

WAGNER NATURAL AREA NEWSLETTER

Volume 7, Number 2 October 1993

Newsletter of the Wagner Natural Area Society, Management Committee
and Volunteer Stewards of Wagner Natural Area, Spruce Grove, Alberta



Wagner Natural Area Society

welcomes you to
ANNUAL MEMBERS' NIGHT 1993

on Thursday, October 28, 1993 at 8:00 pm

in the **PROVINCIAL MUSEUM
LECTURE ROOM (GROUND FLOOR)**

Program:

"A Good Year for Butterflies."

John Acorn, local entomologist and author of the popular guide *Butterflies of Alberta*, will speak and present slides on his favorite topic.

President's Report by **J. Derek Johnson**.

"Peatlands: An Overview."

Derek Johnson, a peatland ecologist with Forestry Canada at the Northern Forestry Centre, will discuss some of the basic principles of peatland ecology, drawing upon illustrations from Wagner Natural Area.

Refreshments to follow. Please bring your own mug.

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Editorial

In the coming months Wagner executive will be taking another look at the Society's Management Plan. This is a document drawn up by Catherine Mowat as part of her master's thesis in the Department of Environmental Design at the University of Calgary in 1987-1988. Ms. Mowat based it on two years of careful study of the area and the literature and countless hours of consultation with Wagner Society.

We will be refreshing our memories of the issues we thrashed out a half dozen years ago. These include such things as whether different sectors of Wagner should be set aside for different purposes such as recreation, education, research and conservation (i.e. as wilderness), to what extent we were going to do interpretive programming, and how we were going to monitor, and if necessary, limit use. With respect to the management and maintenance of habitats, we had to assign priorities (for example, fens and bog forest versus beavers and flooded wetlands) and affirm what management tools we were prepared to use, for example, herbicides, fire, planting and relocation? For most of us without formal backgrounds in either ecology or management, some of these issues proved quite abstract and difficult to deal with. In the course of our review, with the benefit of hindsight and a bit more experience, we will be assessing how well we have stuck to the policies enunciated in the Plan, and, where we have departed from them, why and how. Of course, circumstances change, and some circumstances are beyond our control, but we need to have policies and a sense of direction if we are not to respond ad hoc to every management decision that comes up.

As usual, we welcome feedback on the Natural Area and what we are doing. Please call any member of the executive or the Natural Areas Program (427-5209) with comments, suggestions and questions.

Finally, a big thank-you to all our members for your continued support in these tough economic times.

Patsy Cotterill



The Wagner Grapevine



A Summer's Experience

One swallow doesn't make a summer, but a few of them, busily raising families, create quite a bit of work for summer students at Wagner Natural Area! Our summer employee this year, funded by a SEED grant, was Tara Normand, student in the biological sciences in renewable resources option at NAIT. From May 10 until August 24, Tara did the usual jobs of the "summer student" at Wagner including maintenance of the site and facilities, tending the bird boxes (mainly occupied by tree swallows) and carrying out the annual breeding bird survey. As her own special project, Tara collected butterflies. (These are now in the possession of the Wagner Society and will be mounted for display purposes.) Along with society members, Tara took part in the May Species Count, the Spring Cleanup and the Annual Field Day. Tara particularly enjoyed meeting and talking with people as she patrolled the area.

Since a knowledge of bird song is a tremendous asset in carrying out the breeding bird survey, Tara took a local bird song identification course as part of her work experience and spent hours listening to bird tapes. When she left, she thanked executive members who had helped her with her projects, particularly Terry Thormin, who worked with her on the bird survey along with Mike Jenkins and Jasper Keizer. Alice also spent many hours with her, hiking and locating interesting plants and helping her with projects. Tara is also particularly grateful to John Acorn, entomologist and former parks naturalist, who helped her with her butterfly capture and identification techniques.

Tara also kept a log of her daily activities, and the entries, although not long or excessively detailed, point out the usefulness of keeping a continuous record over a season. Details get forgotten, so are always interesting to look back on. For example, Tara noted that on June 20 "the Marl Pond Trail marl ponds are now totally dry. All the tadpoles are dead in the ponds." On June 24, however, she noted that "The Marl Ponds on the Marl Pond Trail are full of water again due to the rain." Despite the wet summer, Tara noted that by August 9 the marl ponds along the trail were dry again. On August 20 she observed that there were tadpoles still in Jones's Pond and many more toads than frogs.

Tara hopes to take up a career as a Fish &

Wildlife officer or a park warden. We wish her well and trust that her summer in Wagner has been a valuable experience.



