GETTING TO KNOW YOUR PRAIRIE LICHENS

of

Saskatchewan, Canada

Series I

Bernard de Vries
Irma de Vries

Posted/Compiled by: Steve Porter
Conservation Data Centre - Resource Stewardship Branch
Saskatchewan Environment
Revised July 2006

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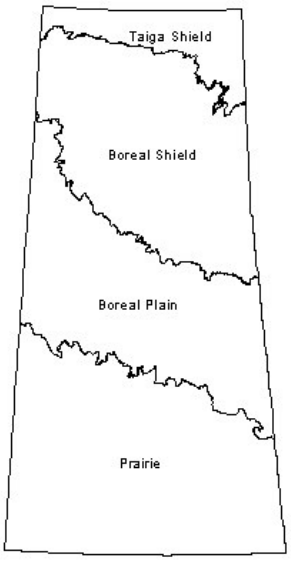
PREFACE

This illustrated list is a welcome to the fascinating world of lichens. Many of you might have seen them as colourful splashes on trees, rocks, and soil, or noticed on old granary and barn roofs as a rusty hue, but did not know what they were.

To most of us these interesting plants are somewhat of a mystery. They have no flowers, leaves nor roots. How then do they survive in often very dry semi-arid places on open windswept prairie or on mountains, and rocks? The answer would be that they are a very special kind of plant, which upon close examination with a good hand lens show that it is composed of two totally different but distinct organisms: a green or blue-green alga visible when the upper layer is carefully removed, resting on colourless fungal strands. This association, known as symbiosis, forms a completely new lichen body with no resemblance to either one of the components. The alga is photosynthetic manufacturing carbohydrates, while the fungus gives shelter to these algae, supports the lichen body, and is slightly parasitic upon the algae to obtain carbohydrates for its own metabolism. This enables the lichen to function as an independent organism in areas otherwise hostile to the algae or fungi. Although the algal component has its own scientific name, the name of the lichen is that of its fungal component.

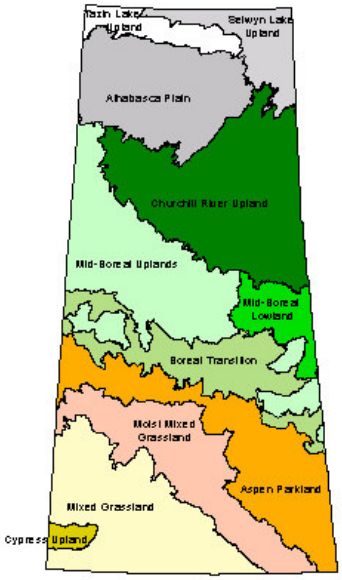
Lichens are extremely sensitive to atmospheric pollution, because of their ability to directly absorb chemicals dissolved in rain, dew or mist through their upper surface, and the delicate balance between the components. Should a toxic element affect the photosynthetic algal cells, the partnership will break down and the lichen dies. For this reason, lichen are recognized as valuable low cost environmental monitors. Some lichens have medicinal uses, yield colourful dyes, or are an important nutrient for large ungulates. First Nation's People also recognized the medicinal and nutritive value of lichens.

Figure 1a Ecozones of Saskatchewan.



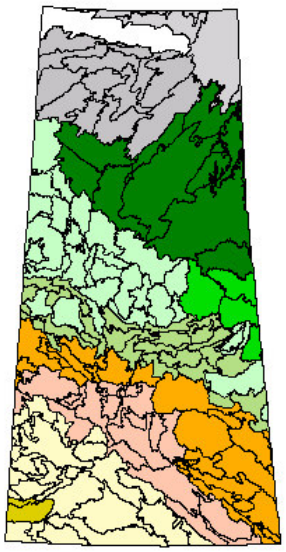
Few non-technical books about lichens are available, and this series is a first for Saskatchewan that includes a non-technical text illustrated with colour photos, and a geographic distribution map showing, the general known localities within a dark shading (see Figure 1c), and a potential range for the species in a light shading (see Figure 1b), using the Ecoregions of Saskatchewan Map (Padbury and Acton. 1994, Figure 1b). Most of the lichens are prairie species, although a few are recorded for the Taiga Shield and Boreal Shield Ecozones in northern Saskatchewan (Rowe. 1972, Figure 1a).

Figure 1b Ecoregions within Ecozones



The series is important, because the user becomes familiar with our prairie lichens which are not well understood, and provides the experience to identify these lichens in the field.

Figure 1c. Landscape Areas within Ecoregions



The series describes 14 common prairie lichens found throughout the native prairie grassland, mostly in southern Saskatchewan, alphabetically arranged by genus, with comments on location, habitat, geographic distribution, description of the species, chemical reactions, and notes on commercial or nutrient values. Common English names are also given for each species.

It is hoped that the list will help naturalists, elementary and high school students, and anyone else interested in lichens to understand their importance in monitoring our environment, and be able to identify some of our prairie lichens in their natural habitat.

All photos, with the exception of Brown-eyed scale lichen, were taken in the field under natural light, generally at 1:1 magnification. with a standard 50m macro lens, 35 mm single lens reflex camera, Ektachrome 100 plus film (ASA 100), and versatile tripod .

Mostly colourful and not difficult to find species have been selected, but the series remains far from complete. A bonus to lichen studies is, that it can be done in all seasons.

Updates on Series 1 will be given from time to time. A similar series on common boreal lichens will be posted at a later date. Comments and suggestions are welcomed.

WARNING

The chemicals Potassium hydroxide, Sodium hypochlorite, and Para-phenylenediamine are hazardous if used inappropriate. The user of these chemicals must ensure that they are used in a well-ventilated area and to avoid skin contact.

