



**PROCEEDINGS OF  
THE SECOND INTERNATIONAL SYMPOSIUM  
ON THE FAMILY MAGNOLIACEAE**

XIA Nian-He  
ZENG Qing-Wen  
XU Feng-Xia  
WU Qi-Gen

  
HUSTP



**PROCEEDINGS**  
**OF**  
**THE SECOND INTERNATIONAL SYMPOSIUM**  
**ON THE FAMILY MAGNOLIACEAE**

5 – 8 May 2009  
Guangzhou, China

Edited by

XIA Nian-He  
ZENG Qing-Wen  
XU Feng-Xia  
WU Qi-Gen



Huazhong University of Science & Technology Press  
Wuhan, China

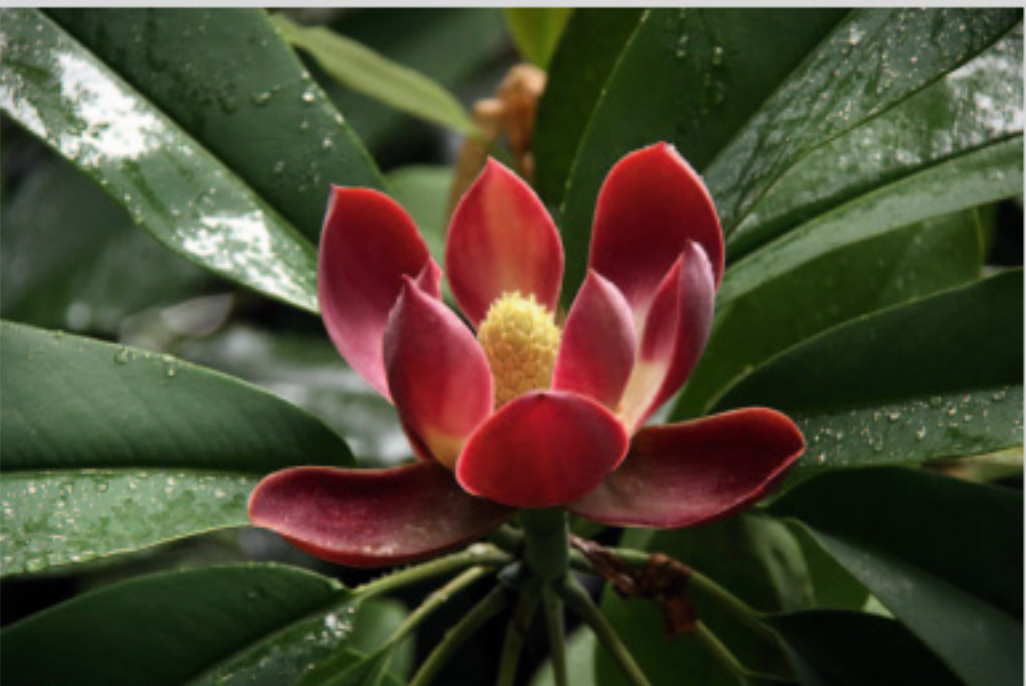


# PROCEEDINGS OF THE SECOND INTERNATIONAL SYMPOSIUM ON THE FAMILY MAGNOLIACEAE

XIA Nian-He  
ZENG Qing-Wen  
XU Fang-Xia  
WU Qi-Dan

  
HUSTP

USD 49.99





# PROCEEDINGS

OF

## THE SECOND INTERNATIONAL SYMPOSIUM ON THE FAMILY MAGNOLIACEAE

5 – 8 May 2009  
Guangzhou, China

Edited by

XIA Nian-He  
ZENG Qing-Wen  
XU Feng-Xia  
WU Qi-Gen



Huazhong University of Science & Technology Press

<http://www.hustp.com>

Wuhan, China

**Editors** XIA Nian-He, ZENG Qing-Wen, XU Feng-Xia, WU Qi-Gen

**Design** Baitong Culture Communication Company

**Published by** Huazhong University of Science & Technology Press

© **Copyright 2012**

**Address** 1037, Luoyu Rd. Hongshan District, Wuhan, P.R. China 430074

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise without prior permission of the publisher.

**ISBN** 978-7-5609-7349-4

**Printed in Shenzhen, China**



Huazhong University of Science & Technology Press  
<http://www.hustp.com>

# THE SECOND INTERNATIONAL SYMPOSIUM ON THE FAMILY MAGNOLIACEAE

5 – 8 May 2009  
Guangzhou, China

## ORGANIZED BY:

1. South China Botanical Garden (SCBG), Chinese Academy of Sciences (CAS)
2. Botanic Gardens Conservation International (BGCI)
3. Magnolia Society International (MSI)
4. Guangdong Botanical Society
5. Magnolia Branch, Guangdong Botanical Society

## CO-ORGANIZED BY:

1. Shenzhen FairyLake Botanical Garden
2. Shenzhou Magnolia Garden and Breeding Center, Xuwen
3. Kunming Institute of Botany, CAS
4. Nankunshan Nature Reserve of Guangdong Province
5. Forestry Bureau of Wenshan Prefecture, Yunnan Province
6. People's Government of Xichou County, Yunnan Province

## SPONSORED BY:

1. Bureau of International Cooperation, CAS
2. National Nature Science Foundation of China
3. Guangdong Palm Landscape Architecture Co., Ltd.