White Admiral Butterfly (*Limenitis arthemis*),
photographed in the Winterburn Area
Courtesy of the Provincial Museum

Volunteer Steward Conference, Seebe, June 4-6, 1993

Most Wagner executive members attended this second conference for the volunteer stewards of provincial natural areas, this time held at the Rocky Mountain YMCA near Bow Valley Provincial Park. The climax of months of preparation for staff of Natural Areas in the Dept. of Environmental Protection, Wagner executive members Janice Cantafio and Alice Hendry were also closely involved in the planning and preparation this time. On the conference organizing committee, Janice, our treasurer, shouldered a good deal of the accounting and payroll work involved in registration, and Alice was in charge of A-V equipment for the sessions.. Derek Johnson gave a well-received presentation on peatlands and Patsy Cotterill attempted to introduce an audience to vascular plant identification. Both led plant walks. Barry Jenkins spoke as a panel member on management, and various people introduced speakers at presentations. The sessions, plenary sessions and field trips were so appealing and so many that most of the participants put in 18-hour days over the weekend (make that 21-hour days for the staff of Natural Areas)! Edgar Jones received a special award and all Wagner executive, along with

many other stewards, received a fleece sweatshirt emblazoned with the Volunteer Steward and Natural Areas logo in appreciation of their efforts. The Bow Valley setting, across the river from Mt. Yamnuska, was ideal, the weather perfect (remember, this was before the rains!), and those who could spare the extra time stayed on past the weekend to take in more field trips. A memorable experience!

Field Trips

Frog-and-Toad Walks took place on April 28, May 5 and May 12, all led by Wayne Roberts and well attended in total. Frog egg masses were visible on April 28; frog tadpoles and toad eggs on May 5, when toads were calling, and by May 12, tadpoles only (of frogs and toads) were evident. The frogs are of course Wood Frogs and the toads Western or Boreal Toads.

Calgary Field-Naturalists honored us this year by choosing Wagner as the destination for their annual bus trip. About 36 people attended and were conducted around the property by Alice, Derek and Terry. The CFNS participants kindly brought copies of two of their publications: Olgo Droppo's *A Field Guide to Alberta Berries* (1987) and *A Bird-Finding Guide to the Calgary Region* (1993), edited by John F. McDonald, as gifts for the leaders and for Wagner archives.

The Orchid Walk on the evening of June 24, led by M.Sc. botany student Carla Zelmer, was attended by about 16 enthusiastic people who walked the Cabin Trail and the south fence line despite cool, cloudy weather. Carla demonstrated how small orchid seeds are, storing so little food they must establish fungal relationships in the soil in order to germinate and grow, and what the pollinia are. She clearly demonstrated the importance of getting "close up" if one is to appreciate properly the intricate structure of plants.

On July 31, Wagner Society held its Annual Field Day. "Bug Walks" with Terry proved popular—there is obviously a lot of interest in entomology out there.

Apart from "official" trips, sponsored by the Wagner Society, several other private trips took place, including school visits. Wagner Natural Area was also a featured site for Joy and Cam Finlay's "The Nature Walk." Their column appeared in *The Edmonton Journal* of Friday, May 14.

Leave it to Beaver?

Beaver are once again causing management problems in the Natural Area. The activity of beaver in the dugout area close to Atim Road resulted in a

plugged up culvert alongside the road, souring relations with our neighbor to the west. A plugged culvert east of the parking area (old 118 Avenue) has also interfered with road construction and a trapper has been employed to remove the beaver. According to Bill Richards of Public Lands, Department of Environmental Protection, trapping beaver out is not the answer. They will only recolonize suitable sites. He favors proper maintenance of culverts and the use of siphons or perforated tubing to keep an open flow and prevent flooding. (Mind you, it's not as easy as it sounds!)

Vandalism

There was the usual minor damage to property this year—registration boxes damaged, trail guide posts interfered with and signs damaged or removed. A disturbing new trend was the lighting of fires inside the picnic shelter. Four or five instances of fireside parties occurred during the summer and fall. Fortunately no structural damage was done to the shelter but there was plenty of ash and trash to clean up and in one case, broken beer bottles. Car theft was down this year, at least as far as we know. One incident report that we know of was filed with police when the window of a van was smashed and a purse stolen. It continues to make sense to lock your doors and take valuables with you when parking your car.

Road Developments

It has been a summer of earthworks, earth movement, and the drone of heavy equipment as construction of the S.H. 794 interchange and the new east-west access road has proceeded apace. Certainly as the project nears completion, the north-east corner of Wagner becomes more and more unrecognisable as it disappears under tarmac. According to Don Snider, Manager of Environmental Affairs with Alberta Transportation and Utilities, opening of the new road was scheduled for October 31 and will certainly take place before the end of the year. Whether the additional noise and dust and the vehicles themselves will pose a threat to quality of life in Wagner for wildlife and humans remains to be seen.

Access routes to Wagner have changed or will change as Highway 16X is upgraded to a high-speed highway. Parking at the Villeneuve (S.H. 794) intersection has been impractical for a year or more and access to the "Villeneuve extension" is now completely cut off by the clover-leaf development of the interchange. Once an open road allowance much used by students and naturalists for access to

Wagner's south-east fens, the Villeneuve extension has in consequence become distinctly overgrown. The old County east-west access road to the south, running from Highway 60 between Hunter's commercial property to a point east of Wagner's eastern boundary, now ends at the new road. Culverts have been installed west of the new road and this area too is gradually revegetating.

