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Patron / Président d'honneur
Her Excellency the Right Honourable / Son excellence la très honorable
Adrienne Clarkson, C.C., C.M.M., C.D.
Governor General of Canada / Gouverneure générale du Canada



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**2001 CBA ANNUAL MEETING
KELOWNA, BC, 23-27 JUNE
CONGRÈS ANNUEL DE L'ABC 2001
KELOWNA, BC, 23-27 JUIN**

The organization for the CBA/ABC 2001 meeting in Kelowna is progressing rapidly. We are excited about hosting the meetings here in Kelowna this year. There will be 79 contributed oral presentations and posters in addition to the 17 symposium presentations. The symposium topics are: Plant Behavioural Ecology, Forest Management and Plant Biodiversity, Forests and Fungi, and Phytogeography of Glaciated Landscapes. All the field trips are full, but we have a great trip planned for everyone on Monday June 25th. You have a choice of going for a walk in the Ponderosa pine forests and grasslands of Kalamalka Lake Park, having a tour of the BC Ministry of Forests Kalamalka Research Station, or joining the local mushroom club for a mushroom foray.

On Saturday June 23rd, while the pre-conference field trips are running, the CBA/ABC and Okanagan University College are presenting a Plant Fair for the general public from 11:00 to 16:00. Ten professional botanists, most of whom are CBA members, will be giving some fascinating talks. The topics range from use of medicinal plants by local First Nations groups to invasive plants of the Okanagan, to genetically-modified organisms. In addition local nurseries and garden clubs will have displays. You are welcome to join us for this event at the North Kelowna Campus. The Kelowna Garden Tour is also running on this day. I may be able to arrange for tickets (\$15), if you contact me soon. The Tour sells out quite early. You would need your own transportation.

A reminder to everyone presenting PowerPoint presentations to bring a back-up mode of presentation. If there are computer problems during your presentation, we will not be able to extend your time. In addition, we ask PowerPoint presenters to bring their presentation on CD or floppy, not on zip disks. We will be asking you to load your presentation the night before you are scheduled to speak. Check our webpages for updates: <http://www.sci.ouc.bc.ca/biol/cba2001.html>. The schedule of talks will be posted shortly. If you have any questions, please contact me at mjones@okanagan.bc.ca. See you in June!

Melanie Jones, Chair of the CBA/ABC 2001 Organizing Committee

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Information for submitting texts / Soumission des textes

Texts and illustrations for the Bulletin must be sent to the Editor preferably via the electronic mail (attached file) or on a diskette. Texts should be saved under "Word" and illustrations under the "TIFF" format.

If you have any question about text submission please contact the Editor.

Les textes et les illustrations pour le bulletin doivent de préférence être envoyés par courrier électronique (sous forme de fichier attaché) ou encore sur une disquette.

Les textes doivent être enregistrés sous « Word » et les illustrations sous le format « TIFF ».

N'hésitez pas à contacter le rédacteur pour toute information sur l'envoi de documents.

CBA Bulletin / Bulletin de l'ABC

The CBA Bulletin is issued quarterly (February, May, August, November) and sent to all CBA members.

Le Bulletin de l'ABC paraît quatre fois par année (février, mai, août, novembre) et est envoyé à tous les membres de l'ABC.

To ensure continuous delivery of the Bulletin please notify the Treasurer promptly of any change of address.

Veuillez communiquer tout changement d'adresse au trésorier afin de recevoir tous les numéros du bulletin.

If you have any comments or suggestions about the Bulletin, please contact the Editor at the above address.

Si vous avez des commentaires ou suggestions concernant le bulletin, veuillez s'il vous plaît contacter le rédacteur à l'adresse mentionnée plus haut.

Texts for the August issue must be received before July 15, 2001. Les textes pour le bulletin d'août doivent arriver au plus tard le 15 juillet 2001.

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2001 CBA Annual Meeting / Congrès annuel de l'ABC 2001

Draft Program	Day 1 Sat. June 23	Day 2 Sun. June 24	Day 3 Mon. June 25	Day 4 Tue. June 26	Day 5 Wed. June 27
Morning (08:30-12:00)	Full-day Field Trips : South Okanagan Desert; Forestry	Plenary Symposium: Plant Behavioural Ecology	Mycology Symposium: Forests and Fungi Contributed Oral Papers: Systematics and Phytogeography; Plant-Insect Interactions	Systematics and Phytogeography Symposium: Phytogeography of Glaciated Landscapes Contributed Oral Papers: Ecophysiology, Bryophyte Ecology	Full-day Field Trip: Miocene Fossils Half-day FieldTrip: Wine tour CBA Incoming Executive Meeting
Lunch (12:00-13:00) (or 13:30)		Posters up Conservation Meeting	Section Meetings : Ecology, Structure & Development	Section Meetings: Mycology, Systematics, Teaching Posters down	
Afternoon	Half-day FieldTrip: Winery Tour CBA Outgoing Executive Meeting	13:00 Ecology Symposium: Forest Management and Plant Biodiversity Contributed Oral Papers: Structure and Development	13:30 Buses leave for Kalamalka Lake Park or Ministry of Forest Research Station or Mushroom Foray	13:00 Contributed Oral Papers: Teaching and Mycology Sections; Ecology and General	
Late Afternoon	Can. J. Bot. Editorial Board Meeting	16:30-18:00 Poster Viewing with cash bar/appies		16:30-18:00 CBA/ABC Annual General Meeting	
Dinner			BBQ at Kal campus	18:30 Banquet	
18:00-21:00	Arrivals Registration Welcome Mixer	Free evening	20:00 Weresub Lecture (Jim Ginns)	Post-Banquet Entertainment	

Symposia

**Plenary Symposium:
Plant Behavioural Ecology**

(morning of Sunday 24 June)
Chair: R.G. Lalonde

8:30 - 8:45 : Introduction.

