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The Canadian Botanical Association Bulletin



Bulletin de l'Association botanique du Canada

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A GOLDEN JUBILEE MEDAL to Bill Cody

Bill (William J.) Cody is well known to members of CBA/ABC. He served as treasurer in 1965 and was a member of the first executive (Taylor 1969). He was later active in many ways including service as auditor. In 1997 Bill received the CBA/ABC Lawson Medal in recognition of his outstanding work on the Flora of the Yukon Territory (Chinnappa 1997).

On 25 November 2002 Bill received a Queen's Golden Jubilee Commemorative Medal. These medals mark the 50th anniversary of accession of Queen Elizabeth II to the Throne. They were awarded to persons who have made a significant contribution to Canada. The citation reads: "William Cody has contributed to botany in Canada and to the Ottawa Field-Naturalist's Club, especially for his work on the Canadian Field-Naturalist, Canada's foremost scientific journal for field biology. Mr. Cody is a retired curator of the Vascular Plant Herbarium at the Central Experimental Farm, Agriculture and Agri-Food Canada. Currently he is Canada's leading expert on the flora of the



Bill Cody is wearing here the Gold Badge of the Ottawa Field-Naturalist's Club for his outstanding service (uppermost pin), below it, the Queen's Golden Jubilee Commemorative Pin, and in lowermost position, the Queen's Golden Jubilee Commemorative Medal.

Yukon. Mr. Cody is the author or co-author of well over 200 publications.

Chinnappa, C.C. 1997. Awards at Montreal. *Canadian Botanical Association Bulletin* 30(4): 58-59.

Taylor, R.L. 1969. Founding of CBA - ABC - a review. *Canadian Botanical Association Bulletin* 2(2): 5, 8.

Canadian Botanical Association

The Canadian Botanical Association is honored to have a patron such as Her Excellency the Right Honourable Adrienne Clarkson, C.C., C.M.M., C.D., Governor General of Canada.

Bulletin

The CBA Bulletin is issued quarterly (February, May, August, November) and sent to all CBA members. Comments or suggestions about the Bulletin should be directed to the Editor at the address below.

Information for submitting texts

Texts and illustrations for the Bulletin should preferably be sent to the Editor as electronic documents, nevertheless any medium is acceptable. Any format for texts or illustrations are welcome. Please make sure that scanned illustrations are done with a very good resolution. If you have any question about text submission, please contact the Editor.



Association botanique du Canada

L'Association botanique du Canada jouit du bienveillant patronage de sa présidente d'honneur, Son excellence la très honorable Adrienne Clarkson, C.C., C.M.M., C.D., Gouverneure générale du Canada.

Bulletin

Le Bulletin de l'ABC paraît quatre fois par année, en février, mai, août et novembre. Il est envoyé à tous les membres de l'ABC. Tout commentaire concernant le bulletin est apprécié par le rédacteur.

Directives aux contributeurs

Les textes et les images sont de préférence envoyés sous forme électronique, néanmoins, tous les supports de même que tous les formats imaginables sont acceptables. Les fichiers graphiques doivent être de très bonne définition. N'hésitez pas à contacter le rédacteur pour toute information.

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Next issue / Prochain numéro

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Message de la présidente

Je dois admettre que ce mot de la présidente a été un peu plus difficile à écrire, étant au Burkina Faso, Afrique de l'Ouest. Mais, par le miracle de l'informatique, nous sommes maintenant capable de nous rejoindre à travers le monde. On réalise qu'avec les moyens plus efficaces de transport et de communication, le nombre de chercheurs travaillant dans d'autres régions du monde augmente. Je suis en fait curieuse de savoir combien de nos membres ont des activités académiques à l'extérieur du Canada. Ceci est un aspect que notre association n'a pas vraiment encore abordé mais d'autres sociétés ont déjà établi des sections ou des groupes affiliés dans ce domaine telles que la « Ecological Society of America » et la « American Institute of Biological Sciences ». Je ne suggère pas que nous ayons dès maintenant cette approche mais nous ne savons jamais dans le futur ce que cela pourrait nous apporter. Cela est d'autant plus important que d'autres organismes tel que le Conseil de Recherche en Sciences Naturelles et Génie (CRSNG) a aussi initié récemment un programme de bourses de recherche à l'international et il a signé des entente de coopération avec d'autres pays dont la Chine et la Russie.

De retour aux activités de l'ABC. Dans les derniers mois, le comité de direction a eu des discussions sur la possibilité d'introduire des prix de présentations pour les étudiants de premier cycle participant à des colloques régionaux. Dans le prochain bulletin, cette proposition sera rendue publique et nous allons pouvoir en discuter à notre **assemblée générale annuelle à l'Université Saint Francis Xavier (Nouvelle-Écosse)**, au mois de juin prochain. Nous croyons qu'il est important pour l'association d'être plus présente dès le premier cycle afin d'aller chercher plus d'intérêt en botanique et dans l'association. Déjà dans le dernier message, je faisais appel à tous pour encourager la venue de nouveaux membres étudiants dans l'association. Sur ce point, j'aimerais remercier ceux et celles qui ont répondu à ce message. Nous travaillons à l'amélioration de nos formulaires afin de mieux satisfaire ce besoin.

C'est aussi le moment de l'année pour commencer à annoncer les activités à venir dans la prochaine réunion annuelle de l'ABC. L'information pertinente à notre prochaine assemblée annuelle vous sera envoyée très bientôt. Cette réunion sera des plus intéressantes du fait qu'il s'agira de la première réunion de **Plante Canada**, et donc conjointement avec la Société canadienne de physiologie végétale (Canadian Society of Plant Physiology, CSPP). Comme vous vous le rappelez, cette fédération a été créée afin de mieux satisfaire nos besoins à être reconnus en tant que groupe en biologie végétale. Dans le futur, en fait, il est à prévoir que les assemblées de Plante Canada permettront à plusieurs associations dans le domaine végétal de se réunir et d'exercer des voix publiques plus fortes. De plus, la réunion de cette année amènera un événement spécial soit le **10^{ème} Symposium de New Phytologist**, organisé et supporté conjointement par la Foundation New Phytologist (et le fameux journal international de ce nom) et en honneur de la contribution de Verne Grant. Ce symposium, nommé « **Plant Speciation** » (organisé par Loren Rieseberg) regroupera ensemble plusieurs noms renommés dans ce domaine incluant Les Gottlieb, Caroline Saintagne, Don Levin, Tom Givnish, Doug Soltis, Barbara Schaal, Jeannette Whitton, Brian Husband, etc. Cet événement devrait être des plus intéressants et conduire à de grandes discussions. Cette assemblée devrait satisfaire les intérêts de plusieurs botanistes puisque d'autres symposiums, sessions de présentations orales et par affiche compléteront l'agenda. Cette réunion promet donc d'être des plus enrichissantes pour tous, participants et présentateurs. Nous souhaitons particulièrement inviter les étudiants gradués et de premier cycle à venir très nombreux à prendre part à ces activités. N'oubliez pas de marquer votre calendrier, plus amples informations vous parviendront très bientôt.

Liette Vasseur, présidente de l'ABC



President's Message

I have to admit that it was somewhat difficult to write this message from Burkina Faso in Africa. But, by the miracle of the Internet, we can reach many more regions in the world. In fact, because of more effective means of communication and transportation, the number of our members going abroad for various academic reasons has certainly increased. This is an aspect that our association has not yet explored. However, several other societies have established chapters or sections for such activities such as the Ecological Society of America and the American Institute of Biological Sciences, to name a few. I am not suggesting that the CBA has to do the same, but we never

know in the long term. With more possibilities for researchers, this aspect might become quite interesting. Even the Natural Sciences and Engineering Research Council (NSERC) has initiated activities in this area with international grants and signature of memorandum of understanding with other countries such as Russia and China.