Sometime in the future, Atim Road's intersections with Highway 16X will also be severed. Access to Wagner Natural Area will then be from Highway 16 north along Atim Road to the narrow gravel lane (old 118 Avenue) into Wagner or, from the northwest, along gravel roads running east from Century Road in Spruce Grove. This will not be such a convenient arrangement as the present one requiring only a left turn into Atim Road from Highway 16X or a simple right turn into Atim for eastbound drivers. Nevertheless, it seems preferable to other alternatives that have been suggested. We trust that our regular patrons will bear with the changes and that new visitors, with the help of appropriately placed Watchable Wildlife signs, will still seek out the Natural Area.

Bridge Art--The Latest Trend in Transportation!

Travellers and observant visitors will have noticed that the bridge supports of the overpass at S.H. 794 have Yellow Lady's-slipper motifs on them, one facing east and the other west. According to Don Snider of the Dept. of Transportation, the orchids were the brain-child of the bridge designer in the Bridge Engineering Branch of the Department, who thought that the planned bridge was too plain without some form of decoration. With the approval of the branch's executive director and the Department as a whole, an artist and an assistant were engaged to produce fibreglass forms for the relief. They worked from illustrations and the Orchid Society of Alberta's pin, supplied by two members of the Transportation Department who are also members of the Orchid Society. Snider said that the same and other designs will be put on other new bridges in the province where appropriate, although probably they will be cast larger.

Spring Plant Highlights

First highlight of the year was undoubtedly the discovery by Alice, Derek and Tara on May 10—after a year's gap—of Calypso orchids (*Calypso bulbosa*) in flower in the vicinity of the old cabin site along the Cabin Trail. The Calypsos had finished flowering by May Count time.

The Natural Area and its immediate environs

were combed by no fewer than eight people during the May Species Count on May 30 this year. A total of 80 species of plants in various stages of flowering was recorded, a respectable number for a spring that seemed to proceed in fits and starts. In Wagner, a large and diverse area to cover, the challenge is always to observe all the species that have been observed in previous years. This year, look as we might, we could not locate any Alpine Cotton-Grass (*Scirpus hudsonianus*) or Few-flowered Spike-rush (*Eleocharis quinqueflora*) in flower. If correctly identified, however, Dwarf Bulrush (*Scirpus pumilus*) was found, not only in flower, but also significant as a first record for Wagner.

We saw at least three specimens of Bristly Black Currant (*Ribes lacustre*) in flower on the May Count, noteworthy because this species is uncommon in the Natural Area and has proved elusive for the last few May Counts. The shrub, however, also proved easy to find in other localities this year. Being a May Counter certainly alerts one to the fluctuating fortunes of plant populations over the years: some species do well in some years and are all but invisible in others. Perhaps an adopt-a-plant program, whereby a person chooses a plant (or two, or more) to study intensively over a period of years, could yield some fascinating data? Marsh Ragwort (*Senecio congestus*) was recorded for the second time in the May Count. This amazing plant, with masses of yellow flower-heads but otherwise with clear affinities to the Sweet Coltsfoot (*Petasites*) genus, has become very abundant in central Alberta in the last few years, probably because low water levels have increased its shoreline habitat. (For further information on seasonal plants, please see the Rare Plant Report).

Alice's "Bat Tree"

During four successive nights in August, Alice, who lives in Osborne Acres just south of the Natural Area, observed up to 33 bats emerge from a moribund aspen on her property. After the fourth night they were not seen again. She consulted with zoologist Dr. Margo Pybus who suggested they were probably a nursery colony and the species could likely have been the Big Brown Bat. Alice, who now teaches Outdoor Education to Education students at the University of Alberta, plans to use the information and artifacts she has accumulated on bats in a session for her students entitled—you guessed it—"Halloween."

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Emergency Contact

For further information on Wagner Natural Area or other Natural Areas in the province, or to report information or emergency situations in Natural Areas, call **Public Lands, Dept. of Environmental Protection**, at 427-5209.

Wagner Society Executive, 1993

President - Derek Johnson (436-8231)
Past President - Terry Thormin (482-1389)
Vice-President - Dave Ealey
Treasurer/Membership Director - Janice Cantafio
(963-3938)
Secretary/Newsletter Editor - Patsy Cotterill
(481-1525)
Director/Public Relations - Alice Hendry
(962-4836)
Director - Barry Jenkins (458-1794)
Director - Edgar Jones (436-5327)

Membership in Wagner Natural Area Society

The membership year runs from January 1 to December 31. Please consider renewing promptly to continue your support of the Society and Wagner Natural Area. Fill out the membership/renewal form below and mail it with a cheque to Wagner Natural Area Society. Do the same thing if you are joining the Society for the first time. As a member, you will receive free copies of the newsletter (2 per year) and an invitation to the Annual Members' Night in October. Field trips and other activities are organized from time to time. Donations are tax deductible. For more information, contact Janice Cantafio at 963-3938 (evenings).

Please include me as a member of the Wagner Natural Area Society!

____ Family \$12 ____ Individual \$10
____ Student \$8 ____ Senior \$12

Besides my membership fee, I enclose a gift to support the activities of the Wagner Natural Area Society: ____.