8:45 - 9:30 : Plant phenotypic plasticity: why a behavioural ecology approach?

B.D. Roitberg, Department of Biological Sciences, Simon Fraser University, Burnaby, BC.

9:30 - 10:15 : Plants and the tragedy of the commons.

Fred Adler, Department of Biology, University of Utah, Salt Lake City, Utah.

10:15 - 10:30 : Coffee.

10:30 - 11:15 : "Cheating" by Yuccas: "Dead-End" Fruit for Yucca Moths.

J. Addicott, Department of Biological Sciences, University of Alberta, Edmonton, Alberta.

11:15 - 12:00 : Evolutionary ecology of plant mating systems

E. Elle, Department of Biological Sciences, Simon Fraser University, Burnaby, BC.

Forest Management and Plant Biodiversity

(afternoon of Sunday, 24 June)
Chairs: E. Reekie, M. Roberts, L. Vasseur

13:00 - 13:30 : Response of Vascular Understory Vegetation to Forest Cutblock Edges in the Sub-Boreal Spruce Zone of Northwest-Central British Columbia.

Philip J. Burton, Symbios Research & Restoration, Smithers, BC.

13:30 - 14:00 : Pattern of epiphytic lichen diversity in forests of British Columbia: Implications for biological conservation and forestry.

A. Arsenault, B.C. Forest Service, T. Goward, UBC Herbarium.

14:00 - 14:30 : Understory plant communities in selection-managed forests in Central Ontario: harvest impacts and meso-scale spatial variation.

S. C. Thomas and N. Iwanycki, University of Toronto.

14:30 - 15:00 : Coffee

15:00 - 15:30 : Effect of selective tree harvesting on biodiversity in a southern Ontario deciduous forest.

R. Reader, University of Guelph.

15:30 - 16:00 : Response of the herbaceous layer to forestry practices in southeastern New Brunswick.

M. Roberts, University of New Brunswick.

16:00 - 16:30 : Plant diversity in red spruce forest: clear cutting versus natural disturbance.

L. Vasseur, St. Mary's University.

Fungi and Forests

(morning of Monday, 25 June)
Chair: S. Berch

8:30 - 9:30 : MycoForestry: The influence of silviculture on production and value of edible ectomycorrhizal forest mushrooms. D. Pilz, S. Alexander and R. Molina. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, Corvallis, Oregon, USA.

9:30 - 10:30 : Ectomycorrhizal community succession in managed forests - Strategies and issues for ectomycorrhizal fungus conservation.

Marty Kranabetter, BC Ministry of Forests, Prince Rupert Region, Smithers, BC.

10:30 - 11:00 : Coffee

11:00 - 12:00 : After the Ice Age: the Return of Lichens to Glaciated North America (with Apologies to Chris Pielou). Trevor Goward and Toby Spribille. Herbarium, Department of Botany, University of British Columbia, BC and U.S. Forest Service, Fortine, MT.

Phytogeography of Glaciated Landscapes

(morning of Tuesday, 26 June)
Chairs: Geraldine A. Allen, Luc Brouillet, Luise Hermanutz

8:30 - 09:15 : Phytogeographic musings about glaciated (and unglaciated?) landscapes of coastal British Columbia.

Rolf W. Mathewes, Department of Biological Sciences, Simon Fraser University.

09:15 - 10:00 : What seaweeds can tell us about coastal refugia during the last ice age.

Sandra C. Lindstrom, Department of Botany, University of British Columbia.

10:00 - 10:30 : Coffee

10:30 - 11:15 : Chloroplast diversity and phylogeographic patterns within Packera: interpreting the effects of glaciation on chloroplast migrations in western North America.

John F. Bain, Department of Biological Sciences, University of Lethbridge.

11:15 - 12:00 : Geographic patterns related to the protection of vascular plant biodiversity in eastern Canada.

Paul M. Catling, Eastern Cereal & Oilseed Research Centre, Agriculture and Agri-food Canada.

**Poorly Known Economic Plants of Canada
- 29. Common reed, *Phragmites australis*
(Cav.) Trin. ex Steud.**

E. Small and P.M. Catling, Eastern Cereal and Oilseed Research Centre, Research Branch, Agriculture and Agri-Food Canada, Saunders Bldg., Central Experimental Farm, Ottawa ON K1A 0C6

Common reed is becoming increasingly common in Canada, and indeed may have the widest distribution of all flowering plants. Although grasses are by far the most important economic family of plants, the potential of this giant grass has scarcely been exploited.

Latin Names

Phragmites australis is widely called *P. communis* Trin. "Phragmites" is derived from the Greek word for fence, *phragma*, a reference to its fence-like growth along bodies of water.

