

TIGER BEETLES OF MANITOBA: ECOLOGY, LIFE HISTORY AND MICROSCULPTURE

ROBERT E. WRIGLEY, LARRY DE MARCH AND ERWIN HUEBNER. 2022. 106 PP. \$20.
(WRIGLEY – AUTHOR; DE MARCH – COLOUR PHOTOGRAPHY; HUEBNER – SCANNING ELECTRON MICROSCOPY)

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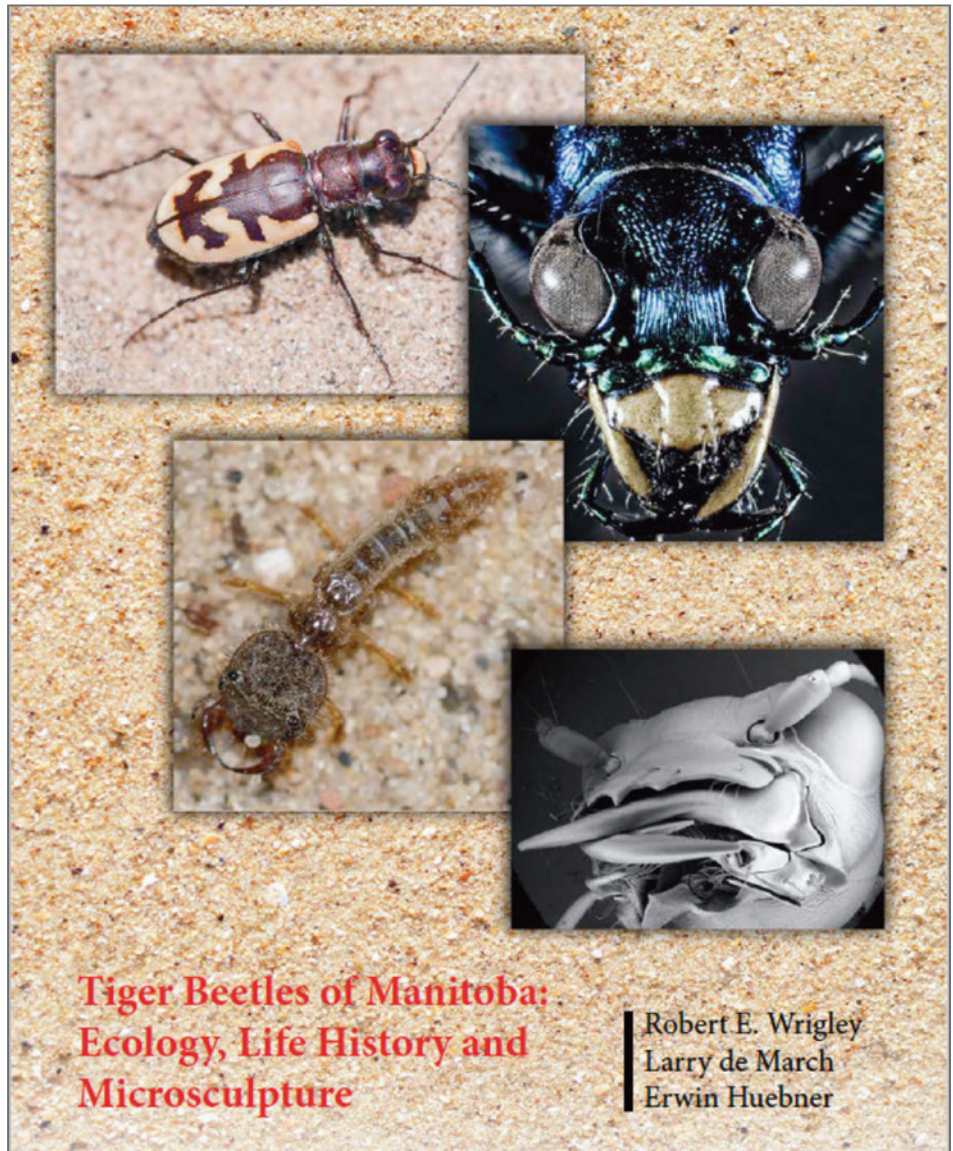
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A few groups of insects have special appeal. Butterflies, dragonflies, and larger bees attract attention because of their size, bright colours, energetic behaviour and especially they are out and about in the types of weather we humans most like — warm, sunny, calm days. These are the often-termed charismatic insects, and to this list can be added tiger beetles. They may not be as well known to the general public, but to the initiated they offer the same appeal and with even more drama and elan.

