

Subarctic Records and Range Extensions of Two Species of Tiger Beetles (Coleoptera: Cicindelidae) in Churchill and Wapusk National Park, Manitoba

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Two species of tiger beetle (Coleoptera: Cicindelidae) were collected in the vicinity of Churchill, Manitoba and Wapusk National Park. Habitats were dry, sandy areas typically preferred by this family. No tiger beetle has been recorded from this region previously. *Cicindela longilabris longilabris* was collected in two localities, one south of Churchill and another on a relict beach ridge in Wapusk National Park. *Cicindela limbata hyperborea* was collected only on the beach ridge, where adults co-occurred with *C. longilabris longilabris*. These localities represent significant range extensions for both species.

Key Words: *Cicindela longilabris* Say, *Cicindela limbata* Say, Wapusk National Park, beach ridge.

Tiger beetles (order Coleoptera, family Cicindelidae) are attractive, fast-moving, and conspicuous predators of invertebrates in open areas. Over 2000 species are known worldwide and approximately 111 in North America (Pearson and Cassola 1992; Pearson et al. 2005). Most species prefer dry habitats such as sand dunes, rocky outcrops or clay banks (Pearson et al. 2005). Some are known to withstand hypoxic conditions during periodic flooding of their habitat, particularly as larvae (Hoback et al. 1998; Brust and Hoback 2009). The larvae dwell in burrows in the same habitats as the adults, and are also voracious predators of smaller invertebrates. Their interesting biology and the beautiful iridescent colouration of adults make tiger beetles the subjects of a broad base of enthusiasts among professional and amateur naturalists alike, rivalled only by the devotees of Lepidoptera and Odonata. Although many species of tiger beetle are widely distributed, few records exist from northern areas of the world. In this paper, we report the collection of two species of tiger beetles in the Churchill region of northern Manitoba, Canada (Figure 1), an area from which they were previously unrecorded. Collecting insects in the north can be difficult, considering vagaries of weather, dangerous wildlife (polar bears), and remoteness. Sampling in Wapusk National Park requires extensive logistical support, including helicopter travel and bear security personnel, the latter being mandatory for researchers working with Parks Canada in the Churchill region.

The first record for *C. longilabris longilabris* south-east of the town of Churchill, along a sandy road atop the kame between Twin Lakes (15N 452807 UTM 6498079), came from the Arctic & Boreal Entomology Course held in the Churchill region in 2004 (Taki et al.

2005). In 2009, *C. longilabris longilabris* (13.5–14 mm in length; Figure 2A) was taken along the same road on July 7, and on a relict beach ridge in Wapusk National Park (15N 447959 UTM 6381822, Figure 3) on July 12. *C. limbata hyperborea* (11 mm in length; Figure 2B) was also taken on the beach ridge, with adults of the two species active and coexisting in the same area. These records represent significant extensions of the known ranges for both of these species (Pearson et al. 2005). Specimens are deposited at the J. B. Wallis Museum, University of Manitoba.

Although most diverse in warm, dry climates, arctic and subarctic records of tiger beetles are not unknown. *Cicindela longilabris* has a typical boreal distribution, and is known to occur across North America from Newfoundland to northern Alaska, with its northern limit approximating the tree line (Schultz et al. 1992; Pearson et al. 2005). *Cicindela limbata* has several recognized subspecies, formerly including the critically endangered Coral Pink Sand Dunes tiger beetle (*C. l. albissima*) of Utah, which has been elevated to species status by Morgan et al. (2000). Several subspecies occur in northern regions of North America, most commonly on sand dune formations, including the recently described *C. l. nogahabarensis* from an area of sand dunes in Alaska (Knisely et al. 2008), possibly including the Kobuk Sand Dunes (Kobuk Valley National Park) in western Alaska, north of the Arctic Circle (Pearson et al. 2005). *Cicindela oregona guttifer* has also been recorded north of the Arctic Circle in Alaska (Brzoska 2008).