English Names

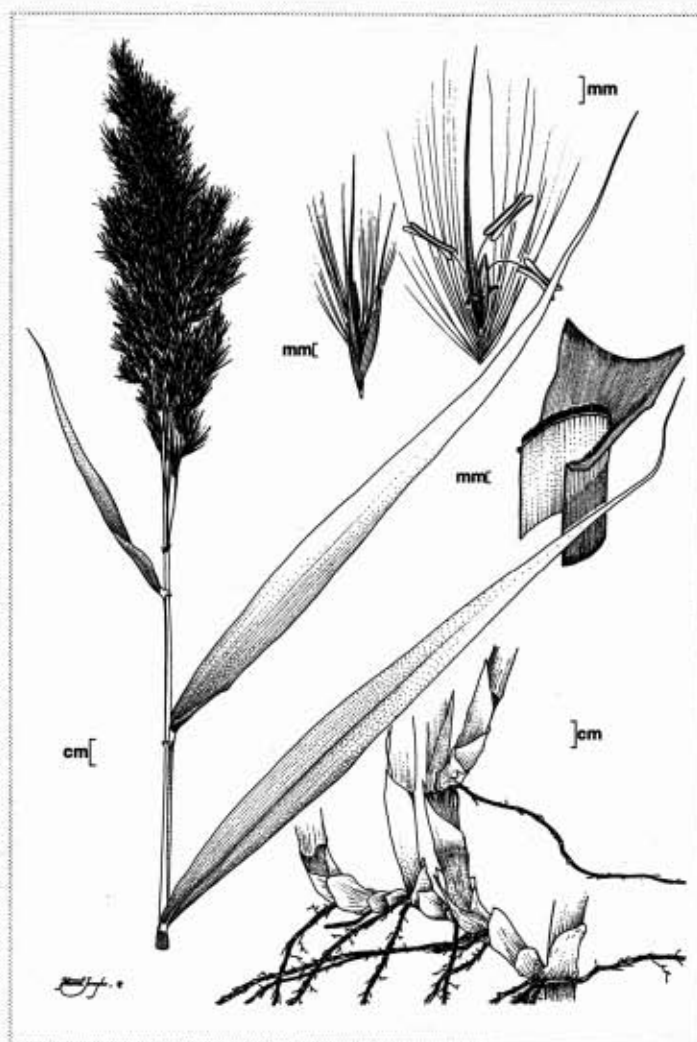
Common reed, common reed grass, giant reed grass, giant reed ("giant" is better reserved for the taller *Arundo*, discussed below), ditch reed, reed grass (reed-grass, reedgrass), (cane grass and quilrod in Australia; names like "arrow grass," "bamboo grass," and "common rush" are used locally, but lead to confusion with other genera).

French Names

Roseau commun; roseau à balais (France).

Morphology

The tallest of Canadian native grasses (1-4(-7) m), common reed is a robust, perennial with flat, pennant-shaped, gray-green leaves, 20-50(-70) cm long, 1-5 cm wide, the bases of the leaves sheathing the stem. The stems are stout, jointed, with hollow internodes. Flowering occurs in late summer and early fall. The plant produces a large plume-like, whitish (often purplish when young) inflorescence 20-40 cm long, that appears to be feathery because of the presence of long, silky hairs. The flowering head is made up of spikelets, each with 3-7 small flowers. The fruits are small, edible grains, but the seeds are often sterile. Common reed inflorescences may contain as many as a thousand viable seeds, or as few as none. In both North America and Europe, seed production and fertility seem to decrease towards the north, apparently related to the shorter growing season. One recent study found that seed production in Europe was strongly influenced by rainfall and temperature.



Vegetative reproduction is extensive by stout, fleshy, creeping rhizomes (below-ground stems) or stolons (above-ground horizontal stems). Rhizomes survive for 3 to 6 years, and alternate between a vertical and horizontal phase. The vertical rhizomes develop buds at their base in late summer, which grow horizontally for about a metre, turn upward, and remain dormant until the spring, when they produce a new vertical rhizome, shoot, and eventually new buds that repeat the cycle.

Classification and Geography

There are three species of *Phragmites*, *P. karka* (Retz.) Trin. ex Steud., of the Old World tropics, with perennial shoots, *P. mauritanus* Kunth. of tropical Africa, and *P. australis*, by far the most widespread, and the only one native to North America. Interspecific hybridization has not been reported in the genus. Many subspecies and varieties of *P. australis* have been described, but seem to be mostly local ecotypes. There seem to be minor differences between European and North American plants, but before accepting these as different subspecies or varieties, there is a clear need for further study of the taxonomy of *P. australis*. Chromosome numbers vary (mostly $2n = 36$ and 48),

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with an apparent giant octoploid ($2n = 96$) called var. *gigantissima* in the Danube Delta with shoots over 6 m high.

