TAM

INDUMENTUM

VANCOUVER Rhododendron SOCIETY

General meeting:

November 20, 2008 at the Vandusen Botanic Garden, In the Floral Hall at 7:30 p.m.

Mary Comber Miles will have for sale a selection of her paintings, prints, and cards.

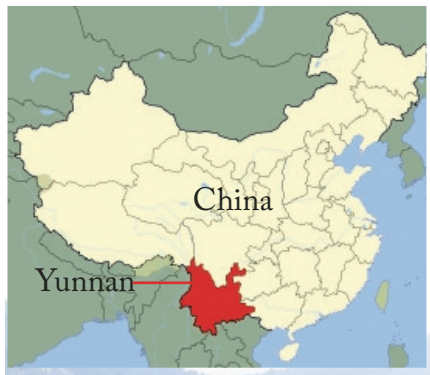
Inside this Issue of the Indumentum:

Visit the Vancouver Rhododendron Society Website at www.rhodo.citymax.com

Newsletter Volume 40, Number 3, November 2008 cover

Dana Cromie in Yunnan with Peter Wharton, on Cangshan Mountain

By Joe Ronsley



VRS member, and Treasurer, Dana Cromie will be our speaker the evening of November 20th, the title of his lecture being 'A Day in Yunnan with Peter Wharton'. Dana will take us along for a short walk in the Cangshan with Peter Wharton on what was agreed by all to have been a perfect day.

It was one particular day, he says, on which we saw a sample of each of the rhododendrons we saw on the whole trip. This was also Peter Wharton's last trip to Asia. The trip to Yunnan was for UBC Friends of the Garden and their spouses, and was a pilot venture for future botanical tourism in Yunnan, Peter's intended retirement project, unfortunately never to be realized.

Dana tells us that 'I prefer not to give the audience the impression I have even 1% of Peter's knowledge, or that I am giving them Peter's talk or Peter's view on anything. It is just me after all'. 'A retired number cruncher', as he describes himself, Dana Cromie is a member of many local garden clubs and is very active as a Friend of the Garden at UBC Botanical Garden. He has a tiny garden in Vancouver with a heavy bias toward Ericaceae and Liliaceae. This trip to Yunnan was his first botanical vacation. Despite his modesty, Dana's lecture promises to be extremely interesting, and perhaps historically important.

Also called Diancang, or Holy Golden Eagle Mountain, the Cangshan Mountain juts up like a huge screen wall in the western part of Dali. Malong, the main peak, soars 4,122 meters into the sky capped with a snowy summit that never thaws. Over the valleys, many streams flow with a rich babbling sound; upward on the slopes, the blue sky is obscured by the dense foliage of the groves of ancient trees; atop the peaks, lakes sparkle like rippling mirrors. With its vast collection of plants and trees, the Cangshan is also a veritable botanical garden.

Stunning scenery on the Jade Cloud Road, Cangshan Mountain, Yunnan- China. Photo courtesy of Wikipedia. For more information on Cangshan visit the Wikipedia website at: **http://en.wikipedia.org/wiki/Cangshan**

New Research Initiative - Monocot Evolution

A major new effort to document the evolution of the economically most important group of plants on earth – the monocots – will be supported by a grant of nearly $2.9M by the National Science Foundation under its Assembling the Tree of Life (AToL) Program.

Monocots (including such groups as grasses, sedges, palms, gingers, bananas, orchids, onions, yams, pondweeds, and philodendrons) comprise more than 65,000 species of flowering plants, occur in almost all habitats on Earth, and provide the basis for the great majority of the human diet. Monocots also account for much of the commerce in cut flowers and horticultural bulbs such as crocuses, irises, hyacinths, tulips, and lilies. They dominate grasslands, seagrass beds, bamboo thickets, many wetlands, and are especially common on extremely infertile soils.

Previous attempts to analyze relationships among different monocot groups have made substantial progress over the past decade, but they have fallen short of producing a complete picture, perhaps because many major groups diverged more than 90 million years ago, leaving only subtle and difficult-to-detect traces of deep relationships in their form and genetic material.

A consortium of investigators at seven North American institutions – including Cornell, New York Botanical Garden, Penn State, University of British Columbia, University of Georgia, University of Missouri, and University of Wisconsin-Madison, as well as more than 30 collaborators worldwide – plan to use a revolutionary approach to develop a definitive family tree for the monocots over the next five years, and then use it to infer relationships among different groups and their evolutionary history across the globe.

