University of North Carolina Herbarium (NCU) North Carolina Botanical Garden, University of North Carolina at Chapel Hill. [http://www.herbarium.unc.edu/FloraArchives/WeakleyFlora\\_2015-05-29.pdf](http://www.herbarium.unc.edu/FloraArchives/WeakleyFlora_2015-05-29.pdf) [Accessed August 2017.]

### Acknowledgements

Much appreciation to distinguished wildflower author and conservation botanist at the State Botanical Garden of Georgia, Linda Chafin, for expert review of this article.



# Commercial hybrids and 'Heritage' lilies

*In this article **Kate Kearns** discusses the impact of commercial hybrids on lily growers in New Zealand.*

The breeding of hybrid lilies in the West is very recent, beginning only in the early twentieth century, but major advances have transformed the genus. Since the 1970s laboratory techniques such as tissue culture and artificial fertilisation have made it possible to cross very distantly-related lilies which cannot normally breed. Thus modern hybrids can and usually do have complex ancestry, drawing on different sections. In 2006, Lim and van Tuyl wrote 'It will not take long before one group of hybrid lilies will be developed in which the different species and hybrid groups cannot be distinguished anymore.' They refer mainly to the OLA hybrids, combining Oriental, longiflorum, and Asiatic ancestry.

One of the main goals driving this breeding programme has been to improve the health of hybrid lilies, in particular seeking resistance to virus, botrytis, and fusarium, lately using genetic engineering techniques. Progress has been made, but many new commercial hybrids are still somewhat susceptible to disease.

The other major influence on commercial lily breeding is the international cut-flower industry. Growing lilies commercially is very competitive and margins are tight. The cut-flower industry consumes almost the whole commercial lily crop, and commercial growers cannot survive if they do not mainly produce for the cut-flower industry. Consequently, commercial breeding focusses on the kind of lilies that the cut-flower merchants want, in form, colour, and scent.

Lilies for cut stems must be suitable for easy packaging and transporting without damage. They must be upward-facing, with a compact, even crowded inflorescence, short pedicels, and tepals of solid texture. Plain colours are generally preferred, and bowl-shaped blooms. A light scent is acceptable, but the strong scent of Oriental lilies is often considered undesirable and there is ongoing research on removing the scent from lilies.

There are rare exceptions to this trend, such as the recent—and celebrated—release of 'Kushi Maya' and 'Lankon'. But unfortunately such lilies are very hard to obtain for the New Zealand gardener, because it is almost impossible for a non-commercial grower to import bulbs into this country, and commercial growers do not have a use for lilies like 'Kushi Maya' and 'Lankon'.

The influence of the cut-flower industry on the form of new hybrids is reflected in recent entries in the International Lily Register, summarized opposite. The

*Lilium 'Robina'*



figures show that the great majority of new hybrids are upward-facing bowls. Turkscap and trumpet lilies, classic examples of the genus, barely appear among new hybrids.

#### Floret orientation

Upward-facing and upward/outward	79%
Outward	9%
Outward and outward/downward	6%
Downward	6%

#### Floret form

Bowl	80%
Flat	17%
Recurved	2%
Trumpet	1%

To sum up so far—on the one hand, commercial breeding of lilies has given us much healthier lilies which are easier to grow, and this is a great advance. But on the other hand, despite their complex ancestry, the new cultivars are more and more alike in form, and show less and less of the full variety of characteristics that give so many lilies their individuality and charm, whether species or hybrids. Hybrids which are not of the cut-flower type are becoming what one might call ‘Heritage lilies’. Classics such as ‘Journey’s End’, ‘Northern Carillon’, ‘Napa Valley’, the Paisley hybrids and other martagon hybrids, trumpets of all colours, American hybrids, *and all lilies like them*, may now depend on the home grower for survival. We probably cannot keep forever the existing named clones of older style—most named clones are eventually lost. We do need to keep producing a wide range of hybrids.

It is a worthwhile goal for lily societies to promote the wider range of styles of hybrid lilies to the general public. We can make bulbs available for sale, including unnamed new hybrids. Many gardeners like something different or unusual—even unique.

It may be time to place greater emphasis on home hybrids in our shows and show judging. Separate classes of home-bred lilies would encourage breeders, and also be more interesting to the general public. I recall the first lily show I ever saw where many of the lilies that took my eye were simply labelled as ‘seedling’—baffling and uninformative to the newcomer. They weren’t seedlings in the usual sense—they were in flower, after all—and the label gave no indication of how intriguing they actually were. Raising our own crosses is one of the great pleasures of growing lilies, compared to many other types of plant, and we should celebrate it more.