Name _____

Address _____

Town/City _____

Telephone No. _____

Mail to: Janice Cantafio, Membership Director, Wagner Society, Box 842, Stony Plain, Alberta
T0E 2G0

Unusual/Rare Plant Report

Every year Wagner throws us up something new and thrilling, or mystifying and intriguing, often sending us scurrying to our botanical keys or even the local herbaria. Derek Johnson found patches of Great-spurred Violet, *Viola selkirkii*, in flower in the northeast corner of Wagner in May. *V. selkirkii* may be distinguished from the Marsh Violet (*Viola palustris*) and the Bog Violet (*Viola nephrophylla*) by the relatively longer whitish spur forming the base of the petals and the beardless petals. The leaves also show a sparse pubescence on their upper surface when held up to the light whereas the other species have glabrous leaves. Although it occurs on ravine slopes in Edmonton's river valley, it is provincially a rare plant and this is the first time it has been recorded in Wagner. Derek also noted two rare Hawkweed species in disturbed ground in the eastern part of Wagner this spring. Orange Hawkweed (*H. aurantiacum*) and Field Hawkweed (*Hieracium pratense*) are both weedy species in B.C. and eastern Canada. Orange Hawkweed has been previously recorded from Wagner, but Field Hawkweed, an unusual component of Alberta's flora, is a first.

Terry Thormin came across a single specimen of Round-leaved Bog Orchid (*Habenaria orbiculata*) on the Cabin Trail on June 20 during the Calgary Field-Naturalists Field Trip. Participants in the orchid field trip led by Carla Zelmer four days later were also lucky enough to see it. Tall and cool and green in the gloom of coniferous forest, this orchid can only be described as "awesome." It must easily have been the most admired plant in Wagner this year. Terry notes that although this species is on our checklist, this is the first time it has actually been seen on the Wagner site proper rather than just close to its boundaries.

Our rare Slender Spike-rush (*Eleocharis tenuis*) put in an appearance again in the south fens dead on time, Tony Szumigalski spotting it first during the field trip on June 24. By early to mid July, this rhizomatous plant was growing in abundance in disturbed marl fens (for example, the ruts left by former vehicle tracks) just south of the property but was less easy to find in the south-east fens within the fence-line where it was first spotted in late June, 1990.

On July 26, Alice and Patsy were exploring the edge of a large marl fen south of the fence when they came across "something different." Patsy figured it could only be the long-lost Slender Beak-

rush (*Rhynchospora capillacea*), recorded during investigations of Wagner for the International Biological Programme in 1974 but not, I think, seen in all the years since. A small collection was made, and then again in August, when the fruits were ripe. Derek subsequently confirmed the I.D. of this plant, very rare in Alberta. Thinking that it might be a "good year" for this member of the sedge family, Patsy later investigated Heatherdown Fen, a site from where Slender Beak-rush has also been reported, but with no luck.

The occurrence of Dwarf Bulrush (*Scirpus pumilus*) has already been noted in the May Count report. A species of calcareous wetlands found mostly in the mountains, it is also known from an area of calcareous springs north of Mayerthorpe, a site that has many species in common with Wagner.

No plants were found this year at the site of the largest known clump of Bog Adder's-mouth (*Malaxis paludosa*), but other sites of this ultra rarity, as well as of White Adder's-mouth (*M. monophylla*) were found by Janice and Tara during their perambulations. Colonies of the Flat-topped White Aster (*Aster umbellatus*), locally common but rare provincially, continued to flourish in the central part of the property close to the Villeneuve extension.



Viola selkirkii

Great-spurred Violet

U of A Mushroom Course

Mushroom Identification, by Dr. Randy Currah.
Five Mondays, November 8 to December 6, 1993.
Time 1900-2100 hrs. Cost \$112.35.

This Faculty of Extension Course, #8273, "provides a relatively detailed introduction to the identification of gilled mushrooms and other large fungi (morels, puffballs, boletes, polypores, jelly fungi, coral and club fungi)." For information call 492-3037.

Purple Loosestrife: What Is the Story?

Purple Loosestrife is almost a household name in the west these days, thanks to its own aggressive spread and the publicity it has attracted. This tall, attractive perennial with long spikes of magenta flowers owes its relatively recent notoriety to the fact that it is an environmental weed rather than an agricultural one. It can form dense stands in wetlands and along rivers and sometimes fills in small lakes and marshes. That it can outcompete native vegetation is bad enough, but most wild fauna cannot use it as they can native plants, so they too suffer—from reduced amounts of food, cover, and shelter.