There are two subspecies of *C. limbata* found in Manitoba; *C. limbata limbata* extends into the southwestern part of Manitoba, but *C. limbata hyperborea* is recorded from the extreme northwest of the province

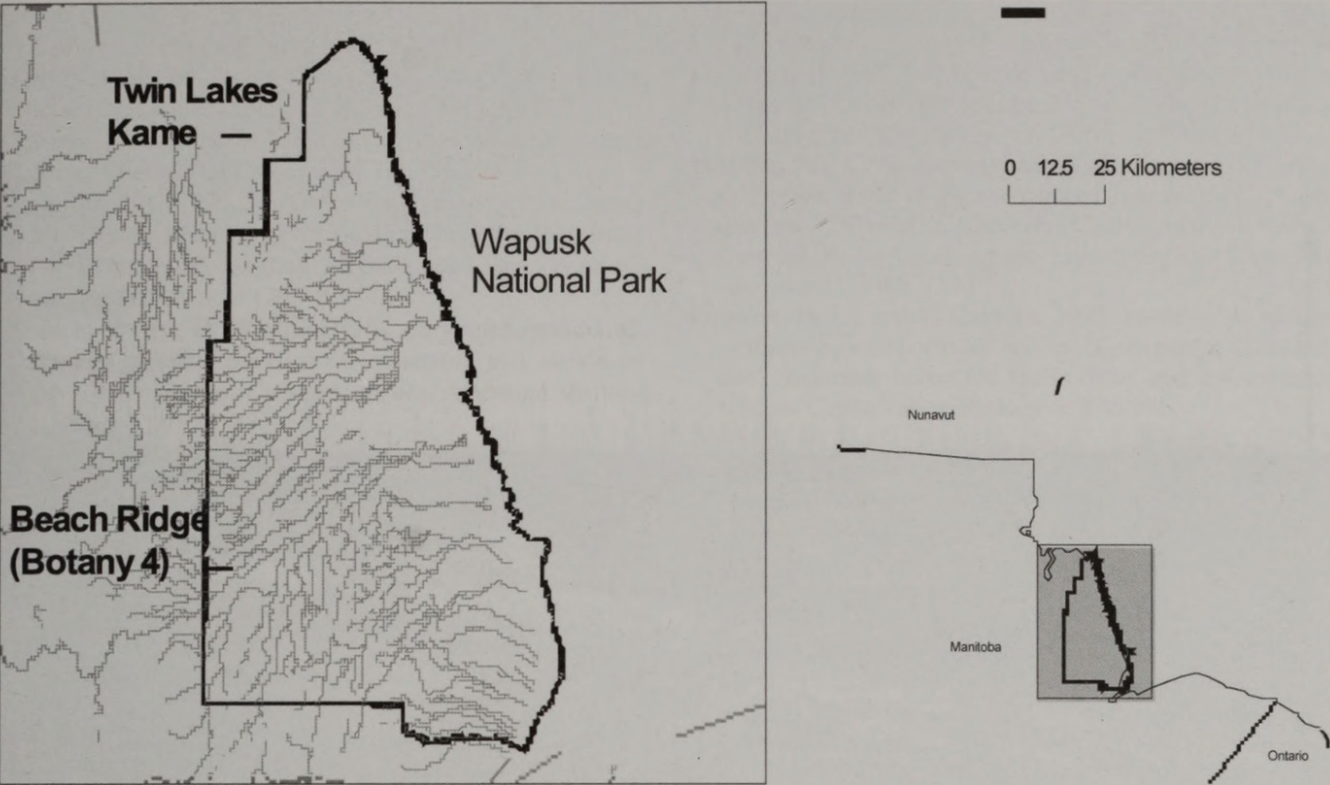


FIGURE 1. Map of the Churchill region and Wapusk National Park, including collection locations of *Cicindela longilabris longilabris* and *C. limbata hyperborea*.