# Growing Martagons (and other lilies) in Dundee

*In this article **Chris Hind** discusses his passion for Martagons and other lilies.*

I have been growing lilies for the past 30 years. With my retirement on the horizon, I have been building my lily collection to the extent that I currently have 120 Oriental hybrids, 105 species and approximately 60 mature / flowering-sized martagon bulbs, with, currently, 40 seedlings and several homemade crosses germinating.

My initial interest was in orchids which, over time, developed to include the beautiful Oriental lily hybrids. These take their shape and scent, mostly, from their *Lilium auratum* parent and are useful as cut flowers. Then, as my interest in lilies grew, I learned more about species lilies. Scotland has an ideal climate for most



*Lilium martagon* 'Jaunie Varti'

lilies, so this has given me room to experiment with growing conditions. I find that species lilies have a delicate beauty all of their own and a gentle, simple flower structure that comes in a variety of colours.

Martagons, often described as ‘Turk’s cap’ lilies because of their reflexed flowers, grow strongly in Scotland. They are found in a variety of colours, from white to dark purple. They also have a beautiful scent, that is very noticeable, when 20–30 are flowering at the same time. Martagon lilies are true lilies and are classed as Eurasians, i.e. they grow across Europe and Asia. They are classed in Division 9 (Species) in the *Lilium* categories. As martagon species have been subject to much hybridisation, over many years, most martagons, grown in gardens, are actually hybrids. Scotland has long winters; the first frosts start in November and last until May. This allows the vernalization process (cooling of seed during germination in order to accelerate flowering when it is planted) that helps my martagons to flower. Conversely, winters that are too mild will result in less martagons flowering. Wet Scottish springs can be a disaster for my martagons, so initially I have them on staging to protect them from too much rain. I live in Dundee, a post-industrial city on the east coast of Scotland, which is surrounded by hills that offer some protection from the worst of winter storms. My garden is half a mile from the estuary of the River Tay and is relatively mild most years, i.e. neither too hot, nor too cold.

Martagons have the widest distribution of all species lilies, growing from Portugal in the west to Russia in the east and from Siberia in the north to Mongolia in the south. They have naturalised across the UK and can be found in strange locations far from habitation.

There are five related species that can be crossed to produce hybrids:

- *Lilium martagon*
- *Lilium tsingtauense*
- *Lilium distichum*
- *Lilium hansonii*
- *Lilium medeoloides*

There are a number of martagon varieties, e.g. *albiflorum*, *album*, *cattaniae*, *daugava*, *flavidum* and *plenum* (double).

In the past few years I have been increasing my collection of species lilies, utilizing the reach of the internet to find the rarer species (and more of the common martagons). The challenge for me is to discover the most favourable growing conditions in order to achieve the best results from my lily bulbs. This might necessitate changing the growing medium, balancing acid/ alkalinity using lime and trying out different fertilizers to see what delivers the best results. The results, when I get this balance right, are spectacular, i.e. well grown plants with a number of delightful flowers that I can use to pollenate other lilies, or cross

with the same species to generate more seed to cultivate, give to friends and colleagues or donate to the RHS Lily Group. By way of a disclaimer, what I have described works for me and everyone should try their own plants in their own situations in terms of right plant, right place. Reading, about the cultivation of lilies, should inform/assist what one does. However, the key guidance should be to follow what the plant wants.

**My approach to growing martagons is as follows:**

**In pots** I use a standard 8 inch/20 cm wide clay pot for my new acquisitions. The drainage hole has a crock over this, covered with 1 inch/2 cm of washed gravel, then 2 inches/5 cm of Levington 50:50 compost John Innes compost mix (John Innes #3 was too soil like). The bulb is placed on this layer and covered almost to the brim with the same compost mix, with the top 1 cm comprising limestone gravel. I add some bone meal to this and wash it in. I find my lilies respond well to bone meal, which is an ideal slow release feed. It helps them grow well developed roots, large bulbs and strong flowers.

The advantage of growing lily bulbs in pots is that I can move them to a situation that suits the plant, as the temperature and the sun's strength increases into the three days of the Scottish summer! The other advantage is that if the bulbs are too wet the



*Lilium martagon* 'Jennifer Evans'





*Lilium martagon* 'Zvanu Tornis'

late dry bulbs will struggle to develop roots and often die back as the weather warms. However, they usually recover the next year, but can develop basal rot, which may be due to bulbs being 'forced' with a nitrogen rich feed that does not like the chilly Scottish winters. I avoid mulching them, because as the martagon expert, Eugene Fox warns, this can cause stem rot in martagons.