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Buellia elegans

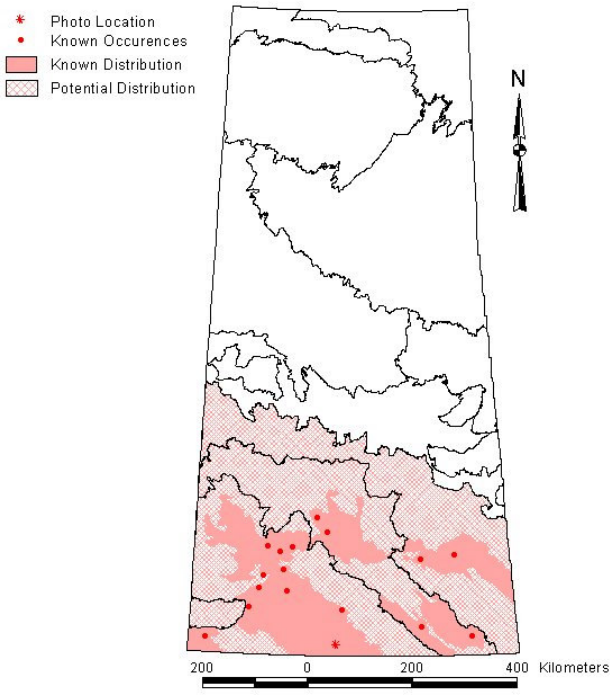
Poelt

Button lichen

Location: Rock Glen, Southwestern Saskatchewan. Prairie Ecozone

Habitat: Dry open calcareous areas in grasslands.

Geographic Distribution: A North American Great Plains species, occurring in Saskatchewan mainly in the southern prairies.



Description: The lichen body appears to be crustose with white small often scale-like or radiate white lobes. The lower side is pale with attached fine hair-like structures. The fruiting bodies are at first immersed, but soon break to the surface, and become tightly attached to the surface. Remnants of the upper surface persists around the thin margin. The disk of the fruiting body is dull black, flat to somewhat rounded and soon losing their frosted appearance.

Chemical Reactions: The upper surface is K+ yellow, C-, PD-, UV-. The inner layer is K-, PD-, or K+ red and PD+ orange-red mostly in small spots.

Chemical Abbreviations: K= potassium hydroxide, C= sodium hypochlorite, PD= para-phenylenediamine, UV-ultra violet light.

Cetraria arenaria

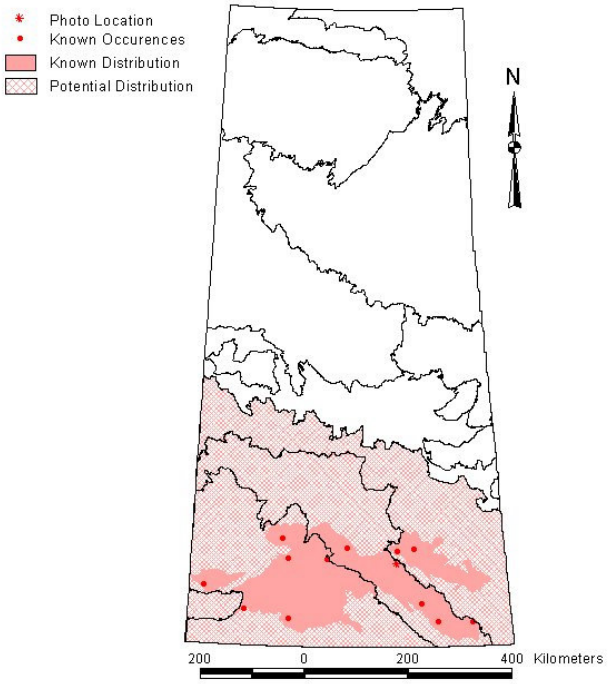
Kärnefelt

Sand-loving Iceland lichen

Location: White Butte Wildlife Preserve-White City, Southcentral Saskatchewan. Praire Ecozone.

Habitat: Common on sandy soil in open grasslands and fields.

Geographic Distribution: Widely distributed across the southern Prairie.



Description: The vegetative lichen body is light greenish-brown with rather flat lobes, often curled in at the margin. Lobes are short, mostly with forked branching spines about 1-4 mm broad, and marginally spotted with small and occasionally rather broad, depressed tiny white dots, which are less frequently found on the upper surface of the lichen. Shiny-brown fruiting bodies are uncommon but do occur on expanded lobe tips.

Chemical Reactions: The inner layer of the lichen is K- and C-.

Chemical Abbreviations: K=potassium hydroxide, C= sodium hypochlorite (common household bleach)

Notes: Superficially this species can be confused with the more northern Iceland lichen (*Cetraria ericetorum* sub-species *ericetorum*) which has narrower lobes, sharply curved to almost fused at the margins, with spinal projections and long white marginal breaks showing the extension of the inner fungal strands to the surface.

Dimelaena oreina

(Ach.) Norman

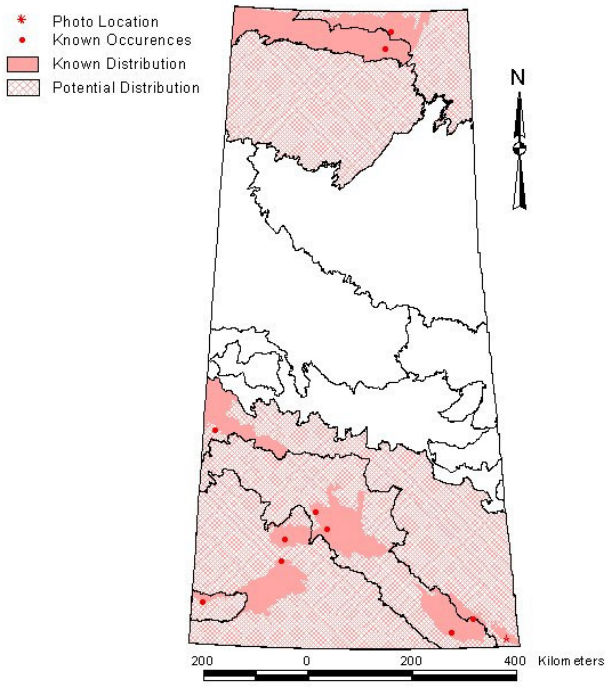
Golden moon glow lichen

Synonym: *Rinodina oreina* (Ach.) A. Massal.