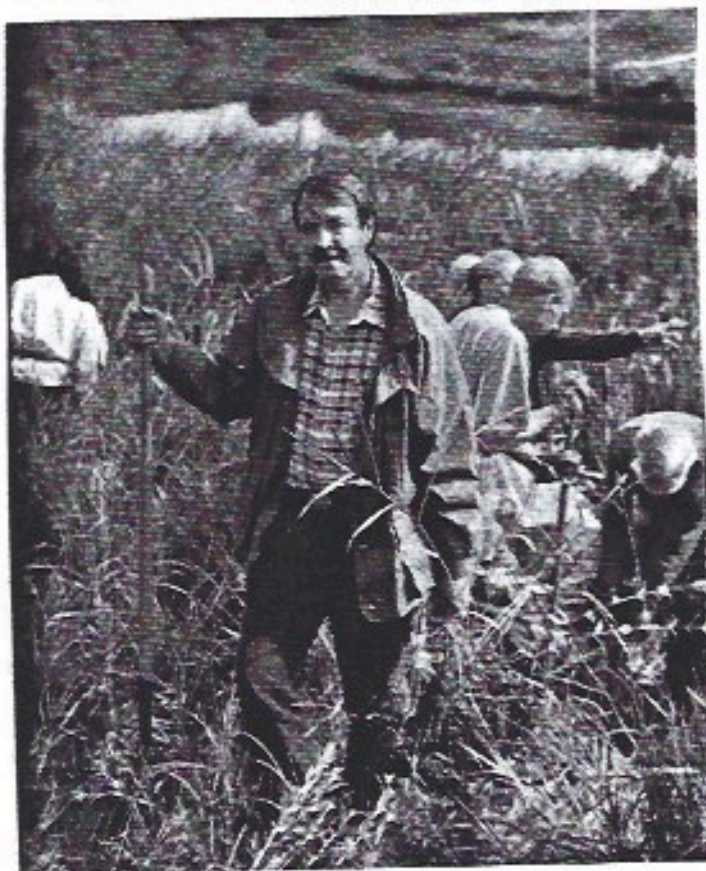
An Exotic Run Rampant

An introduction from its native Eurasia, Purple Loosestrife has become naturalized in eastern North America north of the 35th parallel. It also occurs on both the east and west coasts of Canada and, in the last couple of decades, has spread to the prairies. By 1990 several infestations were known from Alberta (the figure is now around 20). Hence, in an attempt to stop its spread the Alberta government on January 28, 1992 declared Purple Loosestrife (*Lythrum salicaria*) a noxious weed under the provincial Weed Control Act. Not, of course, that banning a weed removes the problem. Small patches of Loosestrife can be cut down or dug up, but severe infestations cannot be controlled, let alone eliminated. Research is under way on a selective herbicide for Loosestrife, and on three insect predators that could reduce its vigor: a weevil that would eat its roots, and two leaf-eating beetles, but none are ready to be released. Why bother to outlaw a plant if you can't get rid of the it? Well, the story is a bit more complicated than that. Purple Loosestrife's rise to power may depend mostly on its remarkable biology, but it has not always been a *planta non grata*, as Roger Vick of the University of Alberta Devonian Botanic Garden has dubbed it (4).

Bred for Good Looks

Purple Loosestrife came to North America around the beginning of the last century. Like many weeds, it was introduced both inadvertently, probably in emptied ship's ballast, and intentionally, because of its value as an ornamental crop and as a honey plant for beekeepers (1). Its presence was recorded by botanist Frederick Pursh in *Flora Americae Septentrionalis* (*Flora of North America*) of 1814 and it was being advertised in nursery and seed-trade catalogues in New York state as early as 1829. By

the early twentieth century, the plant's popularity had led horticulturalists to select and propagate clonally cultivated varieties of it. In the 1920s, in an action that would seem unthinkable today, some of these cultivars were even planted in a marsh in the city of Minneapolis. In the 1930s, a Manitoba plant breeder produced "Dropmore Purple," and the Morden Research Station, operated by Agriculture Canada in Morden, Manitoba, began releasing its famous Morden *Lythrum* cultivars, beginning with "Morden Pink."



Harry Jenkins digging Purple Loosestrife on the banks of the Sturgeon River at St. Albert in August 1992.

"Good" Garden *Lythrum* and "Bad" Wild *Lythrum*?

In the wild the plant didn't start to cause alarm until about the 1930s, when its ability to dominate wetlands and even pastures began to be noticed. By the 1980s, several states and a few provinces had enacted legislation to control it. The legislation did

not apply to cultivars. As Roger Vick at the Devonian Botanic Garden (DBG) puts it, a distinction was made between "good" garden Lythrum, which almost never set seed, and the "bad" wild kind which produces abundant winged seeds (up to 300,000 per flowering spike) and thus has the capacity for aggressive spread in wetlands (3). The idea has been widely held that cultivars are both sterile and morphologically distinguishable from wild plants. (This is an important point for government inspectors enforcing the law.) Research and experience have since shown that neither of these assumptions is true. In Minnesota, a state with many wetlands, the legislation was extended in 1988 to include cultivars. Not surprisingly, the furor among nurserymen was tremendous. In Alberta, in the spring of 1992, Alberta Agriculture's Crop Protection Branch was still recommending that "Morden Pink" was safe for garden planting. Now it is saying no such thing. The Alberta Purple Loosestrife Management Committee, formed in 1992 and chaired by Shafeek Ali of the Crop Protection Branch, wants all garden material to be destroyed. (The City of Edmonton is, incidentally, also supporting this stance.) With this sudden about-face, gardeners and nurserymen can be forgiven for their shock and scepticism. Destroy a beautiful, hardy, innocuous garden plant that doesn't appear to spread? Surely not? Unfortunately, yes. To understand why it's necessary, we need to look a little closer at the biology and history of *L. salicaria* and its relatives.