But back to the activities of the CBA. In the past months, the direction committee has been discussing the possibility of having regional awards in conferences at the undergraduate level in order to promote the association and its work. In the next issue, a suggestion will be made public for consideration and will be discussed at the next **Annual General Meeting at Saint Francis Xavier University**, Nova Scotia, in June 2003. We feel that it is time for the CBA to be present in other levels in order to ensure the involvement of students in this association. This is important if we want to maintain our membership. Another action that was mentioned in the previous issue is the sponsorship of students. I would like to thank some of us who have responded positively to this message. We are now looking at ways to improve sponsorship, possibly on the renewal forms.

It is also time to start advertising the next CBA annual meeting. The information will be coming very soon with call for abstracts and registration. This meeting is particularly interesting that it will be a joint meeting with the Canadian Society of Plant Physiology (CSPP) and the first meeting of **Plant Canada**. As you remember, this venue was agreed two years ago and has brought attention of other societies. In the future, Plant Canada meetings will bring together several plant associations in Canada and can become in the long term a strong voice for all of us. In addition, this year's annual meeting will be hosting another important event, the **10th New Phytologist Symposium**. This is a special event sponsored and jointly organised by the New Phytologist Foundation (and well known international journal) in honor of the contribution of Verne Grant. This symposium called "**Plant Speciation**" (under the organisation of Loren Rieseberg) will bring together several renowned names including Les Gottlieb, Caroline Saintagne, Don Levin, Tom Givnish, Doug Soltis, Barbara Schaal, Jeannette Whitton, Brian Husband, etc. This should be a great interest and bring great discussions. This meeting should cover many interests since other symposia, contributed papers and poster sessions will be completing the agenda. This meeting promises to be an eventful gathering that I hope most of you will be contributing to as speakers or attendees. We particularly hope again that students, graduate and undergraduate, will be part of these events. So, please, mark your calendar for this meeting, further information will be coming soon.

Liette Vasseur, CBA President

The Scientific Publications of Dexter Reid Sampson

As announced in the short biography published in the preceding issue of the Bulletin, here is that list. It was prepared by the Sampson family.

Les publications scientifiques de Dexter Reid Sampson

La liste suivante fait suite à la note biographique publiée dans le numéro précédent. Elle a été fournie par sa succession.

Nass, H. G., Franck, P., Teich, A. H., Sampson, D. R., Blatt, C. R., Caldwell, C., Walton, R. B., and Johnston, H. W. 1993. 'Fundulea' hard red winter wheat. Can. J. Plant Sci. **73**: 199-201.

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Teich, A. H., Sampson, D. R., Shugar, L., Smid, A., and Curnoe, W. E. 1987. Yield, quality and disease response on soft white winter wheat cultivars in nitrogen fertilization in Ontario, Canada. Cereal Research Communications **15**: 265-272.

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Sampson, D. R., Flynn, D. W., and Jui, P. 1983. Genetic studies on kernel hardness in wheat using grinding time and near infrared reflectance spectroscopy. Can. J. Plant Sci. **63**: 825-832.

Sampson, D. R. 1983. Extra hard kernels associated with semidwarfness. Proceedings of the Sixth International Wheat Genetics Symposium, Kyoto University, pp. 1073-1076.

Sampson, D. R., Flynn, D. W., and Jui, P. Y. 1983. Inheritance of kernel protein content in five spring wheat crosses [*Triticum aestivum*]. Can. J. Genet. Cytol. **25**: 398-402.

Sampson, D. R. 1982. Lack of correlation between kernel hardness and protein content in a winter wheat progeny *Triticum aestivum*. Can. J. Plant Sci. **62**: 797-799.

Sampson, D. R. and Nass, H. G. 1982. 'Valor', a winter feed wheat for the Maritimes. Can. J. Plant Sci. **62**: 505-507.

Sampson, D. R. and Fulcher, R. G. 1981. 'Gordon' soft white winter wheat. Can. J. Plant Sci. **61**: 455-457.

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Sampson, D. R. and Tarumoto, I. 1976. Genetic variances in an eight parent half diallel of oats. Can. J. Genet. Cytol. **18**: 419-427.

Sampson, D. R. 1976. Choosing the best parents for a breeding program from among eight oat cultivars crossed in diallel. Can. J. Plant Sci. **56**: 263-274.

More on *Phragmites* - Native and Introduced Races

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- “What is that huge grass growing along highway ... ? There was none there a few years ago and now there is tons of it.”
- “Is the Ministry of Transportation & Communication planting *Phragmites* on roadsides?”
- “Is Bamboo spreading in southeastern Canada?”
- “Is there an introduced race of *Phragmites* in Canada?”

These are just some of the questions that have come to the AAFC herbarium and the Eastern Ontario Biodiversity Museum (EOBM) over the past few years concerning the grass known as Common Reed (*Phragmites australis* (Cav.) Trin. ex Steud., formerly *P.*

communis Trin.). This plant was featured in the bulletin series “Poorly known economic plants of Canada (no. 29 in CBA/ABC Bulletin 34(2): 21-26. May 2001). In that article reference was made to possible “invasive biotypes” which pose a threat to irrigation systems and natural habitats. At the time that the article was written there was little information on the occurrence of invasive biotypes in Canada but now the races are better understood and information is readily available (see www.invasiveplants.net). An urgent need for a synthesis of information on common reed led to a international symposium hosted by the New Jersey Marine Sciences Consortium in January 2002. A special issue of “Estuaries” featuring the talks at this conference is in production.

History

In the late 20th century monocultures of *P. australis* began to replace mixed wetland plant communities in parts of the United States (Blossey 2002). Invasive characteristics were attributed to the introduction of one or more aggressive European genotypes. Recently native and introduced lineages (races) within *P. australis* have been identified using chloroplast DNA (Saltonstall 2002a). Eleven native North American chloroplast strains share five mutations and are quite distinct from those from other continents (though a mostly-South American strain occupies the Gulf coast and Florida). Common reed was rare on the east coast in the 19th century, but it increased continuously during the 20th century, as the strain that originated in Europe spread steadily from mid-Atlantic ports. The invasive strain is now found almost across the continent and has replaced native genotypes in almost all of the New England states. Neither the reproductive relationships between the races nor their taxonomic status had been sufficiently studied but there is good evidence now that native and introduced genotypes do not hybridize (Saltonstall 2002b). While this may be a surprise, the different flowering phenologies of native and introduced genotypes growing in the same area probably leads to reproductive isolation.

During the 1980's and 1990's Canadian field biologists noticed common reed in more places and in greater abundances than in the 1970's. In a distributional study, Haber (1999, <http://infoweb.magi.com/~ehaber/Reedmap.html>) reported a recent proliferation of the



A single years growth of the introduced race of Common Reed towers above University of Ottawa student Lisa Robichaud at a site in eastern Ontario.

plant in southeastern Ontario. Schueler (2000a, 2002) noted major recent increases around the Great Lakes in Ontario and also east and south of Ottawa, around Montreal and eastward along the St Lawrence valley.

Recognition

Morphological characteristics by which the races can be separated would help a great deal in documenting invasion and evaluating control. Reliable morphological characteristics need to be based on an extensive sample. A number of characters have been recommended (e.g. Blossey 2002) based on field studies and material gathered across much of the temperate United States and Canada (SC, NC, VA, MD, DE, NJ, PA, NY, VT, NH, CT, RI, MA, Ontario, MI, IN, IL, MN, NE, CO, AZ, CA, OR, WA, and British Columbia).