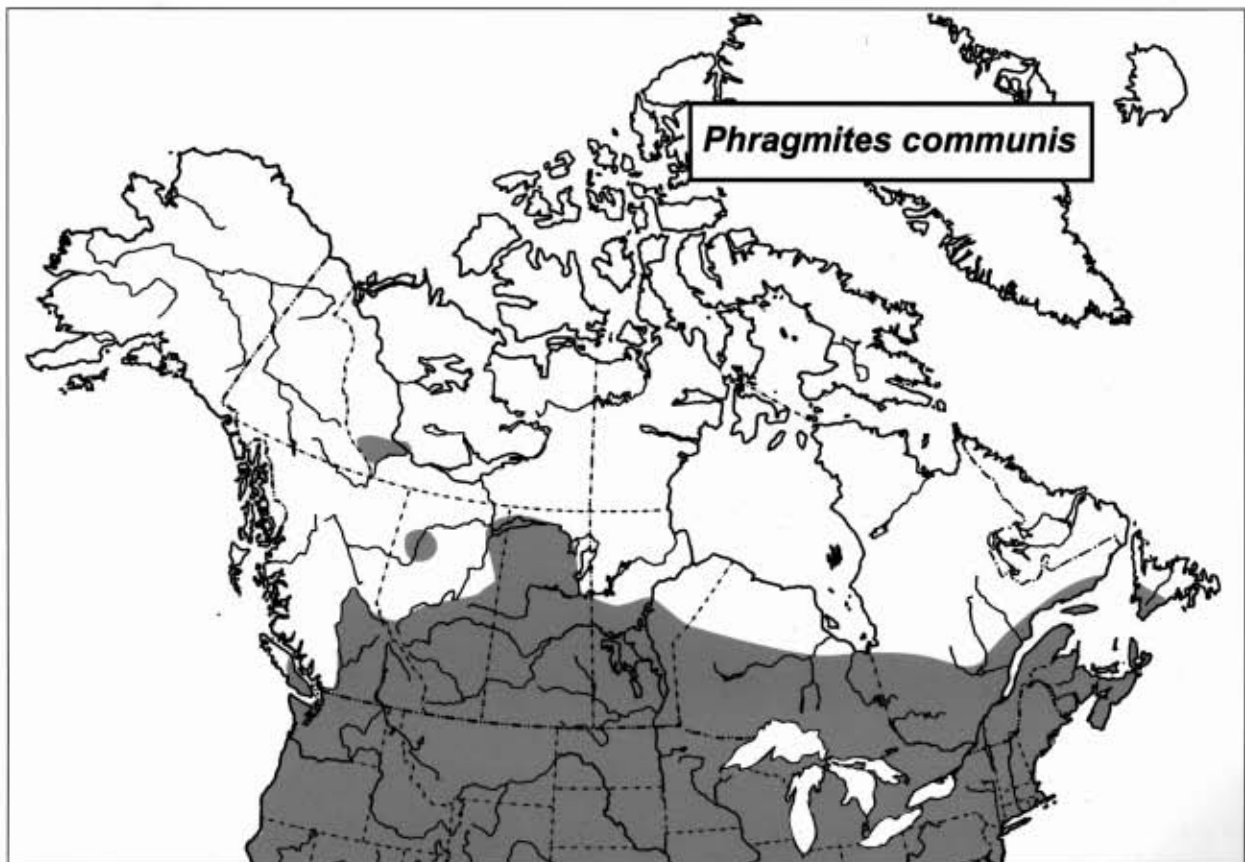
Common reed is sometimes misidentified as giant reed (*Arundo donax* L.) and wild rice (*Zizania* spp.). *Arundo donax* is an exotic Asian introduction to North America, where it is a troublesome aquatic weed in the southern US. The plant is occasionally cultivated, and an apparent escape near Ottawa has been recorded, but this species is essentially absent from Canada. *Arundo* is distinguishable in flower: the glumes of *Phragmites* are glabrous while those of *Arundo* are covered with soft whitish hairs 6-8 mm long, and the lemmas of *Phragmites* are longer than the glumes of *Arundo*. Wild rice is an annual, easily pulled up because of its shallow roots (unlike the stout rhizome which firmly anchors common reed). Wild rice also has unisexual spikelets in separate parts of the inflorescence (unlike the perfect flowers of *Phragmites*).

Common reed occurs on every continent except Antarctica, and is especially widespread in the temperate zones. It is present in almost all states of the US. In Canada, it is found in all provinces, and reaches north to the southwestern Northwest Territory. It is most abundant in the central interior of Canada, very rare in Newfoundland, and relatively infrequent in Alberta and British Columbia. The species is becoming more common in southern Ontario and southern Quebec.

Ecology

Phragmites australis typically is the dominant species where it occurs, often forming large monocultures, frequently with about 200 stems/m². It is frost resistant (surviving at least to -20°C), tolerates some shade, but is sensitive to drought stress. The plant is both a pioneer of mud flats and areas of shallow inundation, and a successional species that thrives in quite shallow water. Alkaline fens are often converted to acidic sphagnum bogs or woodlands, and stratigraphic analysis frequently reveals peat formed from common reed in the lower strata. Common reed has several features that make it especially competitive. It is very well adapted to its watery habitat, with aerenchyma tissues providing aeration to the stems and rhizomes.

The plants reproduce very vigorously by vegetative spread, building up considerable litter, and the rhizomes and adventitious roots form dense mats, discouraging other species from establishing. Common reed grows so tall that few plants can outshade it. Although seed reproduction is comparatively rare, the seeds are sometimes numerous. They are normally dispersed by the wind, but sometimes by birds. Seeds will germinate in water depths up to 5 cm, and salinities up to 2% (but germination is reduced in water with over 1% salt). The seedlings and young plants can persist through slow growth, and thus the plant is especially well adapted to exploiting new areas that become available. Perhaps more important than reproduction by seed is



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reproduction by rhizome fragments. Such fragments can be carried to newly opened sites by machinery, floodwaters, birds gathering nesting material, and even by wind. Rhizome fragments are generated not only by human activity (e.g. plowing and cleaning out ditches) but also naturally by rodents.