# Contents

## I. Taxonomy, Systematics and Phytogeography

A New Classification System of the Family Magnoliaceae.....	XIA Nian-He (012)
How Did Magnolias (Magnoliaceae, Magnolioideae) Reach Tropical Asia?.....	Hans P. NOOTEBOOM (039)
Turning Points in the Taxonomic History of Magnolioideae — from Baillon to Dandy to DNA.....	Richard B. FIGLAR (047)
A New System for the Family Magnoliaceae.....	SIMA Yong-Kang, and LU Shu-Gang (055)
Diversity and Distribution of Magnoliaceae in India.....	Tikam Singh RANA, Baleshwar MEENA, and Bhaskar DATT (072)
Plants Used as Medicine and Spices of the Family Magnoliaceae in Vietnam.....	TRAN Cong Khanh (086)
Taxonomy and Biogeography of the Family Magnoliaceae from Vietnam.....	VU Quang Nam, and XIA Nian-He (095)

## II. Anatomy, Embryology, Palynology and Cytology

Studies on the Morphology, Structure and Development in Magnoliaceae.....	LIU Yong, and XU Feng-Xia (116)
Observation on Megasporogenesis and Development of Female Gametophyte in <i>Parakmeria yunnanensis</i> Hu (Magnoliaceae).....	FU Lin, ZENG Qing-Wen, and XU Feng-Xia (125)
Floral Numerical Variation of <i>Michelia yunnanensis</i> .....	HAO Jia-Bo, and SIMA Yong-Kang (132)

## III. Molecular Biology and Phylogeny

Determining Ploidy Levels and Relative Genome Sizes in <i>Magnolia</i> L.....	J. Kevin PARRIS, Thomas G. RANNEY, W. Vance BAIRD, and Halina T. KNAP (137)
Intraspecific Variation of cpDNA in <i>Magnolia virginiana</i> Native to Eastern-southeastern North America and Cuba.....	Hiroshi AZUMA, Richard B. FIGLAR, Peter Del TREDICI, Koen CAMELBEKE, Alejandro PALMAROLA-BEJERANO, and Mikhail S. ROMANOV (145)

## IV. Physiology, Ecology, Biodiversity and Conservation

Photosynthetic Characteristics of <i>Manglietia yuyuanensis</i> in Different-Aged Compound Mixed Forest Community at Mausoleum of Dr. Sun Yat-Sen.....	HE Kai-Yue, YANG Tong-Yi, LI Xiao-Chu, and XU Hai-Bing (151)
Study on Antibacterial Activity of Ultrasonic Wave Extracts from Leaves of Three Species of <i>Michelia</i> L.....	BI Hui-Min, and HE Kai-Yue (160)
Conservation of Rare and Endangered Species <i>Manglietia longipedunculata</i> (Magnoliaceae) .....	XIE Cong, FU Lin, ZENG Qing-Wen, LIU Dong-Min, WEN Xiang-Ying, and ZHONG Wen-Chao (166)



<b>Special Propagation and Conservation of Rare and Endangered Native Thai Magnoliaceae</b> .....	Piya CHALERMGLIN (180)
<b>Botanical Knowledge of Magnoliaceae in Papua New Guinea</b> .....	Kipiro DAMAS (185)
<b>Conservation of Magnolias in Colombia</b> .....	Marcela SERNA GONZÁLEZ (191)
<b><i>Magnolia ex situ</i> Collection at Arboretum Wespelaar, Belgium</b> .....	Koen CAMELBEKE, and Philippe De SPOELBERH (199)

## **V. Cultivation, Propagation, Gardening and Landscaping**

<b>Comparison Tests on Growth of Seven Landscape Plants of Magnoliaceae</b> .....	YANG Cheng-Hua, and ZHOU Jia-Wei (209)
<b>The Introduction and Acclimatization of Magnolias in French Botanical Gardens and Arboreta</b> .....	Thierry LAMANT (214)
<b><i>Mognolia</i> Cultivation, Propagation, Breeding and the Gardens Growing Them in Europe</b> .....	Jim GARDINER (220)
<b>Development of Guidelines for the Conduct of Tests for Distinctness, Uniformity and Stability of New Varieties of <i>Magnolia</i></b> .....	JIN Xiao-Bai (231)
<b>Propagation of Rare and Endangered Plant <i>Magnolia odoratissima</i></b> .....	YANG Yao-Hai (236)
<b>Studies on Seed Germination and Seedling Growth Mechanism of Six Endangered Magnoliaceous Plants</b> .....	CAO Ji-Wu, LIU Chun-Lin, WU Yi, TANG Liang, LIU Jie, DU Kai-Guo, and PENG Li-Wei (247)
<b>Timing and Hormones Affected Rooting of Stem Cuttings of <i>Magnolia grandiflora</i> L.</b> .....	GENG Fang, ZHANG Dong-Lin, LI Zhi-Hui, and CAO Ji-Wu (256)
<b>Performance in Northern Florida of Yellow-flowered Cultivars Derived from <i>Magnolia acuminata</i></b> .....	Gary W. KNOX (262)
<b>Commercial Nursery Production of Magnoliaceae in the Southern United States</b> .....	Gary W. KNOX (270)
<b>Comparison of the Growth of Five Magnoliaceous Trees in Ecological Scenic Forests in Zhongshan, Guangdong, China</b> .....	JIANG Qian-Cai, WU Yong-Bin, WANG Jia-Bin, YANG Yu-Wang, HUANG Chuan-Teng, LIU Zhao-Xiang, and JIANG Bin (276)