The best characters appear to be the following:

- 1a. Leaf sheaths loose by August with most of them dropping off the plant in late fall. Stems (not the sheaths) at base of plants red or reddish-purple (where exposed) in summer and fall and developing high gloss **native race**
- 1b. Leaf sheaths wrapped tightly around the stem with only a few basal sheaths falling off in the fall. Stems (not the sheaths) at base of plants tan-brown, yellow, or less often reddish-brown (where exposed) in summer and fall and stems dull without gloss **introduced race**

There are numerous other qualitative characters associated with the stem color character. The stems of the native race are more flexible and more easily crushed between the thumb and forefinger. A feature of the putative introduced race that strongly supports its status as an introduction is the fact that it remains green well into October unlike the native races which have yellowed by that time. Many other plants of European origin remain green later in the fall than native species. The introduced race also produces larger inflorescences with smaller flowers which are in peak later. Plants of the introduced race are also generally taller. For other differences see <http://www.invasiveplants.net>

An eastern Ontario survey

During a survey in eastern Ontario aimed at investigating floral and fruit characteristics of the two races, Catling & Robichaud were surprised to find out how well the qualitative stem colour character seemed to work. Almost 100 patches examined along Hwy 417 between Ottawa and Vankleek Hill were clearly the introduced race. In some places patches occurred at least once every km, and there were few places where there were no patches for up to 10 km. Patches varied from a few m² to half a km long and 10 m wide. Ten years ago there were only a few patches of giant reed along Hwy 417. It appears that

the introduced race has only become frequent on the landscape over the past 20 years. If the trend of increase continues, Hwy 417 may be lined with the introduced race of common reed within a few decades. It is already nearly continuous along some highways through Montreal and Syracuse, New York. The patches are less frequent along smaller roads but again it was uncommon to drive 10-15 km along any major road in eastern Ontario without seeing a patch, and the introduced race is also present along many gravel roads. The first native patch we noticed was 100 m from a road along a creek through a marsh. Later we found several patches of the native race along eastern Ontario roadsides, in some cases near patches of the introduced race, but the differences as outlined above were generally pronounced. Patches of the introduced race far outnumbered patches of the native race (see below).

Native race in natural habitats

If the introduced race has only recently spread into the province along roads, then most older collections would represent habitats of the native race. Older collections are from fens, marshes (in water to 1 m deep), rivershores, bogs and swamps. Ten populations in and near to natural nutrient-poor fens, bogs and rivershores were all referable to the native race. In eastern Ontario we have seen almost 400 patches of the putative introduced race and 20 patches of the native race. Specimens collected during our survey have been deposited in the AAFC herbarium (DAO), and many have also been identified at Cornell University.

A trans-Canada survey

Schueler's surveys of roadside *Phragmites* (2000b, 2002), now totalling more than 80 surveys, along >10⁵ km, and >3500 stands, have mostly documented abundance, but he has also noted regional differences in morphology. Proceeding from east to west, no roadside stands were seen in Prince Edward Island, and few in New Brunswick, where extensive tidal marshes along the east coast are free of the species. The frequency of roadside stands increases up both shores of the St. Lawrence to Montreal, where nearly continuous stands extend along some roadsides and into forest edges. This density tapers off into eastern Ontario, and the species is frequent but not dominant around Toronto. It is relatively scarce in most of central southern Ontario, though more abundant in southwestern Ontario. There are scattered stands and areas of abundance across northern Ontario, increasing to widespread abundance in southern Manitoba. No roadside stands were seen in Alberta and very few in southern Saskatchewan and interior British Columbia. Morphologically distinctive forms noticed at highway speeds (and documented by scattered collections in the EOBM(CCO) herbarium) include the open-stand, reddish-stemmed form seen in natural habitats in Eastern Ontario, a tall form with broad leaves, large, lax heads, and early autumnal senescence (first

noted at Hwy 17/Muskrat River, west of Cobden, Renfrew Co, Ontario, but also seen in the Delta Marshes, Lake Winnipeg, Manitoba), and an open-stand form with broad leaves held in a pinnate array, sparse-headed and turning bright orange-yellow in the fall, seen along the highways of western Ontario. More collections are needed from across the country to allow study of the distribution and variation of these natives, as well as documenting the spread of the invasive strain.

A story in old specimens

Of the Ontario material in the AAFC herbarium collection (DAO) in Ottawa there are 59 specimens adequate for determination using the stem color character. This character is not as easily evaluated in some herbarium specimens as in living material and the following results should be considered tentative. Nine were evaluated as introduced and 50 were evaluated as native. Three specimens collected prior to 1900 are all referable to the native race (100% native). Seventeen of 18 collected between 1901 and 1950 are native (94.4 % native). Thirty of thirty-nine collected after 1950 are native (76.9 % native). Based on the 2002 survey we estimate that less than 10% of the hundreds of patches on the landscape of eastern Ontario are referable to the native race. The decreasing proportion of native plants appears to be due to both an increase in the introduced race and loss of native populations. Based on the old collections a similar pattern appears to exist in other Canadian provinces, the older material being largely or entirely referable to the native race. Examination of additional herbarium material and more extensive field survey will help to clarify this situation.

Impacts

The introduced race may displace the native race over large areas of North America and result in declining biodiversity in fens and other unusual wetlands (e.g. Marks et al. 1994). Native stands of common reed may already be declining as a result of stabilization of water levels (Shay et al. 1999). The aggressive invading race has taken over US coastal marshes with impressive rapidity and has been subjected to fire, herbicide, plow, mulcher, and pest, sometimes with limited effect. It grows taller, has more persistent dead stems that exclude more light and has higher stem and rhizome densities often forming a dense, dark monoculture where no other vascular plant species are present. A search for biocontrol agents has already begun (Tewksbury et al. 2002). Although the recently arrived alien race may have outdistanced some of its natural enemies, some may have come with it and may also be spreading (e.g. Mikkola and Lafontaine 1994).

The native race is not a biodiversity protection problem. As noted in New York State (Blossey 2002), the native race in eastern Ontario tends to have a lower stem and rhizome density and forms more open patches that

accommodate many other native species including some that are rare and endangered.

The occurrence of native and introduced races in Canada is not only of importance in management for protection of native biodiversity, it is also relevant to the potential development of the plant as a crop. Common reed has been largely ignored as a significant source of food, fuel and industrial materials (Small & Catling 2001). The increased productivity of introduced races, that are already established and common in parts of Canada, offers commercial opportunities. Material from Europe has been imported to the eastern US for thatch roofs, but the recently developed abundance of the European plant in eastern coastal marshes makes this expensive importation unnecessary.

Morphological characters that can be used to distinguish the races are important to agriculture, biodiversity protection and landscape management. Work in eastern Ontario has strongly supported the distinctive characters already identified.

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Tewksbury, L.T., R.A. Casagrande, B. Blossey, M. Schwarzaender and P. Haeffliger. 2002. Potential for biological control of *Phragmites australis* in North America. *Biological Control* **23**: 191-212.

Le nouveau LUDOVICIANA

Le texte suivant présente les nouvelles orientations de cette revue de botanique publiée par l'Herbier Louis-Marie, Université Laval, Québec. Il a paru dans *Ludoviciana* **29**: 1, 2000.

En décembre 1966, le département d'Agrobiologie de la faculté d'Agriculture de l'Université Laval présentait au monde scientifique la série LUDOVICIANA qui venait d'être créée à l'initiative du botaniste Bernard Boivin (1916-1985) et de Lionel Cinq-Mars (1919-1973), conservateur de l'Herbier Louis-Marie. LUDOVICIANA rappelait le nom du fondateur de l'Herbier, le Père Louis-Marie o.c.s.o. (Louis Lalonde, 1896-1978). Cette nouvelle série faisait suite aux Contributions de l'Institut d'Oka qui avaient succédé aux Contributions du Laboratoire de Botanique, Institut Agricole d'Oka.