Common reed is an emergent hydrophyte specialized to grow on moist or saturated soils deficient in oxygen. The species inhabits fresh water, brackish (slightly saline) and alkaline wetlands, typically in marshes, swamps, wet meadows, and fens. It has been recorded in standing water up to 2 m deep, but generally occurs in much shallower water. It grows best in fresh water, but seems better able to outcompete several of its plant associates in brackish, and alkaline waters. Salinity tolerance varies among populations - reports ranging from about 1‰ to over 3‰. Because common reed rhizomes can penetrate to almost 2 m below ground, and the roots even deeper (sometimes down to 5 m), the species can reach low-lying ground water in saline areas. The species roots in a wide variety of soil types. Stunted common reed has been reported from acidic tailings of an abandoned copper mine in Vermont with soil pH of 2.9.

Common reed can develop stolons that trail along the ground for as long as 15 m. These very long runners typically develop out of water, serve to rapidly spread the plant, and pro-

duce shoots with abnormally small leaves. Such runners have been observed in Canada, and in Europe are known as *legehalme*.

Plaur refers to floating or loosely rooted mats or fixed islands of decaying vegetation. Plaur vegetation dominated by *Phragmites* is often developed at the fringe of reed swamps located along the shores of shallow lakes protected against erosion by the prevailing wind. Large floating reed mats have been observed in parts of Europe, generated by wave action on the reeds coupled with the formation of methane produced by rotting of the plants, the gas serving to increase the natural buoyancy of the mats. Particularly impressive expanses of plaur are found in the largest continuous marshland in Europe, the Danube Delta (mostly in Romania), which probably has the world's greatest stretch of reed beds (2700 km²).

Weed Aspects

Common reed has been listed as one of the "world's worst weeds." It is a major pest of irrigation and flood control channels, where it invades the wet banks and sometimes extends into water 2 m deep, reducing flow. In addition it causes water loss and stagnation in reservoirs and impedes navigation. It is a particularly troublesome weed in marshes that have been disturbed by excess sediment from flooding, pollution and cultivation. It does well in disturbed areas, especially along roadside ditches, railroad tracks, and on dredged soils and mine spoils. Common reed often becomes very aggressive in aquatic areas where the water table is lowered. There is widespread suspicion, and some genetic proof, that invasive biotypes in one region have been introduced from other regions. In particular, invasive biotypes in North America may originate from Eurasia. The species is increasing dramatically in the northeastern and Great Lakes states, and in Ontario and Quebec. This may be partly due to increasing soil salinity resulting from de-icing salts washed off roads into ditches and wetlands.

Purple loosestrife (*Lythrum salicaria*) is well known for its negative impact on wetland biodiversity, resulting from its competitive displacement of native vegetation. Invasion of wetlands by common reed, especially in fen habitats, has become a concern for the same reason. There is some evidence that common reed has always been present in some fens, but changes in groundwater flow and composition may be allowing it to become more competitive. This has led to extensive monitoring of effects on biodiversity and the success of control measures (<http://tncweeds.ucdavis.edu/esadocs/phraaust.html>). Control measures include cutting, burning, herbicides, and water management systems. The herbicide Rodeo has proven effective, while Roundup has a surfactant that is harmful to amphibians. Deep burning fires that kill rhizomes reduce populations of common reed, and may have been a natural process in dry years. All of these methods have advantages and disadvantages, and a combination of techniques is probably desirable.



Use as Food

Common reed is considered to be an attractive wild food for humans. The young emergent shoots, especially while still white, can be eaten like asparagus, or pickled. Very young leaves (before they are completely unfolded) may be cooked as a potherb. The young, green stems (while still fleshy) can be dried and pounded into a fine powder, that is moistened and roasted like marshmallows. The rootstocks are full of starch in the fall and spring, and can be consumed like potatoes. The small seeds are firmly attached to their hulls, but can be ground into flour and consumed as a gruel. The rhizome has been employed to produce a brown beer. Plants should not be collected as food unless it is certain that the water they are occupying is not polluted.

Common reed is not important as a wildlife food source, although several species of birds eat the seeds. Muskrats sometimes eat the stems and rhizomes, although they prefer other plants. During early growth common reed is a medium quality livestock food, although the protein value is considered poor. Young plants are readily eaten by cattle, horses, deer, and moose, and are useful for hay. After maturity, the plant is tough and relatively unpalatable.

Chemistry

The most significant component of common reed is the starch content of the rhizomes, reported to be as high as 12.5% in mid-winter, and as low as 2.5% in early summer. The leaves of common reed are reported to contain: protein - 17.1%; fat - 3.5%; total carbohydrate - 63.7%; fiber - 27.4 %; ash - 15.7%; ascorbic acid (vitamin C) - 90 - 200mg/100g; vitamin A - 5.15 mg/100g; and vitamins B₁ and B₂. The cellulose content is over 50% and the fibres are 0.8-3 mm long and 5-30.5 µm in diameter. (Also see tryptamines under Myths, legends...)

Toxicity

In polluted areas, heavy metals such as Cu, Cd and Pb can accumulate in the roots in potentially toxic amounts, and toxic levels of Zn in shoots of some polluted wetland plants have been recorded. High levels of these elements could be toxic to livestock and wildlife.