For the first time, hundreds of whole chloroplast genomes (the circles of DNA inside the green organelles that conduct photosynthesis) will be sequenced and analyzed. Almost all previous studies using DNA to infer plant relationships have relied on sequences of only one or a few genes or spacers between genes. The new AToL approach – which will depend on collecting 600 monocot species around the world, from the jungles of southeast Asia, to the rich fynbos of South Africa, to the tops of the famed "Lost Worlds" of northern South America – will provide sequences for more than 100 chloroplast genes and, in many cases, the spacers between them, providing an avalanche of new data with which to assess evolutionary relationships. All the evolutionary history that can be wrung from the chloroplasts will thus be captured in this pioneering effort.

Sequencing the plastomes should also provide – at essentially no additional cost except computer analysis – the DNA sequences of all genes in the mitochondria, the organelles that conduct respiration within cells. The AToL team also plans to sequence transcriptomes – that is, the entire complement of RNA expressed from DNA – from the young leaves of several dozen monocots. For each species, the transcriptome sequences will provide information on thousands of nuclear genes. The unparalleled amount of genetic information from all three plant genomes should provide the most powerful analysis of relationships among any group of organisms studied to date. The monocot investigation is the first large-scale study to take advantage of the twin revolutions in sequencing technology and computer DNA analysis that have occurred in the last three years, making their phylogenomic approach possible.

The monocot AToL consortium will also score 600 living monocots under study and 75 fossils for over 200 morphological characters. This effort will permit the investigators to determine what traits characterize different groups, and to infer how such traits have evolved over millions of years of monocot evolution.

The resulting insights into the family tree of the monocots will provide the foundation for many new studies in physiology, ecology, biogeography, and genomics. The transcriptome study, in particular, offers the hope for widespread discoveries of new genes associated with traits that are absent from the few model plants (for example, rice and corn) that have been studied previously, and may provide new insights into plant development and physiological capacity. Moreover, comparisons of nuclear, mitochondrial and plastid genes from diverse monocots will greatly enhance understanding of gene and genome evolution throughout the history of flowering plants. Plant breeders will be especially interested in using these data to unlock vast vaults of novel genes that could be introduced into key crop, forage and ornamental plant species.

Web access to the data, family trees, and conclusions from the study will be provided to researchers, students, and teachers around the world. Team members will develop a travelling exhibit to convey key findings at high-profile venues in New York, Chicago, Denver, and Berkeley. A children's monocot garden – and a planting list for other gardens around the country – will be developed at the New York Botanical Garden. The principal investigators include:

Thomas Givnish (University of Wisconsin-Madison)
James Leebens-Mack (University of Georgia)
J. Chris Pires (University of Missouri)
Jerry Davis (Cornell University)
Dennis Stevenson (New York Botanical Garden)
Wendy Zomlefer (University of Georgia)
Alejandra Gandolfo (Cornell University)
Sean Graham (University of British Columbia Botanical Gardens)
Cecile Ané (University of Wisconsin-Madison)
Claude dePamphilis (Pennsylvania State University)

More information at: **http://www.plantgroup.org**

TROPICOS - A Website for Scientists

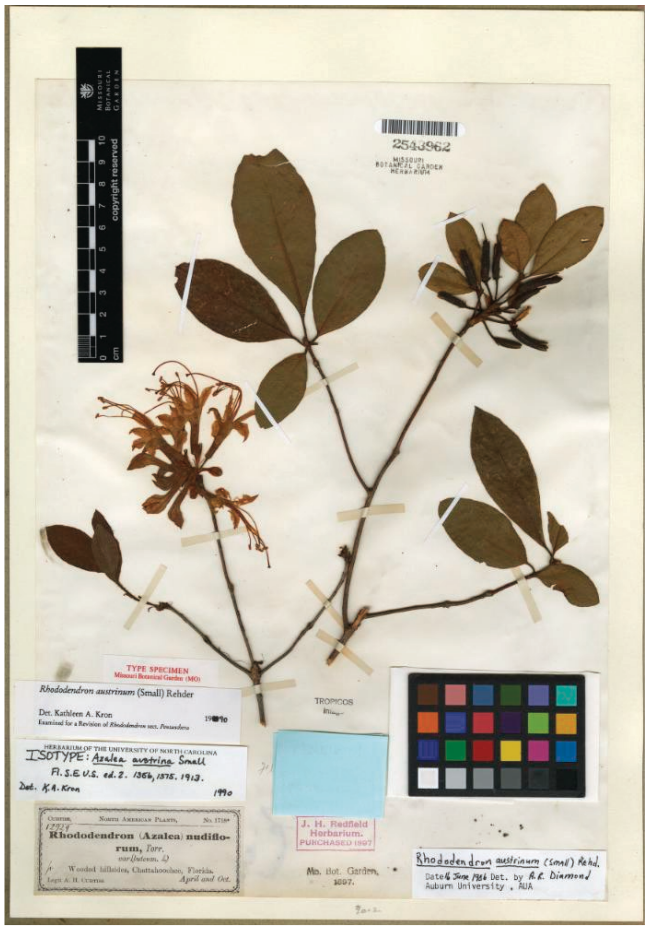
TROPICOS was originally created for internal research at the Missouri Botanical Garden, but has since been made available to the world's scientific community.