À ce jour, 28 numéros de LUDOVICIANA ont paru. Tous ces numéros étaient cependant constitués d'articles qui avaient déjà été publiés dans *Le Naturaliste canadien*, rarement ailleurs. Le contenu de la série LUDOVICIANA n'avait donc jusqu'à maintenant rien d'inédit.

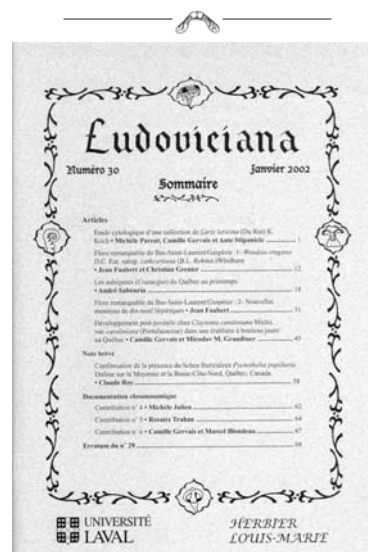
Avec le présent numéro, le contenu de la série LUDOVICIANA est radicalement transformé. Il n'est en effet constitué que de résultats inédits de travaux botaniques. La publication dans les pages de LUDOVICIANA d'extraits de travaux déjà parus est donc abandonnée. Chaque numéro comportera désormais des travaux botaniques présentés sous forme d'articles ou de notes. Enfin, la rubrique "Documentation chromosomique" réunira des résultats de comptages chromosomiques et des notes cytotauxonomiques.

La périodicité de la parution des futurs numéros de LUDOVICIANA demeure irrégulière. Elle sera fonction du volume de travaux soumis pour publication. Par cette modification radicale de son contenu, nous souhaitons ardemment que LUDOVICIANA devienne le véhicule privilégié de la communauté des botanistes du

Québec, toutes catégories confondues. Les pages sont en effet ouvertes à tous les botanistes, qu'ils soient professionnels, autodidactes, amateurs confirmés ou débutants. De plus, afin de refléter la diversité culturelle du Québec, nos collègues botanistes de langue anglaise sont invités à soumettre leurs travaux dans leur langue.

Résolument orienté vers la systématique, la floristique et la phytogéographie de tous les groupes de végétaux et des champignons, LUDOVICIANA accueillera avec enthousiasme tous les travaux, petits et grands, dans ces vastes domaines. Point n'est besoin de réaliser des découvertes étonnantes pour se décider à publier. Que chacun se souvienne que l'édifice des connaissances se construit petit à petit et qu'en conséquence, toutes contribution, si minime soit-elle, participe à l'élaboration du savoir.

Robert Gauthier, rédacteur de LUDOVICIANA



Poorly Known Economic Plants of Canada - 36.

Hog Peanut (Talet Bean), *Amphicarpaea bracteata* (L.) Fernald

E. Small and P.M. Catling

National Environmental Program, Biodiversity Section
Agriculture and Agri-Food Canada
Saunders Bldg., Central Experimental Farm, Ottawa ON K1A 0C6

Latin Name

The genus name *Amphicarpaea* is based on the Greek 'amphi', both + 'karpos', fruit, an allusion to the plant producing two kinds of fruit, one type above-ground and the other subterranean. The genus name has been spelled *Amphicarpa* in most older literature. Adding *ae* to produce the awkward spelling *Amphicarpaea* is the result of a decision to conserve the latter name that was made mandatory by the 1956 International Code of Botanical Nomenclature. There are two genera in the grass family with similar names: *Amphicarpon* and *Amphicarpum*. In the scientific name, *bracteata* refers to the bracts at the base of the flowers.

English Names

"Peanut" in the name hog peanut is for the peanut-like appearance of the seeds, and the peanut-like characteristic of producing seeds underground. The "hog" in the name is based on the observation that hogs allowed to roam in woods often rooted up the nuts. The species is also known as American hog peanut, ground peanut, hog pea, hog peanut vine, hog vine, and (wild) ground-bean. The name Southern hog peanut has been employed in Texas. The names pea vine, American licorice, wild bean, wild licorice, and wild peanut have also been used, but are inappropriate as they are best employed for other species. The name Dakota pea is based on frequent collecting of the hog peanut by Dakota Indians of the Missouri Valley. The Mexican plants are called talet bean, from the Nahuatl language *talli*, tall + *et*, bean. Hog peanut should not be confused with "pignut," a name applied to five different species of trees in the genus *Carya*. The Bambarra groundnut, *Vigna subterranea* (L.) Verdc., is also sometimes called hog peanut. The hog peanut is sometimes confused with the groundnut, *Apios americana* (reviewed in #24 in this series of articles), which differs in its pinnate leaves with 5–7 (instead of 3) leaflets.

French Name

Amphicarpe bractéolée

Morphology

Hog peanut is an annual, twining, slender, herbaceous vine, with delicate, thread-like, weak stems growing from 30–200 cm in length, trailing on the ground or climbing over shrubs. The plant is generally branched at the base, with a slender taproot. (The underground single-seeded pods, described below, are erroneously called "fleshy roots" or "tubers" in some texts which refer to the roots

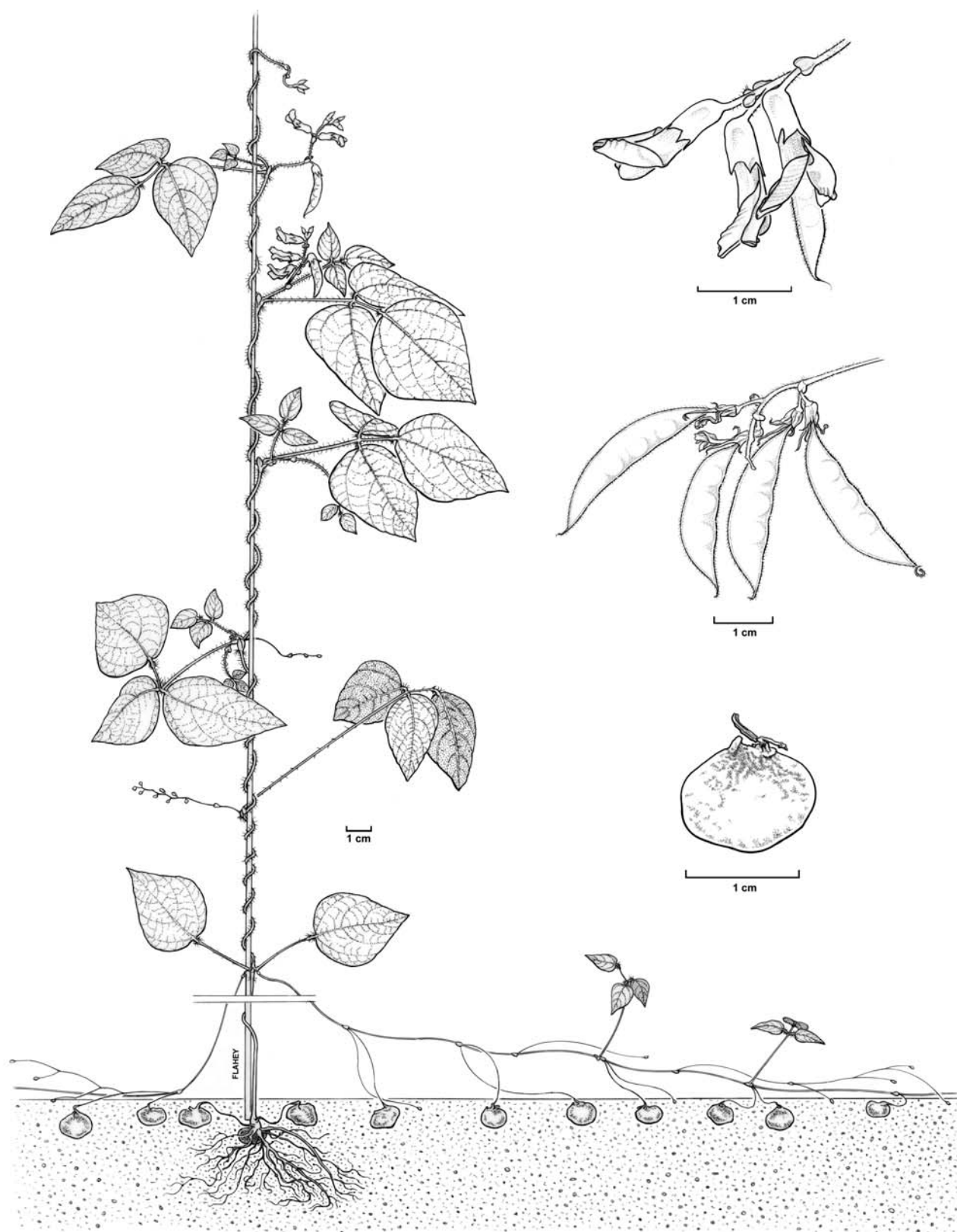
being collected and eaten when in fact it is the underground seeds that are consumed.) The leaves are alternate, and made up of three leaflets, which are 1.3–10 cm long. The leaves have been mistaken for poison ivy, which they resemble. Both the leaves and stems tend to be hairy. Poison ivy leaflets are glossy and have more than five primary lateral veins, unlike hog peanut, which has relatively dull leaves and fewer lateral veins.