Non-Food Uses

The leaves and rhizomes have been used to treat numerous illnesses in folk medicine, most commonly as a diuretic (to induce urination), but also for arthritis, rheumatism, leukemia and other cancers, breast problems, diabetes, gout, jaundice, nausea, typhoid, and many other conditions.

Parts of common reed yield up to 13% furfural, so the species is a potential major source of this chemical. Furfural is currently derived by steam distillation from agricultural residues (straw, husks, etc.) treated with dilute sulfuric acid. This organic solvent is widely used in the chemical, petrochemical, and pharmaceutical industries for an amazing variety of purposes. It is employed as a refining solvent in the manufacture of synthetic



rubber and nylon, and in the production of resins for moulded plastics and metal coatings. It is also a component of insecticides, embalming and disinfectant fluids, an additive to rocket fuel, and for manufacturing pharmaceutical products such as antibiotics, anesthetics, bacteriostatics and fungicides.

Because it is an excellent soil stabilizer and spreads rapidly, common reed is often established for wetland rehabilitation and stabilization. There has also been recent interest in constructing reed wetlands to control water pollution and to treat municipal and industrial wastewater. The dense, impenetrable stands formed by common reed tend to eliminate habitat for most wild animals, and reed stands are less useful than other emergent vegetation for nesting waterfowl. Nevertheless, the edges of the stands do provide nest sites and muskrats employ reeds to construct dens.

Common reed has often been used for weaving mats, for thatching, cordage, nets, and for roofing and construction of huts. Pens for writing on parchment were once cut and fashioned from common reed. Other miscellaneous uses include animal bedding, upholstery stuffing, insulation, fencing, musical instruments, fishing rods, and basket weaving. North American Indians used the stems for a very wide variety of purposes, including shafts of arrows, prayer sticks, weaving rods, and pipestems. The plant has also been employed as a source of cellulose for making paper and construction board. Because of its short fibres, common reed is unsuitable for high-quality paper, but up to 20% can be added to paper products. In Europe, reeds are harvested to manufacture paper and cardboard. The rhizomes have served as raw material for manufacturing alcohol. The flowers heads are often a component of dried flower arrangements. *Phragmites* is

occasionally planted to dry out excessively wet areas, especially near water courses.

Agricultural and Commercial Aspects

For the most part, common reed has not been developed as a commercial crop, except at the cottage industry level. Recent work has been carried out, especially in Sweden, to establish *Phragmites* as a biomass crop. It has been said to be the most productive temperate aquatic plant. Total dry weight biomass in vigorous stands in Europe is 10-40 t/ha, including below ground material (300 t/ha has been recorded for Australia). Above-ground dry matter ranges from 5-20 t/ha in Europe at flowering time, with a record 80 t/ha underground biomass. The potential for fuel production is well recognized in the colder regions of Europe.

Cultivars & Germplasm

Highly aggressive biotypes of common reed are known, and while these are considered to be undesirable weeds, their productivity offers commercial possibilities. Cultivars suitable for crop purposes are not available, although there are variegated ornamental cultivars ('Variegata' with thin gold and green stripes, 'Karka Variegata' (a cultivar of *P. karka*) with grey green foliage striped in pink and white). The cultivar 'Shoreline' is used as a land stabilizer in the southern Central Great Plains.

Prospects

Common reed produces prodigious amounts of starchy rhizomes, and this source of edible and industrial materials has been largely ignored to date. Appropriate harvesting and processing technology is lacking, but given that there is a widespread desire to have the plant harvested for control purposes, it would be clever to develop means of exploiting this natural resource. There is also considerable potential for common reed as a source of biomass, principally for production of building materials such as fibreboard, insulation, and similar products. As well, biomass could be useful as fuel, fodder and agricultural compost. The seeds are too small to be considered for development of the species as a cereal. Finally, common reed has excellent potential to be developed as an attractive cover plant near roadsides where it must tolerate salty-runoff.

Myths, Legends, Tales, Folklore, and Interesting Facts

-Reedbeds as old as 1,000 years are known, and it has been speculated that some may be up to 6,000 years of age (although no living part of the plants is more than 8 years old).

-In Australia, aboriginal peoples constructed large rectangular rafts of bound common reed, and used these to collect mussels from lakes. North American Indians also used common reed for rafts.

-Several North American Indian groups used to fill reed stems with tobacco and smoke these like cigarettes. Six-hundred-year-old cigarettes were found at the Red Bow Cliff Dwelling in

Arizona, some adorned with miniature bows. The tobacco was lit and smoked, and because the tough reed exterior did not burn, it could be used again. Thirteen kinds of plants, as well as bird feathers, were smoked.