**Feeding** In April I top dress my martagons with some lime granules, bone meal and slow release fertiliser, and feed every month, until July. I water as and when required, then reduce watering and stop watering completely by September. This allows foliage to die back, with the remainder being removed in November, when I store the pots in my garden shed.

**Propagation** There are a couple of methods of propagation that I use:

**Scaling** (to create clones of parent plants)

This is done by taking fresh scales from the outer ring of the bulb, ensuring that there is some basal plate attached to each scale. The scales can be soaked in fungicide, allowed to dry and then placed in a labelled polythene bag; and then stored in a fridge for 12 weeks. Good results are usually found after this time.

clay allows faster drying than plastic pots. However, martagons are certainly hardy in the Scottish climate and will tolerate -10 °C on occasions, so long as they can drain off, as cold and wet usually means the end of martagon bulbs in my part of Scotland.

**In the soil** I am fortunate that my garden is walled, has reasonably good drainage and is surrounded by trees. Generally, however, it is important to ensure that the soil is well drained (adding extra grit can help) and to also ensure that a sump of water is not created, which would, effectively, drown/rot the bulb and/or rapidly kill the plant with basal rot.

I plant my martagons in the autumn, when they can settle down and develop roots over the winter. If planted too

### Sowing seed

Either buy seed from a reputable grower, like David Hercsberg, obtain seed from the RHS Lily Group Seed List, SRGC seed exchange, or pollinate your own martagons and collect your own seed.

For sowing seed I recommend a decent sized plastic pot about 10 cm/4 inches in diameter. I then fill the pot with Levington 50:50 mix with John Innes seed compost, just moist, then filled to 1 inch/2 cm from the top. I soak the seed for 24 hours, prior to sowing, then place the seed on the surface of the compost and cover the seed with a light dusting of seed compost. I follow this by applying 0.5 cm of grit on top of the seed compost.



*Lilium martagon* 'Peppard Gold'

### Tarlton method (modified)

<https://plantlilies.com/lily-culture/growing-lilies/martagons-from-seed.html>

This method is named after the American grower Fred Tarlton who had a great deal of success with his seed.

Mix the seed with seed compost in a plastic bag, then label the bag and store in a warm 'airing' cupboard for 12 weeks, then either place the bag in a fridge for 12 weeks/or outside in a Scottish winter for 12 weeks. Careful checking should see the development of hypogeal growth within the bag, with a bulbil forming in the soil. The spring should see the start of a first leaf and onward growth of the lily (this saves at least one to two years of development).

### Tissue culture

For the avid scientist, lilies can be micro-propagated to produce large numbers of clones.

**Pests** I deal with pests as follows:

- Lily beetle. The grit stops them getting to the bulb and roots, careful monitoring and killing stops the beetles.
- Vine weevil. As above, use of nematodes, or Provado systemic insecticide

- Slugs. The grit seems to stop them.
- Mice. A good mousetrap in the shed in winter usually resolves the problem.
- Basal rot. Maintain a dry soil; the clay pots are a blessing for that, ensure they don't dry out in summer

As I approach retirement, I am working with a few fellow enthusiasts to collect as many species as possible to ensure that several different forms of each species are propagated and made available to lily growers. This involves getting the bulbs/seeds/bulbils/scales to my colleagues who then culture the appropriate material in sterile conditions. Once cultured, the resulting plants will then be made available, through a grower, so that more people can appreciate the beauty of species lilies and help to preserve them for future generations.

### Sources of martagons

David Hercsberg ([www.lilijas.info](http://www.lilijas.info)).

H. W. Hyde & Son Lilies, Specialist Growers of Lilies and other bulbs. Iuewan Evans martagons from Canada. <https://www.hwhyde.co.uk/catalog/martagon-lilies>  
Pitcairn Alpines (species). [www.pitcairnalpines.co.uk](http://www.pitcairnalpines.co.uk)

Pontus Wallsten. <https://pontuswallstenplants.smugmug.com>

Faraway flowers. Ramona Hall Titus has a range of lilies from the USA; search on Facebook.