Heterostyly and Cross Pollination

Purple Loosestrife attracted the attention of no lesser a naturalist than Charles Darwin. Darwin was interested in flower structure and pollination mechanisms and, around the 1860s, investigated the breeding mechanism of Purple Loosestrife (2). Loosestrife shows heterostyly, a condition in which the flowers on different plants have styles of different lengths. (Styles are the stalk-like structures joining the pollen-receptive surface of the stigma to the ovary, in the female organs of the flower.) The length of the stamens also varies such that, in a given flower, the style and the anthers, the pollen-producing tip of the stamens, occupy different positions or levels in the flower. Heterostyly occurs in a number of plant groups with tubular flowers, for example, the Primrose and is a mechanism to encourage cross-pollination or outbreeding. *L. salicaria* is particularly complicated in that it is tristylous, its populations having three different kinds of flowers (known as flower or style morphs).

In the long-styled type of flower (see diagram), the stigma projects beyond the stamens, which form two groups of six, one group with anthers at the mid level and one group of short stamens (remember, anthers must not be at the same level as the stigma in the same flower). In the mid-styled type the stamens are grouped into long and short, and in the short-styled type the stamens are long and mid-length. Bees are the most effective pollinators of Loosestrife. When a bee enters the flower it touches the shortest set of reproductive organs (style or anthers) with the underside of its head, the mid set with the undersurface of its thorax, and the longest set with the underside of its abdomen. Such a mechanism makes cross-pollination likely but of course there is always a chance that a flower stigma will receive pollen from the same flower or from flowers of the same plant. If however, the genes for a particular flower morph are linked with genes for incompatibility, then self-pollination or pollination by flowers of the same style morph will not produce viable seed. Workable or compatible pollinations are those in which the pollen comes from anthers that are at the same height in the flower as the style. Thus plants with short-styled flowers can be pollinated by mid-styled plants with short anthers and long-styled plants with short anthers; mid-styled plants by long- and short-styled plants having mid-level anthers; and long-styled plants by mid- and short-styled plants with long anthers, for a total of six compatible combinations out of a possible 18 crosses. Such compatible crosses are termed *legitimate*, while all other types of crosses, or self-pollination, are incompatible or *illegitimate*. Knowing this, it is easy to see why cultivars, each of which belongs to only one of the three style morphs, may appear to be sterile under the conditions under which they grow in gardens and nurseries. A mid-styled cultivar, for example, growing in a garden where it was the only Lythrum cultivar would have no opportunity to produce seeds (remember, it is self-incompatible) and the same would be true if it grew in contact with other mid-styled cultivars (with which it would be cross-incompatible).

Cultivars' Complex Genetic Web

There are further complications to the story of Purple Loosestrife and the Lythrum cultivars. *L. salicaria* has a close relative and a look-alike species (though there are minor morphological differences) called *L. virgatum*, which is also an exotic from Eurasia and also tristylous, and the two can cross freely.) Also in the picture is a species native to N. America, *Lythrum alatum*, Winged Loosestrife, which prefers

even wetter habitats than *L. salicaria* but nevertheless overlaps with it. *L. alatum* can apparently cross with *L. salicaria* and *L. virgatum* in the wild, even though it is distylous and has another barrier to hybridization (chromosome number, which we won't go into here but could nevertheless be a significant factor in *L. salicaria*'s weedy behavior). *Lythrum* cultivars have been selected in the past from both *L. salicaria* and *L. virgatum*, and from interspecific crosses between these species and *L. alatum*. (For example, varieties "Modern Gleam" and "Morden Rose" were developed by crossing "Morden Pink" (*L. virgatum*) with *L. alatum*.)

CHAP. IV. LYTHRUM SALICARIA. 139

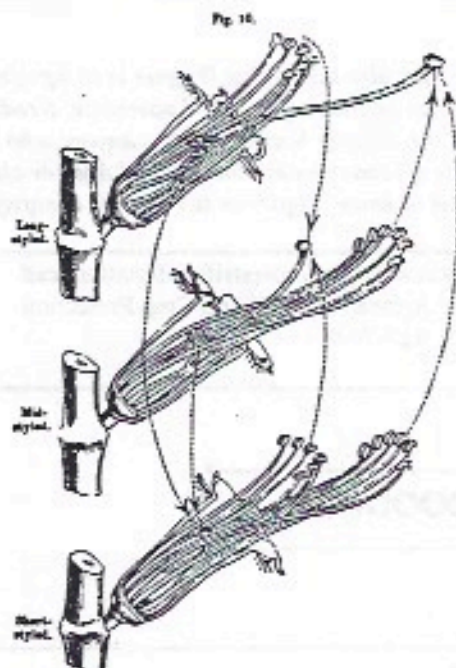


Diagram of the flowers of the three forms of *Lythrum salicaria*, in their natural position, with the petals and calyx removed on the near side; enlarged six times. The dotted lines with the arrows show the directions in which pollen must be carried to each stigma to ensure self-fertility.

