

Plants and Insects New to Sable Island, Nova Scotia

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During recent inventories, particularly in 2008 and 2009, 8 plants and 17 insects were found that are additions to the flora and fauna of Sable Island, respectively. Additions to the flora include *Alnus incana* subsp. *rugosa*, *Carex nigra*, *Frangula alnus*, *Isoetes tuckermanii*, *Linaria vulgaris*, *Mertensia maritima*, *Panicum dichotomiflorum*, and *Solidago rugosa*. Additions to the insect fauna include *Apateticus bracteatus*, *Barce fraterna*, *Carabus maeander*, *Conocephalus fasciatus*, *Danaus plexippus*, *Eulithis explanata*, *Haliplus cribrarius*, *Harmonia axyridis*, *Lasioglossum novascotiae*, *Lateroligia ophiogramma*, *Lycophotia phyllophora*, *Muirodelphax arvensis*, *Nemoria rubrifrontaria*, *Neoconocephalus retusus*, *Paraphlepsius irroratus*, *Scaphytopius acutus*, and *Spilodiscus arcuatus*. The occurrence of *Spilodiscus arcuatus* is of interest with respect to an apparent decline throughout much of its range. *Neoconocephalus retusus* and species of *Catocala* provide an indication of the capability of storms to transport even large insects over substantial distances. The increasing numbers of *Danaus plexippus* observed may be part of a trend toward the northward movement of migratory insects. Some of the 7 plants are likely recent arrivals, but *Isoetes tuckermanii* and others may have been previously overlooked.

Key Words: Sable Island, Nova Scotia, flora, fauna, new records, climate change.

Sable Island (approximately 43.9333°N, –60.0000°W) is a remote sandy island 41 km long and up to 1.4 km wide lying in the Atlantic Ocean 161 km from the nearest mainland at Canso Head, Nova Scotia. The island has an impoverished flora and fauna but includes a number of endemic and restricted plants and animals (Howden et al. 1970; Catling et al. 1985; Wright 1989). The flora and fauna are possibly the best enumerated of any wild part of Canada, and the island provides an unusual opportunity to study ecology and evolution under isolated conditions.

The history of botanical exploration (notably surveys by John Macoun in 1899; Hans Güssow in 1911; Harold St. John in 1913; John Erskine in 1952; and the team of Paul Catling, Bill Freedman and Zoe Lucas in 1981, reported in Freedman et al. (1982) and in Catling et al. (1985)), and the flora of the island up to 2002 were reviewed by Stalter and Lamont (2006) and Stalter et al. (2006), who reported that the native island flora has remained relatively stable over the past century and the non-native flora has not increased. The terrestrial fauna of Sable Island has been compiled and reviewed by Wright (1989). That comprehensive list included 500 species of insects and made reference to an earlier compilation (Howden et al. 1970). Dragonflies new to the island fauna, including *Ischnura hastata*, *Tramea carolina*, and *Tramea lacerata*, were reported recently (Catling et al. 2009).

Studies of the ecology, evolution, and dynamics of the unusual and isolated island flora are continuing, so current information on composition is needed. Here

we provide information on species of plants and insects that are newly reported on the island based on survey work during late July and August 2008 and late August 2009, unless otherwise stated. Voucher specimens have been deposited in the Agriculture Canada National Plant Collection in Ottawa (acronym DAO), the vascular plant herbarium of the University of Michigan (acronym MICH), and the National Collection of Insects at Agriculture and Agri-Food Canada in Ottawa (acronym CNCI). Plants are listed alphabetically by family and within family. Insects are listed alphabetically by order and within order.

Additional Vascular Plants

ASTERACEAE

Solidago rugosa P. Mill. subsp. *rugosa*, Wrinkle-leaf Goldenrod

A single patch approximately 1 m in diameter was found in open *Ammophila* grassland inside the horse enclosure fence at the Fisheries and Oceans Canada field camp near East Light (43.96037°N, –59.7848°W). Possibly always present but very rare and previously overlooked.

BETULACEAE

Alnus incana (L.) Moench subsp. *rugosa* (DuRoi) Clausen, Speckled Alder

A single shrub 1 m tall on the edge of a slope beside a moist area with *Juncus balticus* on the north side of the Sable Island Station compound (previously known

as the weather station) (43.93392°N, -60.01522°W). The site was protected from wind by surrounding dunes and buildings. This plant may be an overlooked remnant of a tree planting attempt in 1901.

BORAGINACEAE

Mertensia maritima (L.) S.F. Gray var. *maritima*, Oysterleaf

A specimen was collected on 26 July 2009 on the upper beach slope, along the edge of a beach grass foredune, north beach, west of West Light (approximately 43.93555°N, -60.03854°W). The stems and foliage covered an area of about 30 × 30 cm. Other small patches were observed on the north beach of West Spit.