### Sources of seed

Alpine seeds; Chiltern seeds (<https://www.chilternseeds.co.uk/search?q=lilium>);

SRGC seed exchange ([www.srgc.net/site/index.php/extensions/seed-exchange](http://www.srgc.net/site/index.php/extensions/seed-exchange));

RHS seed list (<http://www.rhslilygroup.org/page6.html>);

Plant World seeds (<https://www.plant-world-seeds.com/>).

### Recommended martagon varieties

*Lilium martagon album – superbum*; *L. martagon* 'Megan Evans' (white); 'Amelita', 'Bethan Evans', 'Moonyeen', 'Wood Nymph' (pink); RO Backhouse, 'Lois Hole' (yellow); 'Port Wine', 'Sarcee', 'Mahogany Bells' (red); 'Burnt Orange'; 'Orange Marmalade' (orange) and 'Norrlund' (black)

### References

Fox, Dr E. E. (2006). *Martagon Lilies*.

Fox, D. (1987). *Growing Lilies*. Christopher Helm, London.

Synge, P. M. (1980). *Lilies*. B. T. Batsford Ltd, London.

Haw, S. G. (1986). *The Lilies of China*. B. T. Batsford Ltd, London.

NALS website, <http://www.lilies.org>

NALS Martagon CD Image bank, <http://www.lilies.org/martagoncd/index.html>

RHS Lily Register, <http://www.lilies.org/articles/martagon%20register.pdf>

# Experience with the cultivation of *Fritillaria chitralensis* in the open ground and the possibilities for its use in a breeding programme

*Willem A. Wietsma*<sup>1</sup> and *Ronald G. van den Berg*<sup>2</sup>

## Introduction

*Fritillaria chitralensis*, is one of the four members (besides *Fritillaria eduardii*, *Fritillaria imperialis* and *Fritillaria raddeana*) of section *Petilium* of the genus *Fritillaria* (Rix 2001, Mathew 1996, Wietsma et al 2015). Crown Imperials (*Fritillaria imperialis*) are widely grown, *Fritillaria raddeana* and *Fritillaria eduardii* are more rare in cultivation and *Fritillaria chitralensis* is very rare and only grown in some botanical gardens and specialists' collections.

*Fritillaria chitralensis* has been in cultivation for just over one century. It was Miss Watson, North Court, Finchampstead, Hampshire, who exhibited the flowers on 22 February, 1910, at one of the committees of the Royal Horticultural Society. The flowers were sent to Kew Gardens for identification, and it appeared that they belonged to *F. imperialis*, being the Chitral form (Wikipedia: Chitral is the largest district in the Khyber-Pakhtunkhwa province of Pakistan) of that species (*Gardeners' Chronicle*, page 171, 12 March, 1910) and it was named *Fritillaria imperialis* var. *chitralensis*.

Mathew (1996) remarked: "In view of the fact that these four taxa [*Fritillaria chitralensis*, *F. eduardii*, *F. imperialis*, *F. raddeana*] are readily distinguishable and geographically distinct it is considered that they are best regarded as separate species and the appropriate combination for *F. chitralensis* is provided below". AFLP data confirms that *F. chitralensis* is a separate taxon and a species in its own right (Wietsma et al. 2015).

According to the description (Mathew 1996, Wietsma et al. 2015) of *Fritillaria chitralensis* the stem is 20–45 cm high, with 5–9 glossy ovate-lanceolate leaves. The inflorescence, a pseudo-umbel of 1–5 leaf-like bracts, 1–4 flowers, broadly campanulate, pendent, bright yellow [outside petal: RHS 7 A (RHS Colour Chart,

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2007), yellow, with very weak purple flush, veins green, own observations], slightly fragrant (sweet, own observations). Perianth segments are 3–4 cm long (in cultivation to 5 cm), nectaries white. Bulb ovoid, up to 3 cm in diameter, with weak fox-like smell (Mathew 1996, Wietsma et al. 2015).

*F. chitralensis* is reported from Kashmir (Chitral), NE Afghanistan and N Pakistan (Wietsma et al. 2015). According to Ali (2007): “Though *F. chitralensis* is reported from Kashmir also by Brian Mathew (l.c.) who has treated Chitral as part of Kashmir, however, to our knowledge, this taxon does not extend to Kashmir”.

Mathew (1996) gives the following information about cultivation of *Fritillaria chitralensis* in his monograph on page 30: “To date, as far as I am aware, it has not been tried in the open ground in Britain since its rarity in cultivation has preclude much experiment; it does, however, appear to be reasonably frost-hardy in an unheated glasshouse in Britain, planted in deep pots to accommodate the vigorous root growth”. According to Hall (2002), *F. chitralensis* at Kew Gardens was only successfully grown under Kew’s all-weather frame (a large cold frame with no sides).