<b>Appendix I Scientific Committee</b> .....	(283)
<b>Appendix II Organizing Committee</b> .....	(284)
<b>Appendix III Program</b> .....	(285)
<b>Appendix IV Participants</b> .....	(290)

# ***Magnolia ex situ* Collection at Arboretum Wespelaar, Belgium**

Koen CAMELBEKE\*, and Philippe De SPOELBERCH

*Stichting Arboretum Wespelaar, Grote Baan 63, B-3150 Haacht, Belgium*

(\*Author for correspondence. E-mail: Koen.CAMELBEKE@arboretumwespelaar.be)

**Abstract:** Arboretum Wespelaar grows a total of 224 specimens belonging to 41 species and infraspecific taxa of *Magnolia* of which 12 taxa and 57 specimens are of known wild provenance. These collections are discussed per taxon and according to the IUCN Red List category they received in 2007.

## **1 Introduction**

In 2007 Fauna & Flora International (FFI, The Global Trees Campaign) together with Botanic Gardens Conservation International (BGCI) and The World Conservation Union/Species Survival Commission (IUCN/SSC Global Tree Specialist Group) published the *Red List of Magnoliaceae* (Cicuzza *et al.* 2007). Following this publication BGCI undertook a Global Survey of *ex situ* Magnoliaceae collections and the results were published in June 2008 and are available at the BGCI website ([http://www.bgci.org/files/Worldwide/global\\_survey\\_of\\_ex\\_situ\\_magnoliaceae\\_collections.pdf](http://www.bgci.org/files/Worldwide/global_survey_of_ex_situ_magnoliaceae_collections.pdf)). The survey identified 131 wild magnolias as being in danger of extinction, out of a global total of 245 taxa. One of its recommendations included the strengthening of existing *ex situ* collections. It also includes a ranking of botanic garden collections for Magnoliaceae taxa and Arboretum Wespelaar is listed as 6<sup>th</sup> most significant botanic garden.

Arboretum Wespelaar is situated in mid Belgium at an altitude of 10 m, some 100 km from the North Sea. The climate is characterized by maritime influences and westerly winds (USDA hardiness zone 8). Rainfall is approximately +800 mm mostly in November to April. Spring frosts will hit on a regular basis from the end of March to mid May and can be an important damaging factor for *Magnolia* flowers. The soil is acid and can be heavy and then poorly drained. Since the start of the collection in the mid 1970's the genus *Magnolia* received special attention. This resulted in a collection of 1,102 specimens belonging to 489 taxa at the Arboretum and surrounding private estate (mainly Herkenrode). The bulk of the collection obviously contains cultivars and hybrids but we have tried to collect all species hardy in our climate. This resulted in (February 2009) a total number of 41 species and infraspecific taxa (8%) and 224 (20%) specimens of which 12 taxa and 57 specimens are of known wild provenance.

Arboretum Wespelaar aims to strengthen its *ex situ* collection of *Magnolia* taxa not only for educational and horticultural purposes but also as an insurance policy for the future. The Arboretum also supports *in situ* conservation projects including scientific studies and getting local people and authorities involved to protect the natural habitat



of these wonderful plants. The *ex situ* collection at the Arboretum is available for restoration or reintroduction programmes.

**Table 1. Magnolia taxa and specimen numbers at Arboretum Wespelaar sorted on Red List category.**

Name	# spcms	# spcms wild origin	Red List category
( <i>M. sinica</i> )			CR
<i>M. zenii</i>	5		CR
<i>M. biondii</i>	6	3	DD
<i>M. delavayi</i>	1		DD
<i>M. denudata</i>	6		DD
<i>M. liliiflora</i>	2		DD
<i>M. nitida</i>	1		DD
<i>M. sprengeri</i>	10		DD
( <i>M. tamaulipana</i> )	0		EN
<i>M. dawsoniana</i>	3		EN
<i>M. decidua</i>	3	1	EN
<i>M. stellata</i>	13	7	EN
<i>M. wilsonii</i>	13	3	EN
( <i>M. insignis</i> )	0	0	LC
<i>M. acuminata</i>	2		LC
<i>M. fraseri</i>	3	3	LC
<i>M. fraseri</i> subsp. <i>pyramidata</i>	3	2	LC
<i>M. globosa</i>	4		LC
<i>M. grandiflora</i>	9		LC
<i>M. macrophylla</i>	5		LC
<i>M. tripetala</i>	9		LC
<i>M. virginiana</i>	7		LC
( <i>M. duclouxii</i> )	0		NE
<i>M. acuminata</i> var. <i>subcordata</i>	3		NE
<i>M. doltsopa</i>	5		NE
<i>M. kobus</i>	4		NE
<i>M. laevifolia</i>	3		NE
<i>M. maudiae</i>	4		NE