-“Ayahuasca” (pronounced EYE-a-wasca, literally ‘spirit-vine’ in the Andean language Quechua) refers to drug mixtures from South American plants, particularly the vine *Banisteriopsis caapi* (Spruce ex Griseb.) Morton, but also many other plants such as *Psychotria viridis* Ruiz & Pav., that have been used for millennia in the Amazon Basin by Indian tribes and shamans for healing and spiritual development. The term ayahuasca is also employed generically to refer to plant preparations of other regions of the world used in the same manner. The active constituents are alkaloids, including tryptamines, powerful and dangerous hallucinogens that are popular in the illicit drug trade. Similarly, the skin and glands of several toads were used by ancient shamans, and in the 1960s some people licked or smoked the secretions of the rare venomous Colorado River toad (also known as the Sonoran Desert toad and the psychedelic toad), *Bufo alvarius*, which is known to contain high amounts of hallucinogenic tryptamine. Extracts of the rhizome of common reed have ayahuasca analogues, particularly dimethyltryptamine, and dried extracted resin has psychoactive properties when smoked. Although some early cultures consumed tryptamines, probably with great care, use of tryptamine in any of these forms is quite risky. The presence of high amounts of tryptamines in some animals, plants and fungi likely reflects a common protective function of these powerful drugs.

-Common reed is important in North American Indian lore. In the Navajo story of creation the reed was a gift given to escape from the rising waters of the fourth world. People and animals crowded into the magical reed, which rapidly grew to the sky. To keep it from swaying in the wind, one of the Holy People took a feather from his headdress and stuck it through the top of the reed to secure it to the sky. Today, the feathery inflorescence of common reed is a reminder to the Navajo of their escape from the flood into the fifth world. The Hopi emergence story also is based on ancestors climbing from the underworld through the reed. The reed is used for ceremonial equipment, such as prayer sticks, in all ceremonies.

-In the Exodus story the Hebrews were in the desert near starvation and complained to Moses who appealed to God. The next day they were astounded as the dew dried into edible flakes that appeared as dew and tasted like honey on the desert floor. It was the manna that was to sustain them through 40 years of wandering. But this manna couldn't be stored. Some people tried gathering more than they needed, but by the next day their surplus stunk and was full of maggots. And so for 40 years they lived day in and day out dependent on the grace of God. The story of manna teaches that the gifts of God are not to be hoarded. Early missionaries in California observed that a kind of sweet sugar solidifies and hardens on the leaves of common reed from which

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it is collected by the Indians. The gathering of the honeydew seems to have been one of the annual seasonal rounds of activity of the Indians of the Great Basin. The honey dew was rolled into balls the size of one's fist, wrapped in leaves, and stored in baskets until needed. Some of the Holy Fathers relished this Indian food and considered it "manna from Heaven," but lost their appetites when they observed that the main ingredient of the pressed mass was insects. The predominant insect is *Hyalopterus pruni*, called the mealy plum aphid because it spends its winter phase on plum trees and other species of *Prunus*. In the spring and early summer it migrates to summer hosts, primarily common reed, where it produces the honeydew. The extent to which it uses *P. communis* is unclear, because most of the accounts are early, and "reed" could have referred to several different species.

-For an amusing display of animal figures constructed out of plants, including *Phragmites*, see <http://www.longwoodgardens.org/SeasonalFestivals/1998PeterRabbitTopiaries.htm>

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Book Reviews

Symmetry in Plants

Roger V. Jean and Denis Barabé (Editors)

World Scientific Publishing, 1998

Series in Mathematical Biology and Medecine Vol. 4

This book is dedicated to the two brothers L. Bravais, a botanist, and A. Bravais a crystallographer. Naturally the subject is phyllotaxis, not phyllotaxis in the conventional sense, but rather as it relates to all sorts of forms, both living and inorganic, that have a basic lattice structure that is characteristic of crystals. The premise from the outset is that phyllotaxis should be discussed in the larger concept of spatial relationships between objects of the same nature, hence the more general title of the book "Symmetry in Plants".

Three sections divide the book, each part containing 10 papers of about equal length. The forward contains four prologues written in turn by a mathematician (I. Adler), a botanist (R.O. Erickson), a molecular geneticist (A. Lima-de-Farina), and a crystallographer (A.L. Mackay). These four texts indicate the desire of the editors to follow in the line of thought of Bravais and Bravais.

Part I - Basic Information Gathering and Pattern Recognition in Phyllotaxis - Data-Experimentation-Description. In this first section (245 pp.), phyllotactic patterns of a large number different plant taxa are examined by way of presenting new information (eg. in *Vitaceae*, *Eucalyptus*, *Pinus*, *Rhododendron*, *Dipsacus sylvestris*, *Helianthus annuus*, *Ulmus glabra*, ...). These studies deal with not only on determining phyllotactic

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parameters but also on the transitions between types of phyllotactic patterns and on the links between phyllotaxis and the production of leaves, the symmetry of leaves (pendulum symmetry), and the structure of stems (normal vs. anomalous). Inflorescences are also dealt with. A quantitative analysis of phyllotactic parameters is also developed.

Part II - Pattern Generation in Phyllotaxis - Modelling. The second section (290 pp.) is the pivotal part of the book. It is here that we find the many different models that have been developed since the time of the Bravais brothers to describe and illustrate the types of phyllotaxis patterns laid out in the first section. From the curious device called a crocograph, with all its pulleys and wheels, to the most esoteric mathematical formulas, all the possible mechanisms available to explain phyllotactic patterns are invoked. The models fall into two groups: geometric models that use disks to plot the relative position of similar units, and dynamic models that take into account the way the elements are produced on the apex.

The mathematical nature of some of the papers makes them difficult to understand for a non-specialist, but it should be pointed out that an honest effort has been made to make them as accessible as possible. The paper by Adler is particularly good in this respect.