Location: South of Carievale, Southeastern Saskatchewan. Prairie Ecozone.

Habitat: On sunny siliceous rock in semi-arid areas.

Geographic Distribution: A widespread species ranging over grasslands and northern regions of the province in similar habitats.



Description: An interesting lichen with a greenish yellow and mostly circular crustose body, often broken up in small irregular patches in the center, lobes radiating, closely attached to the rock, and often blackening at the margins. Fruiting bodies are closely attached to the upper surface, black with thin margins, concolorous with the lichen body, and at times white frosted.

Chemical Reaction: The upper layer of the lichen body is KC+ gold.

Chemical Abbreviation: KC=potassium hydroxide with added sodium hypochlorite (common household bleach).

Diploschistes muscorum

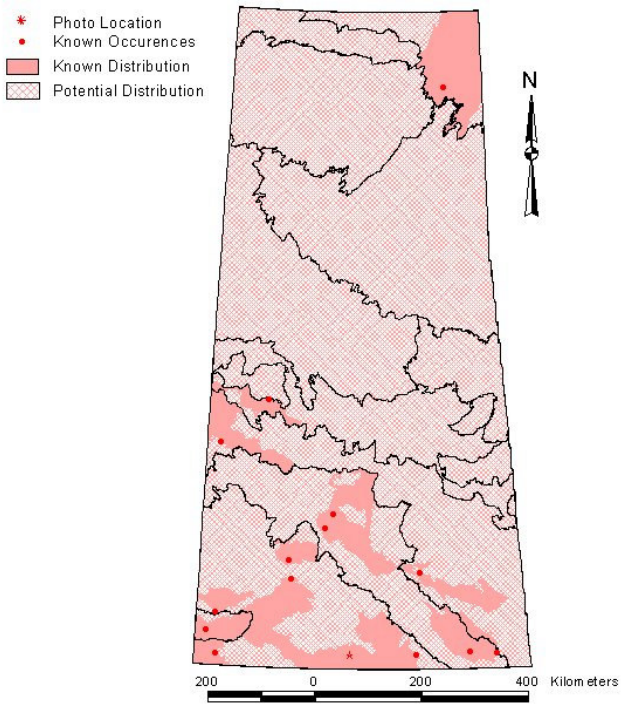
(Scop.) R. Sant.

Cowpie lichen

Location: Rock Glen, Southwestern Saskatchewan. Prairie Ecozone

Habitat: On dry, open sandy or calcareous soils, and mosses.

Geographic Distribution: A common and wide-spread species throughout Saskatchewan.



Description: The vegetative body consists of small to large and divided round to swollen irregular patches, which are smooth or have a fine powdery appearance, forming a grayish to almost white crust. Abundant small embedded fruiting bodies are black, crater-like with a double margin; the outer margin radiate. Disks are open and bowl shaped.

Chemical Reactions: Upper body and sometimes the inner layer are PD-, K+ yellow becoming purple, KC+ red, C+ red.

Chemical Abbreviations: PD= paraphenylene-diamine, K=potassium hydroxide, C=sodium hypochlorite, KC=a combination of the two.

Notes: This is a very interesting lichen, it can establish itself as a parasite on other lichen, often *Cladonia* species, by incorporating the algae of the host. At a later stage it becomes free living.

Fulgensia bracteata

(Hoffm.) Räsänen

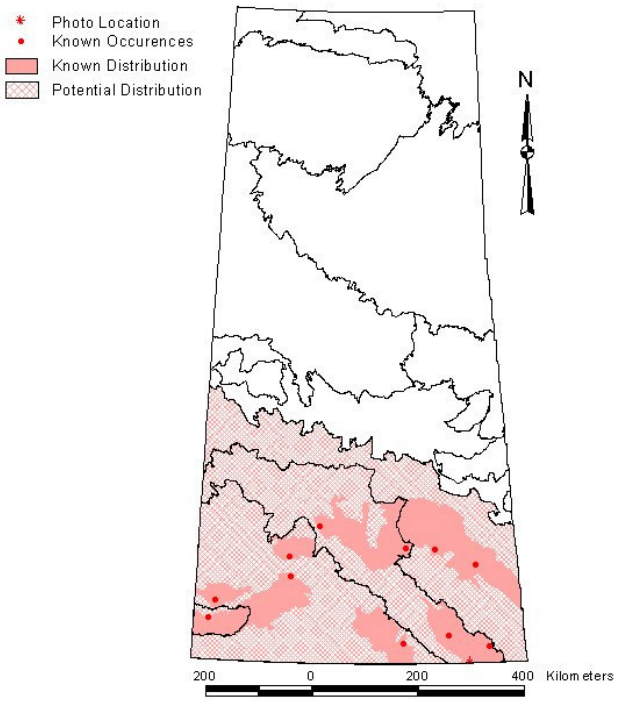
Tundra sulphur lichen

Synonym: *Caloplaca bracteata* (Hoffm.) Jatta (Firedot lichen).

Location: Roche Percee, Southeastern Saskatchewan. Prairie Ecozone.

Habitat: Locally common on open sparsely vegetated dry calcareous soil in native grasslands.

Geographic Distribution: A broadly distributed species of the southern prairies.



Description: This showy lichen has a small irregular rough warty surface which are yellow to almost sulphur coloured marginally, becoming orange-brown toward the center. The upper surface in part frosted , without distinct marginal lobes. The lichen is directly attached to the substratum. The abundant flat red-orange fruiting bodies are tightly attached to the upper lichen body with a thick margin which tends to become thinner upon maturity.