The reproductive system of hog peanut is complicated. The plant produces outcrossing (chasmogamous) flowers with prominent petals, as well as self-pollinating (cleistogamous) flowers which are much smaller, apparently lack a perianth (in fact rudimentary petals are present), and are permanently closed. Seeds that are produced aerially (above ground) are always harder and much smaller than those that are produced underground. Estimates of weight have indicated that the subterranean seeds are 15–30 times heavier than the aerial seeds, but contain about 50% water, much more than the aerial type. The underground pods (or "nuts" as they are commonly called) of hog peanut are typically 6–12 mm in diameter, and contain one edible, fleshy, succulent seed resembling a peanut, although the size and shape of these differs considerably on the same plant. The pod wall is stretched over the seed, and gives it a brownish to purplish-brown appearance. When the pod is removed, the remaining seed has a white, pale blue or purple skin, which loosens on cooking, leaving a cream-coloured seed. These edible seeds are often abundant, frequently positioned just under the surface of the ground, and they can easily be gathered.

There are essentially four combinations of floral types and seed types:

Class 1: Self-pollinating flowers that originate from underground portions of the plant + underground pods with single, large seeds. A small number of such pods are usually produced, from the axils of the underground cotyledons (generally within 2 cm), and at the tips of small branches of the fibrous roots.

Class 2: Self-pollinating flowers that originate from aerial shoots which grow into the ground + underground pods with single, large seeds. Runners, sometimes branched at the nodes, are produced from the axils of the lowest pair of leaves, which are simple, not trifoliate. At the nodes of these runners (or at the nodes of the branches of the runners), very thin shoots develop (singly or in



pairs) and penetrate the ground and, if conditions are suitable, a tiny closed flower develops at the tip and matures into a single-seeded pod. By contrast, the true peanut (*Arachis hypogaea* L.) first produces aerial flowers; these self-fertilize, and the stalk at the base of these fertilized flowers develops into a thread-like stalk which pushes the flower underground where they mature into pods.

Class 3: Self-pollinating aerial flowers + aerial pods with 1–several relatively small seeds. The flowers in this case tend to occur singly or in pairs, in contrast to the flowers of class 4, which are in racemes.

Class 4: Outcrossing aerial flowers + aerial pods with 1–several relatively small seeds. In the axils of the upper leaves, the plant produces drooping, clusters (few- to 17-flowered) of pea-like, whitish or lilac flowers, each about 1.3 cm long, which mature into small, flattened, thin-walled, bean-like, somewhat curved pods 1.5–4 cm long containing 1–5 small, hard seeds. The pods and seeds are similar to those of class 3 (but a bract more often subtends the pod in class 4). Pods produced by outcrossing tend to be higher up on the plant than pods produced by inbreeding. Plants appear to produce either class 3 or class 4 flowers and pods, not both.

Classification and Geography

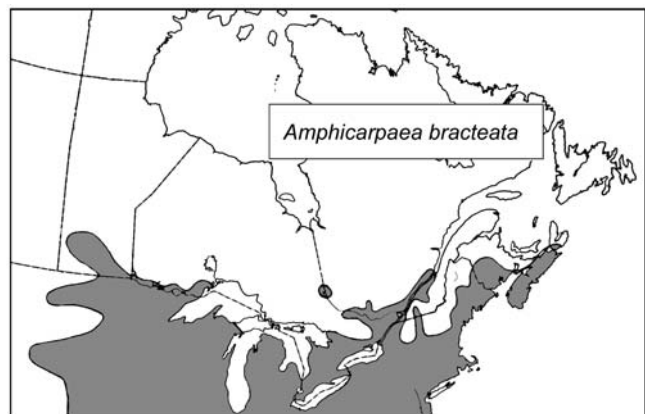
Amphicarpaea bracteata is native from Quebec to Manitoba and Montana in the north, and south to Texas, Louisiana and Florida. Also it occurs in the Mexican states of Veracruz and Puebla. Some plants native to Asia, from the Himalayas of India through China and Korea to Japan, are so similar that some authorities have included them in *A. bracteata* as subsp. *edgeworthii* (Benth.) Ohashi, although others separate them as the species *A. edgeworthii* Benth. There is one more species of *Amphicarpaea*, the perennial herb *A. africana* (Hook. f.) Harms, which occurs in the cool mountains of central Africa.

In North America, some taxonomists have recognized two varieties of *A. bracteata*. *A. bracteata* var. *bracteata* has been characterized as more common in the eastern portion of the range, and having more slender leaves and stems with sparse, pale pubescence. *A. bracteata* var. *comosa* (L.) Fern. ("Pitcher's hog peanut") is said to be more common in central North America, and distinguishable by thicker leaves and stems covered with coarse, dense, often tawny pubescence. *A. bracteata* var. *comosa* appears to prefer sunnier sites. Isozyme studies have indicated that there are indeed two distinctive lineages, with marked intersterility between them despite considerable sympatry, but these groupings did not correspond perfectly with the traditional separation of varieties *bracteata* and *comosa*. Some taxonomists have described additional species on the basis of cleistogamous flowers — a characteristic that exists within individuals of a population. *Amphicarpaea*

chamaecaulis Boivin & Raym., from Île d'Orléans near Quebec City, is evidently based on cleistogamous flowers and has thus been considered unworthy of recognition.

Ecology

Hog peanut tends to be found along shoreline and alluvial habitats in disturbed sites, and usually not far from rivers and streams. The soils occupied are generally well drained, sandy, and typically alluvial. The plants occupy cool, moist, shaded deciduous woodlands, the edges of forests, damp, sunny meadows, and prairie bottomlands. Although not considered a weed, in some areas hog peanut grows aggressively. A variety of wild animals, including bear, chipmunk, deer, grouse, mice,



Pheasant, prairie chicken, quail, and wild turkey consume both the aerial and subterranean seeds. Development of cross-pollinated (chasmogamous) flowers and seeds is much more evident in sunnier locations, and on the higher portions of the vines that are well exposed to sunlight. Outcrossing flowers are pollinated by bees, particularly bumblebees. The plants often lack cross-pollinated flowers, and reproduce by seeds from self-pollinated flowers — both aerial and underground. The persistence of such plants in a particular location has sometimes resulted in the mistaken impression that the species is a perennial. The aerial fruits have an explosive dehiscence, the rapidly unfolding pod catapulting the seeds up to 4 m from the parent plant. The seeds from outcrossing flowers, which are produced higher on the stem, are projected further.

