

DATA PAPER

Deliberately introduced dung beetles in Australia: 12 years of occurrence and abundance records from 2001 to 2022

Jacob D. