

## The ROM Field Guide to Freshwater Fishes of Ontario

By E. Nicholas, E. Mandrak, and M. Burrige. 2009. Royal Ontario Museum, 100 Queen's Park, Toronto, Ontario M5S 2C6. 462 pages. 29.99 CAD. Paper.

This guide covers the 128 native fish species in Ontario along with 17 species of established exotics. The Introduction indicates that it will enable the reader to identify species in the field. To this end, the book is replete with over 500 colour photographs of all the species, often as many as five for each species.

The book has short introductory sections on factors influencing distribution, habitats, observing fishes, how to use the book, further information (books and internet sources), anatomical figures and, at the end, illustrations and short descriptions of fishes that may occur in Ontario, a short glossary, a checklist, an index to common and scientific names, a list of photographers and illustrators, acknowledgements, and short blurbs about the authors.

Fifty-one pages are devoted to keys and the rest of the book, 355 pages, to the species accounts.

The keys are innovative in that they group fishes by a single illustrated character (initially eel-like body, barbels, adipose fin, one dorsal fin without spines, dorsal fin with one or more spines) and then each of these five headings have up to 3 subheadings. Within the subheadings a single character may identify a species or family of fishes although some require up to 3 characters to separate them. Members of the Carp and Minnow family, Cyprinidae, appear in 4 places (barbels, spineless dorsal fin with forked tail and belly keel, spineless dorsal fin with no keel, and spiny dorsal fin), evidence of their diversity. This works well and narrows down the possibilities.

The next section comprises Comparative Photographs which are reached from the key by a page number. This can be confusing as several unrelated fishes are grouped together and the heading of each page does not repeat the key characters. Page 40, for example, is reached from two key groups under "adipose fin" and "spiny dorsal fin". The species are two ciscoes (Sal-

monidae), a smelt (Osmeridae) and a silverside (Atherinopsidae) – the heading for the page is "Silvery fishes with a soft dorsal fin, no overhanging snout, and no keel". The latter two species are quite distinctive but there are no characters separating the two ciscoes. Later, in the species accounts, the authors do point out that "To the untrained eye, it is virtually impossible to tell all ciscoes apart". In the key, the smelt and silverside are given a page number for their species account, but not here in Comparative Photographs. This requires some work to locate the descriptions and maps of the species from this point as the index lists the brook silverside under "silverside, brook", for example. Generally, this comparative section requires some skill to use and is not always successful, e.g., "Redhorses with red tails" has one species without a red tail, indicative of the variation that can be found in fishes but confusing for the reader. The difficult group "Carps and Minnows" has 9 sections, two of which are "Minnows with large scales (36-54 lateral scales)" and 5 pages later "Minnows with large scales (39-55 lateral scales)" which is confusing. Some characters used are correct but might require some thought by the neophyte reader, e.g., under eel-like fishes, two lamprey species are distinguished by  $>2$  or  $<3$  bicuspid lateral circumoral teeth. The teeth are illustrated, which helps, but  $>2$  meaning 3 or more, and  $<3$  meaning 1 or 2, could have been expressed in this more familiar fashion.

Generally, it is difficult to see how this Comparative Photograph section can work for the reader in families where there is a high diversity in species but close similarity in appearance. The fact that the senior author of the book has taught regular fish identification courses indicates how tricky some identifications can be. Ideally, the Comparative Photographs should have been a continuation or subsets of the initial keys, although this would have necessitated an extensive

nested arrangement in such a diverse group as Carps and Minnows.

The book could have had true anatomical identification keys to difficult and speciose families which would help bridge the gap between the angler and amateur naturalist looking at a fresh fish just caught and needing a quick identification, and the biologist with access to a microscope and preserved specimens needing an accurate and more reasoned identification. Nonetheless, with patience and practice, most Ontario fishes can be identified using this guide.

Each of the 24 family accounts is preceded by a section giving illustrations of key characters referred to in the species accounts, clarifying structures that are not always apparent in colour photographs or not easily understood when expressed in words. The family has a one-page general account. In some families more could be added here, e.g., under each of the two gar species, the same sentence about their adhesive snout disc when young is repeated and should have been on the family page, giving more space for information on individual species.

Each two-page species account is headed by the common name and the scientific name, an explanation of the meaning of the scientific name, a colour photo-

graph of the fish on the white page background, a short section with some informative note about the fish such as distribution, anatomy, behaviour, relationships, etc., a description of the fish (anatomy and colour), a comparative section on similar species, an Ontario shaded distribution map, short sections on feeding, reproduction and habitat, letter and number codes that explain conservation status, and a two-line table giving maximum age, Ontario average length, and Ontario record and world record lengths, and sometimes weights. Other colour photographs in the account show adults, juveniles, close-ups of heads, eggs, fish in a nest, etc, mostly in a natural (or aquarium) setting. Species descriptions are alphabetical by common name so unrelated fishes (in body form) occur next to each other, e.g., smallmouth and largemouth bass are related species that an observer would want to distinguish but are separated by 4 unrelated species accounts.

The book is an excellent introduction to the fishes of Ontario and is packed with information. The authors have carried out a difficult task in an exemplary manner and are to be congratulated for their efforts in presenting this fauna to a wide audience.

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