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BLUE JAY

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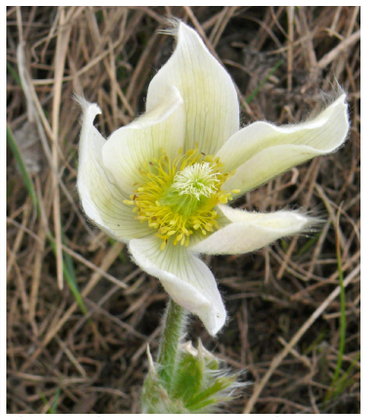
Front Cover: *White Birch* - *Randy McCullough*
Back Cover: *Mystery photo* - *Vicky Kjoss*



Prairie crocus (Anemone patens): *top – typical flower form; bottom left – rose flower form; bottom right – white flower form. (from article page 135)*
– Vladimir Kricsfalusy

Desert firedot lichen - *Bernard de Vries*

Top - Figure 1: Eared grebes for comparison; typical Eared Grebe (near) and chestnut red foreneck (far) © 2012 Heather Cuthill
Bottom - Figure 2: Eared Grebe showing chestnut red foreneck © Don Delaney

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BIRDS

ARE EARED GREBES WITH A CHESTNUT RED FORENECK ABSENT FROM NORTH AMERICAN POPULATION?

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Abstract

Examples of Eared Grebes (*Podiceps nigricollis californicus*) in breeding plumage with chestnut red feathers in their upper breast and foreneck seem to be absent from the North American ornithological literature, while seven records exist in European Black-necked Grebes (*P. n. nigricollis*). A photo search identified seven Eared Grebes, three of them in Canada, affected by the mutation that may simply have been overlooked until now, so the character trait could be widespread in the *californicus* subspecies.

Introduction

During a study on colour mutations affecting the plumage of grebes (Podicipedidae), I noticed that one aberration typical for *P. nigricollis* was considered very rare in European Black-necked Grebes (*Podiceps nigricollis nigricollis*) while it appeared to be completely absent in North American Eared Grebe populations (*P. n. californicus*). The mutation produces a chestnut red coloration in the upper breast and foreneck of the breeding plumage in Black-necked Grebes. At some distance, they resemble Horned Grebes (*P. auritus*). In Europe, a total of seven individuals displaying the condition were recorded. The first was collected in 1883 at Lake Velencze in Hungary.[1] The next observation was much later, in 1969.[2] It was followed by a record in 1974,[3] two records in 1994,[4] a record in 2005 (García Rios, unpublished) and a last record in 2009 (Konter, in press). Except for the first observation and García Rios' sighting from Spain, all other observations were from Germany. In contrast, the North American ornithological literature seems to be silent; not a single record of an Eared Grebe with a chestnut red foreneck could be found. The question arose: whether individuals affected by the genetic mutation had passed unnoticed, or whether they were really absent from North American populations. To check this, I went through over two thousand of my own photos of

Figure 1: Comparison; typical Eared Grebe (near) and chestnut red foreneck (far) (see back inside cover for colour image) *© 2012 Heather Cuthill*

Eared Grebes and I also surveyed photos published on the internet.

A short introduction to genetic mutations affecting the pigmentation of birds

The coloration of the plumage and bare parts of birds results from color pigments. Overall, there are many different color pigments. Most common in birds are melanins followed by carotenoids. Grebes rely almost entirely on melanins for their coloration. There are two different forms of melanin. Depending on concentration and distribution within the feather, eumelanin is responsible for black, grey and dark brown whereas phaeomelanin is responsible for warm reddish-brown to pale buff colors. Both melanins together can give a wide range of grayish-brown colors.[5]

If melanin deposition in feathers is altered, aberrant individuals result. Old age or sickness may cause this, while other aberrations are caused by genetic mutations. In the latter, we generally recognize six different results. Three of them (leucism, dilution and melanism) can be caused by several different mutations, while the other three (albinism, brown and ino) are all caused by a single genetic mutation.[5]

The following explanations are largely based on van Grouw.[5, 6, 7] Albinism is caused by a complete absence of both melanins in feathers, eyes and skin. Generally, all-white plumage, red eyes, pink feet and a pink bill result. Leucism is caused by a total lack of both melanins in some or all feathers. It may affect bare parts, but does not affect the eyes. If all feathers are white, leucism is total, otherwise it is partial. Brown expresses by a qualitative reduction of eumelanin only. Due to an incomplete oxidation, what is ordinarily black or grey becomes brown and bleaches further. A quantitative reduction of one or both melanins is called dilution. Dilution may take several forms, depending on whether one or both melanins are affected. Most common are a quantitative reduction of eumelanin only (isabel dilution) or of both melanins (pastel dilution). The degree of dilution is variable. Affected colors will look faded and may bleach further. A qualitative reduction of both melanins without that the quantities produced are changed is called ino. What is ordinarily black becomes very pale brown to cream; what is ordinarily reddish- to yellow-brown remains hardly visible. The iris turns pinkish, the feet and bill pink. Finally melanism is an abnormal deposit of pigments that may express in three different ways: by an altered distribution, by the deposit of higher quantities including in parts previously uncolored and by a change in the form of melanin produced.

The mutation of interest here is the third type of melanism. It was first described by Harrison[8] who noted that where the chestnut-red melanin appeared, it seemed to replace the other melanin pigments. He[9] proposed to refer to it as erythromelanin. Campbell and Lack[10] considered the abnormal change to chestnut-red occurring in individuals of some species, to be a mutation resulting in a qualitative reduction of eumelanin. Today it is clear that there is no third type of melanin. However, we still lack a detailed explanation on how the change from, in the case of Eared Grebes, black to chestnut red plumage occurs. For the time being, we may continue to call the result erythromelanism.

Material and methods

To check the occurrence of red-necked Eared Grebes in North American populations, I revisited all own photos of the species taken during visits to Manitoba and Saskatchewan (July 2006, May 2008), Alberta (July 2012), California and Oregon (July 2009, May 2011) and Utah (July 2010). In addition, I searched

the internet for photos of Eared Grebes on http://www.flickr.com/ using the search string “Eared Grebe photos”.

Results

Three of my own photos showed Eared Grebes in breeding plumages with chestnut red in their foreneck and upper breast. At Oak Hammock Marsh, Manitoba, an individual displayed a bright chestnut upper breast in July 2006. In its lower foreneck, chestnut tinges existed while the upper neck was entirely black. At Farmington Bay, Great Salt Lake, Utah, I photographed on 1 July 2010 an Eared Grebe which had the foreneck and upper breast interspersed with many chestnut feathers. Out of some distance, this area looked rather red. A grebe in complete breeding plumage with an intense chestnut upper breast and foreneck interspersed with some black feathers was present at Lower Klamath Lake, California, in May 2011.

On flickr.com, an additional four examples were retrieved. R. Michal photographed an Eared Grebe in breeding plumage with a chestnut red upper breast and foreneck at Henderson Bird Viewing Preserve, Las Vegas, Nevada, on 5 July 2009. At Ventura Marina, California, M. Forsman took a picture of a grebe with chestnut red tinges on the foreneck on 16 July 2011. This individual engaged in a body shake and was of particular interest in that it displayed a completely brownish red belly. While the chestnut tinges on the upper breast and lower neck were not very pronounced, the unusual pigmentation of the belly was striking. At Klein Park, Calgary, Alberta, a female in complete breeding plumage showed a chestnut red upper breast and lower half of the front neck on 1 June 2012 (Figure 1). D. Delaney photographed a grebe in breeding plumage with chestnut red lower foreneck and upper breast (Figure 2; see inside back cover) at John E. Poole Wetland, St. Albert, Alberta on 20 May 2013.

Finally, on the internet page www.apogeephoto.com, A. Long showed a photograph of a nesting Eared Grebe with chestnut red upper breast and foreneck. Place and date of his picture were not indicated, but it was probably taken around 2001 in Colorado.