Part III - Origins of Phyllotaxis - Homology-Comparative Morphology-Exotic Phyllotaxis. The last part (270 pp.) deals with the more causal and philosophical aspects of phyllotaxis. The transition from the second part of the book to the third is the same as from the first to the second - ie generalisation and abstraction so that phyllotaxis is viewed within an ensemble of physical phenomena that possess iterative regularities. Some of the viewpoints discussed include, for example, the basic rules of growth leading to the formation of a phyllotactic patterns in nature, the physical constraints on the self-organization of the apical meristem, the theory of universality of phyllotaxis, the origin of structural periodicity from the atom to the organism, etc. The evolution of land plants is also discussed from the viewpoint of the origin and development of symmetry, branching and phyllotaxis.

In my opinion, this last section contributes most to the originality of the book because it reaches out to so many fields of scientific thought.

A final point is worth mentioning. Thanks to the number and quality of contributors to this book, the bibliographic coverage is very complete on a subject that is at the centre of studies in plant morphology. The book will certainly become a standard reference in university and research libraries.

Bernard Jeune, Université Pierre et Marie-Curie, Paris (translation - **Stuart G. Hay**, Université de Montréal)

Common and scientific names of weeds in Canada. Revised and enlarged. / Noms populaires et scientifiques des plantes nuisibles du Canada. Revu et augmenté

by S.J. Darbyshire, M. Favreau & M. Murray. 2000. Agriculture and Agri-Food Canada. Research Branch. Ottawa.
Publication 1397/B. 132 pp.

This new list of Canadian weeds is a revision and expansion of the 1969 "Common and Botanical Names of Weeds in Canada" published by the Canada Weed Subcommittee, and takes into account the lists published by the province of Québec ("Noms des mauvaises herbes du Québec", last published in 1975). The list is considerably expanded to include 1130 taxa. It includes the scientific name, following Kartesz (1994), English and French common names, as well as the Bayer Codes, used in several databases to reference economically important organisms.

One could argue endlessly about the proper scientific name to be applied to particular taxa. The authors chose to use mostly a single source, Kartesz (1994), controversial in some aspects but at least complete in coverage. One could argue that a more up-to-date taxonomy was available at the time the work was done, but the important point here is that nobody be misled by the taxonomy and scientific names used, not that the latest name be absolutely used. This will be the role of future databases, as such names change with the development of taxonomic knowledge. Also, as common names often raise passions among both professional botanists and users, the basis for selection and spelling of common names in both languages is explained in detail. The procedures used are both transparent and reasonable. In general, names of weeds in widespread use were retained.

More importantly is the definition used for weeds : any plant growing where it is not desired, in an agricultural context or elsewhere. Because of such a broad definition, a number of plants included in the list are not necessarily noxious, or even strongly harmful to crops, for instance. They may merely be "weeds" of fields or roadsides, or even of plantations. This considerably broadens the scope of the plants included and may account in large part for the increase in the number of weeds noted by the authors, particularly among the native taxa. Not all new weeds listed are recent introductions. Also, the fact that the authors included poisonous or toxic plants in the list must be underlined. These facts have repercussions that must be discussed.

For instance, all maples are listed as weeds in the list, I guess because they grow in fields that are left fallow in the normal succession of old fields. Some are true weeds, such as *Acer*

negundo and *A. platanoides* in cities and parks. Others just fulfill their normal role in nature. Likewise, nearly all Canadian asters have been listed as weeds. Plants of successional habitats, which asters often are, therefore automatically appear to become weeds. Are all asters harmful, even when they appear where they were not formally invited, party crashers all? I do not believe so (and not only because I study them). The most troubling case is the inclusion of *Ionactis (Aster) linariifolia* in the list. That species only occurs in Canada in the Trois-Rivières area of Quebec, where it is considered a rare species, in open sandy areas. Such areas occur occasionally within the town limits, and the species invades such fields readily. But it disappears as fast as soon as cover becomes dense, not a characteristic of weeds. Furthermore, its biology is such that it cannot be transplanted easily, and further, it grows in small clumps from a rootstock, not from extensive rhizomes. These are not factors of weediness. But what is most troubling to me is the fact that a rare species is included within a list of weeds, when it has never been reported as causing trouble, and what is worse, when people have attempted to protect it regionally. Let me provide a few more examples: also listed, most probably because they are toxic, are *Cypripedium reginae*, listed as rare in several provinces, and *Podophyllum peltatum*, a medicinally important herb. The question raised is this: how will we manage to protect such vulnerable species when they are very publicly listed on a weed list, furthermore called in French "plantes nuisibles" ? There is no symbol warning us of such distinctions within the list.

The use of the term "plantes nuisibles" instead of "mauvaises herbes" in the French title is also of concern, because such a strong term conveys with it the meaning of noxiousness in the mind of many. Not all plants listed are noxious. This was probably chosen because of the addition of poisonous taxa to the list, which do not fit well in the concept of "weed". But a problem of perception about the plants listed is thus raised.

Overall, this is a very good piece of work. Doing such a list is a thankless task at best, doing a perfect one is nearly impossible. As all tools, however, the list will have to be used with caution. Indeed, listing of rare taxa as weeds in an official document of the federal government could have the effect of preventing or hampering conservation actions, particularly where development projects are involved. Future versions of this document will have to take that into consideration. The list will be useful to a large audience, and it is a welcome addition to our set of tools to control invasive species.

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