In 2003 Clarke et al. reported that no records of growing *Fritillaria chitralensis* in the open ground are known. Rukšāns (2007) lost almost all his bulbs, planting them in an open garden in Latvia: “In my region it comes up so early that the shoots are always killed by frost; as a result, the few bulbs I had planted became smaller and smaller. Now I grow them in the greenhouse without any problems”.

In autumn 1992 the first author received one *Fritillaria chitralensis* bulb (collection: Carter 762, collected by Mr and Mrs Piers Lee Carter, in Afghanistan in 1970) from Brian Mathew. From autumn 1992 till 1999 the plants were grown in a cold frame. From 2000 onwards *F. chitralensis* was grown in the open ground.

In the present paper we will report our experience with the culture of *Fritillaria chitralensis* in the open ground and the use of *F. chitralensis* in a breeding programme.

## **Cultivation and growing conditions**

### **Starting with a pot-culture in a cold frame, 1992–1999**

The bulb received in 1992, size 5, (periphery = 5 cm in size, diameter (ø) ca. 1.6 cm) was planted in a pot and grown in a cold frame (Wageningen, the Netherlands). During the winter the cold frame was protected against frost, but also against high temperatures during sunny periods, by a cover of reeds. The bulbs were planted in the second half of October, in a well-drained mixture of compost (ca. 75%) and sand (ca. 25%). In February before the plant started to grow, fertilizer (NPK 12-10–18, ca. 5–7 gramme/pot) was added. The first two years after the bulb was received (1993, 1994) it did not flower. In the summer of 1994, the bulb grew





**Photo 1.** Culture in the open ground. Left front: *Fritillaria chitralensis*; left behind: F1 hybrid *Fritillaria raddeana* × *F. chitralensis*; right front: *Fritillaria raddeana*.

into size 11 (ø ca. 3.5 cm). In the period 1995–1999, the plant flowered with 1–2 flowers each year. In 1999, by natural splitting, two bulbs were harvested, one of size 10 (ø ca. 3.2 cm) and the other of size 4 (ø ca. 1.3 cm).

### **Culture in the open ground, from 2000 till 2015**

From 2000 onwards, the bulbs were planted in the open ground (in a garden at Wageningen, NL), in well-drained sandy soil with a pH around 5 (the garden is in use as vegetable garden, and compost is regularly added).

Over the years, bulbs were planted from the beginning of November until mid-November. At the time of planting new roots were already developed (ca. 2–3 cm). The plant depth is circa three times the biggest size of the bulb. The reason for this relatively late planting is to prevent the plants emerging very early, already in winter. The plants start to grow (emerge) in the beginning of February in 'warmer' winters. In cold springs, with heavy ground frost (up to -4 °C till -8 °C), the emerging plants were covered with a non-woven frost fabric.

In February, just after the plants started to grow, a fertilizer was added (NPK, 12-10-18, 75 gramme/m<sup>2</sup> and lime (CaCO<sub>3</sub>) 50 gramme/m<sup>2</sup>).

Before the plants emerged, preventive control against slugs was carried out, since these slugs can already be active in early spring. This was done during the whole growing period, till the plants were harvested. From mid-March until the end of May, every 7–10 days, preventive control against botrytis was carried out. The susceptibility of *F. chitralensis* to this pathogen was also reported by Mathew (1996) p. 30: ‘As soon the above-ground growth appears in early spring the plants require plenty of moisture, light and free air movement to prevent damage by botrytis’. It appeared that outdoor, *F. chitralensis* is highly susceptible to botrytis which can destroy leaves and stems. The other members of the section *Petilium* are not as susceptible to botrytis. Occasionally a botrytis spot can be seen on leaves (or bracts in the tuft) of *F. imperialis*, especially during the flowering period, during warm and wet weather conditions. Sporulation is hardly observed on such spots, but *F. chitralensis* leaves can be covered with grey botrytis spores. In May, when damage is seen from the larva of the Lily beetle (*Lilioceris lili*), they are manually removed or destroyed by chemical treatment.

The bulbs were harvested at the beginning of June and were stored in a dry shed (under dry conditions, wind can come through), until planting them in November. Since 2011 bulbs were stored together with the other fritillaries under controlled conditions (June until mid-August constant 25 °C, then going down until 17 °C end-October). *F. chitralensis* is susceptible to Bulb Rot caused by *Fusarium oxysporum* and during storage, over the years, some bulbs were lost.