Name	# spcms	# spcms wild origin	Red List category
<i>M. obovata</i>	10	3	NE
<i>M. salicifolia</i>	6		NE
<i>M. sieboldii</i>	27	14	NE
<i>M. officinalis</i>	10	9	NT
( <i>M. odora</i> )	0		VU
<i>M. amoena</i>	5	5	VU
<i>M. cylindrica</i>	8	3	VU
<i>M. macrophylla</i> subsp. <i>ashei</i>	4		VU
<i>M. rostrata</i>	2		VU
<i>M. sargentiana</i>	2		VU
<i>M. sinensis</i>	2		VU
<i>M. biondii</i> (hybrid?)	2	2	
<i>M. campbellii</i> subsp. <i>mollicomata</i>	1		
<i>M. figo</i>	1		
<i>M. kobus</i> var. <i>borealis</i>	4	4	
<i>M. officinalis</i> var. <i>biloba</i>	9		
<i>M. sargentiana</i> var. <i>robusta</i>	3		
<i>M. sprengeri</i> var. <i>elongata</i>	2		
<i>M. virginiana</i> var. <i>australis</i>	6		
<b>TOTAL: 41</b>	228	59	

## 2 Conservation Status of *Magnolia ex situ* Collection

Below we present an overview of the species we (can) grow according to the IUCN category they received in the above mentioned Red List.

### 2.1 Critically Endangered (CR)

#### 2.1.1 *Magnolia sinica* (syn. *Manglietia sinica*, *Manglietiastrum sinica*)

*M. sinica* is probably one of the rarest and endangered species of *Magnolia* in the world with only 10 mature individuals in a single population in south-east Yunnan, China. We have been lucky to receive seed of this species in the spring of 2007. The species is known from a relatively low altitude (1,300–1,550 m) which gave us some doubts on its hardiness in the Belgian climate. It prompted us to distribute the seed to other gardens with greenhouse facilities. We have kept only few seeds which germinated readily; an observation confirmed by the other garden curators also. The young seedlings should probably be planted in a greenhouse although we may try one in a much protected outdoor spot in the collection. We

expect to be able to report in more depth in the near future.

### **2.1.2 *Magnolia zenii***

This species is also only known from a single population containing only 18 individuals in Jiangsu, China. It is however more frequent in specialized collections than *M. sinica* due to its better hardiness (40 collections for *M. zenii* versus 3 collections for *M. sinica*, according to the BGCI Global Survey of *ex situ* Magnoliaceae collections, 2008). One should however be wary for possible wrongly identified or hybridized specimens as *M. zenii* resembles some other related taxa such as *M. amoena*. Three out of five specimens at Arboretum Wespelaar are seedlings from seed sent out through the Magnolia Society International in 2001 from Chollipo Arboretum in South-Korea. These are plants from the original Arnold Arboretum introduction and as they flower very early chances for hybridization are small. The plants are young and haven't flowered yet so verification of their identity is necessary. A fourth plant is even younger and was received as an open pollinated seedling from John Gallagher, UK. The fifth plant is a graft from an original introduction ex Long Wu Lu Botanical Garden. Two other seedlings from that same introduction are growing in Holland at Esveld Nursery and the private garden of the late, well known *Magnolia* propagator Wim Rutten. *M. zenii* is reputedly one of the earliest flowering magnolias and can therefore be spectacular. But for that same reason it is not recommended for maritime climates as we experience in Belgium where reoccurring spring frosts will mostly ruin the floral display.

## **2.2 Endangered (EN)**

### **2.2.1 *Magnolia dawsoniana***

A species well known in cultivation but endangered in nature. I was lucky to be able to participate in a joint expedition to southern Sichuan, China with prof. Tang Ya from Sichuan University and his team and Peter Wharton from the University of British Columbia Botanical Garden in September 2006. We found scattered individuals and groups in the Meigu – Dafending National Nature Reserve within mixed deciduous forest covering an estimated 20,000 ha. There were no fruits on the trees and no seedlings. Thus though not extremely rare in that region we were concerned about its ability to regenerate naturally. Efforts for reproduction of these individuals should be undertaken.

### **2.2.2 *Magnolia decidua* (syn. *Manglietia decidua*)**

This species is known from one location and the population is thought to number less than 500 individuals (Jiangxi, China). We received seed which we shared with several people. Four people failed to keep the seedlings included ourselves (they died very suddenly from fungus infection) but we got two plants back from those more successful. These plants grow very well and seem perfectly hardy in our climate. They have not flowered yet. Meanwhile we have been successful in propagating this species vegetatively and it will undoubtedly become more frequent in specialized collections.

### **2.2.3 *Magnolia stellata***

*M. stellata* is a well known and very popular species in horticulture with numerous selections but it is categorized as endangered in its country of origin, Japan (central Honshu). A detailed overview of its occurrence in Japan with useful references can be found in Ejder (2008). Five plants of known wild origin at Wespelaar all come from Beni Iwa, a wild site near the town of Hirukawa Mura in Gifu Prefecture. They grow locally in often dense thickets at the edge of a marsh. Flower colour varies from white to pink but none of them exhibit the spectacular flower display in early spring for which their cultivated counterparts are known, planted and admired. Two other plants are of unknown wild origin. Their flowers have been described as small, even mini, and strap like. Few flowers occur over period of time during early spring giving the plants sometimes an untidy habit.