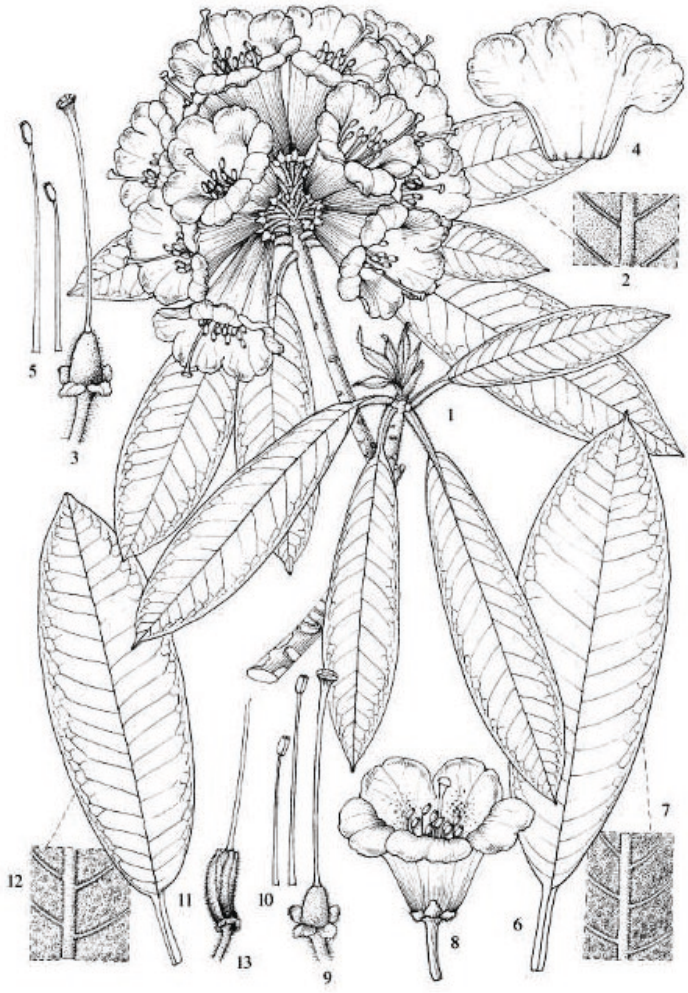
All of the nomenclatural, bibliographic, and specimen data accumulated in MBG's electronic databases during the past 25 years are publicly available here. This system has over one million scientific names, 3.4 million specimen records, 111,000 bibliographic citations, and more than 70,000 images of living plants and specimens.

TROPICOS contains some fantastic line drawing, herbarium pictures and other information. A sampling of the line drawings and herbarium samples from this site are shown on this page.

The site is for those who have solid to advanced knowledge of the subject to be searched, it is not for beginners. Information can be searched by topic, researcher, project number, family, image collection and so on. To visit the Missouri Botanical Garden's TROPICOS site, click here **http://www.tropicos.org**

All images are courtesy of the Missouri Botanical Garden.