I may add that at least two of the erythromelanistic individuals bred successfully as they were caring for chicks, one was nesting and two others appeared to be paired to normal Eared Grebes.

Discussion

Similar to Europe, a total of eight Eared Grebes having chestnut red feathers in their upper breast

and foreneck were found in North America, in a much shorter time frame. Three of them were recorded in the Canadian prairie states. This suggests that the mutation may be widespread and is simply overlooked in Canada and in the USA.

Affected Eared Grebes resemble the now extinct Colombian Grebe *Podiceps andinus*. The latter is by some considered a species of its own, by others a subspecies of *P. nigricollis*. It is conceivable that in ancient times a small population of Eared Grebes in which the gene for chestnut melanism was widespread became isolated in the Bogota highlands. Considering that melanism is generally a Mendelian dominant,[11] erythromelanistic grebes had a good chance to completely invade this subpopulation rather rapidly. Even with recessive alleles, this could have been achieved. In general, low population sizes strongly contribute to loss of genetic variation. On average, this increases the level of homozygosity.[12] Through sexual selection, the genes for the expression of the trait and the genes for mating preferences for the trait may then become genetically correlated.[13] Assortative mating may thus have produced a subpopulation of Eared Grebes with a different appearance from the parental stock. In this case, DNA investigations should reveal genetic differences to *Podiceps nigricollis californicus* that would only warrant subspecies status.

To what extent the mutation causing erythromelanism in Eared Grebes may be dominant or recessive cannot be directly investigated in the field. There, we may only find out to what extent the expression of the trait is widespread. Its occurrence may occasionally challenge the identification skills of birdwatchers as at some distance confusion with Horned Grebes becomes possible. The very limited number of observations suggests that erythromelanistic Eared Grebes present a curiosity that contributes to genetic variability in the species rather than anything else. The trait as such does not seem to provide any disadvantages with respect to health or fitness to the individuals concerned. The pairing and breeding success of the individuals retrieved a priori supports this statement. The occurrence of these aberrant individuals and their chances for successful pair bonding and breeding should be further investigated in the field.

Acknowledgement

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proposals that contributed to the quality of the final article. Many thanks to the editors for gaining permission and to the photographers for granting permission to use the two photos of erythromelanistic grebes.

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LONG-EARED OWL NESTING PHENOLOGY AND HABITAT IN CENTRAL ALBERTA

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The Long-eared Owl (*Asio otus*) is a secretive nocturnal owl found in open and sparsely forested habitats across North America and Eurasia between 30° and 65°N latitude.[12] In Alberta, it is found in the Boreal Forest, Foothills, Grassland, Parkland, and Rocky Mountain Natural Regions, where they prefer fragmented habitats containing dense woodlands or shelterbelts for nesting and roosting and open areas for hunting.[7] It is a year round-resident, but it's overwintering ecology is relatively unknown.[2,7] The Long-eared Owl is considered `Secure` in Alberta,[1] although information on populations, trends, specific habitat use and even distribution are poorly understood.[9,12] Banding data from Saskatchewan suggest there is inconclusive evidence for population declines, and that populations are cyclical.[10]

The first step in managing wildlife populations is having knowledge of distribution and abundance.[14] Owls are elusive, which makes them difficult to study and monitor.[8] In 1988, a volunteer raptor nest card program was initiated by Alberta Environment and Sustainable Resource Development (Alberta ESRD) to encourage raptor banders and researchers to collect additional information on nest locations and breeding habitat use of birds of prey. This program developed into the Prairie Nest Record Scheme and Alberta Raptor Nest Card Programs. The Alberta Raptor Nest Card data are stored with Beaverhill Bird Observatory and data are submitted to Alberta ESRD and the national NestWatch Program run by Bird Studies

Canada. The Beaverhill Bird Observatory has been analyzing the phenology of a variety of raptor species from data collected in the nest card program.[16,17,18,19] This paper addresses the timing of nesting and breeding habitat of Long-eared Owls nesting in central Alberta, based on nest banding data collected between 1987 and 2011.

Methods

The study area was located in central Alberta (latitudes 52.5° to 54.6°, longitudes 110.5° to 114.2°), surrounding the city of Edmonton. Nests were located in the Aspen Parkland and Boreal Natural Regions. Nests were found by one or more of: 1) visiting known nesting sites of other species that build the stick nests; 2) looking for birds on territory in the spring; or 3) through contact with landowners who found pairs or nests on their land. For each nest, banders collected information on nest type (natural or man-made), nest height, tree height, nest habitat, surrounding land use, and banding data including an estimate of the age (in days) of the young at the banding time.[3,20] The age at banding was determined by experienced banders using descriptions of growth and development.[20,23] Developmental changes include, eyes open at five days, second natal down at two weeks, and flight feathers developing into their second week with vanes erupting as they are ready to leave the nest in the third week. All data was entered into Microsoft Excel for analysis.

The estimated date of Long-eared Owl hatching was calculated by subtracting the age (in days) of the oldest-aged young from the date of banding. Laying date was estimated by subtracting the number of days required for incubation from the estimated hatch date. Fledging date was estimated by adding the number of days required for fledging to the estimated hatch date. The time required for incubation and fledging was determined as the largest number of days reported in published literature. The estimated number of days needed for incubation and fledging used for this paper were 28 and 21 days respectively.[6,12,23]

Results and Discussion

There were 59 nest records submitted for Long-eared Owls. The average laying date was May 7 (range Apr. 11 to June 11) (Figure 1), the average hatching date was June 4 (range May 9 to July 9), and the average fledging date was June 25 (range May 30 to July 30) (Figure 2). In Idaho, first clutches were usually laid between mid-March and mid-May.[11]

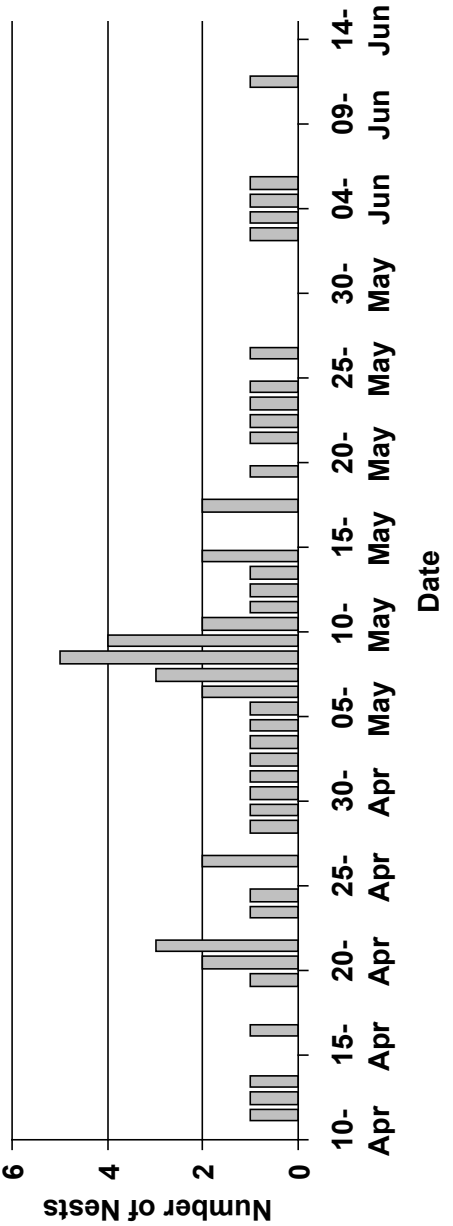

Figure 1. Estimated egg laying dates of the Long-eared Owl in central Alberta 1987 to 2010.