Chemical Reaction: Lichen body and disks are K+ dark purple.

Chemical Abbreviation: K=potassium hydroxide.

Notes: A number of North American species have been misidentified as *Fulgensia fulgens* (Sw.) Elenkin which is a larger lobed lichen of similar colour and range. *Fulgensia bracteata* is very variable and described with subspecies and varieties. It is often found with *Psora decipiens* (Hedwig) Hoffm. (Blushing scale) which has bright small brick-red scale-like lichen bodies with white frayed edges.

Lecanora muralis

(Schreber) Rabenh.

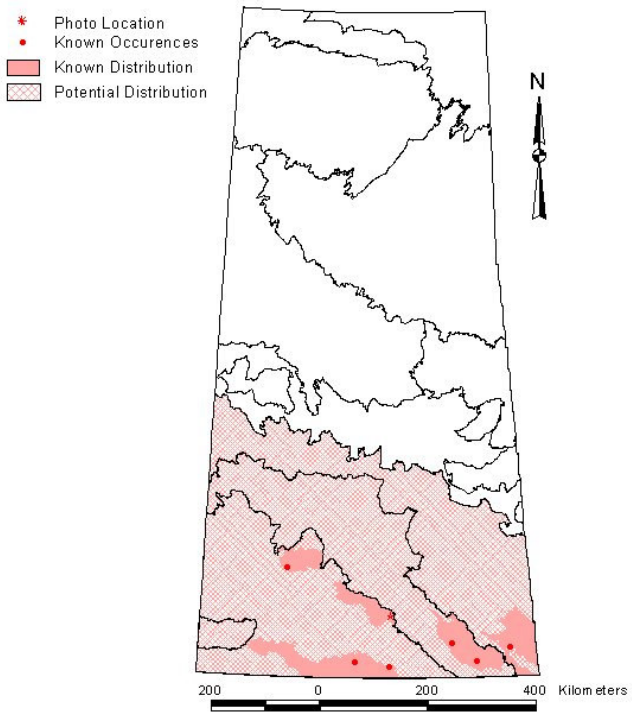
Stonewall rim-lichen

Synonym: *Protoparmeliopsis muralis* (Schreber) Choisy

Location: Avonlea, Southcentral Saskatchewan. Prairie Ecozone.

Habitat: Mainly on calcareous rock, but can occur on other rock types as well. Prefers rocks used as bird perches.

Geographic Distribution: A common and widespread species throughout the North American Great Plains and southern Saskatchewan.



Description: The upper surface of this lichen is yellowish-green and its center broken into small irregular patches, but has flat and closely appressed marginal lobes, which can be entire or angular or somewhat circular at the tips. The algal layer is irregular, and the inner part of the lichen is rather loosely arranged. Fruiting bodies are yellowish to greenish-brown and closely attached, having entire or irregular thick and persistent margins.

Chemical Reactions: None.

Notes: This is a common, variable, and wide ranging lobate species of the *Lecanora* group favouring rocks fertilized by bird droppings. The dark orange-red lichen is *Xanthoria elegans* (Link) Th. Fr. (Elegant sunburst lichen), which also prefers similar rocks, but can also be found on other rock types.

Physcia aipolia

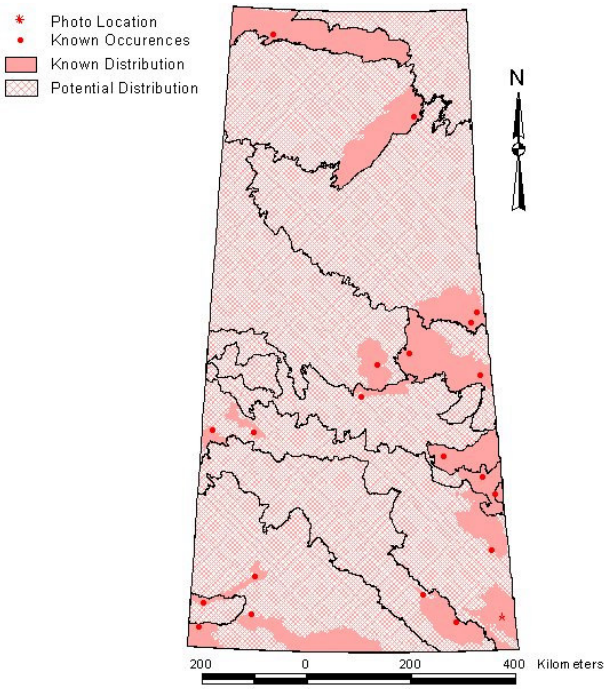
(Ehrh. Ex Humb.) Fürnr.

Hoary rosette lichen

Location: Redvers, Southeastern Saskatchewan. Prairie Ecozone.

Habitat: In open locations on a wide variety of deciduous trees bark and large branches. Seldom on rocks.

Geographic Distribution: Hoary rosette lichen is widely distributed in Saskatchewan and commonly found with other tree lichens. (*Xanthoria* - Sunburst lichens)



Description: This large rosette forming lichen is grayish-white to bluish-gray, with copious white spots on its upper surface. Narrow, separate and radiating flat to slightly hollow lobes are marginally, with upturned tips and sometimes overlapping. The lower surface is dull white to pale brown with many pale to brown fungal outgrowths serving as an attachment to the surface upon which the lichen grows. No vegetative outgrowths are present on the upper surface. The numerous fruiting bodies are red-brown to black and typically heavy frosted, reflected in the common name, with thick, smooth to scalloped margins.

Chemical Reaction: The upper surface, as well as the inner fungal layer, are K+ yellow.

Chemical Abbreviation: K=potassium hydroxide.