#### **2.2.4 *Magnolia tamaulipana***

*Magnolia tamaulipana* is a species from north-east Mexico and has recently become available at specialized nurseries in Europe. One specimen was tried at Arboretum Wespelaar in 2006 but died after the first winter. It was probably planted in a too exposed spot and surely needs some protection against our cold winters.

#### **2.2.5 *Magnolia wilsonii***

*Magnolia wilsonii* is a first class ornamental species of the *Oyama* section. It occurs in Sichuan, northern Yunnan and Guizhou, China where it suffers from habitat destruction and where it is exploited for its bark for medicinal uses. We grow three plants collected by Eike Jablonski (Luxemburg) in Yunnan at an altitude of 2,800 m. These plants are weak and smaller in all their parts compared to those of cultivated origin (f. *taliensis*?).

### **2.3 Vulnerable (VU)**

#### **2.3.1 *Magnolia amoena***

*Magnolia amoena* is known from small scattered stands in southern Anhui and southern Jiangsu in south-east China. According to Spongberg (1998) it also occurs in the neighbouring provinces of Zhejiang and Jiangxi. It is an early flowering species closely related to *M. zenii* and we expect the flowers to have a similar proneness to spring frosts. The five specimens we grow were received as seed through the 2001 Magnolia Society International seed counter. They were collected in Zhejiang at an elevation of 800 m and have not flowered yet. It is thus too early for an evaluation of their status as a garden plant or for making any claims on their exact identity.

#### **2.3.2 *Magnolia cylindrica***

Again a species from south-east China (provinces of Anhui, Fujian, Jiangxi and Zhejiang) where it is growing in a restricted area and received the status of vulnerable under the Red List category system. As usual, habitat destruction is a real treat for this and other taxa in the region. We are growing a total number of eight specimens of this species and strangely enough some of them were actually received as *M. amoena*. This species is however easily distinguished as it misses the three sepeloid tepals so typical of true *M. cylindrica*. The carpels of the infructescence are connate or densely aggregated thus forming a truly cylindrical structure (Xia *et al.* 2008). The three specimens of known wild origin at Arboretum Wespelaar are from seed received by the Holden Arboretum (accession Holden 87–86) as a gift from the Chinese Academy of Forestry. The packet was labelled “31°N, 117°E”, which corresponds with a place in southern Anhui. Their identity has been verified and confirmed. It are superb plants that usually flower profusely and the typical somewhat prehistorical fruits in autumn give them an extra bonus as a garden plant.

#### **2.3.3 *Magnolia macrophylla* subsp. *ashei* (syn. *Magnolia ashei*)**

*Magnolia macrophylla* subsp. *ashei* is the rarest of the North American *Magnolia* taxa. It is limited to six counties in the Florida panhandle (Meyer 1997). It is in danger of extirpation because of habitat disturbance. It is smaller in all parts compared to typical *M. macrophylla* but it seems doubtful that this justifies recognition at species level. However, taking into account its distribution and conservation status it should remain distinct as a taxon from typical *M. macrophylla*. *Magnolia macrophylla* subsp. *macrophylla* is a more spectacular garden plant than subsp. *ashei*. Our three plants all originate as seedlings from a plant at Henry Foundation (Gladwyne, Pennsylvania). This mother plant has been verified as true subsp. *ashei* but subsp. *macrophylla* is growing nearby and doubts have risen on the true identity of our siblings. They could in fact represent hybrids of *M. macrophylla* subsp. *ashei* with *M. macrophylla* subsp. *macrophylla*.

#### **2.3.4 *Magnolia odora* (syn. *Michelia odora*, *Tsoongiodendron odorum*)**

This species from southern China and northern Vietnam has been tried once at Arboretum Wespelaar but without success. It is not hardy in our climate.

#### **2.3.5 *Magnolia rostrata***

An impressive tree with huge, thick papery leaves known from China (Tibet and Yunnan) and Myanmar. It however suffers from cold temperatures in our climate. Growth can be impressive but frost damage can be equally impressive thus leaving almost no growth in one single year. It should be planted in milder areas where it will be an astonishing garden plant.

#### **2.3.6 *Magnolia sargentiana* (EN on IUCN website)**

*Magnolia sargentiana* is known from the provinces of Yunnan and Sichuan in China and its status is assessed as vulnerable. The close relative *M. dawsoniana* is thus more threatened than this species. In the expedition mentioned above sub *M. dawsoniana* we also encountered *M. sargentiana*. In that region in southern Sichuan *M. sargentiana* seemed much rarer than *M. dawsoniana*. This is an attractive, precocious species not often planted in Belgium. It seems to be more popular in warmer parts of Britain such as Devon or Cornwall. The two specimens at Wespelaar require further identification as some doubt has arisen on their identity.

#### **2.3.7 *Magnolia sinensis***

This species is known only from Tianquan, Lushan and Wenchuan Counties in Sichuan, China. A higher threat category may be appropriate (Cicuzza *et al.* 2007). *M. sinensis* is often wrongly labelled in collections and then confused with *M. sieboldii*. This does not help efforts to make a correct assessment and survey of *Magnolia* taxa in collections. The identity of one of our specimens is still under evaluation. The other specimen could well be a selection as it often exhibits much more tepals as the 9–10 typical for the species.