Of the 59 nests, 6 failed (no young fledged) and 53 were considered successful (one or more young were ready to fledge at banding time). Egg counts were present for 25 nests, and averaged 4.9 eggs per nest (range 3 to 7, SD=0.93). Murray (1976) found the average clutch size for Long-eared Owls in North America was 4.5 eggs per nest (range 2-10), and number increased as you went north and west. Of the successful nests (n=52) the average brood size was 3.7 young per nest (range 1-6). Average number of young fledged per successful nest reported ranged from 3 to 4.5 in the United States.[5,12]

There were habitat data available for 57 Long-eared Owl nests. Fifty-four nests were stick nests and three were man-made platforms. Twenty-six stick nests were described in further detail as being originally built by American Crow (*Corvus brachyrhynchos*) (6), Black-billed Magpie (*Pica pica*) (16), Cooper`s Hawk (*Accipiter cooperii*) (2), Sharp-shinned Hawk (*Accipiter striatus*) (1), and squirrel (1). Most (44%) nests were found in willow, and the average height of nests was 14.8 feet (range 7 to 36 feet, SD=7.04). Nests were found most often in Grassland/Shrubland (Table 2), and were usually in isolated groups of trees or shrubs surrounded by

Table 1. Long-eared Owl nest-tree types in central Alberta.

Nest Tree -type	Number of Nests (%)
Black Spruce (Live)	11 (19)
Maple (Live)	1 (2)
Trembling Aspen (Live)	6 (11)
White Spruce (Live)	14 (25)
willow (Dead)	2 (4)
willow (Live)	23 (40)

Table 2. Habitat-types surrounding Long-eared Owl nests in central Alberta.

Habitat-type	Number of Nests (%)
Coniferous Forest	6 (11)
Forest (type not specified)	2 (4)
Grassland/Shrubland	28 (49)
Mixedwood Forest	14 (25)
Parkland	5 (9)
Urban Treed/Shrub	2 (4)

crops. Other habitats described nearby included horse pasture, overgrown fields, unoccupied and occupied farmsteads. Many nests were found in the same woodlots for multiple years, and on the rare occasion the same nest was used in multiple years.

Throughout their North American breeding range, Long-eared Owls have been found nesting in dense or brushy vegetation amidst open habitats.[12] They used hedgerows along farm fields in Montana (D. Holt pers. comm. 2010). Typically stick nests were used and of 130 nests found in southwestern Idaho, 91 were built by Black-billed Magpie, 38 by American Crow, and one in a cliff cavity.[13] Long-eared Owls also commonly use nests built by Common Ravens (*Corvus corax*), Cooper's Hawks, and various *Buteo spp.*[3,4,21]

Population declines of Long-eared Owls have been caused by habitat alteration, forest succession, urbanization, competition with Great Horned Owls (*Bubo virginianus*), loss of habitat for prey species, rodenticides, shooting, and habitat loss.[9,12] If habitat alteration is to occur, occupied nest sites need to be protected. Although young Long-eared Owls leave the nest at about 21 days, they are still flightless (branching stage), and reside in surrounding vegetation.[11,23] They are capable of short flights at 35 days and are fed by parents for up to 11 weeks.[22] Therefore, occupied Long-eared Owl nests and the adjacent habitat should not be cleared from mid-April through mid-August in central Alberta.

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AN OBSERVATION OF GROUND FEEDING AND COPROPHAGY BY A COMMON NIGHTHAWK IN NW MANITOBA

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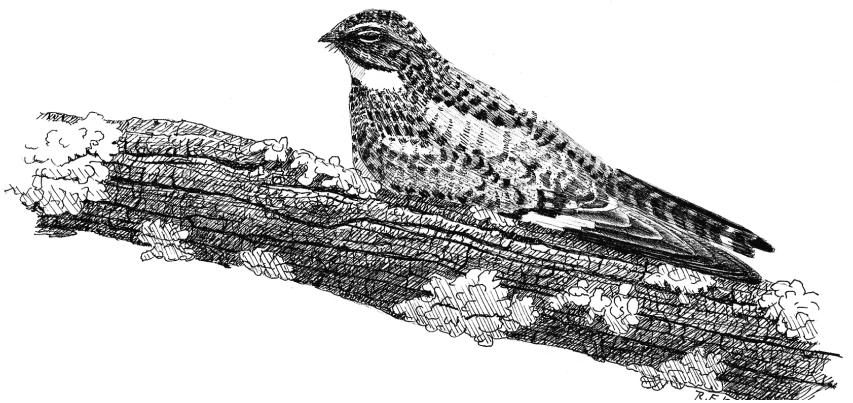
The common nighthawk, *Chordeiles minor*, reaches its northernmost summer range near the northern boundaries of the Canadian Prairie Provinces. Although the IUCN lists its status as "of least concern", its decline in recent years has been alarming, leading to it being classified as "threatened" by COSEWIC in 2007.

Our observations took place on 9 July 2013 at about 1900 hr at the Bain Lake fishing outpost (58° 54' 48"N; 99° 13' 55"W.) of Gangler's North Seal River Lodges, in northwest Manitoba. The outpost consists of a number of small buildings in a partially-cleared area with scattered white, black spruce and white birch. The weather was overcast, the air smoky from nearby forest fires and the temperature about 12° C. Our observations were made using 7 x 42 and 10 x 42 binoculars.

The first observation of the common nighthawk was as it flew past one of us (RFK) just outside the cabin at less than 2 m distance. This was a startling experience because of the bird's close proximity and the rapidity of its flight.



Line drawing of common nighthawk *- Rudolf Koes*

Then, when both observers were inside the cabin, a bird (presumably the same individual) flew through the same clearing in a very fast manner, passing our window less than 10 m away at a height of about 4 m above the ground. This happened more than once. We observed that these "fly-pasts" by the bird were part of wide circles of about 80 m diameter. On the last observed "lap" the bird landed on the sandy ground in the clearing directly in front of our observation window.

It spent a few minutes on the ground observing its surroundings, then picked up and ate some ants. It then shuffled around and ate more ants. It appeared to be searching in a determined manner. It then picked up and ate about 7 or 8 white objects from the ground. Total observation time on the ground was about ten minutes; the bird eventually flew away and was not seen again.

After observing these events we went outside to identify the remaining white objects. We discovered that they were old, bleached feces of a carnivore. Ken Poitras, the camp manager, told us that the scats were those of a gray wolf and had been present since the previous year (2012). There are no domestic dogs in the area.

Common nighthawks are virtually never seen feeding on the ground because like other members of the nightjar family, they are aerial feeders. We speculate that this bird was eating the remains of carnivore feces to supplement its diet with calcium carbonate. Barclay has shown that bats and those birds that are primarily aerial insectivores may have life history consequences due to the limited amounts of calcium in their diets. Female birds deplete their own calcium stores to meet the demand of growing offspring; in this case the bird found a ready source of calcium. [1] Secondly, it is important to reiterate that this was not a random event because the bird appeared to be purposefully searching for both ants and feces. Its repeated flight circuits over the clearing were possibly to examine the items and to check the safety/ feasibility of landing to eat them.