…e 560. 1–5. **Rhododendron arboreum** Smith var. **arboreum,** 树形杜鹃(原变种) shu xing du ju…
…bian zhong). —1. Flowering branch. —2. Portion of leaf abaxial surface showing indumentum. —…
…er with corolla and stamens removed showing calyx and pistil. —4. Opened corolla inside view. —…
…ens. 6–10. **R. arboreum** var. **roseum** Lindley, 粉红树形杜鹃 fen hong shu xing du juan. —6. Leaf. —…
…on of leaf abaxial surface showing indumentum. —8. Flower. —9. Flower with corolla and stame…
…ved showing calyx and pistil. —10. Stamens. 11–13. **R. arboreum** var. **cinnamomeum** (Wallich ex …
… Lindley, 棕色树形杜鹃 zong se shu xing du juan. —11. Leaf. —12. Portion of leaf abaxial surfa…
…ing indumentum. —13. Capsule. (FOC 376; FRPS 57(2): 172, pl. 55. 1994. —冯先洁 Feng Xianjie).

Underground Gardening by Earthworms is Spreading Ragweed Seeds

Research shows more than two-thirds of giant ragweed seedlings emerge from earthworm burrows.

Scientists have discovered that "underground gardening" by earthworms is contributing to the spread of giant ragweed, a plant that causes sneezes and sniffles in many people. "Earthworms help ragweed thrive by systematically collecting and burying its seeds in their burrows," said weed ecologist Dr. Emilie Regnier of Ohio State University. "In fact, we've found that more than two-thirds of all giant ragweed seedlings emerge from earthworm burrows." Though giant ragweed (***Ambrosia trifida***) is best known for the prolific blanket of pollen it produces to plague hay fever sufferers, it also takes a costly toll on crops.

Throughout the Midwest, USA the weed is especially a problem in corn and soybeans, causing yield losses of 50% to 75% when left unchecked. Scientists have long been mystified by the rapid spread of giant ragweed since it produces relatively few seeds. Now research shows the lowly earthworm is one of the culprits.

In a study funded by the USDA's Cooperative State Research, Education and Extension Service, Regnier and her fellow scientists examined the impact of earthworms on giant ragweed. The study focused on ***Lumbricus terrestris*** worms – commonly known as nightcrawlers. Until now, nightcrawlers have had a stellar reputation among growers since their burrows promote water filtration and their eating habits help make nutrients more available to crops. The worms feed on plant litter they collect from the soil surface and store inside their narrow, underground homes. As the litter softens and decays, it improves the availability of nutrients in the soil.

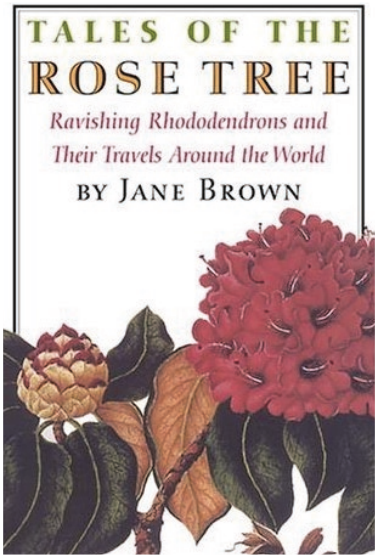
Now, it appears there is also a dark side to the earthworm's work. "Our study shows that nightcrawlers are some of nature's most effective weed farmers," Regnier said. "They actively forage for weed seeds (photo above right), pull them into their burrows and then 'plant' them under up to several inches of soil." In fact, researchers found that worms collected and buried more than two-thirds of the seeds dispersed by a stand of giant ragweed.

Each burrow examined in the study contained an average of 127 ragweed seeds, or 450 seeds per square foot. While nightcrawlers collect seeds from other plants as well, giant ragweed is definitely on their preferred list. "We found the worms collect and bury 10 types of seeds in the same size range," Regnier said. "But they have three special favorites – giant ragweed, bur cucumber (***Sicyos angulatus***) and sunflower (***Helianthus annuus***)."Lead researchers on the earthworm project include Regnier, weed ecologist Dr. Kent Harrison and entomologist Dr. Clive Edwards, all of Ohio State University. "Research that helps us understand the accumulation of weed seeds in the soil and how weeds are spread is critical to the development of new, effective management strategies," said Lee Van Wychen, policy director, the Weed Science Society of America. "Giant ragweed should be vigorously controlled in fields and gardens in order to minimize further seed production and protect plant growth and crop yields."

Information courtesy of the Weed Science Society of America, a nonprofit professional society founded in 1956 to encourage and promote the development of knowledge concerning weeds and their impact on the environment. For more information, visit **www.wssa.net**

Ambrosia artemisiifolia
Annual Ragweed, found across North America.