CYPERACEAE

Carex nigra (Linnaeus) Reichard, Smooth Black Sedge

Tall (to 4 m), slender plants were abundant in two low natural meadows with *Vaccinium macrocarpon* and *Juncus balticus* on the west side of the station compound (43.9332°N, -60.0137°W). A clump approximately 0.5 m² of small (to 4 cm tall) but robust plants was found in open sand on a sandy ridge near West Light (43.9309°N, -60.0228°W). Although fairly conspicuous, this species is localized and could have been overlooked in previous surveys. Infrataxa of *Carex nigra* are not recognized in North America, but the specimens from Sable Island represent unusual extremes.

ISOETACEAE

Isoetes tuckermanii A. Braun ex Engelman in A. Gray, Spiny Spore Quillwort

Thousands of plants were found in water 1–2 m deep in sandy substrate of Gallinule Pond (43.9323°N, -59.8986°W). In some places, the plants occurred with *Myriophyllum tennellum*. Although this species was abundant at this location, we believe that it could have been overlooked in previous surveys due to its inconspicuous occurrence in relatively deep water (over 1 m). It occurred only in this one pond based on an inventory of all ponds on the island during the summer of 2008. In this one location it was abundant and dominant in 1–2 m of water and covered the entire bottom. Based on the size of this pond, it is possible that half a million plants were present. Some of the plants were unusually large, with leaves 20–25 cm in length.

POACEAE

Panicum dichotomiflorum Michx., Fall Panic Grass

Robust plants were found around the edges of saline ponds west of the station (approximately 43.9304°N, -60.0252°W). These pond margins were formerly well vegetated and fresh, but incursions of sea water have killed much of the original vegetation, resulting in

sandy and muddy flats where numerous plants of this species were observed. It seems likely that this is a recent arrival.

RHAMNACEAE

Frangula alnus P. Mill. (*Rhamnus frangula*), Glossy False Buckthorn

Two of these introduced shrubs 0.4 m tall were found on the edge of a slope at the station (same location as *Alnus incana* subsp. *rugosa* above, and possibly also an overlooked remnant of the tree planting attempt in 1901).

SCROPHULARIACEAE

Linaria vulgaris P. Mill., Greater Butter-and-eggs

This alien species was found inside the horse enclosure fence at the Fisheries and Oceans Canada field camp near East Light (43.95961°N, -59.78294°W) and is unknown elsewhere on the island. Since it is a conspicuous species, it seems likely that it was not overlooked previously but is a recent introduction.

Additional Insects

COLEOPTERA

Carabus maeander Fischer (Carabidae)

This species was first collected on the island by Z. Lucas at the West Ponds on 29 June 2005. It is normally associated with marshes, and on Sable Island one was taken in a pitfall trap in wet sand at the edge of a freshwater pond.

Haliphus cribrarius LeConte (Haliphiidae) (Figure 1)

Three specimens were found in ponds 10 (43.93187°N, -60.02377°W) and 16 (43.93198°N, -59.96898°W) in early August 2008. This species is much less common on the island than the smaller *Haliphus immaculicollis* Harris, which was found in eight ponds.

Harmonia axyridis Pallas (Coccinellidae), Asian Lady Beetle

A single specimen was found on a dead bird on the south beach on 29 July 2007. This species was introduced to North America to control aphids and it has recently spread widely.

Spilodiscus (Hister) arcuatus Say (Histeridae) (Figure 1)

Ten were collected on sand on a south-facing beach ridge on 23 June 2008. This species is known from dunes on the Atlantic coast from the east coast of Chesapeake Bay north to Nova Scotia and less commonly inland on dunes to Lake Michigan (Caterino 1998). In Canada it is known only from Nova Scotia, having been collected at Pictou and at Clam Harbour (Bousquet and Laplante 2006). Caterino (1998) suggested that it has not been collected in the USA (most of its range) since the 1950s, and the only exception



FIGURE 1. Insects recently found on Sable Island that were not recorded in earlier entomological surveys. From left to right: *Spilodiscus (Hister) arcuatus* Say (Coleoptera: Histeridae), *Halipilus cribrarius* LeConte (Coleoptera: Halipilidae), and *Barce fraterna* Say (Hemiptera: Reduviidae).

to this appears to be a recent collection from Block Island, Rhode Island (Sikes 2007), which appears to be a refugium for a number of beetles that have been extirpated from the mainland. The more recent (1968, 1998, 2008) Canadian records suggest that the northern more disjunct populations may not have declined as much as those to the south.

HEMIPTERA

Apateticus bracteatus (Fitch) (Hemiptera: Pentatomidae)

Eight specimens were found in heath land near the station on 19–26 August 2009.

Barce fraterna Say (Hemiptera: Reduviidae), Thread-legged Bug (Figure 1)

Two specimens were found in a space below a piece of wood on 13 August 2008.

HOMOPTERA

Muirodelphax arvensis (Fitch) (Delphacidae)

Thirty individuals were found in grassland sweep net samples from outside horse enclosures at the station.

Paraphlepsius irroratus (Say) (Cicadellidae)

Five individuals were found in heath land sweep net samples at the station.

Scaphytopius acutus (Say) (Cicadellidae)

Fifty-five individuals were found in sweep net samples from heath land vegetation at the station.