Why Are Plants Amphicarpic?

"Amphicarpic," is usually used to describe the phenomenon of producing more than one kind of fruit. Generally, this refers to fruit produced both above and below ground, and frequently is associated with different kinds of flowers and seeds. [In some cases, amphicarpic species produce one kind of fruit well above ground level, and another on or near, but not under the ground.] Only about three dozen species in the world are known

to be amphicarpic, mostly in the Fabaceae and Poaceae, but also in nine other families (Asteraceae, Balsaminaceae, Brassicaceae, Commelinaceae, Cyperaceae, Polygalaceae, Polygonaceae, Scrophulariaceae, and Urticaceae). Most of these occur in dry habitats, in well drained soils, and most amphicarpic species are annuals. Hog peanut is one of the few amphicarpic Canadian plants, and is strictly amphicarpic. Some species are facultatively amphicarpic, i.e. they produce geocarpic fruits only under certain circumstances.

Amphicarpy contributes to a flexible strategy that has survival value in unpredictable environments. Below-ground seeds can be advantageous in several respects: (1) compared to above-ground seeds, they are safer from predators, catastrophes such as fire, and from extremes of microclimate; (2) since they are produced near the maternal plant, they are likely in a suitable habitat; (3) they are normally larger, giving them the competitive benefits of greater stored energy. Above-ground seeds have the advantages of: (1) greater potential for dispersal; (2) availability of pollinators, and the genetic benefits of outcrossing. The aerially distributed seeds serve to rapidly spread the plant to new areas. The subterranean seeds serve as a guarantee that once the plant reaches a new area, it will survive there even under harsh conditions that limit production of aerial seeds.

An interesting aspect of amphicarpy in hog peanut is an alternation of selfing and outcrossing. The relatively small aerial seed, distributed to a new habitat, is able at best only to produce a small plant. Although too small to reach the size necessary to produce outcrossing flowers, it can produce seeds through selfing flowers. The offspring from the large underground seeds that are produced from the initial colonization can grow to a larger size and produce outcrossing flowers.

Use as Food

Hog peanut produces very nutritious underground seeds which were once a valuable food for Native Americans, especially in the Missouri Valley. They employed the beans (i.e. seeds) in various ways, cooking them separately or with cornmeal, and to make bean bread. Early explorers also used hog peanuts as food. Although a wild plant, hog peanut is said to have once been cultivated in the southern US for its underground nuts, and in the 19th century the species was grown in Scotland. In Mexico today, some Indian groups (Nahuas, Totonics, and Mestizos) allow hog peanut to grow as a weed in corn fields and while cultivating the soil they collect the underground beans. Typically in Mexico the seeds are roasted and consumed as a snack or with the daily meal. The geocarpic seeds harvested for food in Mexico are similar in chemical composition to other food legumes. The hog peanut underground seeds resemble shelled garden beans, but are rather dry. When raw, the

“bean” is sweet, pleasant-tasting, with a somewhat nutty flavor, not a “raw-bean” taste. Raw hog peanuts taste much better than raw peanuts. The leathery “skin” or shell of the one-seeded pod cracks off during boiling. On cooking, the beans tend to disintegrate into a purée, and so are suitable for soups, stews, and casserole dishes. Dried beans shrink and become somewhat harder than peanuts, although not as hard as dry beans or peas. They can be ground into flour. The small, hard, seeds produced in the multi-seeded aerial pods are also nutritious and have sometimes been consumed by Native Americans, usually boiled (but see information in Toxicity). They have been compared to soybeans in flavor.

Toxicity

As with a number of other edible legumes, antinutritional factors are present in the seeds. These include trypsin inhibitors (the subterranean seeds have similar levels to soybean), but fairly low content of hemagglutinin (lectin). These chemicals are thought to be destroyed during cooking, and are therefore not of concern, unless large quantities of raw seeds are consumed. Like other members of the bean family, hog peanuts can produce intestinal gas. It is often stated that the seeds from the fruits produced above ground should not be eaten.

Non-Food Uses

Native Americans used the hog peanut for a variety of medicinal purposes. The Cherokee Indians applied boiled tea of the underground parts of hog peanut to snake bites, and also used the tea to treat diarrhea. The Iroquois also used it to treat digestive problems, as well as tuberculosis. The Chippewa employed a similar preparation in combination with other species as a laxative. The Houma drank a boiled preparation of the leaves and stems, together with hackberry and powdered oyster shells, to treat venereal disease.

Agricultural and Commercial Aspects

Hog peanut is a wild plant, that has not been marketed as a food plant, and its “peanuts” are obtainable only from wild-growing plants. Several early explorers and botanists expressed the view that the plant should be developed as a vegetable. Although it is possible to grow hog peanuts, the yield is low and picking the small, underground beans is tedious. Keeping weeds down is very difficult because the plant is a vine, and naturally grows around any nearby stems. The pods can’t be harvested by pulling up the whole plant, as one does with peanut, because the stalks are so slender that they break. Moreover, the fruits are dark in color, and difficult to see in the soil. These problems can be overcome. The late Canadian botanist W.G. Dore experimented with growing the plants in a sandy soil, and succeeded in harvesting 1 kg of seed per 10 m row from seeds planted 10 cm apart in sterilized sandy loam. The seeds can be

separated out relatively easily with a 6 mm screen.

It has also been suggested that hog peanut is potentially useful as a soil cover and for erosion control. There are indications in the literature that hog peanut was cultivated in the southern US as forage, but there is no evidence that it was ever significant as a crop. Hog peanut certainly has potential as a forage legume, which could enrich the soil by its heavily nodulated roots. Hog peanut also has horticultural potential as a ground cover, since the foliage forms a dense cover and the plants remain quite low when they do not have objects to grow on.

“They would rather spend time in trying to coax something to grow that is foreign to the climate than develop what nature has already acclimated.”

—Melvin R. Gilmore (1868–1940, noted American ethnobotanist), when asked why agricultural schools have not tried to develop the hog peanut.

Cultivars & Germplasm

No cultivars of hog peanut have been selected. The plant has a very wide distribution — Mexico to Canada, and there appears to be considerable intraspecific variation, so the wild plants constitute a very large genetic range of germplasm. The earliest recorded collection of Canadian germplasm was in 1834 when biologist-explorer James McNab collected seeds at an Indian camp at the mouth of the Maitland River on Lake Huron. The seeds were planted at the Royal Botanic Garden, Edinburgh. Hog peanut germplasm is not only potentially useful for developing the species into a crop, it also has potential for improving the soybean, which has no closer relative in North America.

Prospects

Hog peanut grows prolifically under some circumstances, one of the basic characteristics of crop plants. As a legume, it is adapted through its symbiotic nitrogen-fixing bacterial partner to grow well in nitrogen-deficient soils, which make it a good choice for sandy soils. Coincidentally, sandy soils offer the best prospect of harvesting the edible fruits, although technology for this remains to be devised. Tobacco farming on sandy soils in eastern Canada requires replacement crops, and it would therefore be of interest to study the potential of hog peanut for this purpose. Because hog peanut is a vine, it makes sense to intercrop it with another plant on which it can climb, and which could benefit from the added soil nitrogen. Intercropping with corn and ginseng has been suggested. However, a breeding program probably would focus on the creation of a compact type of plant which concentrates its underground seeds in a small area, to facilitate harvesting. While the yield is low and the seeds would have to be marketed at a premium

price, it is possible that specialty health food stores would be interested in stocking this most unusual bean. The seeds are easy to prepare, pleasant in flavor, and make an excellent snack. However, the unattractive name “hog peanut” is obviously unsuitable for marketing purposes. Talet bean, the name in Mexico, seems exotic and is therefore preferable. Although having 1/20th the yield of the similar peanut, talet bean may at least increase in regional importance, as other species with edible subterranean seeds and tubers already have. It has been recommended for development as a protein supplement in Mexico.