Image courtesy of: USDA NRCS. Wetland flora: Field office illustrated guide to plant species. USDA Natural Resources Conservation Service. Provided by NRCS National Wetland Team, Fort Worth, TX



Tales of the Rose Tree: Ravishing Rhododendrons and Their Travels Around the World

by Jane Brown

From the towering Burmese magnificum, with its three-foot-diameter trunk and its masses of sweet-smelling purple flowers, to the potted pink azalea, glowing like a burning bush on the backyard garden patio, Rhododendron is a genus of infinite variety and beauty.

There are 1,025 known species; it is a native of the snows of the Himalayas and the swamps of the Carolinas, the jungles of Borneo and the island inlets of Japan. It is also one of the oldest of plants – many believe the dove that returned to Noah's ark was carrying a rhododendron sprig – although it has been known to western horticulture for only 300 years. The curious history of Westerners and rhododendrons is full of swashbuckling plant collectors and visionary gardeners, colonial violence and ecological destruction, stunning botanical successes and bitter business disappointments. And it is here related with consummate skill by Jane Brown, an English garden writer clearly besotted by these "glorious and scented strangers, with their mouth-watering candy colors, their cascades of way bells or iridescent globes proffered in ruffs of green leaves."

From its origins fifty million years ago to its arrival in England in the early 1600s; from its export from America by John Bartram in the 1760s to its vigorous collection by Harvard's Arnold Arboretum in the 1870s; from the foundation of the British Rhododendron Society in 1915 to the genetically engineered hybridizations of the early 21st century: this is the sweeping and exciting botanical epic that Jane Brown provides in this remarkable book. She achieves exactly what she sets out to do – "to construct a history of the genus Rhododendron that pays tribute to the mystery and majesty of these plants" – and does so with a scholar's thoroughness and the anecdotal skill of an enthralling entertainer.

Jane Brown is the author, most recently, of The Modern Garden and The Pursuit of Paradise: A Social History of Gardens & Gardening. She lives in Cambridgeshire, England.

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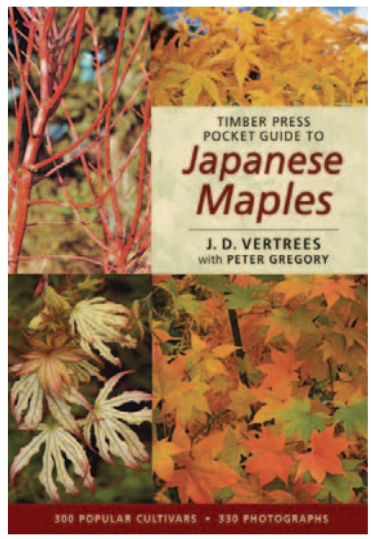
Website: **http://godine.com/isbn.asp?isbn=1567923127**

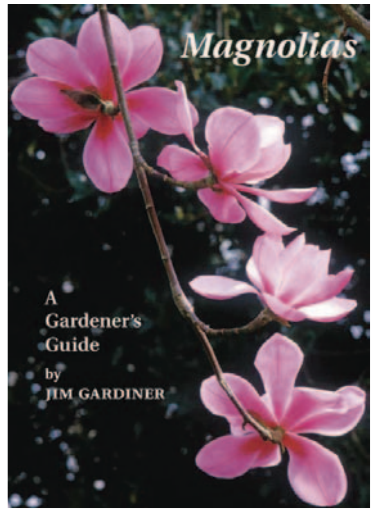


The Pocket Guide to Japanese Maples

By Peter Gregory and J. D. Vertrees

The Timber Press Pocket Guide to Japanese Maples describes and illustrates 300 of the most widely available Japanese maples in North America and Europe. Along with basic information on cultivation and maintenance, it provides lists of trees for specific landscape uses, enabling gardeners to select the best trees for various garden conditions. Fifty newer cultivars are presented, including four outstanding trees that are expected to become very popular in the near future.

Flexibind, 224 pp; Illustrations, 330 color photos, 2 maps
ISBN-13: 9780881927993 ISBN-10: 0881927996
Website: **http://www.timberpress.com/books/isbn.cfm/9780881927993/timber_press_pocket_guide_japanese_maples/gregory**



Magnolias A Gardener's Guide

By Jim Gardiner

Revered by gardeners since ancient times, when they were brought into cultivation in Asia, magnolias have lost none of their allure. In fact, a steady supply of new magnolias has become available in recent years, from both newly discovered species and newly created hybrids, making the genus a source of greater horticultural excitement than ever before.