### **2.4 Near threatened (NT)**

#### **2.4.1 *Magnolia officinalis***

*M. officinalis* has been evaluated as critically endangered in Yunnan but due to its wide distribution in China it was given the lower category near threatened in the BGC Red List. An important remark however is that *M. officinalis* is becoming very rare outside cultivation where it is grown for its medicinal bark. *M. officinalis* grows at a relatively low altitude (<1,500 m) in its natural habitat, but seems quite hardy in our climate. The nine plants of wild provenance at the Arboretum all come from the same seed batch. This seed was collected by Jinzing Lin in 1995 in Damaoshan, Ya'an County, Sichuan, China. It is always difficult to assess whether seed came from a tree in the wild or from a cultivated specimen. Some of the specimens start to develop leaves with an emarginated apex, typical for the subspecies *biloba*. It is doubtful that the very minor differences between subsp. *officinalis* and subsp. *biloba* are sufficient for recognizing these as distinct taxa. *Magnolia officinalis* is a very interesting horticultural taxon as it exhibits many characters not usually linked to *Magnolia* such as late flowering, heavy scent, symmetrical beaked fruits, very big leaves in whorls, etc. It has therefore quite an exotic appearance in our maritime climate.

### **2.5 Least concern (LC)**

The taxa listed below and growing at Arboretum Wespelaar have received the Red List category least concern. This category includes widespread and abundant taxa and these will therefore not be discussed in this paper. It may be interesting to note that 7 out of 9 taxa in this category at Arboretum Wespelaar are North American species. *Magnolia acuminata*, *Magnolia fraseri*, *Magnolia fraseri* subsp. *pyramidata*, *Magnolia globosa*, *Magnolia grandiflora*, (*Magnolia*

*insignis*, died after moving out of greenhouse, not hardy), *Magnolia macrophylla*, *Magnolia tripetala*, *Magnolia virginiana*.

## **2.6 Data deficient (DD)**

The category data deficient indicates that more information on abundance and/or distribution is required. This and the next category (not evaluated) demonstrate that there is still a way to go and that further research and field studies are in need to further improve the invaluable tool of the Red List.

### **2.6.1 *Magnolia biondii***

This species from central China is listed as vulnerable in the China Species Red List (Cicuzza *et al.* 2007). It can be recognized by the combination of following characteristics: outer tepals sepaloid, carpels not aggregated as in *M. cylindrica*, gynoeceum and twigs glabrous. This is the first *Magnolia* to bloom in our collections. The flowers are thus every year ruined by spring frosts, but they seem to be tolerable to some degree of frost. The English name Hope of Spring Magnolia seems highly appropriate. Three of the six plants in the collection are of wild provenance (Henan, China) and were received through the Magnolia Society International seed counter in 1996. It has however become clear that this seed batch contained hybrids and that we are therefore not sure of its real provenance (maybe a collection or a seed orchard?).

### **2.6.2 *Magnolia delavayi* (EN on IUCN website)**

*M. delavayi* is known from Yunnan and Sichuan in China and has been listed as vulnerable in the China Species Red List (Cicuzza *et al.* 2007). This evergreen species grows at an altitude of 1,500–2,800 m and is not fully hardy in our climate. One of our specimens died when it was moved from the greenhouse to the outdoor collection at an age of about 6 years. A second specimen is alive and has grown impressively. It is planted between the house and the greenhouse at what must be the warmest location in the garden. Still it suffered there in the winters of 1996 and '97 when all leaves got frozen. This winter (2009) was long and cold with absolute minimum temperatures of –19°C and the leaves of the specimen again all turned brown and are falling this spring. The plant died after a very cold winter in 2010.

### **2.6.3 *Magnolia denudata***

*M. denudata* has a wide distribution in south eastern China, but is equally listed as vulnerable in the China Species Red List (Cicuzza *et al.* 2007). It is however widely cultivated as an ornamental in temperate parts of the world. All our specimens are from nursery source and there seem to be some variation in number of flowers and time of flowering.

### **2.6.4 *Magnolia liliiflora***

This species is known from Chongqing, Fujian, Hubei, S Shaanxi, Sichuan and NW Yunnan, China (Xia *et al.* 2008). It is listed as vulnerable in the China Species Red List (Cicuzza *et al.* 2007). It is widely cultivated as an ornamental shrub and the selection 'Nigra' is one of the most popular and frequently planted Magnolias in Belgium. The plants at Arboretum Wespelaar are all from cultivated origin.

### **2.6.5 *Magnolia nitida* (syn. *Parakmeria nitida*)**

*Magnolia nitida* is known from Guangxi, Guizhou, Tibet and Yunnan in China and northern Myanmar. It is considered endangered in China (Cicuzza *et al.* 2007). Information is needed on its status in Myanmar. *M. nitida* grows at an elevation of 1,500–2,800 m and is likely not hardy in our climate. Temptation to grow it anyway is great due to its spectacular purplish-red coloured flowers and a specimen was bought last year.