Common nighthawk on post
- Anne Brigham

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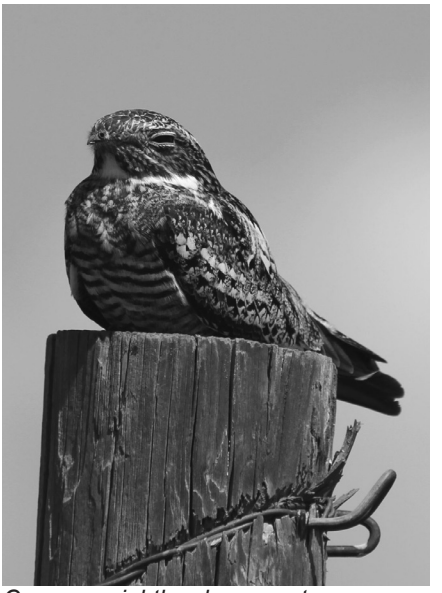

Common nighthawk on post
- Anne Brigham

Common nighthawk on post *- Anne Brigham*

PLANTS

NOTES ON BIOLOGY AND ECOLOGY OF THE PRAIRIE CROCUS (*ANEMONE PATENS* L.) AND ITS CURRENT STATUS IN SASKATCHEWAN

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INTRODUCTION

The prairie crocus (*Anemone patens* L. *sensu lato*) is a perennial herb widespread through the temperate regions of the Northern Hemisphere, comprising a few different subspecies.[1] It ranges from Europe to North America, passing through Central, North and Eastern Europe as well as Central and North Asia, and reaching the central part of North America covering a wide range of climatic and habitat conditions. It should be noted that *A. patens* var. *multifida* Pritz. is confined to the eastern section of the species' distribution range (Asia–North America), while the western section (Europe) is dominated by *A. patens* var. *patens*. Overlapping of these taxa occurs in Central Asia.

A. patens is considered to be resistant to disturbances and can tolerate human influence to some extent. However, its conservation is of growing concern in some parts of the world, especially in Europe where the general population is dramatically declining and hence this species is included in the European Red List of vascular plants,[2] as well as in national Red Data Books of most European countries where this plant is present. In North America, *A. patens* is relatively well represented in the United States and Canada and has limited legal protection in some of the states and provinces of these countries. This plant is strongly associated with native prairies,[3] which are some of the most endangered ecosystems of North America. For the whole continent, native mixed and short-grass prairies have declined to less than 20% of their original extent.[4] In the prairie provinces of Canada, although it

is a widespread and familiar plant, much is still unknown about the species' biology and ecology as well as the processes that may threaten its local survival, for example in Saskatchewan, where the range of *A. patens* has been contracting over the past few decades, particularly in the vicinity of major urban centres like Regina and Saskatoon.[5,6,7]

A. patens is an important species not only from a biological and ecological perspective but also from a cultural point of view, being present in horticulture, traditional medicine, folklore and symbols. As a widespread plant across North America, *A. patens* has been used by many native tribes as a treatment for several illnesses. For example, in Saskatchewan the Blackfoot applied a poultice of crushed leaves topically as a counterirritant. They also used this plant to speed birth delivery by taking a decoction of the plant.[8,9] *A. patens* has an important symbolic value among North American native peoples, as well as some Scandinavian and Slavic nations in Europe. As in ancient Greece, this plant is a herald of the arriving spring.[10,11] *A. patens* is also present in more "formal" symbolism. In Europe this species is adopted as the official floral emblem of two provinces – Häme and South Karelia, Finland. In North America *A. patens* is considered to be the provincial flower of Manitoba and the state flower of South Dakota. It also appears on the Coat of Arms of Manitoba and of the City of Winnipeg. Recently, a special monument was erected in Arden, Manitoba to celebrate *A. patens* as a heritage plant.[12] The image of *A. patens* has also been profusely used in collectable items, including postage stamps in many countries and the world's purest gold coin in Canada.[13]

The goals of this study of *A. patens* are to (i) clarify its taxonomic status, (ii) expand the current knowledge of biology and ecology of the species, and (iii) contribute to biodiversity conservation in Saskatchewan.

METHODS

Study Site

During May–July of 2011 and 2012, we conducted studies of the biology and ecology of *A. patens* and surveyed its distribution in Saskatchewan, placing a particular emphasis on provincially protected areas. Surveyed sites included Prince Albert National Park, The Battlefords Provincial Park, Cypress Hills Interprovincial Park, Redberry Lake Biosphere Reserve, and several conservation areas in the city of Saskatoon and its vicinity: Beaver Creek,

Cranberry Flats, Crocus Prairie, Kernen Prairie, McKercher, Northeast Swale, Peturrson's Ravine, Saskatoon Natural Grassland, and Wanuskewin Heritage Park. For more details on the distribution of *A. patens* in Saskatchewan refer to the study by Kricsfalusy et al.[7]

On 19 July 2011, we sampled a patch of fescue prairie on private land about 25 km northwest of Hafford which is located within the Redberry Lake Biosphere Reserve area (Figure 1). In the process, we found a flowering population of *A. patens* growing on a heavily grazed pasture that was separated from the fescue prairie by a fence. Some of the plants were evidently flowering repeatedly, because they bore well-formed seed heads from spring flowering as well as newly opened flowers. The new flowers were smaller and paler in colour than those we had observed in other populations during the regular April-May flowering season. Because of this unusual mid-summer flowering event, we re-visited this site next year, on 7 July 2012. This time there was no observed mid-summer flowering, and only a few plants had flowered and fruited earlier in the spring.

Sampling Approach

We performed a detailed survey of *A. patens* in the study site within a 10 m × 10 m plot that was staked out over a representative part of the population. The site location and the following conditions of the population were recorded: elevation (obtained using a Garmin eTrex handheld GPS unit), aspect, slope position, percent vegetation cover, litter, bare soil, and type and degree of disturbance (grazing, trampling, burning, burrowing, and invasive species). All higher vascular plant species within the plot were recorded, along with their percent cover.

Soil samples were taken so that they contained a mix of the upper 30 cm horizon where the roots of *A. patens* are mainly distributed. Rangeland type was estimated based on land surface and soil profile examination according to Thorpe.[14]

RESULTS & DISCUSSION

Taxonomic Considerations

A. patens is commonly known under several names in different parts of the world, such as prairie crocus, prairie smoke, prairie pasqueflower, eastern pasqueflower, American pasqueflower, European pasqueflower, sticky pasqueflower, pulsatille, pulsatille multifide, crocus anemone, cutleaf anemone, gosling plant, lionsbeard, wild crocus, windflower

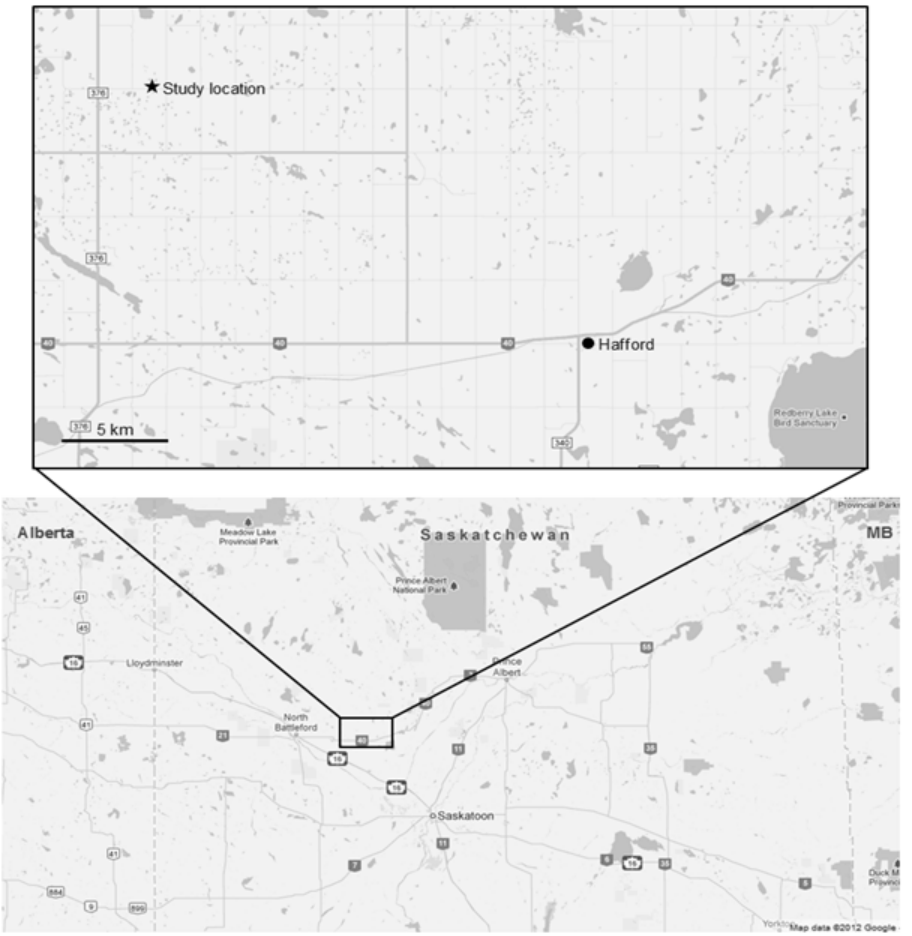

Figure 1. Location of the study population of Anemone patens *near Hafford, Saskatchewan (N 52°50'32" W 107°39'39").*

and others. *A. patens* belongs to the buttercup or crowfoot family (Ranunculaceae). It is interesting that the major common name, prairie crocus, is incorrect and misleading from a scientific point of view. It was given to this plant by the European settlers that colonized the American prairies, as it reminded them of the true crocus of Europe, which in fact belongs to the genus *Crocus* in the iris family (Iridaceae).