This book is extensively revised and expanded. This highly illustrated survey of the genus includes species and hybrids, extensive information on cultivation and propagation, and more than 150 fine photographs. The appendices list societies, plants for specific landscape situations, plant awards, and places to see and buy magnolias.

Hardcover, 330 pages,
ISBN-13: 9780881924466; ISBN-10: 08819244
Website: **http://www.timberpress.com/books/isbn.cfm/9780881924466**

Join the Vancouver Rhododendron Society

Come out and enjoy our monthly lecture programs with insightful speakers working in the fields of horticulture, botany and plant preservation. Share with others the knowledge of rhododendrons and acquire plants from member growers. Receive monthly email issues of the INDUMENTUM.

Guests are always welcome at our monthly meetings!

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Contribute to the INDUMENTUM

Letters to the INDUMENTUM, news, pictures and anything rhodo or just for interest, can be e-mailed to Todd or Shannon Major at stmajor@shaw.ca. If you wish to mail us an article or some pictures (which we will return to you) please give us a call at 604 941 7507 to obtain our mailing address. We need pictures! The larger the picture file size the better the result on screen and in print. If you don't send something, you'll have to live with what we print.

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TAM

Sudden Oak Death and Rhododendrons, What You Should Know

Highlights of a Symposium on Sudden Oak Death - Effect of Environmental and Seasonal Factors on the Susceptibility of Different Rhododendron Species and Hybrids to *Phytophthora ramorum*.

By Isabelle De Dobbelaere,Kurt Heungens, and Martine Maes

Although rhododendron is the most important host of ***Phytophthora ramorum*** in Europe, there is little scientific information about the susceptibility levels of different Rhododendron species and cultivars. Increasing this knowledge would help nurseries in the management of the disease and could be used by plant protection services to target their inspections. In this study a total of 80 Rhododendron species and hybrids were screened for their susceptibility to ***P. ramorum*** using two detached leaf inoculation assays. Due to the variability in susceptibility for a given cultivar within and between years, multi-year data was deemed necessary to establish a reliable susceptibility ranking. The zoospore inoculation method involving non- wounded leaves was most informative. Using this method, a wide range in susceptibility to ***P. ramorum*** was demonstrated.

A second objective of this study was to get a better handle on some of the internal and external factors (time of year, temperature, leaf age) that seem to effect the susceptibility level. Susceptibility was significantly lower during late fall and winter, and seems correlated with the physiological status of the plant. Leaf age mainly seems to affect susceptibility during the early stages of leaf maturity. In general, new leaves were more susceptible to pathogen development. However, young leaves of some cultivars seem covered by leaf hairs, which prevent the zoospores to reach the leaf surface. Environmental factors that affect stomatal regulation, such as temperature, also seemed to have an effect on the degree of symptom development.

Since November 2002, EU emergency phytosanitary measures are being taken to prevent the introduction and spread of ***P. ramorum*** in Europe, including surveys at all commercial premises with ***P. ramorum*** hosts. An eradication and quarantine program is initiated at nurseries with positive findings. Commercial Rhododendron plants are the most important hosts of ***Phytophthora ramorum*** in Europe. In Belgium, one of the largest Rhododendron-producing countries of Europe, about 80 percent of the samples in the ***P. ramorum*** surveys of the plant protection service were Rhododendron plants. Because of the quarantine status of ***P. ramorum***, only preventive measures can be taken by the growers.

General protective measures to prevent Rhododednron infection by ***P. ramorum*** include: water management, crop sanitation, operational hygiene, exclusion of potential host plants and preventive fungicide treatments. Taking into account cultivar susceptibility would be another tool for which there is high interest, but limited availability of scientific knowledge. In the long term, breeding resistance to ***P. ramorum*** may become a part of future Rhododendron breeding programs.

Within the Rhododendron species, lepidote species on average were less susceptible than elepidote species. In terms of seasonal effects, susceptibility was significantly lower during late fall and winter, and seems correlated with the physiological status of the plant. Leaf age plays an important role in susceptibility tests. When using wounded leaves, young leaves of all cultivars tested showed a higher level of susceptibility then mature leaves. However, when using non-wounded leaves, young leaves of some cultivars were less susceptible than older leaves. This effect was correlated with the presence of hairs on the young leaves of those cultivars, which probably form a barrier to the zoospores and prevent tissue penetration by the pathogen.