### **2.6.6 *Magnolia sprengeri***

*M. sprengeri* appears to be not rare in W Hubei and was also found recently in Shaanxi (Kang *et al.* 2008). I also encountered it in S Sichuan (2006) but there it was very rare. It has a wide distribution in SE China but was listed as



vulnerable in the China Species Red List (Cicuzza *et al.* 2007). *M. sprengeri* is one of the most spectacular precocious flowering Magnolias and is therefore deservedly widely cultivated (the divine *Magnolia*). All the specimens at Arboretum Wespelaar are from cultivated origin. There appears to be a lot of variation in flower colour, from pale to deep pink. *M. sprengeri* var. *elongata* is quite different and discussed below.

## 2.7 Not evaluated (NE)

### 2.7.1 *Magnolia acuminata* var. *subcordata*

The variety *subcordata* is different from the typical variety in its hairy annual branchlets and the light yellow tepals which are golden yellow within (Spongberg 1998). It is mostly less tree like than the typical variety. It occurs in the southern parts of the natural wide distribution of *M. acuminata*: North Carolina, Georgia and Alabama. It is not recognized as a distinct taxon in the recent Flora of North America (Meyer 1997). For the above mentioned characteristics, *M. acuminata* var. *subcordata* has a great horticultural value and has often been used as parent of *Magnolia* selections with deep yellow coloured flowers. It is therefore widely accepted as a distinct taxon in the horticultural world.

### 2.7.2 *Magnolia doltsopa* (syn. *Michelia doltsopa*)

*M. doltsopa* is grown as an ornamental evergreen shrub in milder parts of the U.K. It is less hardy than *M. laevifolia* and is thus probably not suited for the Belgian climate. We have bought five specimens in 2008 which overwintered indoors this winter.

### 2.7.3 *Magnolia duclouxii* (syn. *Manglietia duclouxii*)

Our single specimen of this species known from SW China and N Vietnam was killed by roe deer damage soon after it was planted in the outdoor collection. Not considered hardy in Belgium.

### 2.7.4 *Magnolia kobus*

*M. kobus* from Japan and South Korea is said to be relatively common at moderate elevations throughout Japan (Spongberg 1998). It is unclear why this species was not evaluated for the Magnoliaceae Red List. Hybrids with *M. stellata* have been given the name *M. × loebneri* and those with *M. salicifolia* have been given the name *M. × kewensis*. All these taxa and their numerous selections are very popular in W European gardens. The four specimens of this species at Arboretum Wespelaar are from cultivated origin.

### 2.7.5 *Magnolia laevifolia* (syn. *Michelia yunnanensis*)

*Magnolia laevifolia* is known from SW China where it occurs at altitudes of 1,100–2,300 m. This evergreen species of section *Michelia* is becoming more and more popular in Belgium and other W European countries although its relative low altitude provenance can be the cause of some doubts on its hardiness. Our specimens, all from cultivated source, have proven hardy these last mild winters but the cold and long winter of 2009 has killed some of the small and exposed plants. Two 10-years old plants under the protection of a Pine canopy have also been damaged and dropped their leaves but we expect that they will resprout this spring.

### 2.7.6 *Magnolia maudiae* (syn. *Michelia maudiae*)

*M. maudiae* is known from SE China and Hainan Island (Figlar and Nooteboom 2007) where it occurs at low altitudes of 600–1,500 m. It is probably not hardy in our climate but our four plants of nursery source are too young to make any justified statements.

### 2.7.7 *Magnolia obovata* (syn. *Magnolia hypoleuca*)

*M. obovata* is native to altitudes of circa 1,800 m in mountainous regions of the southern Kurile Islands, the Japanese

islands of Hokkaido, Honshu, Shikoku and Kyushu and the Ryukyu Islands (Spongberg 1998). Just as the above mentioned Japanese *M. kobus* and the below listed Japanese *M. salicifolia* it was not evaluated for the Magnoliaceae Red List. Boland (2009) states that *M. obovata* appeared in almost every open mountainside niche during his trip to Honshu in the fall of 2005 suggesting that it is not at all rare in that region. From the ten specimens that we grow at Arboretum Wespelaar three are of known wild origin. They were all collected by the second author during an IDS trip to Japan in 1992 in the Mt. Azuma region, N. Honshu. Two specimens collected at Mt. Azuma at 900m exhibit some serious bark split due to spring frost damage. The third specimen collected at 1,100 m at Shirafu Onsen in the Mt. Azuma region seems less prone to spring frost but is planted in a less open situation. It has grown into an impressive and handsome tree.

#### **2.7.8 *Magnolia salicifolia***

*M. salicifolia* is endemic to the Japanese Islands of Honshu, Shikoku and Kyushu. Some selections and hybrids of the species are very popular in horticulture. The six specimens at Arboretum Wespelaar are of cultivated origin.

#### **2.7.9 *Magnolia sieboldii***

*M. sieboldii* is known from E China, Korea and Japan. It is unclear why it was not evaluated for the Magnoliaceae Red List. Like *M. wilsonii* of section *Oyama* it is an interesting and important plant for gardens but did for some reason not yet make it outside collections. Arboretum Wespelaar has a total of 27 specimens 14 of which are of known wild provenance. We received two of these from the Morton Arboretum (Lisle, IL, USA) which were collected in the province of Liaoning, China. The twelve other wild collected specimens come from Korea.