Much has been written about tiger beetles. A global overview of the biology of tiger beetles is given by Pearson & Vogler (2001).¹ Each of the major biogeographic regions (all of which except Antarctica have tiger beetles) has an extensive literature. Within North America there are catalogues to the species (Freitag 1999)², popular identification guides to Nearctic species (Pearson et al. 2006)³, a treatise on Canadian species (Wallis 1961)⁴, many state and provincial treatments, publications on single species or species complexes and even studies on single populations. There is an international journal (*Cicindela*) devoted to the study of tiger beetles, as well as many tiger beetle studies reported in a variety of entomological and ecological journals. With this plethora of literature, one has to ask the question — is there a need for publication of another regional tiger beetle study?

The publication *Tiger Beetles of*



Manitoba has the stated objectives of summarizing the natural history of tiger beetles, illustrating aspects of their morphology, and encouraging study of these insects. The book has three principal sections: an introduction that includes the natural history and study of tiger beetles; a species-by-species account of the Manitoba fauna; and a photographic

atlas to the external anatomy of adult tiger beetles. Although none of these sections could be considered comprehensive, together they constitute a very good celebration of tiger beetles.

Tiger beetles as a group occur across a range of environments and habitats but generally the prairie species are insects of open spaces,

with adults typically found running over the ground in places where there is open, exposed soil with patchy vegetation. Like us, they eschew jungly tangles and dense shade. They like sunshine and warmth and generally if you are in an environment you like, there is likely a tiger beetle species sharing it with you. Open habitats are usually erosional sites such as unstable slopes and banks, margins of streams and lakes, sand dunes, trails and roadsides and even salt flats. These sorts of habitats are not serene Edens, rather they are the result of catastrophes such as flood events, drought, wind scour, and even the grazing of cattle (for a small insect, the step of a cow or even the resulting imprint can be a disaster) or activities of humans. Wrigley amply describes these dystrophic environments and their importance to tiger beetles.

Like the common name suggests, adult tiger beetles are ferocious predators, feeding on almost everything they are capable of catching and handling, but in turn are fed on by almost any predator capable of catching them (not so easily done for tiger beetles are alert, fast and elusive, especially for human collectors). Where there are tiger beetles there are frequently ants. Evidence is given for tiger beetles feeding on ants, but interactions between the two groups probably extend beyond this and may be important in determining where tiger beetles occur. Although this level of ecosystem interaction is not pursued, interspecific competition between tiger beetle species and even between larval and adult stages, both of which are general predators, is considered.

Although it is the adult beetle stage most people are familiar with, the bizarre larvae are noteworthy. Each larva lives in vertical burrow which provides protection and a perch from which it can strike out to capture passing prey. A larva may spend months or even years within

its earthen fortress and although protected from some dangers such as ants and weather, some parasitoid insects have ways of attacking and killing the larvae and various events such as flooding or extreme soil disturbance (including cattle hooves and human vehicles) can ruin the tunnels. Tiger beetle larvae are usually very specific as to the conditions under which they live, and it is likely the success of larvae that is the main factor determining the distribution and abundance of species.

Manitoba has 19 species (a few of which are represented by two subspecies or distinct colour morphs). The majority of these species are shared with the other Prairie Provinces with the exception of the Laurentian Tiger Beetle (*Cicindela denikeri*) and the Coppery Tiger Beetle (*Ellipsoptera cuprascens* – probably extirpated) occurring only in Manitoba and the Badlands Tiger Beetle (*C. decemnotata*) (AB, SK) and the Western Tiger Beetle (*C. oregona*) (AB) lacking from Manitoba. Several subspecies of the 17 species held in common have more restricted distributions (Bousquet et al. 2013).⁵ Thus, this book quite adequately covers the Canadian Prairie tiger beetle fauna. Each of these species occurs in characteristic habitats, and the focus of the

second section of the book is on the recognition of the various species and characterization of the habitats in which they occur.

Tiger beetles are gorgeous insects with their bodies bearing varying patches of bright metallic copper, green and/or blue colours and on the backs of the elytra (the hardened front wings which form the covering of the mid- and hind body) are characteristic pale markings. These colour patterns as well as differences in size and body shape are generally sufficient to permit species identification. The book presents an excellent photograph of each species which alone makes this a useful field guide to most species within the fauna. As the species occur in very particular types of habitats, the detailed habitat description provided for each species is also a good identification guide.

