Sphagnum squarrosum, *a predominantly woodland species of peat moss, is distinguished by its abruptly narrowed branch leaves spreading at right angles from the stem. Note the capsules.* Photo: J.D. Johnson

A Botanically Interesting Peatland in North-Central Alberta

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As part of a five-year cooperative program between the federal and provincial governments, a study was initiated in 1985 to determine the value of drainage in improving tree growth on certain peatlands in Alberta. One of the three sites selected for study (referred to as the Goose River site) is located off the northwest end of the Swan Hills, immediately south and west of Sweathouse Fire Tower, 38 km southeast of Valleyview. The peatland covers an area of approximately 500 ha centered on 13-68-19-W5 (54°54'N, 116°45'W; elevation 850 m). During the course of research in the area it became evident that it was more interesting botanically than many of the other peatlands we have sampled in Alberta. A number of species on the Rare Vascular Plants list for Alberta (Packer and Bradley 1984) were encountered and several other species that are uncommon in other parts of Alberta were abundant in certain areas of this peatland.

Nomenclature in this note follows Moss (1983) for the vascular plants, Ireland *et al.* (1980) for the mosses, Stotler and Crandall-Stotler (1977) for the liverworts, and Hale and Culberson (1970) for the lichens.

The majority of the Goose River site can be classified as a coniferous swamp (Zoltai *et al.* 1973) dominated by Black Spruce (*Picea mariana*). Common Labrador Tea (*Ledum groenlandicum*) has high cover and is the dominant understory shrub. The herb stratum is dominated by Three-seeded Sedge (*Carex trisperma*), Common Horsetail (*Equisetum arvense*), Woodland Horsetail (*E. sylvaticum*), and Bog Cranberry (*Vaccinium vitis-idaea*), with lesser amounts of Cloudberry (*Rubus chamaemorus*). Northern Reed Grass (*Calamagrostis inexpansa*) and Small Bog Cranberry (*Oxycoccus microcarpus*) are constant species, but have generally low cover. *Sphagnum angustifolium* and *S. magellanicum* are the predominant mosses in the wetter areas; *S. fuscum* and *Pleurozium schreberi* predominate in the drier areas. A few patches of Reindeer Lichen (*Cladina mitis*) occur in more open, drier and elevated areas.

An area which might best be classified as a nutrient-poor treed fen covers part of the southeastern portion of the site. In appearance this area looks like what most people would consider to be a "bog", but closer examination reveals a number of things which indicate otherwise. While the area is dominated by Black Spruce and *Sphagnum*, species such as Tamarack (*Larix laricina*), Dwarf Birch (*Betula pumila*), Bog Rosemary (*Andromeda polifolia*), and sedges (*Carex* spp.), species more indicative of fens, are widely evident in the cover. Chemical analysis of water and peat samples from this area shows higher nutrient levels (specifically calcium and magnesium) than the general limits given for bogs.

Such areas of "poor fens" are particularly interesting as they are not a common peatland type in Alberta.

The entire peatland is poorly to very poorly drained with the water table at or near the surface for the majority of the year. The average depth of peat from 13 sampled locations is 74 cm, but depths approaching 2 m occur in the southeastern portion of the area. The majority of this peatland has been burned within the last 75 years and most of the Black Spruce trees currently present are in the 40 to 50 year-old range. However, there are areas that have escaped fires for some time which have stands of nearly closed-canopy Black Spruce approaching 150 years old and 15 m in height. Because of the strong shading in these stands the understory vegetation is very poor, consisting predominantly of feather mosses and patches of *Sphagnum*, with widely scattered sedges.

Although this peatland is not terribly rich in terms of the number of species it contains, it makes up for it with some rather unusual records. Seventy species of vascular plants, 46 species of mosses, 15 species of liverworts, and 12 species of ground-dwelling lichens have been identified from the area thus far.

Almost all the ground-dwelling lichens are in the genera *Cladonia* and *Peltigera*. As might be expected, the wet nature of peatlands precludes the development of a diverse ground lichen flora. Trees provided a much better substrate for lichens is these areas.

In the drier continental climate of the boreal forest, liverworts are generally restricted to the wetter habitats and hence achieve their greatest abundance in areas such as peatlands, particularly in wet depressions and over tree roots and fallen logs. Of the 15 species found in the area none are particularly unusual, although the abundance of some is worthy of note. In certain areas, *Scapania paludicola* and *Barbilophozia kunzeana* form conspicuous patches in wet depressions and over tree roots, respectively.