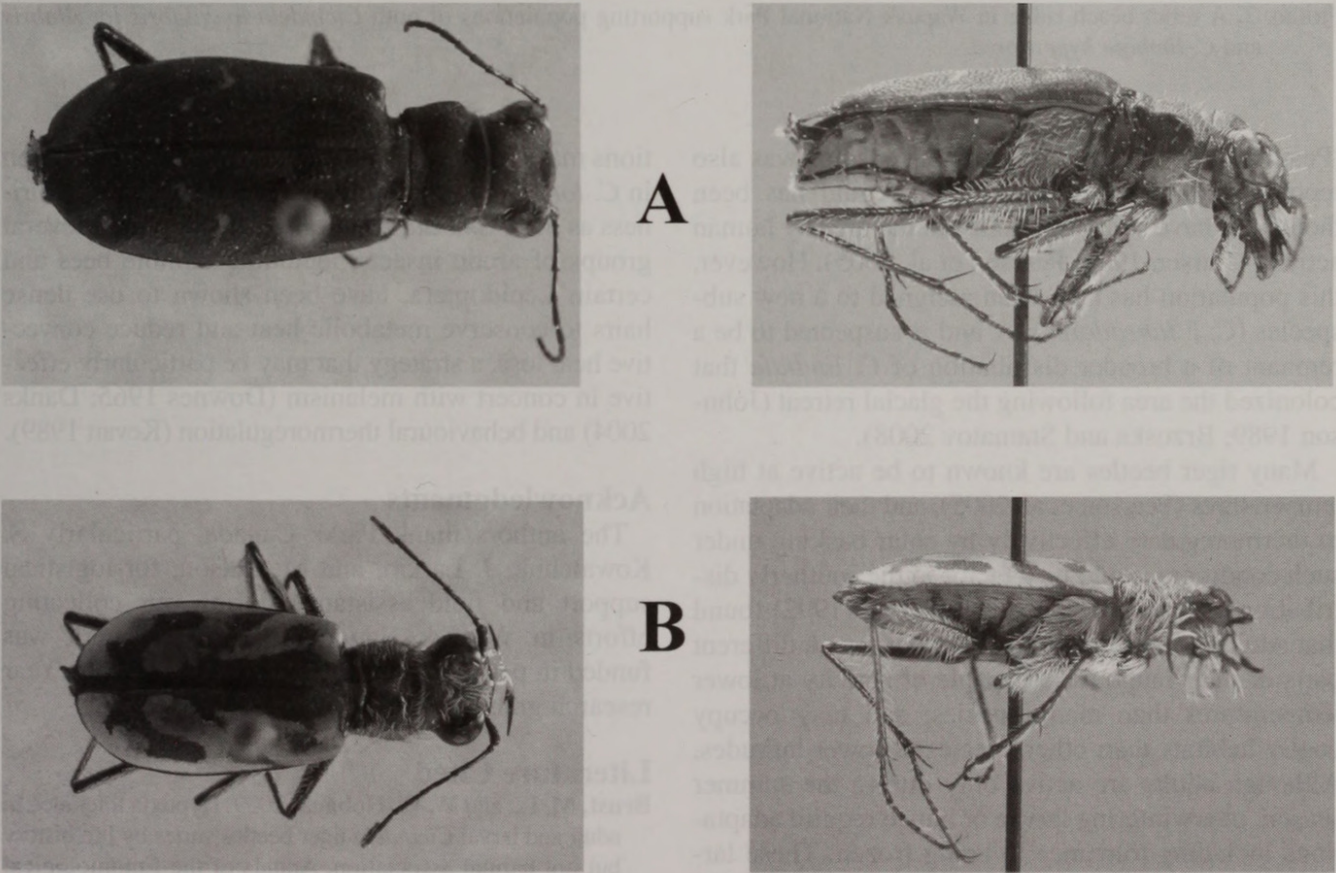


FIGURE 2. Dorsal (left) and lateral (right) views of pinned specimens of *Cicindela longilabris longilabris* (A) and *C. limbata hyperborea* (B) collected in the Churchill region.



FIGURE 3. A relict beach ridge in Wapusk National Park supporting populations of both *Cicindela longilabris longilabris* and *C. limbata hyperborea*.

(Pearson et al. 2005). The latter subspecies was also reported from Goose Bay, Labrador and has been thought to have been introduced to the area by human activity (Larson 1986; Pearson et al. 2005). However, this population has now been assigned to a new subspecies (*C. l. labradorensis*), and is suspected to be a remnant of a broader distribution of *C. limbata* that colonized the area following the glacial retreat (Johnson 1989; Brzoska and Stamatov 2008).

Many tiger beetles are known to be active at high temperatures (Pearson et al. 2005), and their adaptation to thermoregulate effectively by solar basking under such conditions could be a factor in the southerly distribution of most species. Schultz et al. (1992) found that adult *C. longilabris* from populations in different parts of their range were capable of activity at lower temperatures than many species, and may occupy cooler habitats than other species at lower latitudes. Although adults are active only during the summer season, overwintering larvae or pupae require adaptations including tolerance to being frozen. These larvae may take up to three years to reach adulthood in Manitoba (Hamilton 1925). Adults may also need to cope with cold in the summer season. Adults' adapta-

tions may include dark colouration (melanism), as seen in *C. longilabris longilabris* (Figure 2A) and/or hairiness as in *C. limbata hyperborea* (Figure 2B). Several groups of arctic insects, including bumble bees and certain Lepidoptera, have been shown to use dense hairs to conserve metabolic heat and reduce convective heat loss, a strategy that may be particularly effective in concert with melanism (Downes 1965; Danks 2004) and behavioural thermoregulation (Kevan 1989).

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