Notes: This lichen can be confused with *Physcia stellaris* (L.) Nyl. (Star rosette lichen) which occupies a similar habitat as Hoary rosette lichen, but has no conspicuous white spotting, and with flatter or somewhat rounded lobes. However, Its fruiting bodies are sometimes light frosted, but similar in colour. The more reliable way in separating the two species is the K- reaction for the inner fungal layer of Star rosette lichen. The name Physcia proprobably comes from the Greek word for ‘sausage’ or ‘something long’ referring to the long lobes of some species. The name *stellaris* comes from the Latin *stella*, ‘star‘.

Physconia muscigena

(Ach.) Poelt

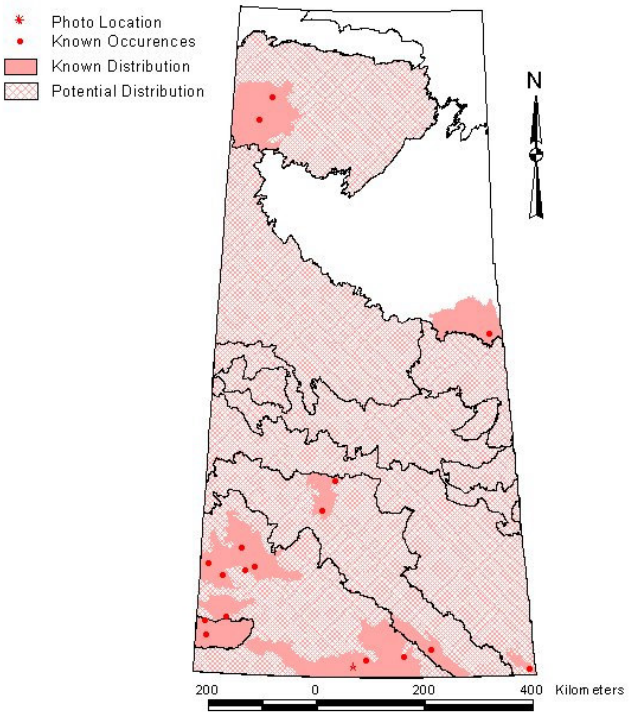
Ground frost lichen

Synonym: *Physcia muscigena* (Ach.) Nyl.

Location: Rock Glen, Southwestern Saskatchewan. Prairie Ecozone.

Habitat: A common species of open grasslands on lime rich soil, moss mats, and base of shrubby vegetation.. Also found in northern regions of the province in similar habitat.

Geographic Distribution: A widespread species in the south and central regions of the province, extending into the southern boreal forest. It has been recorded for the Boreal Shield Ecozone in northern Saskatchewan.



Description: A loosely attached species, which is variable in colour from pale gray brown to dark brown, and lightly to heavily coated with a powdery substance appearing as covered with hoarfrost. The lobes are elongate or short, dissected, distinctly overlapping like shingles, and somewhat hollowed. Vegetative bodies are absent, but fruiting bodies are common with a smooth margin which may have some small lobes. The underside is black with scattered black bottle-brush like filamentous extensions.

Chemical Reactions: K-. C-.

Chemical Abbreviations: K= potassium hydrochloride., C= sodium hypochlorite.

A pdf version of this document can be found at http://www.biodiversity.sk.ca/ftp.htm

Psora decipiens

(Hedwig) Hoffm.

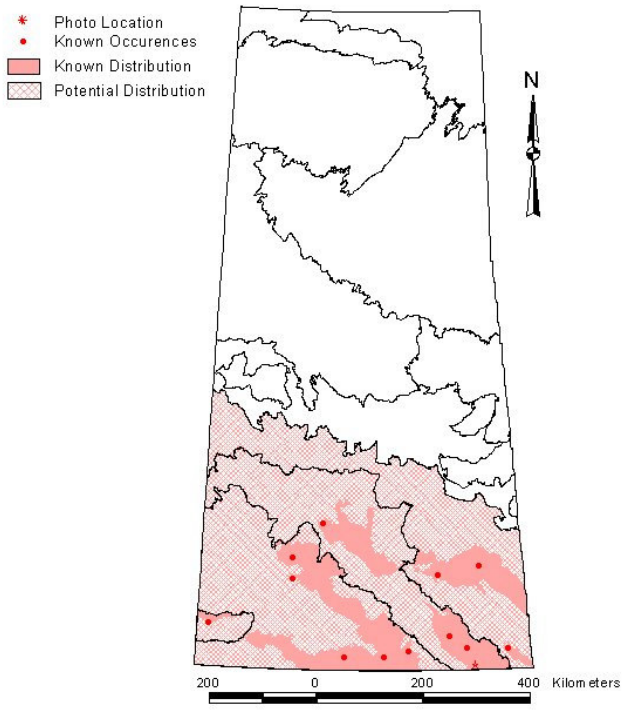
Blushing scale, Sockeye scale (white-edged scale)

Synonym: *Lecidea decipiens* (Hedwig) Ach.

Location: Roche Percee, Southeastern Saskatchewan. Prairie Ecozone.

Habitat: Locally common and scattered over open arid semi-arid grasslands on calcareous soils.

Geographic Distribution: A circumpolar boreal and temperate species found throughout the southern Prairie with populations in northern regions of the province.



Description: The pale red to brick-red and at times orange brown scale-like lobes have occasionally scalloped margins, which are narrowly revolute at the pale white and frayed edges. The lichen body is attached to the substratum by small hair-like outgrowth. The black fruiting bodies are hemispherical and marginally attached on some of the scale-like lobes.

Chemical Reactions: Mostly K-, C- , KC-.

Chemical Abbreviations: K= potassium hydroxide, C= sodium hypochlorite, .KC= a combination of the two.

Notes: *Psora decipiens* is easily recognized by its colour, frayed scale-like lobes, and marginal attached fruiting bodies. It is often found with *Rhizoplaca melanophthalma* (Green rock posy) and *Fulgensia bracteata* (Tundra sulphur lichen). It can be confused with *Psora tuckermannii* which also has white frosted margins, but is chocolate brown.