Myths, Legends, Tales, Folklore, And Interesting Facts

Voles and field mice gather large quantities of the underground seeds, and their nests often contain several litres of them. Midwestern American Indian tribes such as the Ojibway, Omaha, Pawnee and Sioux, and eastern tribes such as the Delaware collected hog peanut seeds from the stores of mice, rats, moles, and ground squirrels. The Dakota typically replaced such “stolen” beans with an equal amount of corn or other food for the rodents. In modern times, it has been suggested that an army of trained mice could be used to harvest the crop.

The Dakota Indians have a popular moral tale about hog peanuts. A woman plundered the peanut storehouse of a mouse, without leaving anything in return. That night, she had a vision of herself crying in despair that her children were starving, and in a dream a spirit reminded her of the obligation to go back to where she had taken the beans and leave something in return. But the woman ignored the messages. Shortly after, a great prairie fire consumed her village and the surrounding area, leaving everyone to wander destitute on the prairie, the children crying from hunger.

The pea family contains a number of species that produce their seeds underground, where they are safe from animals that consume above-ground parts of plants. In addition to the peanut (which see), the most important of these species are the Bambarra groundnut (noted above) and the “groundbean,” *Macrotyloma geocarpum* (Harms) Maréchal & Baudet, both cultivated mainly in Africa.

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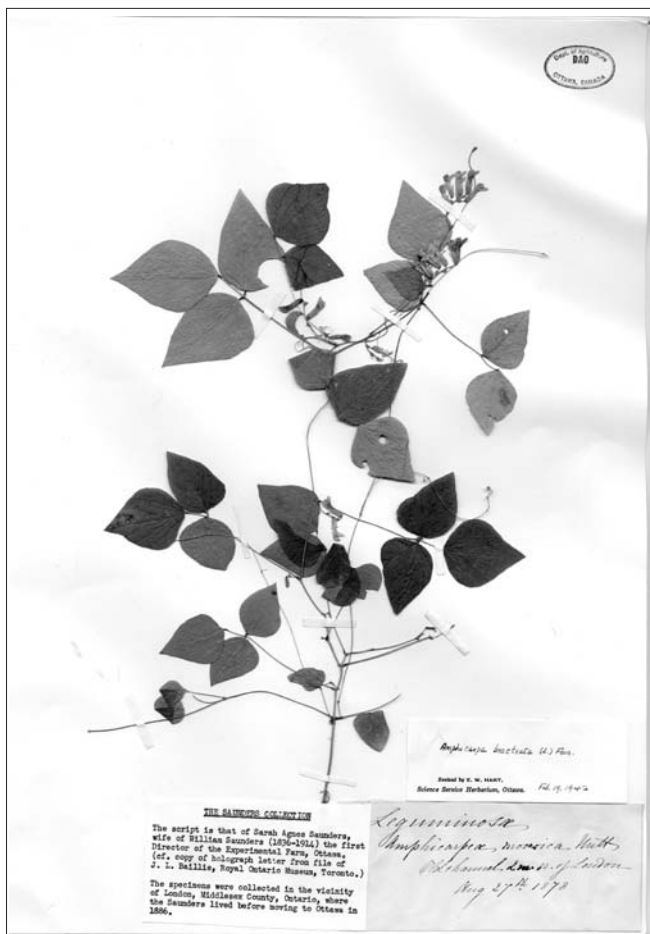
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Acknowledgments: W.J. Cody (review), B. Flahey (artwork), B. Brookes (map).



The script accompanying the pressed specimen of *Amphicarpa bracteata* shown on the left is that of Sarah Agnes Saunders. The plant was collected on 27 August 1878 in the "old channel" 2 miles north of London, Ontario. The specimen is one of a million in the DAO herbarium which is located in the Saunders Building on the exact site of the former Saunders family home in Ottawa.

Mrs. Saunders' family became distinguished for remarkable achievements, especially in the area of botany. They moved from London to Ottawa in 1886 when Sarah's husband, William Saunders became founding director of Agriculture Canada's Experimental Farms system.

The family is often called "the Marquis Wheat family" because in 1892, one of their sons, Sir Charles Edward Saunders, produced the Marquis Wheat which could be grown profitably in the prairie provinces. It vastly improved Canada's economy and fed millions. Marquis wheat constituted 90% of the wheat shipped by Canada to France in 1915 during the first world war. It has been described as "one of the world's greatest feats in crop breeding." Charles was 11 when his mother collected the specimen north of London.

[Additional information on the Saunders family: Pomeroy, E.M. 1956. William Saunders and his five sons, the story of the Marquis Wheat family. Ryerson Press, Toronto. 192 pp. Anstey, T.H. 1986. One hundred harvests: Research Branch, Agriculture Canada, 1886–1986. Agriculture Canada, Ottawa. 432 pp.]

THE SAUNDERS COLLECTION

The script is that of Sarah Agnes Saunders, wife of William Saunders (1836–1914) the first Director of the Experimental Farm, Ottawa. (cf. copy of holograph letter from file of J. L. Baillie, Royal Ontario Museum, Toronto.)

The specimens were collected in the vicinity of London, Middlesex County, Ontario, where the Saunders lived before moving to Ottawa in 1886.

Leguminosae
Amphicarpa monica Nutt.
 Old channel 2 m. n. of London
 Aug 27th 1878

Book Review

Revue de livre

The Ecology of Trees in the Tropical Rain Forest.

by I.M. Turner, 2001

Cambridge University Press, Cambridge, U.K., 312 p.

ISBN 0-521-80183-4 (hardback)

Price: £60.00, US\$80.00

Ian Turner asks whether the hundreds of tree species found in tropical rain forests lend themselves to a rational ecological classification. In addressing this question, he provides a good overview of many issues in basic tree biology, from the mechanics and hydraulics of tree height to the chemistry of secondary metabolites and the biology of mycorrhizae. He has tabulated numerous comparisons of the morphological and physiological attributes of trees from tropical Asia, Africa and the Americas, drawing upon more than 800 references. He has also referred to research from forests on tropical islands and montane rain forests, regions often omitted from reviews of tropical rain forests. While attempting to draw upon both the forestry and the ecological literature, the author laments the paucity of information on the growth and stand dynamics of mature trees, and rationalizes that the regeneration phase often constitutes an important determinant of rain forest ecology.

The Ecology of Trees in the Tropical Rain Forest revisits many of the classical questions in rain forest biology and plant ecology. For example, Turner reviews the various suggestions as to why many tropical trees have buttresses or stilt roots, but reports little progress in relating architectural models to ecological roles. He dispels the notion that tropical forests can necessarily grow more timber than temperate forests, for high night-time respiration rates (being proportional to temperature) can negate photosynthetic gains made during the day. The author reviews the evidence in support of the "predator satiation theory" of seed production, and the "escape hypothesis," the "colonization hypothesis" and the "directed dispersal hypothesis" as advantages for seed dispersal. He notes that figs (*Ficus* spp.) have by far the most effective long-distance dispersal of pollen, with breeding areas

of hundreds of km². But Turner also asserts that the one-to-one relationship needed for co-evolution of plants and pollinators or plants and seed dispersers is relatively rare, with figs and their wasp pollinators being the major exception. One-to-one dependence is a risky strategy so guilds of pollinators, guilds of seed dispersers, and guilds of pollination/dispersal syndromes are more prevalent. Noting such clustering of adaptive traits, Turner successfully returns to his original goal in most chapters, and proposes quantitative or subjective categories of species according to growth patterns, mortality behaviour and reproductive biology.