In garden conditions the plant is much smaller than the 20–45 cm in greenhouse conditions, the stem will be at most 15–25 cm high. Flowering will take place ca. 3–4 weeks after emerging in February, (see photo 1. *Fritillaria chitralensis* flowers in the open ground), ca. 1 week earlier than *F. raddeana* and ca. 3–4 weeks earlier than *F. imperialis*. Bulbs of size 7 and bigger are able to produce flowers, bigger bulbs produce 2–3 flowers per stem, higher numbers of flowers per stem were never observed.

### **Propagation of *F. chitralensis* by cutting**

According to Mathew (1996) vegetative propagation is possible by carefully breaking or cutting the bulbs into two or more pieces. Clark and Grey-Wilson (2003) reported, that Grey-Wilson had two bulbs and these did not show any inclination to increase.

The propagation technique we applied for the multiplication of the larger fritillaries (section *Petilium*) is to cut big bulbs with a knife, from the bottom until halfway through the bulb, in July-August, during the dormant stage (Wietsma et al 2012), (see photo 2). This technique was described by Alkema (1976). In 2003, the first bulb, size 11, was cut at the end of July by making three cuts, crosswise. During planting, at the beginning of November, small bulbs were already visible, growing in



**Photo 2.** Cutting of a *Fritillaria chitralensis* bulb.



**Photo 3.** Growth of *Fritillaria chitralensis* after cutting the bulb, in the middle the main stem (2 flowers) and adventitious shoots (with 1 flower).

the old bulb. In 2004, seven bulbs were harvested, some were bigger in size, 3–5, and some were very small. Between 2003 and 2014, a total of 31 bulbs were cut (bulbs used for cutting were of size 8–11). In 2014, eight bulbs, size 8-upwards, were cut and in 2015 from these eight bulbs, 53 bulbs were harvested (size 0–3: 14 bulbs; 4–6: 17 bulbs; 7–8: 20 bulbs; 9-up: 2 bulbs). The increase rate over the years, can be compared with the number of bulbs harvested after cutting *Fritillaria raddeana* (in comparison *F. imperialis*, bulb cut size >24: 15–20 bulbs harvested; *F. raddeana*, size >18: 6–8 bulbs; *F. eduardii*, size >20: 4–6 bulbs). During culture in the open ground, but also during the long storage process in summer/autumn, many of the very small bulbs were lost.

The young bulbs (offsets) growing in the old bulb after cutting were, besides the main stem (if not destroyed during cutting), were also able to produce flowers, (see photo 3). This phenomenon after cutting, is not seen in the other members of section *Petilium*. Also the F1-species hybrids (see breeding) are able to produce some bigger offsets, which will produce flowers in the subsequent year.

While cutting, there is a good possibility to determine whether the bulbs smell and how they smell. It was observed that *F. chitralensis* had a less pungent fox-like odour, much weaker than that of the bulbs of *F. imperialis*.

### **Seed set of *Fritillaria chitralensis* and the production of hybrids with other species**

Crossing experiments were performed to get more insight into the species relationships (Wietsma et al. 2015) and to develop new cultivars with new properties in section *Petilium*. This breeding programme started in 1978, making crosses between *Fritillaria imperialis* cultivars. From 1987 onwards, crosses were also made between the other members of the section. Breeding goals were: increased

**Photo 4.** F1 Hybrid *Fritillaria raddeana* × *F. chitralensis*.

*Fusarium* resistance, more diversity in flower colours, and cultivars with less fox-like odour suitable to force as cut-flowers in the greenhouse. The contribution of *Fritillaria chitralensis* to this breeding programme is described below.

Between 1995 and 2015, *Fritillaria chitralensis* produced many flowers, with well-developed stamens and styles/ovaries. All plants used in the breeding programme were always hand emasculated and pollinated. Self-pollination of *F. chitralensis* never resulted in seed production, while self-pollinations of *Fritillaria imperialis* (cultivars), *F. raddeana* and *F. eduardii* produced abundant seeds. The efforts to produce F1-species hybrids on *F. chitralensis* also never resulted in seed production.