While the vast majority of taxonomic treatments of the flora of Europe and Asia include this taxon under the genus *Pulsatilla* Miller, most American authors prefer to place it in the genus

Anemone L. According to Dutton et al.,[15] *A. patens* is represented by the var. *multifida* in North America. However, there still remains some controversy over the taxonomic status of *A. patens*. Review of the major treatments and existing databases of the flora of Canada shows that the primary name for this taxon until the late–20th century was *A. patens* var. *wolfgangiana,* after which the majority of sources have used *A. patens* var. *multifida*. Although *A. patens* var. *wolfgangiana* is still being used by some authors (Table 1), *A. patens* var. *multifida* has priority and it should be applied as the legitimate name in modern floristic treatments.

There are two "atypical" colour forms of *A. patens*, with rose and white flowers respectively (Figure 2). *A. patens* var. *rosea*, characterized by pink flowers, has been described by Cockerell[16] in North America. We found some plants belonging to the var. *rosea* during our field surveys in the city of Saskatoon (Crocus Prairie) in 2011. Albino individuals of *A. patens* have been described as var. *albo–lutea* in Europe[17] and f. *stevensonis* in North America.[18] The holotype of the latter form is deposited in the AAFC National Collection of Vascular Plants and the specimen was collected in 1960 near Brandon, Manitoba by G.A. Stevenson, hence the name. Later, this form was found in two different locations near Carlyle, Saskatchewan by Silcox in 1995 (#142755 SASK)[19] and in 1998 (#145264 SASK).[19] We also observed a few plants identified as f. *stevensonis* during our field surveys in the city of Saskatoon (Northeast Swale) in 2012.

Features of Life Cycle

The mid-summer flowering individuals in the population of *A. patens* located northwest of Hafford (see Figure 1) were found to have abnormally light-coloured (almost white) tepals, in contrast to the normal pale lilac flowers. Although looking very similar to the plants with white flowers identified as *A. patens* f. *stevensonis*, the individuals in the study population cannot be classified as belonging to this form. They are most likely individuals with bleached flowers. Because of the late flowering these plants were exposed to higher solar radiation and temperature regimes than in the spring which caused flower bleaching.

The mid-summer time of flowering (July) was also highly unusual, given that the normal flowering of *A. patens* in the region occurs from April to early May.[7] To the best of our knowledge, no records exist of *en masse* flowering of *A. patens* in mid-

Figure 2. Prairie crocus (Anemone patens): *top – typical flower form; mid – rose flower form; bottom – white flower form. (see inside front cover for colour images)*

– Vladimir Kricsfalusy

Table 1. Primary scientific names of *Anemone patens* in the Canadian floras and floristic databases

Taxon	Looman and Best 1979[28]	Moss 1983[29]	Scoggan 1957[30]	Scoggan 1978[31]	Boivin 1968[18]	Burchill 2002[32]	Harms 2006[33]	FOIBIS 2005[34]	Aiken et al. 2007[35]	VASCAN 2012[36]
Anemone patens L.		+		+				+		
A. patens L. var. *multifida* Pritz.									+	+
A. patens L. var. *wolfgangiana* (Besser) Koch	+		+		+	+				
Pulsatilla patens (L.) Miller ssp. *multifida* (Pritz.) Zämelis							+			

summer. There are only some indications that extent of the formation of leaf rosettes and of flowering and fruit-bearing shoots depends on weather conditions such as winter temperatures, snow cover, autumn precipitation, temperature, and sunshine duration in spring.[20]

According to Borisova,[21] floral buds contain fully mature floral organs by June, allowing some individuals to flower for a second time in the early autumn (September) in Kazakhstan. In our opinion, this is the most likely explanation for the mid-summer repeated flowering we observed in the study population. Given that the population is located on intensive pasture, it is quite likely that the flowers produced in the spring failed to set seed due to grazing and trampling by cattle, which stimulated the development of the new fully formed flowering buds. This is supported by the fact that in 2011, new flowers significantly outnumbered old (dried) flower stalks from spring flowering, with most of the observed generative plants showing new flowers only.

Secondly, the summer of 2011 was relatively wet for this climatic region, and the input of moisture may also have been a flowering stimulus. The consumption of the newly formed floral buds in the mid-summer repeated flowering would also explain the relative lack of flowering plants in the following season (2012).

Community Ecology and Management

The *A. patens* population near Hafford was situated on a pasture located on a gentle south-facing slope (3°). It was evidently strongly grazed and trampled by cattle, with a significant amount of bare soil (30%), and showed no evidence of any recent burning. The vegetation community can be interpreted, according to the classification by Thorpe[14], as Western Porcupine Grass – Northern Wheat Grass – Sedge – Pasture Sage (*Hesperostipa curtiseta – Elymus lanceolatus – Carex* sp. – *Artemisia frigida*) type on the Loam Ecosite in the Aspen Parkland ecoregion. The vegetation cover was dominated by several graminoid species and a variety of forbs. In total, 33 vascular plant species were recorded within the 100 m^2 plot (Table 2). Most species were native, but there was a significant presence of invasive plants such as Kentucky blue grass (*Poa pratensis*), smooth brome (*Bromus inermis*), white sweet clover (*Melilotus albus*), yellow sweet clover (*M. officinalis*), and dandelion (*Taraxacum officinale*). Overall, this grassland community experiences moderate to severe health alteration caused mainly by overgrazing and establishment of invasive plant species. Based on the vegetation structure and species composition this community is identified as only 52% similar to reference community Plain's Rough Fescue – Northern Wheat Grass – Western Porcupine Grass (*Festuca hallii – Elymus lanceolatus – Hesperostipa curtiseta*), which occurs in optimal growth conditions with reduced grazing impact.

In North America *A. patens* is strongly associated with native grasslands,[3] particularly the endangered fescue prairie.[22] Fescue prairie, which has declined to less than 1% of its original range in Saskatchewan, is an important grassland type for *A. patens*. In the study vegetation community, the cover of rough fescue (*Festuca hallii*) was estimated as being only 3%, compared to 7% (of biomass) in the reference community.[14] This indicates a decline of rough fescue and its potential loss in overgrazed grassland habitats.