The species photographs, mainly by Larry de March, are for the most part oblique dorsal views. They capture the dynamics of an alert, active beetle but are not always the best for identification or comparative purposes. Novices learning tiger beetle identification would probably appreciate a composite page of more pedestrian images of each species (or colour morph) in dorsal aspect so that comparisons could be made. If such



Hairy-necked Tiger Beetle. Photo credit: Larry de March.

a page could be made as a separate, say a card that could fit into the field jacket pocket, one could have a rapid field reference guide. Luckily, this has been done by another Manitoba naturalist, J.B. Wallis (1961) who provides coloured plates of the species and various colour forms of Canadian tiger beetles. This is valuable because of the variation in colour and pattern occurring in particular species, for example, the Cow Path Tiger Beetle (*C. purpurea*, pp. 62 – 64). The colours of the beetles in the photographs of this species do not resemble the dark specimens occurring in the short grass prairies of Alberta and Saskatchewan, but Wrigley explains that the black form of the western prairies occurs only rarely in Manitoba and thus is not illustrated.

A map would have been a useful addition to at least show the distribution of Manitoba ecozones and to which habitat types and distribution could be related.

The term “microsculpture” in the title immediately perked my interest. Having an interest in insect taxonomy it is a term I commonly encounter, with mixed feelings. Microsculpture is usually taken to mean fine detail on the surface of the insect cuticle, and it often provides good characters for species discrimination. It also means cleaning the objective lens of the microscope and adjusting the lighting on the specimen for viewing conditions are critical for clear resolution of such fine details. However, Erwin Huebner's scanning electron microscopy (SEM) images in the last section of the book provide a closeup tour of the external anatomy of an adult tiger beetle's body but is not really a study of microsculpture. The tour is wonderful and the detail and clarity of body parts, such as the male tarsal structures used in mating, are clearer than one will ever be able to see. Many people will find these images amazing, however once I heard microsculpture mentioned

my interest was perked in hopes that a discussion of the physical and ecological implications of fine cuticular detail would be unveiled. Alas, maybe a subject for another paper.

Wrigley, being a resident and an ecologist working in prairie environments, is well aware of the difficulties these environments pose to the organisms that inhabit them. This is a theme running through the book whether it be related to extirpated populations or species, the sudden surge of species numbers in a given site, or changing distribution patterns. As with much of the biota, there is concern regarding the status of the various constituent species and under each species a section on its Conservation Status is provided. For most species, not much can be said, partly because of lack of observations but also “it is the nature of some tiger beetle species and populations to fluctuate in abundance over the years.” (p. 81).

This book should go a long way to encourage people to notice tiger beetles and keep track of how they are doing and, in this way, contribute to our understanding of the biology and conservation of some varied and dynamic parts of the prairie environment.

To answer the beginning question: yes, there is a need for this publication. If you are a tiger beetle aficionado you will find the observations on the biology of some of the lesser known, regional species to be interesting, as well as the information on how more common species are doing near their range limits. If you are more of a general naturalist, the appreciation gained about these vibrant insects will enrich your outings. If you are of a literary bent, you will enjoy some original poetry and reference to literary works. The SEM images will amaze you with the intricacies of the structure. And all will enjoy the carefully edited and organized manuscript, especially at the price

— free for the downloading (see information in title of this review).

P.S. Wrigley frequently mentions collecting and collections of tiger beetles. Some current opinion opposes the collecting of natural history specimens but in various ways Wrigley demonstrates the importance of such collections in assessing the ecology and status of the various species. Collected specimens provide a permanent objective record of the what, where and when of species occurrences. However, collecting must be done properly with specimens prepared to recommended standards (e.g., Martin 1977)⁶ and be fully labelled as to locality and date of collection. Such specimens form an invaluable resource for comparison and identification of specimens, study of morphology, and when their need is through, they can be deposited in a public museum where they contribute to the permanent record of the species. Supplies for insect collection can be found at Indigo Instruments, Waterloo, ON (<https://www.indigoinstruments.com>).

1. Pearson DL, Vogler AP (2001) Tiger beetles: the evolution, ecology, and diversity of the cicindelids. Cornell University Press. Ithaca. 333 pp.
2. Freitag R (1999) Catalog of the Tiger Beetles of Canada and the United States. NRC Research Press. Ottawa. 195 pp.
3. Pearson DL, Knisley CB, Kazilek CJ (2006) A field guide to the Tiger Beetles of the United States and Canada. Oxford University Press. Oxford. 227 pp.
4. Wallis JB (1961) The Cicindelidae of Canada. University of Toronto Press. Toronto. 74 pp.
5. Bousquet Y, Bouchard P, Davies EE, Sikes DS (2013) Checklist of Beetles (Coleoptera) of Canada and Alaska. Pensoft. Sofia-Moscow. 402 pp.
6. Martin JEH (1977) The Insects and Arachnids of Canada. Part 1. Collecting, preparing, and preserving insects, mites and spiders. Research Branch, Canada Department of Agriculture. Publication 1643. 182 pp. 