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Aeshna Subarctica (Odonata: Aeshnidae) in Northwestern Wisconsin

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AESHNA SUBARCTICA (ODONATA: AESHNIDAE) IN NORTHWESTERN WISCONSIN

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ABSTRACT

Nine adult specimens of *Aeshna subarctica*, a boreal dragonfly typically associated with muskeg wetlands, were collected from Black Lake and Breitzman Lake in northwestern Wisconsin (Douglas County). Viable populations likely exist in both lakes. Oviposition by three females is described. This represents the first published report of *A. subarctica* for the state of Wisconsin. Because Black Lake lies on the border of Wisconsin and Minnesota, *A. subarctica* likely occurs in Minnesota as well. Further sampling of acidic peatland habitats for aquatic macroinvertebrates is recommended to document populations of northern species at the southern periphery of their ranges. These species could function as indicators of climate change.

The subarctic darner (*Aeshna subarctica* Walker) is a holarctic dragonfly that is widely distributed across Canada, has been reported from the Upper Peninsula of Michigan, and is well known from northern and central Europe (Walker 1958, Needham and Westfall 1955, Kielb 1996). Its primary habitat is sphagnum (*Sphagnum* spp.) bog ponds, muskeg wetlands, and cold northern swamps (Whitehouse 1941, Robert 1944, Walker 1958). The flight period of *A. subarctica* is extensive, ranging from early June through the middle of September in Canada. Little is known about its oviposition or other aspects of its life history. We collected nine adult specimens of *A. subarctica* from two sites in Douglas County that represent the first records for this species in Wisconsin (Smith et al. 1993).

Black Lake (T.45N, R.15W, Sec. 19) is a muck-bottomed, 32.4-hectare drainage lake with a maximum depth of 1.25 m that is formed by a widening of the Black River at the Wisconsin/Minnesota state boundary. The entire shoreline is in public ownership as part of the Douglas County Forest and is designated as a State Natural Area by Wisconsin and an Interstate Natural Area by Wisconsin and Minnesota. An acid bog lake (pH 6.8, methyl purple alkalinity of 28 ppm) with medium-brown stained water, Black Lake is surrounded by a vast, undisturbed acid peatland. Dominant plants within the open bog immediately surrounding the lake (within 30–40 m of shore) were mosses (*Sphagnum* spp.) and sedges (*Carex* spp.). Common vascular associates included leatherleaf (*Chamaedaphne calyculata*), swamp laurel (*Kalmia*

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polifolia), downy bog rosemary (*Andromeda glaucophylla*), and small cranberry (*Vaccinium oxycoccos*). Prominent members of the muskeg community further from the lake were hare's-tail (*Eriophorum spissum*) and scattered, stunted black spruce (*Picea mariana*) and tamarack (*Larix laricina*). Along the northwest shoreline where *A. subarctica* were collected, the vegetation was almost exclusively a floating mat of mosses and sedges.

Six specimens of *A. subarctica* (four males, two females) were collected at Black Lake during the mid-afternoon of 10 September 1998. Weather was partly cloudy and windy with air temperatures in the upper 20's (°C). Males were netted as they flew low and into the wind along the edges of several small openings (5–7 m in diameter) among the sedges where moist *Sphagnum* was exposed. These openings were 10 to 15 m from the lake shore. The females were netted as they landed to oviposit in the exposed openings of moss. To oviposit, females submerged the ends of their abdomens into the moist *Sphagnum*. No other species of Odonata were seen near the lake, but a few individuals each of *Sympetrum danae* (Sulzer) and *S. obtrusum* (Hagen) were observed near the edge of the muskeg several hundred meters back from the lake.

Breitzman Lake (T.46N, R.15W, Sec. 23) is an acid bog seepage lake (pH 6.0; methyl purple alkalinity of 4 ppm) with 5.3 surface hectares, a maximum depth of 6.4 m, and dark-brown stained water (Sather and Johannes 1973). The shoreline is lightly developed, with one dwelling, and is split between private ownership along the northern half of the lake and public ownership (Douglas County Forest) to the south. Breitzman Lake is surrounded by a muskeg wetland that is much less extensive than that at Black Lake. Tree species surrounding the lake included black spruce, tamarack, and balsam fir (*Abies balsamea*). Open bog areas dominated by leatherleaf, sedges, and floating mosses existed mostly in a thin strip around the lake. Odonate collections were made near a small cove that functioned as an unimproved boat landing on the west shore of the lake. In addition to *Sphagnum*, sedges and leatherleaf, the riparian plant community bordering this cove included patches of wild calla (*Calla palustris*). Openings free of leatherleaf supported inundated clubmoss (*Lycopodium inundatum*) and roundleaf sundew (*Drosera rotundifolia*). Pitcherplant (*Sarracenia purpurea*), rose pogonia (*Pogonia ophioglossoides*), grass-pink (*Calopogon pulchellus*), cotton grass (*Eriophorum* spp.), and pink ladyslipper (*Cypripedium acaule*) also grew there. Breitzman Lake is located about 9 km northeast of Black Lake.

Three subarctic darners (two males, one female) were collected from Breitzman Lake. One specimen was netted each day on 1, 12, and 16 September 1998. Collections were made between 1030 h and 1500 h at low wind speeds and at air temperatures from 21 to 27° C. One male was netted as it flew low along the shoreline of the cove. Another male was netted as it struggled in floating algae at the water surface. A female was observed to oviposit by landing and dipping the end of her abdomen into moist *Sphagnum* within a meter of open water and in water-filled depressions in the *Sphagnum* made by our wading boots. Other odonates that were netted in association with *A. subarctica* were *A. canadensis*, and *A. eremita* Scudder, of which the latter were the most abundant. These aeshnids were observed to cruise the edges of the lake, usually within a meter of shore and less than half a meter above the water, and sometimes flew away from the lake into tamaracks to rest 3 to 6 meters up. All three species engaged in similar cruising and resting behavior.

We conclude that viable populations of *A. subarctica* probably exist in both lakes. Because it has much more extensive areas of the type of habitat that *A. subarctica* apparently prefers, Black Lake may hold a more secure source population for the area. We anticipate that *A. subarctica* will be

recorded elsewhere in western Douglas County as acid bog habitats surrounding lakes are further investigated. These habitats are rare in northwestern Wisconsin, which is near the southern edge of the North American range of such habitats. Although not reported from Minnesota (Boole 1974, Carroll and Gundersen 1995, Kielb 1996), *A. subarctica* likely occurs there as well, at least along the Pine County shoreline of Black Lake which is located only a few hundred meters southwest of our collection site. Acid peatland and muskeg bog habitats in both states have not been extensively sampled for aquatic macroinvertebrates, and other northern boreal species that would represent new state records likely exist in these areas as well. Further sampling of such habitats is recommended because documented populations of northern species at the southern periphery of their ranges could function as valuable indicators in the event of climate change.

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