A version of this paper was presented at the Sudden Oak Death Third Science Symposium, March 5–9, 2007, Santa Rosa, California, Institute for Agricultural and Fisheries Research (ILVO), Merelbeke, Belgium. Corresponding author: kurt.heungens@ilvo.vlaanderen.be

See more on ***Phytophthora ramorum*** on page 8

The Many Species of *Phytophthora*

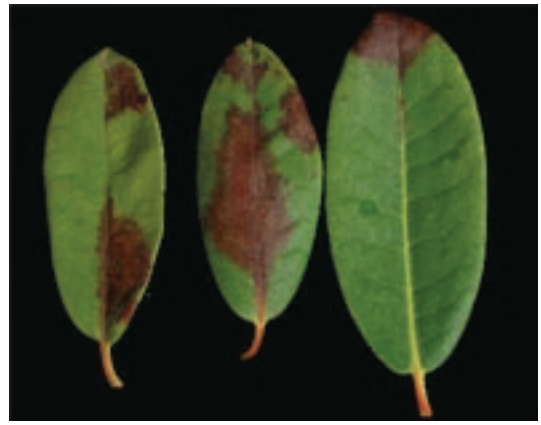
Phytophthoras are mostly pathogens of dicotyledons, and are relatively host-specific parasites. Many species of ***Phytophthora*** are plant pathogens of considerable economic importance. ***Phytophthora infestans*** was the infective agent of the potato blight that caused the Great Irish Famine (1845- 1849). Plant diseases caused by this genus are difficult to control chemically, thus resistant cultivars are grown as a management strategy.
Research beginning in the 1990s has placed some of the responsibility for European forest die-back on the activity of imported Asian ***Phytophthoras***. Other important ***Phytophthora*** diseases are:

- ***Phytophthora alni*** – causes alder root rot
- ***Phytophthora cactorum*** – causes rhododendron root rot affecting rhododendrons, azaleas and causes bleeding canker in hardwood trees.
- ***Phytophthora cinnamomi*** - causes cinnamon root rot affecting woody ornamentals including arborvitae, azalea, Chamaecyparis, dogwood, forsythia, Fraser fir, hemlock, Japanese holly, juniper, Pieris, rhododendron, Taxus, white pine, and American chestnut.
- ***Phytophthora fragaria***e - causes red root rot affecting strawberries.
- ***Phytophthora palmivora*** - causes fruit rot in coconuts and betel nuts.
- ***Phytophthora quercina*** – causes oak death.
- ***Phytophthora ramorum*** – infects over 60 plant genera and over 100 host species including rhododendrons. ***Phytophthora ramorum*** is the fungus like micro-organism that causes Ramorum blight and Sudden Oak Death (SOD). ***Phytophthora ramorum*** was first identified in 1993 in Germany and the Netherlands on ornamental rhododendrons. ***P. ramorum*** was isolated in June 2000 from dying trees in California. Since its discovery in North America, ***P. ramorum*** has been confirmed in forests in California and Oregon and in nurseries in California, Oregon, Washington and British Columbia. There are programs addressing ***Phytophthora ramorum*** in forests settings and in production nurseries. Symptoms inlcude leaf spots which are irregular and necrotic (photo right). Infected leaves usually fall off. Leaf spots are easily confused with leaf scorch, chemical damage, mechanical injuries and other diseases. Branch cankers are shiny black but not sunken. Usually the branch tip dies back, and the branch defoliates (photo top right).

Phytophthera: A new Pocket Diagnostic Kit

A simple test to confirm diagnosis for ***Phytophthera*** is available. The test package is available from:
Horti International Services
31471 Ponderosa Place, Abbotsford, BC, V2T 5G3, Phone: 604-504-8035.

Rhododendron branches infected with ***Phytophthora ramorum.*** Image courtesy of DEFRA -Royal Horticultural Society.



Rhododendron leaf showing symptoms of ***Phytophthora ramorum*** infection. Image courtesy of the Purdue University Plant and Pest Diagnostic Laboratory.
For more information visit their website at this link:
http://www.ppdl.purdue.edu/ppdl/SOD.html