HYMENOPTERA

Lasioglossum (Dialictus) novascotiae Mitchell (Apidae)

Several specimens were collected in various parts of the island, mostly on flowers of *Achillea millefolium* and *Polygonum hydropiperoides*. Specimens determined by Jason Gibbs are in the collection of L. Packer at York University. This species is very similar to *L. lineatulum*, which has previously been reported for the island (Wright 1989).

LEPIDOPTERA

Danaus plexippus (Linnaeus) (Lepidoptera: Nymphalidae), Monarch

Although Monarchs are not common in the Maritimes, they have been reported from southern Newfoundland (Layberry et al. 1998), so the lack of a record earlier than 1999 from Sable Island is surprising. Even more surprising is the fact that during autumn 1999 thousands of Monarchs were seen on Sable Island. It is estimated that there were more than 10 000 on the island during the last two weeks of September. Up to 100 were present on individual plants of flowering Seaside Goldenrod (*Solidago sempervirens*). On 26 September 2006, there were again hundreds of Monarchs on the island. Since then, several have been seen every year during July–September. In 2008, three were seen in early August in the central part of the island. The increasing numbers of Monarchs

observed suggests that migratory insects are moving north, as is suggested by recent observations of migratory dragonflies on Sable Island (Catling et al. 2009).

Eulithis explanata (Walker) (Lepidoptera: Geometridae), White Eulithis

Five specimens were collected at lights at the station in July and early August. The larvae are said to feed on *Vaccinium* (Handfield 1999), two species of which are abundant on this island.

Lateroligia ophiogramma (Esper) (Lepidoptera: Noctuidae)

This relatively recent introduction from Europe was collected near the station in late July 2008.

Lycophotia phylophora (Grote) (Lepidoptera: Noctuidae)

Eight specimens of this native species, likely associated with heath lands, were collected near the station in late July 2008.

Nemoria rubrifrontaria (Packard) (Lepidoptera: Geometridae), Red-fronted Emerald

Eight specimens were captured west of the station on 27 June 2008. Ferguson (1985) suggests that species of *Myrica* are the preferred food plants, and on Sable Island it is suspected that the food plant is the abundant *Myrica pensylvanica*.

ORTHOPTERA

Conocephalus fasciatus (De Geer) (Conocephalidae)

Five specimens were collected in early August 2008 in *Juncus balticus* around the edges of ponds near the station. Those found on 8 August were half grown, whereas those found in late August and September were adults. This is a common species in and around saltmarsh on the mainland (P. Catling, personal observation) but was rare on Sable Island in 2008. It was probably overlooked in earlier surveys.

Neoconocephalus retusus (Scudder) (Tettigoniidae), Round-tipped Cone-headed Grasshopper

A specimen was found dead in vegetation near the station during the late 1990s by Z. Lucas. This is the only Canadian record of a species normally reaching its northern limit in Connecticut. Since this is a large, conspicuous insect and no others have been seen, it is presumed not to be established on the island but rather to have been carried by strong storm winds from at least 1000 km to the south. The specimen is in the Nova Scotia Museum.

Additional Notes

Vascular Plants

Although *Senecio pseudo-arnica* (Asteraceae) was reported by St. John (1921), it was not found by Catling, Freedman and Lucas in 1981 (Catling et al. 1985) and was thought to be extirpated. In 2003, a large patch of > 100 plants was found in vegetated terrain along the north beach, and a second large patch was present in 2004. Since then, several smaller patch-

es have been found at other locations along the north beach. It is a conspicuous species, not easily overlooked, and is likely a re-colonization.

Insects

Catocala relicta (Lepidoptera: Noctuidae) was known previously from a single record in 1978 (Wright 1989). A single specimen was found alive on a window at the Sable Island station between 2000 and 2003 (specimen at CNC). The larvae feed mainly on poplars (*Populus* spp.), birches (*Betula* spp.), and willows (*Salix* spp.), none of which occur on the island, and consequently it is likely that it was blown in (as suggested by Wright for the earlier record). Interestingly, there are several records for two other species of *Catocala* that feed on trees and shrubs not present on the island; these *Catocala* also must have flown in or been blown in. *Neoconocephalus retusus* was presumably also blown in (see above). These observations of extralimital occurrences, less easily interpreted on the mainland (where they could be a consequence of rarity or transport by automobiles, etc.), suggest the great distances that non-migratory insects can travel (possibly on storm fronts), and contribute to our understanding of biogeography.

Agabus anthracinus Mannerheim (Coleoptera: Dytiscidae) is known from Sable Island (Larson et al. 2000) but was not listed by Wright (1989).

Omophron tessellatum Say (Coleoptera: Carabidae) is still frequent on the island in low areas of periodically wet sand and on sandy edges of ponds but is active at night and particularly in rainy weather; this may help to explain why Wright (1989) did not encounter it.

Phaedon viridis F. E. Melsheimer (Coleoptera: Chrysomeloidae) was previously collected on the island but was identified as *Phaedon* sp. near *oviformis* LeConte (Howden 1970). This material was later revised to *P. viridis*. Two specimens collected in 2008 were identified by L. Lesage and placed in CNCI.

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