Ten species of peat moss (*Sphagnum*) have been found in the area. This is remarkable for an area of this size, considering that the total number of species known for all of Alberta is 21 (Vitt and Andrus 1977). One interesting group of mosses is the dung mosses, or Splachnaceae, so called because of their preference (or ability) to grow on the excrement of various animals (herbivore dung; carnivore scats and pellets). Four species in this family were encountered in the study area, *Splachnum luteum, S. sphaericum, Tetraplodon angustatus*, and *T. mnioides*. The *Splachnum* species are considered to be rare in North America (Crum and Anderson 1981).

The most interesting of the vascular plants encountered in the area are Bent Sedge (*Carex deflexa*), Few-flowered Sedge (*C. pauciflora*), Three-seeded Sedge (*C. trisperma*), Wood Rush (*Luzula rufescens*), and Creeping Snowberry (*Gaultheria hispidula*). *Carex deflexa, C. trisperma,* and *Luzula rufescens* are rare in Alberta. *Carex deflexa,* a species of dry, open woodland (Moss 1983), occurs in two patches approximately 400 m apart at the west end of the area. One of these is along a seven-year-old seismic cutline; the other is in a roadside ditch. This species is known from six other localities in Alberta (Packer and Bradley 1984; collections in the Northern Forestry Centre herbarium (CAFB)). *C. trisperma*, a species of bogs and wet woods (Moss 1983), is the predominant sedge throughout the coniferous swamp. It is actually abundant in the area. In general, disturbance is considered a negative factor in influencing the distribution of native flora. However, along portions of certain seismic cutlines less than 15 years old, this sedge has become established in thick mats, almost to the exclusion of other graminoids. It is known from six other localities in Alberta (Packer and Bradley 1984; collections in CAFB). *Luzula rufescens*, a species occurring on the borders of bogs and fens (Porsild and Cody 1980), presents a rather special case. Technically, it has never been reported as occurring in Alberta (Moss 1983; Porsild and Cody 1980; Scoggan 1979). However, "It seems probable that material previously reported from the Swan Hills as *L. acuminata* Raf. (by Moss and Boivin) also belongs here." (in *L. rufescens*) (pers. comm. J.G. Packer). The collection of *L. acuminata* from the Swan Hills in CAFB was revised to *L. rufescens* by Packer. Three small clumps of this species were found in the area, two at the edge of a cutline in the northern portion of the area, and one in a similar habitat towards the west end of the area. The species would appear to have a very localized distribution in Alberta in the Swan Hills-Whitecourt area. The general distribution of the species is Amphi-Beringian with the nearest locality to the Alberta locations being in northeastern British Columbia (Porsild and Cody 1980). *Carex pauciflora*, a species of *Sphagnum* bogs (Moss 1983), is conspicuous and abundant in the "poor fen" area. It is more prevalent here than anywhere else I have seen the species in the Prairie Provinces. I have only encountered this species at one other locality in

Alberta (May Fire Tower south of Fort McMurray), but six other localities in north-central Alberta are indicated in the *Flora of Alberta* (Moss 1983). The species is not considered rare in Alberta, but it is on the Rare Vascular Plants list for Manitoba (White and Johnson 1980). *Gaultheria hispidula* has a rather interesting distribution in Alberta. It occurs at scattered localities in the mountains and eastward in central Alberta in a somewhat localized distribution between the North Saskatchewan River and Lesser Slave Lake (Moss 1983). It occurs across the boreal forest region of the Prairie Provinces, but is rare north of 56°N latitude (Scoggan 1979). It is relatively common at Goose River.

Approximately 135 ha of the peatland have been drained. This is only about ¼ of the total area. The drained area only includes portions of the young Black Spruce swamp. The areas containing the mature Black Spruce stand and the "poor fen" are to be left undisturbed as a control area. None of the species mentioned above is likely in danger of elimination from the area because of this drainage project as all have been found in at least one locality in the control area. However, some changes in relative abundance are likely to occur. It will be interesting to follow what changes do occur in the vegetation over the duration of the project.

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Splachnum luteum, S. rubrum. *Commonly known as Umbrella or Petticoat Moss, the inflated "skirt" at the base of the capsule is believed to attract insects which aid in spore dispersal. As a group, the "dung mosses" are most often found in peatlands.*

Photo: J.D. Johnson