A number of interesting generalizations, brought to light by summary tables and standardized figures compiled by the author, are worthy of note. For example, Turner points out that the well known relationship between seed size and seed longevity (long-lived seeds generally being small) appears to be mediated by water content: large seeds tend to have greater water content and consequently respire more as well as being more susceptible to attack by animals and fungus. Contrary to expectations, large seeds typically do not deploy photosynthetic area more rapidly, and small seeds are capable of producing thin cotyledons of relatively large area. But there is widespread support for the notion that large seeds with greater seed reserves are generally better adapted than small seeds for penetrating deep litter layers and surviving in deep shade.

Turner notes that no tropical tree species has been found to be both abundant as a germinant and characterized by high levels of seedling survival. Seedlings in gaps can typically survive drought better than those in the forest understory, despite high transpirational loads, because faster growth and less severe

light limitation facilitates better root system development. Though he points out that shade-house experiments typically do not simulate spectral shifts found naturally in forest understories, the author also cites work which concludes that the quantity rather than the quality of photosynthetically active radiation has the main effect on the growth and morphology of seedlings. Turner presents some evidence that year to year variation in tree growth can be related to differences in annual irradiance due to cloudiness. He finds little evidence for niche partitioning among tree species in terms of adaptation to the light environment, except at the extremes of "pioneer shade-intolerants" and "climax shade-tolerants." He also reviews several definitions of shade tolerance, and concludes that some measurement of the ability to persist in deep shade (i.e., to survive, not necessarily grow well) is the best index.

The concluding chapter summarizes trends and attempts to combine previous information on morphology and physiology for purposes of functionally classifying tree species of the tropical rain forest. Turner concludes that there is a strong pioneer-climax axis to tropical rain forest species traits, and that this represents a combination of the r-k selection axis and a gradient of shade tolerance. He then asserts that height at maturity is the other primary axis for classifying tropical trees, though he provides little direct substantiation of its importance. Admitting that any categories along the pioneer-climax and tree height axes are arbitrary, Turner describes the following four strategies as the extremes which define most guilds and adaptive syndromes: (1) small pioneers – short, light requiring, fast growing; (2) large pioneers – tall, light requiring, fast growing, potentially gap-making; (3) understory – short, shade tolerant,

slow growing, not gap-making; and (4) canopy – tall, slow growing, producing gaps but not requiring them. Turner ends the book with a bit of undue modesty, asserting that he was unable to provide a new synthesis to the classification of tropical rain forest trees. But I get the feeling he is on the right track. His exploration of the pioneer-climax continuum is well documented, though the importance of tree height is less well explored, and existence of syndromes for dealing with extremes of soil fertility and soil moisture were barely touched. The relationship of pollinator and dispersal guilds with the proposed functional classification system has also

remained undeveloped. Yet Turner's identification of these trait clusters and the proposal that they can be combined and cross-tabulated is an important contribution to ecology and botany, and makes for a very readable and well structured review of tree biology.

Organized in only six chapters, my primary complaint regarding this book is that the individual chapters are too long and should have been split up. Chapter 2 (88 pages, more than one-third of the entire text) especially could have been divided into separate chapters on tree architecture and morphology, root biology, plant

defences, and leaf form and physiology. This hardcover book is well bound and scrupulously free of typographical or other errors, though the price is rather steep for such a thin volume. The comprehensive review and inquisitive nature of the book makes it well suited for use as a dendrology textbook at most tropical forestry schools. I also recommend it to all botanists working in the fields of forest ecology and tree physiology, not just in the tropics.

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Publications - Dexter Reid Sampson (continued from page 3) (suite de la page 3)

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News from Teaching Section

Prepared by Christine Maxwell

Christine Maxwell and Sylvie Laliberté are pleased to announce that the long promised web page of teaching resources is now available on the CBA/ABC website.

We have produced this page as a resource for teachers of botany at all levels from elementary school to university. We hope that the site will be particularly helpful to those who are about to start a career in teaching.

We have divided the information into a number of sections.

1. Image sites, which is organized by plant group and includes a small review of each site.
2. How to do it, a section covering some practical aspects such as how to make a plant collection and also how to make oral and poster presentations.
3. College and University teaching, which has course outlines for a variety of botanical subjects which we think will be very useful for those just starting their teaching careers.

4. Good videos, which has a review of recent videos, valuable for teaching purposes.
5. Teaching at any level, a page of information relevant to teachers at the elementary and high school level.

There is also reference to an internet discussion group, called Plant-ed, which provides a forum for discussion of a variety of plant related topics. The final section has the abstracts from the teaching section's first session of contributed papers at the 2001 meeting of the Canadian Botanical Association held in Kelowna BC.

We hope to keep updating the site, so that it remains dynamic rather than static, so we would appreciate your comments and suggestions. Please send them by email to Christine Maxwell, cm Maxwell@trentu.ca, or to Sylvie Laliberté at laliberte.sylvie@uqam.ca.

To access the site select "The Teaching Section" on the homepage of the CBA, or <http://www.trentu.ca/Biology/botany/welcome.htm>.

An Updated Flora for Prince Edward Island

Work by the Atlantic Canada Conservation Data Centre, Island Nature Trust and the Province of Prince Edward Island has recently uncovered a host of plants not previously known to exist on Prince Edward Island. From predictable exotics such as *Draba verna* to more exciting natives including *Decodon verticillatus* and *Polystichum braunii*, new species are being discovered each year. The number of new provincial records suggests the time has come to update The Plants of Prince Edward Island; Island Nature Trust and the Conservation Data Centre are aiming to do just that.

Based on fieldwork by David Erskine in 1952/53, "The Plants of Prince Edward Island" was updated by Paul Catling, Erskine and Bruce MacLaren in 1985. The past two decades have not only seen many new provincial records but also major taxonomical changes. The planned addition of botanical keys and illustrations should enhance the utility of the book.

Although planning is still in progress, the partners hope to conduct two seasons of intensive fieldwork starting in 2003. They are also seeking assistance from anyone who is willing to donate illustrations for use in the book (including one-time-only use with the illustrator retaining copyright); or is able to donate mounting paper, blotting paper or other herbarium supplies.

If you are able to assist this project in any of these (or other) ways, please contact:

Kate MacQuarrie, M.Sc., Executive Director
Island Nature Trust, P.O. Box 265,
Charlottetown, Prince Edward Island C1A 7K4

Phone: (902) 892 7513.
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Members Publications / Publications de nos membres

Voici une nouvelle rubrique destinée à faire connaître les publications hors périodiques (livres, manuels, monographies) des membres de notre association. Les membres sont évidemment invités à faire parvenir à la rédaction une copie de leur ouvrage pour faire l'objet d'une revue de livre.

Here is a new item in our bulletin to better know these off periodicals publications (books, textbooks, monographies) produced by members of our association. Members are of course welcome in sending a copy of their work to be reviewed in the Bulletin.

Semple, J.C., S.B. Heard and L. Brouillet. 2002. Cultivated and native asters of Ontario (Compositae: Astereae): *Aster* L. (including *Asteromoea* Blume, *Diplactis* Raf. and *Kalimeris* (Cass.) Cass.), *Callistephus* Cass., *Galatella* Cass., *Doellingeria* Nees, *Oclemena* E.L. Greene, *Eurybia* (Cass.) S.F. Gray, *Canadanthus* Nesom, and *Symphyotrichum* Nees (including *Virgulus* Raf.). U. Waterloo. Biol. Series No. 41: 1-134
<http://www.science.uwaterloo.ca/biology/jcsemp/jcs-asto3.htm>