Darwin's illustration of tristylous Purple Loosestrife (2).

Are the Cultivars Sterile or Can They Spread in the Wild Too?

In 1989 Neil Anderson and Peter Ascher (1) of the Department of Horticultural Science, University of Minnesota, set out to settle the matter of cultivar sterility and the controversy surrounding it. Taking cultivars of all three style morphs (short-styled, mid-styled and long-styled), they crossed them (as male

and female parents) with wild populations of Purple Loosestrife from Minnesota and Wisconsin and between themselves. Crosses were of the legitimate type except in the case of "Morden Gleam." Although, statistically speaking, seed production did not follow a normal distribution, but was skewed towards zero seed set, suggesting some sterility, none of the cultivars failed to set seed under any of the test conditions. Even "Morden Gleam" which, anomalously, did not set seed with legitimate pollinations, set seed when selfed or hybridized with *L. alatum*. Although cultivar x cultivar pollinations (within the same species, *L. salicaria* or *L. virgatum*, or between these two species) resulted in lower average germination than cultivars crossed with wild Loosestrife populations, zero percent germination did not occur in any case, indicating that crosses between cultivars in a nursery or garden could produce viable progeny. Cultivated forms of Purple Loosestrife can thus serve as pollen or seed sources promoting the spread of Purple Loosestrife in the wild. Further, their findings that cultivar x *L. alatum* hybrids can hybridize with wild Purple Loosestrife are cause for alarm too, for in this way weedy *L. salicaria* could be gaining strategic information (genes adaptive to local conditions) from native *L. alatum*. A similar study done at the University of Manitoba on cultivar fertility produced similar results.

Given the fertility of cultivars under experimental conditions, it is difficult to see why more seedlings have not been reported, at least in nurseries where opportunity for spontaneous legitimate pollinations to occur would surely exist. Anderson and Ascher think that use of herbicides or other types of weeding may have eliminated seedlings before they were identified. They believe that the Minnesota legislation, which bans *L. salicaria*, *L. virgatum* and any of their combinations, is well justified. Research done at Morden Field Station in 1992 also indicated that "Morden Pink," long thought to be safely sterile, can produce viable seed when crossed with wild Loosestrife under garden conditions.

Wetlands and Wildlands First!

In the summer of 1992 too, Roger Vick made the painful decision to destroy the DBG's collection of *Lythrum*s, dating back over 27 years. Vick had seen a bad Loosestrife infestation in a wetland west of the Garden, one probably originating from garden refuse back in the '50s, and compared plant samples from it with the DBG plants. He was shocked to realize that he could not reliably distinguish between them.

Moreover, that year he found that some of the DBG cultivars produced seeds. Vick concluded: "The wetlands of Alberta are a precious natural resource, and there is no point in putting them at risk for the sake of a garden ornamental." He explains the sudden panic over Loosestrife after all these years of insidious spread, and over cultivars in particular within the last year or two, as due to the increased number of garden plantings of Lythrum and the increased number of wild infestations having reached a level where successful pollinations and seed set are statistically far more likely. It is a sad story for horticulturalists and gardeners, and environmentalists can sympathize, but most commendably, says Ali, nurserymen in Alberta have shown great compliance in destroying their Lythrum stocks. It only remains for some homeowners to follow suit. Vick is right: ecosystems are more important than esthetics. Still, the Purple Loosestrife saga makes a fascinating story, illustrating both principles of plant biology and the interactions between plants and man. I doubt very much that we have heard the end of it.

References

1. **Anderson, N.O. & Ascher, P.D.** Male and female fertility of loosestrife (*Lythrum*) cultivars. University of Minnesota Agricultural Experiment Station Scientific Publication Series Paper No.

19,997, Univ. of Minnesota, St. Paul, 1992.

2. **Darwin, C.** The Different forms of Flowers on Plants of the Same Species. London, U.K: J. Murray, 1892.

3. **Vick, R.** Lythrum: From "Garden Delight" to "Monster of the Marsh." *Kinnikinnick* 7 (6) May 1992: 193-199.

4. **Vick, R.** Lythrum: Planta non grata. *Kinnikinnick* 7 (8) Nov. 1992: 253-257.

Two brochures, "Beautiful Killer" and "Purple Loosestrife." Latter still available from Ducks Unlimited or Canadian Wildlife Federation, 1-800-565-6305, or Edmonton Natural History Club.

Roger Vick also thinks that Wagner is at significant risk for an invasion of Purple Loosestrife. Needless to say, the Wagner Society expects anyone who spots a single specimen within the Natural Area or close by to let us know. Vigilance is the price of safety!

To report a Purple Loosestrife infestation, call Alberta Agriculture, Soil and Crop Protection Branch, 427-7098.



Upcoming Events

Edmonton Plant Study Group

Monday, November 1, 1993 Lecture Room (lower floor) of the Provincial Museum, 7:30 p.m.