Psora tuckermannii

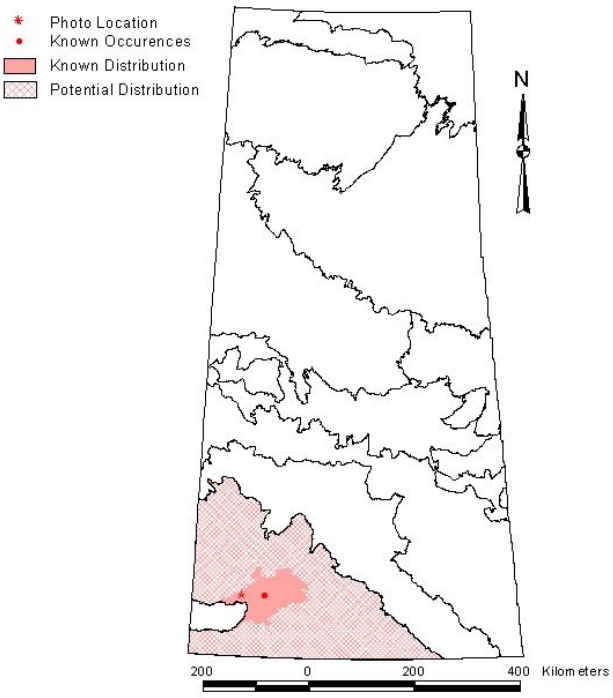
A. Anderson & Timdal

Brown-eyed scale

Location: Carmichael, Southwestern Saskatchewan. Prairie Ecozone.

Habitat: On calcareous sandstone in open native prairie.

Geographic Distribution: Southwestern Saskatchewan and widely throughout western North America.



Description: The smooth and somewhat shiny scale-like lobes are pale yellowish brown to almost chocolate brown with frosty white margins, mostly crowded, overlapping, and 2-5 mm in diameter. The round fruiting bodies are located on the upper site, mostly reddish-brown , and up to 2.5 mm wide.

Chemical Reactions: There are no lichen substances present

Notes: Due to its brown colour and terrestrial habit, this lichen is difficult to find, and as such could be undercollected in our Province. The species could be mistaken for *Psora decipiens* (Blushing scale) which can be found in similar habitat. However, this species has bright brick-red scales with quite noticeable frosty white margins. The specimen photographed is filed in the University of Regina Lichen Herbarium, Saskatchewan.

Rhizoplaca chrysoleuca

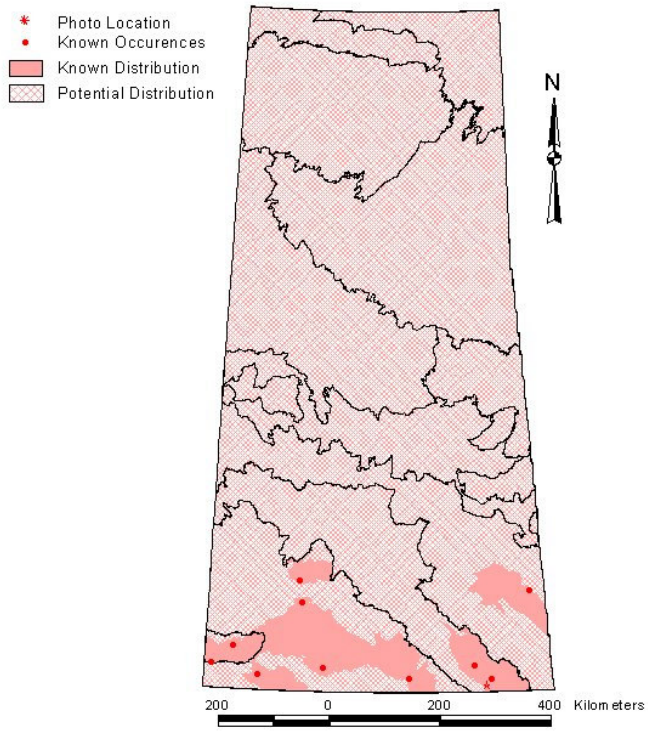
(Sm.) Zopf

Orange rock posy

Location: Estevan, Southeast Saskatchewan. Prairie Ecozone.

Habitat: On acidic or base-rich rocks in open arid to semi-arid locations.

Geographic Distribution: Widely spread throughout Saskatchewan, but mainly a southern grassland species.



Description: Upper side is greenish yellow to yellowish gray, dull, round to irregular, at times with many lobules or becoming columnar. The lobes are thick, cartilaginous, rounded to crenate. Lower surface light brown with darker margins. attached at center of lower surface by a stout central holdfast which attaches the lichen to its substratum. The abundant apothecia are sessile, 2-5 mm in diameter mostly with thick margins, the same colour as the vegetative body, disks are pale reddish to dark orange, hollowed to becoming flat or somewhat rounded.

Chemical Reaction: The species has a complex chemistry with six chemical strains. The upper surface tends to be KC+ yellow-orange.

Chemical Abbreviation: KC= potassium hydroxide/sodium hypochlorite.

Notes: This interesting and showy species ranges throughout most of North America and the Arctic, and is often found with other rock inhabiting lichens. It can be considered semi vagrant, as it can become detached from the rock.