A. patens has been reported to

Table 2. List of vascular plant species recorded in the study population of *Anemone patens* near Hafford, Saskatchewan; vegetation community: Western Porcupine Grass – Northern Wheat Grass – Sedge – Pasture Sage (*Hesperostipa curtiseta – Elymus lanceolatus – Carex* sp. *– Artemisia frigida);* sampling plot: 10 m x 10 m

Plant Species	Cover, %
Forbs	
Androsace septentrionalis L.	<1
Anemone patens L.	12
Antennaria aprica Greene	15
Boechera grahamii (Lehmann) Windham & Al-Shehbaz	<1
Artemisia campestris L.	<1
Artemisia frigida Willd.	15
Astragalus agrestis Douglas ex G. Don	<1
Erigeron caespitosus Nutt.	1
Geum triflorum Pursh	3
Heterotheca villosa (Pursh) Shinners	<1
Melilotus albus Medik.*	1
Melilotus officinalis (L.) Lam.*	2
Oxytropis sericea Nutt.	1
Packera cana (Hook.) W.A. Weber & Á. Löve	<1
Potentilla concinna Richardson	1
Potentilla pensylvanica L.	1
Solidago missouriensis Nutt.	1
Solidago spathulata DC.	1
Symphyotrichum ericoides (L.) G.L. Nesom	<1
Symphyotrichum laeve (L.) Á. Löve & D. Löve	1
Taraxacum officinale F.H. Wigg.*	<1
Thermopsis rhombifolia (Nutt. ex Pursh) Nutt. ex Richardson	1
Vicia americana Muhl. ex Willd.	5
Graminoids	
Elymus lanceolatus (Scribner & J.G. Smith) Gould ssp. *lanceolatus*	10
Elymus trachycaulus ssp. subsecundus (Link) Á. Löve & D. Löve	<1
Bouteloa gracilis (Willd. ex Kunth) Lag. ex Griffiths	1
Bromus inermis Leyss.*	3
Carex duriuscula C.A. Meyer	20
Festuca hallii (Vasey) Piper	3
Avenula hookeri (Scribner) Holub	1
Koeleria macrantha (Ledeb.) Schult.	5
Poa pratensis L.*	10
Hesperostipa curtiseta (Hitchcock) Barkworth	20
Clubmosses	
Selaginella densa Rydb.	20

* Invasive plant species.

flourish in the moderately grazed areas on prairies as it is not heavily relished by livestock.[3,23] Our observations confirm these results and show that both an excess of disturbance and the absence of it are critical threats to the survival of *A. patens*. Adaptations for variable environmental conditions and management practices (different types of ontogenetic development, capacity for regeneration, etc.) provide this species with a series of mechanisms for coping with mild disturbances.[7] On the other hand, the life history strategy of *A. patens* is based on individual survival rather than long range dispersion and colonization of new areas.[7] This makes *A. patens* a weak competitor, unable to thrive in ungrazed, overgrown areas. A high density of tall grasses, forbs or shrubs and large amounts of litter will inhibit regeneration of *A. patens* due to heavy competition. Therefore, light to moderate grazing and management practices that reduce litter, control coarse grasses and open small patches of bare soil for seed germination favour populations of *A. patens*.

Conservation Concerns

The current status of *A. patens* in North America does not cause particular concern; however there has been reduction of the species range due to urbanization and agricultural development,[6] as well as a decline in populations because of a lack of natural ecological processes or disturbances, such as grazing and fire,[24] and impact of invasive plant species.[25] Overall, *A. patens* is considered to be apparently secure (N4) at a national level for the whole United States.[26] This species is not protected under the US Endangered Species Act, however its conservation status has been reviewed and ranked in six states: Wyoming (S4 – apparently secure), Montana (S4), Utah (S1 – critically imperilled), Illinois (S1), Iowa (S4), and Kansas (SH – possibly extirpated).

In Canada *A. patens* is not protected under the Species at Risk Act. The species is classified as apparently secure (N4) at a national level by NatureServe.[26] Nonetheless, the conservation status of *A. patens* varies between provinces. It is considered to be secure in Alberta, British Columbia, Manitoba and Saskatchewan, and as "may be at risk" in Nunavut and Ontario. Moreover, *A. patens* is included in a list of Rare Vascular Plants of Ontario.[28]

Ironically, in order to be protected, *A. patens* must be under some imminent (rather than long-term) threat of extinction. However, because habitat fragmentation is

already threatening this species in Saskatchewan, studying its effects and long-term monitoring to get a better idea of how individuals and populations of *A. patens* cope with anthropogenic impact is of important scientific and conservation interest. Although species that are still relatively common, such as *A. patens*, can hardly be expected to be given legal protection, their association with threatened species may help them in many cases. At the same time, threatened plant species of native prairie may benefit from the results obtained during the study of *A. patens*, which can reveal useful information about vegetation community dynamics and trends.

ACKNOWLEDGEMENTS

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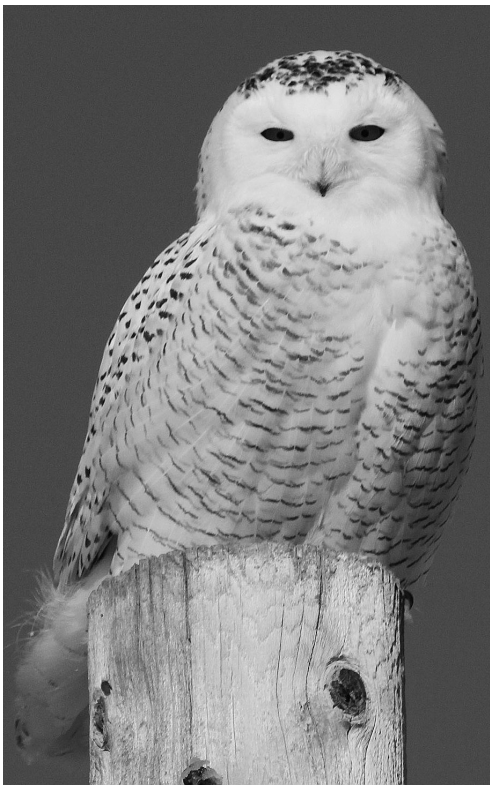
Prairie Crocus *- Lowell Strauss*