*Fritillaria chitralensis* used as pollinator, was more successful. The species hybrid *F. raddeana* × *F. chitralensis* was made in 1996 and flowered with bright yellow flowers in 2000, after four years (the members of section *Petilium* normally takes five to seven years from seed until first flowering), (see photos 4 and 5). Propagation of the F1 is rather slow, like *F. raddeana*. Bulbs from size 12 upwards, will produce flowers. The size of the F1 plant is intermediate between both parents (*F. chitralensis* outdoor conditions: 15–25 cm high; *F. raddeana* 35–65 cm high; F1 *F. raddeana* × *F. chitralensis* 40–55 cm high). Morphological characteristics in the F1 are quite often a mixture of both species. *F. chitralensis* dies off (green leaves turn to yellow and die) at the end of May, *F. raddeana* dies off one to one and a half weeks later. The species hybrid



**Photo 5.** Flowers of: *Fritillaria raddeana* (left); *Fritillaria raddeana* × *F. chitralensis* (middle); *Fritillaria chitralensis* (right).





**Photo 6.** F1 hybrid *Fritillaria imperialis* 'Aurora' × *F. chitralensis*.

**Photo 7.** F1 hybrid *Fritillaria imperialis* 'Aurora' × *F. chitralensis*.

*F. raddeana* × *F. chitralensis* dies off almost two weeks later than *F. raddeana*.

The hybrid combination of the orange-red *Fritillaria imperialis* 'Aurora' × *F. chitralensis* is easy to make and gives numerous seeds. These F1-hybrids vary in their flower colour from yellow-orange to orange, (see photos 6 and 7). One selected clone with orange flowers produced flowers with a yellow-orange chimaeric pattern. Chimaerae are often seen in bulbous crops, in complex crossings where species are involved (pers. comm. Mr. J. van Scheepen, KAVB).

The orange red *Fritillaria imperialis* var. *kashmirensis* (the odourless form of *F. imperialis*, Wietsma et al. 2015) × *F. chitralensis* produce F1-hybrids with orange red flowers, with a tuft with only a few bracts. Both parents have few bracts in the tuft, *F. chitralensis*: 2–5; *F. imperialis* var. *kashmirensis*: 8–15, instead of 11–24 in *F. imperialis* (Wietsma et al. 2015), (see photo 8).

Crossings with *F. eduardii* (both varieties) as a female parent never resulted in F1-hybrids. All F1s produced with *F. chitralensis* were fertile. The F1-hybrids with *F. chitralensis* are weakly to moderately resistant against Bulb Rot. The F1 from the combination with *F. raddeana* used as the mother (*F. raddeana* is highly resistant against Bulb Rot), is susceptible to Bulb Rot.

## Conclusion

Mathew (1996) only reported cultivation of *F. chitralensis* in the UK in unheated glasshouses. Later studies (Clark and Grey-Wilson 2003, Rukšāns 2007 and Hall 2002) showed success only when growing them under controlled conditions. This study, incorporating observations from 2000 until 2015, proves that *F. chitralensis* in the Netherlands, can be grown in the open ground. Care has to be taken for ground frost in early spring, slugs have to be treated and spraying against botrytis is necessary. *F. chitralensis* can be propagated like the other members of section



**Photo 8.** F1 Hybrid  
*Fritillaria imperialis* var. *kashmirensis* × *F. chitralensis*.

*Petilium*, by cutting bulbs with a knife, during the dormant stage in summer.

In the *Gardeners' Chronicle*, page 171, 12 March, 1910, it is reported that: "in Chitral, this particular variety is said to be as common as Daisies in this country" (cited in Mathew 1996). Sadly, there is little plant material available and little is known how this beautiful species grows in its original habitat.

#### Acknowledgments

We are indebted to VOF. De Keizerskroon (represented by Doede de Jong) for supplying plant material for this study.

#### Appendix. Climatic data for Wageningen, NL

The minimum daily temperature between November and March is between -1 °C and +3 °C, the maximum daily temperature in this period is between +5 °C and +9 °C. The average number of ice days (max. temp. < 0, 0 °C) was 8 in the period 1981–2010, with 29 for 2010, and 0 for 2014. The average number of frost days (min. temp. < 0, 0 °C) was 58 in the period 1981–2010, with 89 for 2010, and 26 for 2014.

The minimum daily temperature from March until the beginning of June is between +2 °C and +10 °C, the maximum daily temperature in this period is between +9 °C and +20 °C (data from De Bilt, NL, ca. 50 km from Wageningen, NL).

Average rainfall is 887 mm/year. In November, December, January, March, May and June rainfall is varies between 61–100 mm/month. In February and April rainfall varies between 31–60 mm/month (data for Wageningen, NL).