Xanthoparmelia chlorochroa

(Tuck.) Hale

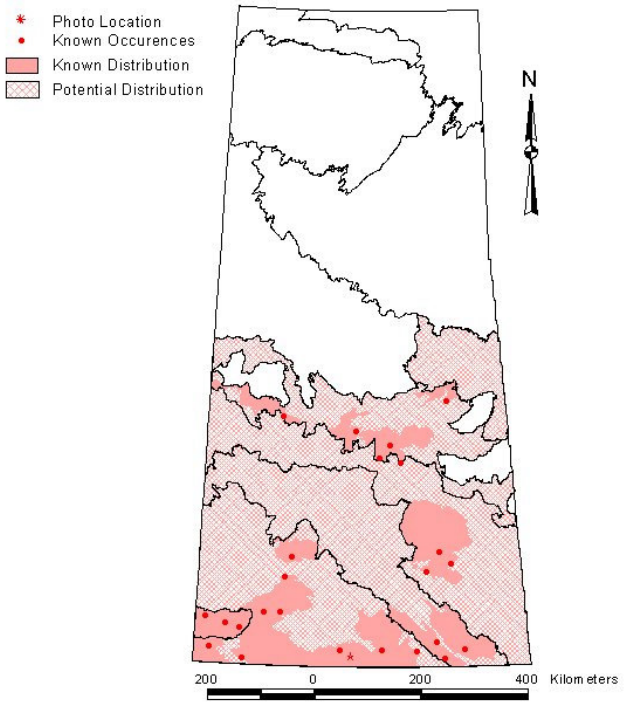
Tumbleweed shield lichen

Synonym: *Parmelia chlorochroa* Tuck.

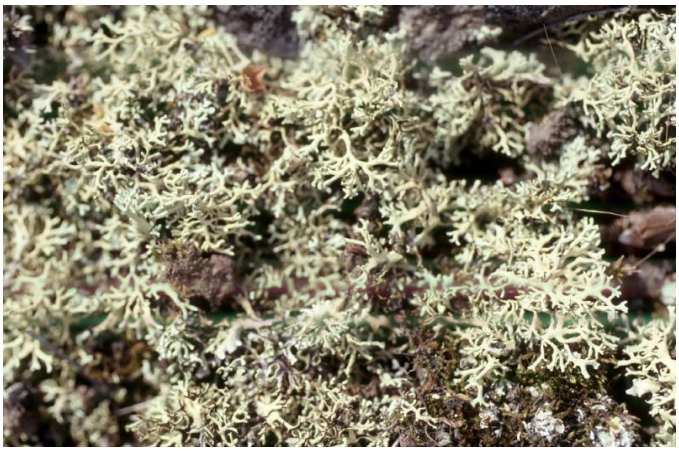
Location: Rock Glen, Southwestern Saskatchewan. Prairie Ecozone.

Habitat: A common species found loosely attached on soil in open windblown semi-arid native prairie.

Geographic Distribution: Primarily a species of the Great Plains, ranging from southern Alberta and Saskatchewan south to New Mexico and Arizona, with a disjunct population in the Reindeer Preserve, Northwest Territories.



Description: This foliose vagrant species forms more or less rounded cushions of long, narrow and more or less leathery lobes, which are strongly reflexed and rounded. The upper part is smooth and yellowish gray. The lower side is pale brown to blackened in older parts with simple or sometimes forked filamentous attachments. Vegetative structures are absent on the upper surface, however a few flat to concave disk shaped dark brown fruiting bodies can occur on older lobes.



Chemical Reactions: The internal layer of the lichen body tests PD+ orange , K+ red , C- and KC.

Chemical Abbreviations: PD= para-phenylenediamine, K= potassium hydroxide, C= sodium hypochlorite, KC= a combination of last two.

Notes: Similar vagrant species are: *Xantho-parmelia neochlorochroa* having a different chemistry and black lower surface, and *Xanthoparmelia norchlorochroa* with a dull black lower surface lacking hair-like outgrowth, and having pronounced reticulate ridges and veins. Its lobes are tube forming. *Xanthoparmelia chlorochroa* is an indicator of good Pronghorn Antelope habitat, where it is an important nutrient in spring and under drought conditions. The species is also an important source for a reddish-brown dye, used by craftspeople.

Xanthoria fallax

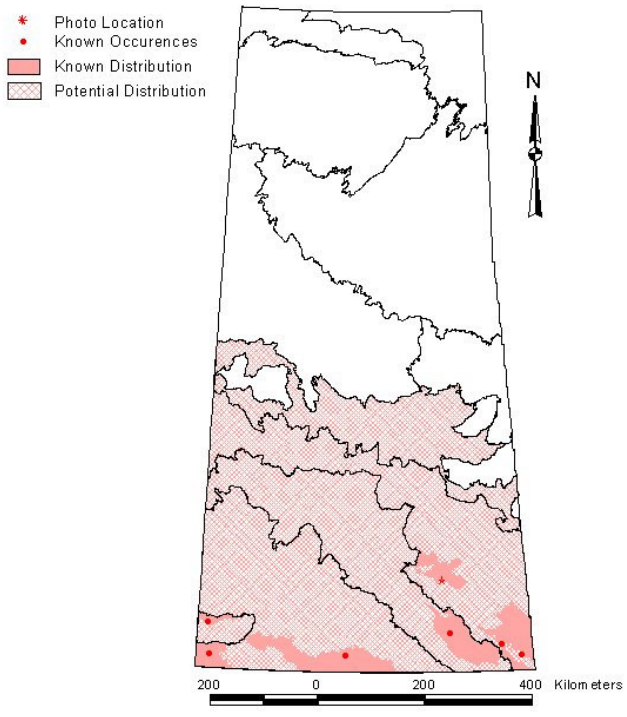
(Hepp) Arnold

Hooded sunburst lichen

Location: Indian Head. Experimental Station, Southcentral Saskatchewan. Prairie Ecozone.

Habitat: On bark of a variety of coniferous or deciduous trees as well as roadside trees or in farm shelter-belts. Occasionally on wood or rock.

Geographic Distribution: A common and widespread across the prairie and fringe of the southern boreal forest.



Description: The yellow to yellow-orange vegetative body is closely attached to its substratum with short narrow to broad lobes, which can be rounded or having slightly raised upturned hood-like tips, bearing powdery vegetative reproductive structures. Fruiting bodies when present are few, sessile, and with thick margins similar in colour as the main body with flat, dull orange disks. On shaded tree bark the colour is pale greenish yellow. The lower surface is white with white hair-like extentions.

