Digging into Canadian Soils: An Introduction to Soil Science. Edited by M. Krzic, F.L. Walley, A. Diochon, M.C. Paré, and R.E. Farrell. Canadian Society of Soil Science, Pinawa, MB. 2021. https://openpress.usask.ca/soilsscience/.

Review

Canada has a rich history of accomplished soil scientists who study the unique and relatively “young” soils of the country. Conversations about soil science education with Canadian soil scientists often involve the difficulty of teaching students about the soils of Canada and the Canadian soil classification system when the only commercial textbooks available are primarily designed for readers from the United States. There are an estimated 3,000 students who enroll in 63 introductory soil science courses across Canada each year (Krzic et al. 2018), and 80 postsecondary academic institutions in total that offer soil science courses (Diochon et al. 2016). Students at all those institutions would greatly benefit from a book that caters directly to the soils and soil classification system of their country. Textbook prices continue to rise, and students in soil science (Moorberg and Crouse 2017) and many other disciplines are feeling the impact (Senack and The Student Public Interest Research Groups 2014). Open textbooks are typically free to students and openly licensed, often using a Creative Commons license (Creative Commons 2021a). Open textbooks are seen as a primary tool in the battle against increasing textbook costs. The book Digging into Canadian Soils: An Introduction to Soil Science (Krzic et al. 2021) is an open textbook that helps combat the rising costs of textbooks while also addressing the specific needs of Canadian soil science students.

As described in the preface of the book, Digging into Canadian Soils was written entirely by members of the Canadian Society of Soil Science. It was written as a text for introductory soil science college and university courses and serves as a primer to the Canadian System of Soil Classification. The book was published in August of 2021 by the Canadian Society of Soil Science under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0) (Creative Commons 2021b). It is available in both English and French; the English version was evaluated for this review. The book was produced using Pressbooks, a book authoring and editing platform (Pressbooks 2021). The book is available for download in several different formats, including a web book that is screen size-adaptive and can be easily read and navigated in a web browser on mobile phones, tablets, or computers. It is also available as a PDF optimized for print, a digital PDF that includes hyperlinks throughout the text, and as an EPUB book for use with e-readers. Importantly, the book is available to download as a Pressbooks XML file, which allows the book to be adapted for use by others who want to customize the book to suit the needs of their students.

The content of Digging into Canadian Soils is well suited for an introductory soil science course. The 17 chapters are divided among three parts, Part I – Digging In, Part II – Digging Across Canada, and Part III – Digging Deeper. Part I – Digging In includes eight chapters that cover each of the major soil science subdisciplines and topics. Chapter titles include the following: Introduction, Soil Genesis, Soil Organic Matter, Soil Physics, Soil Chemistry, Soil Biodiversity and Ecology, Soil Nutrient Cycling, and Soil Classification and Distribution. These eight chapters cover the core lessons a student would need to learn in an introductory soil science course.

Part II – Digging Across Canada includes five chapters overviewing the regional soils of Canada. Chapter titles include the following: Soils of British Columbia and Yukon: The Western Cordillera, Soils of the Prairie Provinces, Soils of Ontario, Soils of Quebec, and Soils of the Atlantic Provinces. Each of these virtual tours of the regional soils highlights the geology influencing those soils, their distribution, important soil types in the region, and applications of soil science concepts from Part I relevant to that particular region.

Part III – Digging Deeper goes into more depth, as the part title implies, on soil science topics that have broad and growing interest. The four chapter titles include the following: Soil Mineralogy, Soil Health and Management, Soil Reclamation and Remediation of Disturbed Lands, and Digital Soil Mapping. Each chapter in Digging into Canadian Soils was written by experts in the respective subdisciplines, regional soils, or soil science topics. Despite the chapters being written by 41 authors and coauthors, the voice presented in the text is consistent throughout. The language used is straightforward and easy to understand; perfect for students in introductory soil science courses or anyone else exploring an interest in soils. The figures in all chapters are consistently of high quality. Each figure includes a caption indicating the original source and lists the specific copyright license for the figure. Similarly, each table in the text is of high quality, easy to understand, and well formatted using the TablePress add-on (Båthge 2021) within Pressbooks.

Teachers and students will enjoy conventional as well as novel textbook features included in this book. Each chapter begins with learning objectives. The text of each chapter is highlighted by breakout boxes titled “Can You Dig It,” which elaborate on main points from the text, identify emerging topics within the soil science profession, or introduce the readers to important Canadian soil scientists who made significant contributions relevant to that chapter topic. The summary section of each chapter includes practice questions and worked examples. A small detail included in each of the chapters that was appreciated is the “About the Authors” section, which includes pictures of each chapter author and their brief biography. This section helps students relate to the authors, but also highlights diversity within the scientific field. The book also includes a traditional glossary, but the web book takes it one step further and allows the reader to click on a term within a chapter, opening up a pop-up box that displays the glossary entry for that term within the same web page. This small detail will likely be much appreciated by most students in introductory soil science courses that are notoriously terminology-heavy.