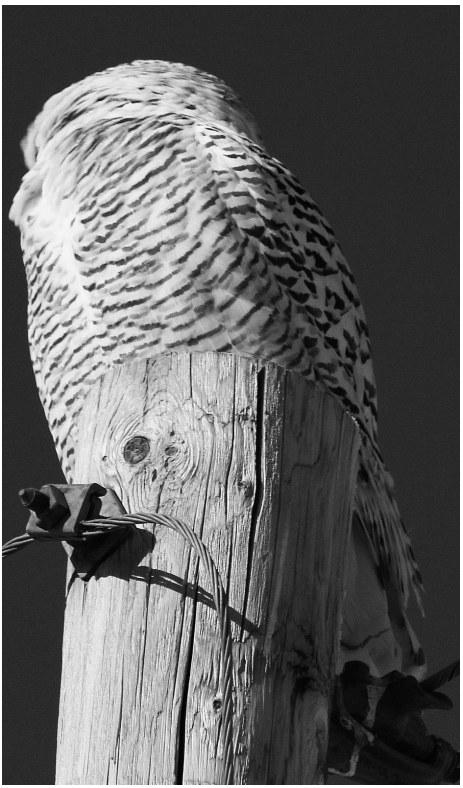
PHOTO ESSAY

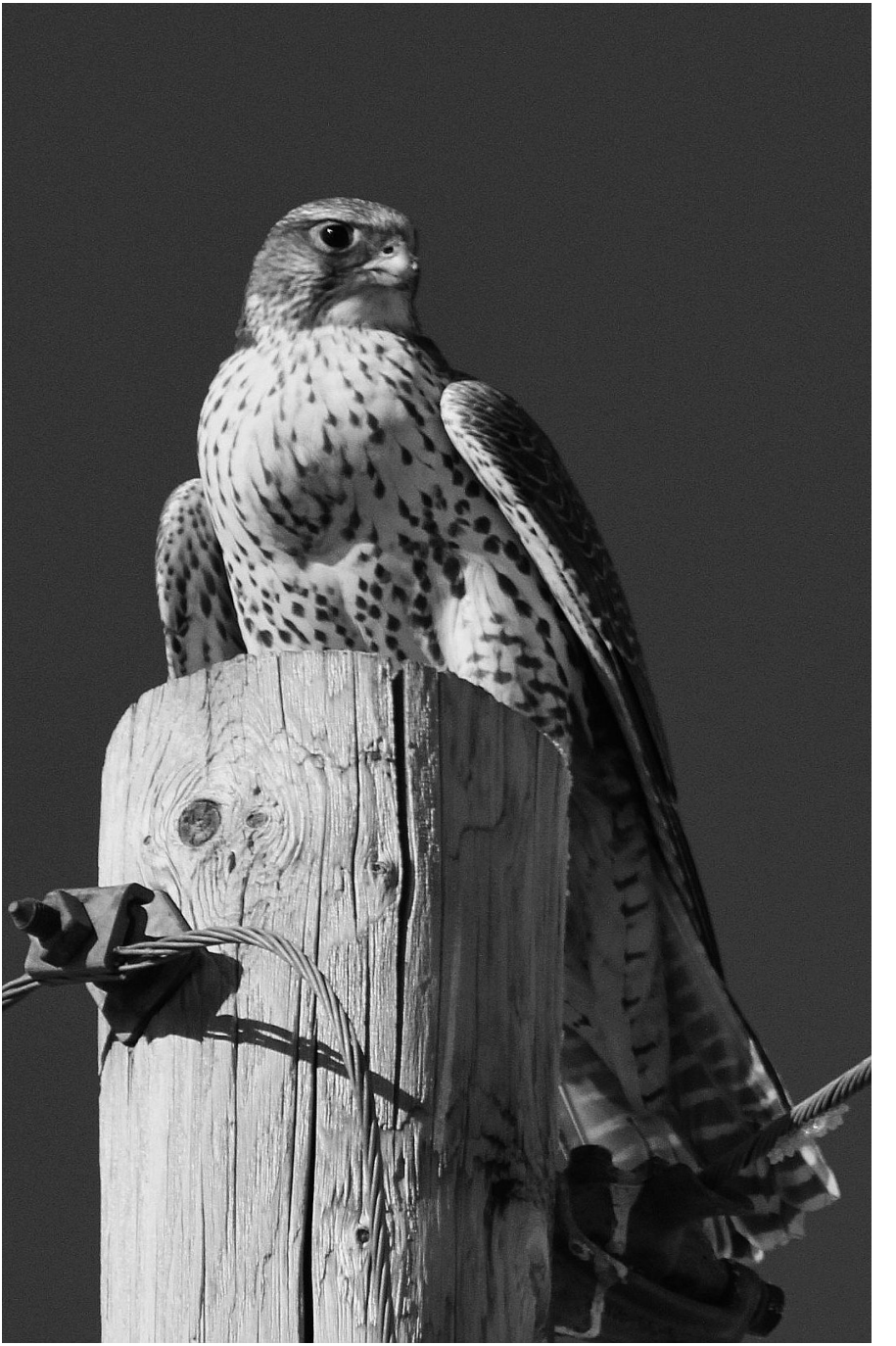
SNOWY OWL - GYRFALCON SCRAP, WHITE BUTTE, SK

On 4 February 2012, my husband and I were out hiking in White Butte, SK, and I was playing photographer. We found a few female snowy owls along the back road into Regina. One owl, perched on a telephone pole, was most perturbed by something in the area, and despite me directly underneath it kept staring off in the distance. Then it took off and landed on the ground nearby. It started posturing in weird ways with wings spread, so I thought another owl was in its territory. Suddenly a blur came in - a falcon! The gyrfalcon passed at the owl twice, with talons open. The owl hopped around and was quite incensed, all puffed up and cranky. The gyrfalcon went up to the top of the pole and glared back at the owl. Meanwhile the owl remained puffed up and most likely called out rude things to the falcon, ending with: “You're nothing more than a prairie chicken!” Ha. That last was just my imagination.

- *Anne Brigham, Regina SK*







NOTES and LETTERS

AN ICONIC INSECT OF EASTERN NORTH AMERICA, THE FIREFLY IS LIGHTING UP THE PRAIRIE SKY.

JEFF BOONE *City of Saskatoon, Saskatoon, SK, S7L 7K6*
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Based on a number of inquiries, more people were observing fireflies in 2013. There were a half dozen requests regarding fireflies and attention from local media. It is unclear why fireflies were suddenly seen with such frequency, but it may be related to the rising water table in Saskatchewan creating more habitat for fireflies. Several of the species in Saskatchewan prefer palustrine environments including wet meadows, marshes, creeks and sloughs.[1]

Fireflies are a family of beetles, called the Lampyridae. There are over 2000 species worldwide including nine species in Saskatchewan (Royal Saskatchewan Museum records). Five of the nine species have been found in aspen parkland,[1] the ecoregion surrounding Saskatoon, although these records are likely biased by the fact that more collecting has occurred in this region (Larson personal communication). According to records at the Royal Saskatchewan Museum one species of firefly, the winter firefly (*Ellychnia corrusca*), has been found as far north as Lake Athabasca.

Fireflies are similar in appearance to their close relatives the soldier, net-winged and click beetles.[2] The signature feature is their flash, which is produced through oxidation of a group of proteins called lucerifases.[3] This reaction takes place in their abdomen and produces the characteristic glow or bioluminescence. [2,3] In many species the larvae, pupae and adults are bioluminescent. In larvae and pupae, bioluminescence is aposematic,[4] signalling to predators the presence of distasteful compounds. There are several colours of flashes in Saskatchewan.[1] It is common to see amber flashes produced by *Pyractomena* or green or yellow flashes produced by *Photinus*.

Adults in many species use signalling to attract mates. Typically males will produce flashes and then wait for a female to respond, creating a chorus of flashes. In an unusual twist on this behaviour, some species of firefly mimic the flashing pattern of another species in order to lure an unsuspecting male.[5] They then capture and eat them. This occurs in the genus

*Figure 1. A Pennsylvania firefly (*Photuris pennslyvanica*) resting on a lily petal.* *© Stephen Luk*

Photuris, nicknamed the *femme fatale* fireflies. In Saskatchewan we have one *femme fatale* species that has been found in the eastern aspen parkland (Figure 1).

There are several species of firefly where the adults are not bioluminescent and consequently are seen less identified.[2] Saskatchewan is home to four of these non-luminous species including the winter firefly, so named because of its activity in the early spring.[2]

Much is still unknown about the biology of many species of firefly. However some are known to feed on soft bodied invertebrates.[6] One species in Saskatchewan, *Pyractomena dispersa*, is possibly a specialist predator of snails similar to close relatives *Pyractomena borealis*.[6] It is the most frequently collected species in the Royal Saskatchewan collection and has been collected from May to August (Royal Saskatchewan Museum records).

Are you interested in spotting fireflies or adding them to your collection? They are often easy to observe in riparian areas next to streams, rivers, or lakes lighting up the night sky. In the daytime they often go unnoticed. Try sweep netting in grassy areas. You may catch lightning in a bottle.

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WHOOPING CRANE WITH LEG BAND SIGHTED NEAR MOSSBANK, SK

I went out Nov 12, 2012, about 5 miles west of Mossbank, and saw a pair of Whooping Cranes. I wish I could have got closer, they were quite far away, but I didn't want to scare them. Over the years I have seen more Whooping Cranes, but this seems to me very late for them to be here. When I worked on the farm back in the 1950's, six Whooping Cranes came out of Old Wives' Lake, and as I remember they stayed around for about a week or so, but that was in September. I went out to look for the cranes the next day (Nov 13, 2012) and got a little closer to them. I could see with my binoculars that one of the cranes had a band on its leg.