Chemical Reaction: The vegetative body is K+ deep purple.

Chemical Abbreviation: K=potassium hydroxide.

Notes: This lichen could be confused with *Xanthoria polycarpa* (Pin cushion sunburst lichen) which has a similar colour, but with abundant fruiting bodies, and found in similar habitat. *Xanthoria fallax* and *Xanthoria polycarpa* often form a species pair on roofs of old barns and other wooden buildings, giving these a characteristic rusty colour. The species name, *fallax,* is Latin for 'deceptive', because the upturned hood-like tips 'hide' a multitude of vegetative bodies.

Xanthoria polycarpa

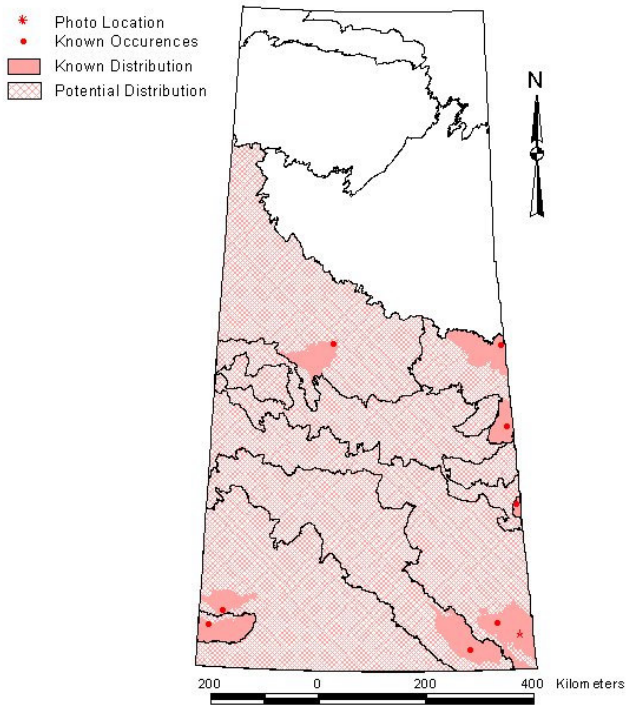
(Hoffm.) Rieber

Pin-cushion sunburst lichen

Location: Redvers, Southeastern Saskatchewan. Prairie Ecozone.

Habitat: On bark, branches and twigs of conifers and various deciduous trees in forests, city parks and shelterbelts.

Geographic Distribution: Widely distributed throughout the Southern Forest and across southern Saskatchewan.



Description: The lichen body is yellow to yellow-orange or often bright orange and almost obscured by numerous rather small, crowded, orange fruiting bodies. It forms small cushions often merging with one an other, having narrow lobes with irregular branching. No vegetative structures are visible. The lower surface is white with specialized structures which have a broad attachment base.

Chemical Reaction: The upper surface and disk of fruiting bodies are K+ dark purple

Chemical Abbreviation: K=potassium hydroxide

Notes: Superficially this species could be mistaken for *Xanthoria hasseana* Räsänen (Poplar sunburst lichen) which is similar in colour and habitat, but having less dense fruiting bodies which often have small white hair-like outgrowth on the lower disk rim. The genus name *Xanthoria*, comes from the Greek word *xanthos*, 'yellow', referring to the yellow colour of the species. The species name *polycarpa*, is from the Greek poly, meaning 'many' and *karpos*, 'fruits', referring to the many fruiting bodies of the species.

References

The following technical manuals are recommended for lichen identification, their common names, and geographic distribution. are recommended:

Brodo, I. M., S. D. Sharnoff, and S. Sharnoff. 2001. *Lichens of North America*. Yale University Press, New Haven. U. S. A.

Esslinger, T. L. 1999. A cumulative checklist for the lichen-forming, lichenicolous and allied fungi of the continental United States and Canada. North Dakota State University: http://www.ndsu.nodak.edu/instruct/esslinge/chcklst/chcklst7.htm (First Posted 1 December 1997, Most Recent Update 19 July, 1999), Fargo, North Dakota.

Johnson, D., L. Kershaw, A. MacKinnon, and J. Polar, with contributions from T. Goward & D. Vitt. 1995. *Plants of the Western Boreal Forest & Aspen Parkland*. Lone Pine, Edmonton, Alberta, Canada.*

Goward, T., B. McCune, and D. Meidinger. 1994. *The Lichens of British Columbia*. Illustrated keys. Part 1-Foliose and Squamulose Species. Ministry of Forests Research Program, Victoria, British Columbia, Canada.

Goward, T. 1999. *The Lichens of British Columbia*. Illustrated keys. Part2-Fruticose Species. Ministry of Forests Research Program, Victoria, British Columbia, Canada.

J. W. Thomson. 1984. *American Arctic Lichens* 1. The Macrolichens. Columbia University Press, New York, U. S. A.

J. W. Thomson. 1997. *American Arctic Lichens* 2. The Microlichens. The University of Wisconsin Press, Madison, Wisconsin, U. S. A.

D. H. Vitt, J. E. Marsh, and R. B. Bovey.1988. *Mosses, Lichens & Ferns of Northwest North America*. Lone Pine, Edmonton, Alberta, Canada.*

Note: Those marked * are recommended illustrated field-books for the beginner.

References Cited

Padbury, G.A., and D.F. Acton. 1994. Ecoregions of Saskatchewan Map. Agriculture and Agri-Food Canada. Available from Information Services Corporation, Saskatchewan.

Rowe, J.S. 1972. Forest Regions of Canada. Ministry of the Environment, Canada. Ottawa, Canada

The SKCDC is always interested in your plant/animal observations. Please visit http://www.biodiversity.sk.ca/ or contact Steve Porter sporter@serm.gov.sk.ca.