"Alpine Night: More on the Cardinal Divide and its Environs."

Slides and exchange of information about this area and Tripoli Ridge Candidate Natural Area. Admission free and open to all but donations for room rental are welcome.

Tuesday, December 7, 1993 University of Alberta, Bio Sciences Bldg, Room B321 7:00 p.m. (Meet in the main lobby on the 2nd floor.) **"Introduction to the Identification of Lichens. I. Macrolichens,** by Bernard Goffinet, U of A.

Call Patsy (481-1525) for further information on any of these programs.

Wildflowers of Wagner (4)

Grass-of-Parnassus Family Parnassiaceae

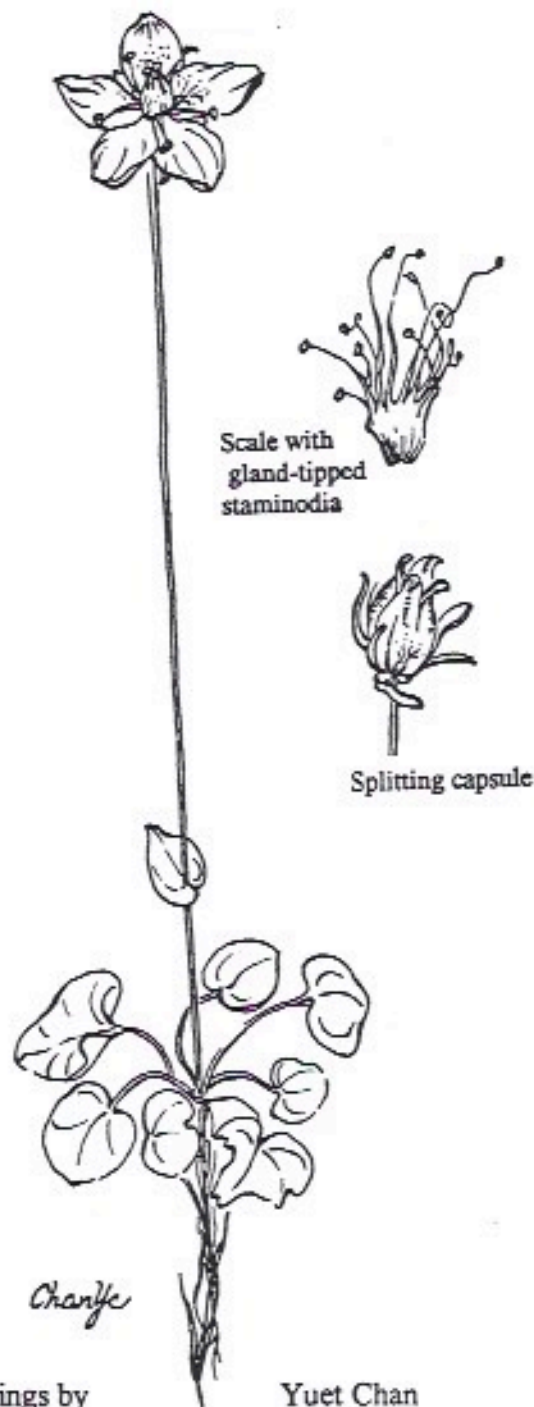
Northern Grass-of-Parnassus *Parnassia palustris* L.

This erect, bright-green glabrous (hairless) perennial plant is common and often abundant in wet places such as marshes, ditches and peatlands. It also enjoys a wide distribution throughout Alberta and across the North American continent. Its large (2 cm or more across) symmetrical white flowers add a dash of white splendour to green herbage during mid and late summer when relatively few other white flowers are in bloom.

The leaves are round-ovate, heart-shaped at the base, and produced at the base of the plant. The leafless stem is thus known as a scape although it is clasped by one small modified leaf or bract near or below its middle. The angular stems can grow to more than 30 cm tall in lush lowland habitats but are often much shorter in the mountains.

The flowers, borne singly at the top of the scapes, are very attractive. Each has a corolla of five separate petals forming a shallow bowl inside a calyx of five green finely nerved sepals. Each white petal, about 12 mm long, is traversed by about nine or ten greyish recessed nerves which may serve as nectar guides. Inside the petals and alternating with them are five stamens which ripen successively. Alternating with the stamens are five scale-like structures bearing numerous gland-tipped sterile stamens or staminodia. The glands attract insects to meagre supplies of nectar at the base of the staminodia. The four short stigmas atop a cone-shaped ovary ripen after the stamens have shed their pollen, a device to prevent self pollination. The ovary enlarges into a capsule which, when ripe, splits at the top along four seams or valves to release numerous winged seeds.

Only Northern Grass-of-Parnassus is found in Wagner Natural Area, but three other species of *Parnassia* also occur in the province, all in moist habitats and mostly in the mountains. Named for Mt. Parnassus in Greece—and indeed the beauty of the flowers would make them a worthy bouquet of the gods—the "Grass" part of the genus's common name is botanically misleading as *Parnassia* is not at all related to grasses. It is, however, included in the much larger Saxifrage Family by some authorities.



Drawings by

Yuet Chan