(source: <http://www.compendiumvoordeleefomgeving.nl/> and <http://www.klimaatinfo.nl/nederland/wageningen.htm>)

#### References

- Ali, S. I. (2007). A taxonomic study of the genus *Fritillaria* L. (*Liliaceae*) from Pakistan and Kashmir. *Portugaliae Acta Biol.* 22: 221-230
- Alkema, H. Y. (1976). Method for Rapid Vegetative Propagation of Fritillaries. Lilies 1976 and other Liliaceae (= *Lily Year Book*), Royal Horticultural Society: 55-59.
- Clark, T., Grey-Wilson, C. (2003). Crown Imperials. *The Plantsman* 2: 33-47
- Hall, T. (2002). *Fritillaria chitralensis* (hort.) B. Mathew. The Fritillaria Group of the Alpine Garden Society, UK 11: 2
- Mathew, B. (1996). 288. *Fritillaria chitralensis*. *Bot. Mag.* 13: 27-32, t. 288.
- RHS Colour Chart. (2007). Fifth edition, Royal Horticultural Society. London
- Rix, E. M. (2001). *Fritillaria*. A Revised Classification. The Fritillaria Group of the Alpine Garden Society, UK.
- Rukšāns, J. (2007). *Buried Treasures*. Timber Press, Inc, Portland, Oregon pp 154-156
- Wietsma, W. A., van den Berg, R. G. (2012). Cultivating *Fritillaria eduardii*. *The Plantsman* 11: 222-225.
- Wietsma, W. A., Deinum, D., Teunissen, H. A. S., van den Berg, R. G. (2015). Phylogenetic relationships within *Fritillaria* section *Petilium* based on AFLP fingerprints. *Plant Syst Evol* 301: 1043-1054.



# About the RHS Lily Group

*www.rhslilygroup.org*

The Lily Group is now organised as an independent separate legal entity with a formal agreement between the Lily Group and the RHS to use their expertise and resources to promote interest in lilies and related plants.

The principal benefits to members of the Group are:

- The **Seed List**. Members of the Group and others, at home and overseas, send their surplus seed from lily species and hybrids, other Liliaceae and many other garden plants and these are offered to members early each year. This distribution has become a major factor in increasing the availability of such plants.
- The **Bulb Auction**. Members' surplus bulbs of lilies and other plants are auctioned in October each year at different venues around the country.
- **Meetings and outings**. Meetings for lectures or discussions are held each year at venues around the country. Outings or week-ends are arranged each year for members to visit gardens of interest to lily enthusiasts.
- **Newsletters**. Three newsletters are distributed to members each year with short articles, correspondence and news of current events in the fields of interest of the Group.
- **Lilies and Related Plants**. Articles on plants, gardens and people associated with the Lily Group appear in a booklet which is published every two years.

Details of the current subscription and any of the above are available from the Group Secretary. See opposite the content page for a list of officers and committee members and key contact details.

- The **Lyttel Lily Cup** is awarded annually by the RHS Council, on the recommendation of the Lily Committee, to a 'person who has done good work in connection with lilies, nomocharis or fritillaries'.
- The **Lily Bowl** is awarded by the Lily Group for the most meritorious single exhibit in a July co-operative display of lilies at an RHS show.
- The **Paul Furse Cup**, first awarded in 1992, for the best fritillary or other plant related to lilies but not of the genus *Lilium* exhibit as part of a Lily Group Co-operative stand at an RHS show.
- The **Voelcker Cup** is awarded to a person in recognition of our international role in promoting lilies.

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Contributions for publication in the Royal Horticultural Society Lily Group yearbook, *Lilies and Related Plants*, are invited on any aspect of lilies and related plants—growing, cultivation and breeding, species and cultivars, history, people who have made a significant contribution to the subject and nurseries or gardens. Any questions concerning articles can be addressed to the Editor, Alan Mitchell.

It is a condition of acceptance that contributions are the original work of the author(s) and that the Editor should be notified if they have been previously published or are under consideration for publication elsewhere. The Editor reserves the right to refuse any contribution and to make minor textual changes without reference to the author.

Contributions can be submitted in any format, hand-written, typescript, double-spaced on one side of the paper, or, preferably via email, in a format that is compatible with Microsoft Word for either PC or Apple Macintosh. If submitting materials by post, on disc etc., a hard copy equivalent should also be supplied.

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Where the Editor considers it necessary he will refer manuscripts to members of the Lily Group Committee for their consideration and advice.