The content of this book clearly meets the needs of most introductory soil science students and instructors. However, the current lack of alternative text for images and figures is a hindrance for visually impaired readers. Alternative text provides descriptions of images to visually impaired readers who rely on screen reader applications to read books and web pages. There is no Canadian counterpart to the Americans with Disability Act (Americans With Disabilities Act of 1990), and such considerations are optional in Canada or regulated at the provincial level. However, with 3000 Canadian students likely to be assigned this book each year, odds are that a significant number of students will be disadvantaged by this omission. The authors are encouraged to add alternative text for all figures and have a librarian or an expert in accessibility review the text for other accessibility considerations as soon as possible.

This book will inspire international interest. As an American soil scientist, the translations between the Canadian System of Soil Classification, the World Reference Base, and USDA Soil Taxonomy in Chapter 8 will be a regularly used reference. This book represented the first in-depth exposure to the Canadian System of Soil Classification for this...
reviewer. Canadian soil science students and international soil scientists will find the introduction to the Canadian System of Soil Classification to be straightforward and very useful. Part II – Digging Across Canada will have immediate utility for Canadian soil science students. That part of the book will likely have the added benefit of inspiring international collaboration by helping soil scientists from other countries form a better understanding of Canadian soils. Having both English and French versions of this book captures two major world languages. Free book access in multiple languages greatly strengthens the international utility of this open textbook.

The most exciting aspect of Digging into Canadian Soils is the fact that it is openly licensed. The open license and the excellent textbook quality will allow this book to serve as a strong foundation for future adaptations. Another exciting aspect is Digging into Canadian Soils can be paired with the open laboratory manual, Soils Laboratory Manual, K-State Edition (Moorberg and Crouse 2021) to offer students a complete set of free and open course materials for introductory soil science courses. Both books can be adapted by instructors and customized for their soils course, as well as for their country, province, or state. Both open textbooks are produced in Pressbooks, which makes them compatible and maintains a consistent user experience for students and instructors.

Canadian students in introductory soil science courses were the target audience of this textbook, and they will not be disappointed. Many other audiences will also find this text useful and approachable. Practicing and professional soil scientists will find this textbook to be an effective reference to review soil science principles or learn about emerging soil science topics. Scientists from other disciplines will find this book as a welcoming introduction to soil science. Farmers, ranchers, and land managers will learn how to put soil science concepts into practice to improve their operations. International audiences will be able to use this book for learning soil science fundamentals that span country borders and soil classification systems, as well as an excellent primer to Canadian soils and the Canadian System of Soil Classification. Digging into Canadian Soils: An Introduction to Soil Science is an excellent open textbook and a welcome contribution to the soil science profession.

Acknowledgements

This book review was improved thanks to the comments from one anonymous reviewer and the associate editor. Contribution no. 22-130-J from the Kansas Agricultural Experiment Station.

Colby Moorberg
Kansas State University, Department of Agronomy, Manhattan, Kansas, United States.

References

Americans with Disabilities Act of 1990. 1990.
Bäthge, T. 2021. TablePress. [Online]. Available from https://tablepress.org/ [Accessed 2 Nov. 2021].
Creative Commons. 2021a. About CC licenses. [Online]. Available from https://creativecommons.org/about/cclicenses/ [Accessed 2 Nov. 2021].
Creative Commons. 2021b. Creative commons — attribution-NonCommercial 4.0 International — CC BY-NC 4.0. [Online]. Available from https://creativecommons.org/licenses/by-nc/4.0/ [Accessed 2 Nov. 2021].
Diochon, A., Basiliko, N., Krzic, M., Yates, T.T., Olson, E., Masse, J., Amiro, B., and Kumaragamage, D. 2016. Profiling undergraduate soil science education in Canada: status and projected trends. Can. J. Soil. Sci. 97: 122–132. Canadian Science Publishing. doi:10.1139/cjss-2016-0058.
Krzic, M., Walley, F., Diochon, A., Paré, M.C., and Farrell, R. (eds.) 2021. Digging into Canadian soils: an introduction to soil science. Canadian Society of Soil Science, Pinawa, MB. [Online] Available from https://openpress.usask.ca/soils/.
Krzic, M., Yates, T.T., Basiliko, N., Pare, M.C., Diochon, A., and Swallow, M. 2018. Introductory soil courses: a frontier of soil science education in Canada. Can. J. Soil. Sci. 98: 343–356. doi:10.1139/cjss-2018-0006.
Moorberg, C., and Crouse, D. 2021. Soils laboratory manual: K-state edition, version 2.0. New Prairie Press, Manhattan, KS. [Online] Available from https://newprairiepress.org/ebooks/39.
Moorberg, C.J., and Crouse, D.A. 2017. An open-source laboratory manual for introductory, undergraduate soil science courses. Nat. Sci. Educ. 46. doi:10.4195/nse2017.06.0013.
Pressbooks. 2021. Our products. [Online]. Available from https://pressbooks.com/our-products/ [Accessed 2 Nov. 2021].
Senack, E., and The Student Public Interest Research Groups. 2014. Fixing the broken textbook market: how students respond to high textbook costs and demand alternatives. Center for Public Interest Research, Inc. [Online]. Available from http://www.uspirg.org/sites/pirg/files/reports/NATIONAL%20Fixing%20Broken%20Textbooks%20Report1.pdf.