### **2.8 Not included in the Red List**

#### **2.8.1 *Magnolia campbellii* subsp. *mollicomata***

*M. campbellii* is included in the Red List under the category Least Concern (Cicuzza *et al.* 2007). It is a variable species, spectacular in bloom, native to a wide area of the Himalayan region from E Nepal to SW China (Spongberg 1998). The subspecies or variety *mollicomata* from the eastern end of its range is not recognized as distinct in recent literature and this explains for the fact why this taxon was not included in the Red List. *M. campbellii* is not really hardy in Belgium and our single specimen, still listed as subsp. *mollicomata*, is not vigorous and suffers regularly from die back and frost damage though planted under the protection of a Pine wood.

#### **2.8.2 *Magnolia figo* (syn. *Michelia figo*)**

Xia *et al.* (2008) state that *M. figo* is cultivated throughout most of S China and probably originated in cultivation. That would explain why this species is not included in the Red List. It is cultivated in tropical, subtropical and warm temperate regions of the world and is not hardy in Belgium. Our single specimen grows in the greenhouse.

#### **2.8.3 *Magnolia kobus* var. *borealis***

Already in 1955 Johnstone (1955) argued that the rationale for the inclusion of var. *borealis* within var. *kobus* is based on the fact that there are no clear-cut distinguishing characters that separate the northern plants (*borealis*) from the southern ones. Hence this taxon is not included in the Red List. At Arboretum Wespelaar we have four specimens still listed under that name that were collected by the second author in 1992 near Lake Shikotsu at the Island of Hokkaido. They all have a rather oval habit and have not flowered profusely as yet.

#### **2.8.4 *Magnolia officinalis* var. *biloba***

Not recognized as a distinct taxon and probably rightfully included in *Magnolia officinalis*. The nine specimens in the collection still listed under that name are from cultivated origin.

### 2.8.5 *Magnolia sargentiana* var. *robusta*

Spreading bushy trees usually branched from near the base, with oblanceolate leaves, producing larger flowers and larger fruit aggregates have long been segregated from *M. sargentiana* as the variety *robusta* (Spongberg 1998). Recent literature has placed this variety in the synonymy of the species and this is why it is lacking in the Red List. The three specimens at Arboretum Wespelaar still listed under this name are of cultivated origin.

### 2.8.6 *Magnolia sprengeri* var. *elongata*

Although a lot has been written on this taxon, its identity, distribution and taxonomy remains mysterious. It is strange to read that Xia *et al.* (2008) place this taxon in synonymy of *M. sprengeri*. Not only the flowers but also the flower buds are like nothing else and instead of lumping it should probably receive species status. It seems closer (or identical) to the recently described *M. multiflora* (endangered) than it does to *M. sprengeri*. The recent quest for *M. sprengeri* (Kang *et al.* 2008) in China does not make any mentioning of var. *elongata*. Molecular studies of var. *sprengeri* and var. *elongata* are needed to reveal how closely related they really are. This study should include other *Yulania* taxa but also some of the former *Buergeria* group. This work will never be fully satisfying if no plants of known wild provenance are included and therefore a field expedition for var. *elongata* is in great need. Foundation Arboretum Wespelaar is willing to contribute to expeditions in quest of this contentious and often discredited variety.

### 2.8.7 *Magnolia virginiana* var. *australis*

In the *Magnolia* treatment for the Flora of North America, Meyer (1997) places the variety *australis* in synonymy of the species. Other authors however keep it separate based on its distribution, upright growth habit, appressed pubescence on the current year growth and evergreen foliage (Figlar, pers. comm.). The six specimens of this variety at Arboretum Wespelaar are of cultivated origin. Their habit, flowering time and evergreen foliage make them interesting plants for gardens.

## References

- Boland T. 2009. Plants and People: *Magnolia obovata* 'Lydia'. *Magnolia* 44(85): 1–4.
- Cicuzza D, Newton A, and Oldfield S. 2007. *The Red List of Magnoliaceae*. Fauna & Flora International, Cambridge. pp. 7–52.
- Ejder E. 2008. *Magnolia stellata* in its native habitat in Japan. *Magnolia* 43(84): 1–19.
- Figlar R B, and Nootboom H P. 2004. Notes on Magnoliaceae IV. *Blumea* 49: 87–100.
- Johnstone G H. 1955. Asiatic Magnolias in cultivation. London: Royal Hort. Soc. pp. 4–160.
- Kang Y X, Ejder E, Wang Y L, Sjöman H, and Yang M. 2008. *Magnolia sprengeri* 'Diva' and its relatives in China. *The Plantsman (NS)* 7(4): 212–217.
- Meyer F G. 1997. Magnoliaceae Jussieu. In: Flora of North America Editorial Committee (eds.). *Flora of North America* Vol. 3. New York: Oxford University Press. pp. 3–10
- Xia N H, Liu Y H (Law Y W), and Nootboom H P. 2008. Magnoliaceae. In: Wu Z Y, Raven P H, and Hong D Y (eds). *Flora of China* vol. 7. Science Press, Beijing; Missouri Botanical Garden Press, St. Louis. pp. 48–91.
- Spongberg S. 1998. Magnoliaceae hardy in cooler temperate regions. In: Hunt D (Ed.). *Magnolias and their allies*. Sherborne, U.K. pp. 81–144.