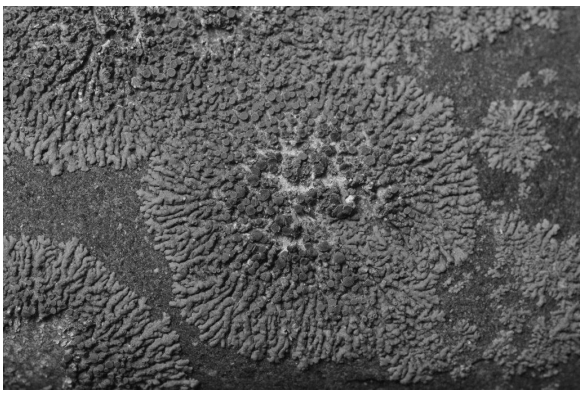
- Don Smith, Box 202, Mossbank SK. S0H 3G0

SERIES: LEARN YOUR LICHENS

BERNARD DE VRIES

Scientific Name: *Caloplaca trachyphylla* (Tuck.) Zahlbr.
Common Name: Desert firedot lichen.
Synonym(s): None
Description: Desert firedot lichen is one of our most colourful lichens with its orange to reddish-orange body (thallus) on open grasslands. One of its characteristics besides its vivid colour are the lumpy and parallel radiating lobes with thick, convex, rough tips which can't be lifted from its substratum without damaging its lower surface (cortex). The centre consists of small often closely attached irregular structures. The many fruiting bodies (apoyhetia) are small and centrally located with a broad margin.
Habitat: On exposed rock in open grasslands.
Growth Form: Somewhat foliose (leaf-like) marginally, but centrally crustose (crust forming).
Provincial Status: A common temperate species of open grasslands.
Comments: This lichen can sometimes be seen with the gray and dense centrally located globose (sphere shaped) isidia (peg-like vegetative outgrowths) *Xanthoparmelia mexicana* (Salted rock-shield), especially in more arid locations (see insert). Desert fire-dot lichen resembles in many ways *Xanthoria elegans* (Elegant sunburst lichen), but this species has a more reddish colour and a lower cortex (protective layer) which can be lifted intact and has a broader distribution. Another species of mistaken identity can be *Caloplaca saxicola* (Smooth firedot lichen) which has shorter, smoother, lobes and occurs in the same habitat as Desert firedot lichen.
Note: This is the third in a series of our lichen flora, and the author hopes you enjoyed them and found it a learning experience. Please send comments to Bernard de Vries: *bdevries@accesscomm.ca*

(see inside front cover for colour photo)



MYSTERY PHOTO

Mystery photo September 2013:
What is this bird?

Blue Jay Reader Vicky Kjoss sent us our mystery photo. She writes: “I am attaching a photo that may be of interest to Blue Jay; it was taken on Crane Beach in Ipswich, Massachusetts, US. I figure that since we have this species in Saskatchewan, theoretically an individual like this might show up some day. In any case, it might be of interest to people who have never seen one like it. I sure thought it was cool.”

Please send your answers to the Blue Jay editors *bluejay@naturesask.ca* *- See back cover for colour photo*

ANSWER TO THE JUNE 2013 MYSTERY PHOTO:

Part I

Dear Editors

The photo is of an adult cicada, probably *Okanagana rimosa*, although for reasons given below the species limits in this genus of cicada are in doubt. *Okanagana rimosa* is a spectacular insect, heavy bodied and about 30 mm in length (including folded wings) and mainly black with orange to red trim. The insects are better known from their sound rather than by sight. They are the insects with the loud, sometimes seemingly incessant, buzzing song that goes on during the heat of summer days.

The song is produced by males which are signalling to females. The specimen in the photo has its wings moving but wings are not the source of the song (such as in the case of grasshoppers and their relatives). Rather sound is produced by the vibration of a pair of tymbals (tautly stretched cuticle similar to the head of a drum) at the base of the insects abdomen. Also on the base of the abdomen are a pair of ears (tympanic membranes) through which air vibrations can be sensed. Cicadas can be very loud in their sound production but they have a neat trick that allows them to turn their ears off while they are singing so they don't have to listen to themselves (a useful trait for rock musicians also).

The abundance of these insects is difficult to assess. They are widely distributed in southern Saskatchewan, including the Cypress Hills. When they are out and singing, they are difficult to miss for their song can be heard from a long distance (several hundred meters) away. Thus the presence of one or just a few insects is noticed. In

addition to this, cicadas are famous for their long life cycles. *Okanagana rimosa* has been reported as having a four year life cycle[1] which means that the adult is around for only a week or so whereas the majority of the life is passed as a nymph or larva that lives underground feeding on sap of roots of various shrubs and trees. At a given time there are probably many more larvae around that adults. This species is always associated with shrubs and trees so on the prairies it has a patchy distribution corresponding to the patches of woody plants.

Identification of cicadas has been problematical. Populations are generally small and fragmented in space as well as time. There may be four genetically separated populations all occurring in the same area but each emerging in a separate year. This means there is a lot of opportunity for population fragmentation with each subset developing its own set of characteristics. Also, it has been suggested that mating calls may vary with there being co-occurring sibling species that differ in their calls and mating.[2] One way to see a cicada is to locate it from its call. This is easier said than done though. From a distance one can quickly locate the general area from where the sound is coming but as you approach the cicada usually senses your presence and stops singing. Wait a while and it will resume so by stealth and patience you can locate the source of the sound and hopefully find the insect (but they will often fly away as you approach). However, it is surprising how difficult it can be to spot such a large insect even when you are within a meter or so and have the sound as a guide. Some time ago I discovered that in my yard when I was mowing grass with a gas mower, cicadas would sing as I went by and the noisier I was the more persistent their calls. Possibly they were sensing me as darn big and noisy rival male. Based on this, I suggest one hunt singing male cicadas with a running chainsaw in one's hand rather than by using stealth.

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- Dave Larson
Box 56 Maple Creek, SK S0N 1N0

Part II

Reprinted from *http://library.thinkquest.org/28049/why_do_periodical_cicadas_adopt_.htm (accessed 10 Aug 2013)*

Cicadas are said to be periodical if almost all of the cicadas in a given location mature into adults in the same year. The *Magicicada septendecim*, a most notable periodical cicada, has the longest life cycle of any insect. There are 3 species with 13-year life cycles and another 3 species with 17-year cycles. They are synchronized perfectly that they are nearly absent as adults in the 12 or 16 years between emergence.

Why do these cicadas possess such a long life cycle? What is the significance of having a life cycle being a prime number of years (13 or 17 years)?

Actually, their long life cycles and synchronous emergence help them to escape from natural population control by predators and parasites. If the predator has a life cycle of 2 years, then the cicada has to avoid having a life cycle which is a multiple of 2, otherwise it will be very likely for the cicada to meet its predator. And if the parasite has a life cycle of 5 years, then the cicada has to avoid having a life cycle which is divisible by 5. Consequently, if the cicada has a life cycle being a relatively large prime number (e.g. 13 or 17), then it can avoid coinciding with predators and parasites, since a prime number does not contain any factor except 1 and itself.

For example, if the cicada has a life cycle of 17 years and its parasite has a life cycle of 5 years, then they will only meet every (17x 5) = 85 years, which is the least common multiple of the two numbers. This enables the periodical cicada to escape from the natural population control, and this also accounts for the astounding population density of the cicada – it can get as high as 1.5 million cicadas per acre!

Mr. Clint Rousseaux correctly identified our mystery photo, and was the lucky winner of a draw for a prize from Nature Saskatchwan!

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Common and scientific (Latin) names are used for all species. Common bird names follow the Checklist of North American birds by the American Ornithologists' Union (7th edition, 1998); mammal names: Mammal Species of the World by Wilson & Reeder; butterfly names: The Butterflies of Canada by Layberry et al.;and names of reptiles and amphibians follow Scientific and Standard English Names of Amphibians and Reptiles of North America North of Mexico, with comments Regarding Confidence in our Understanding, Sixth Edition, by The Committee on Standard English and Scientific Names (Brian I. Crother, Chair) (2008).

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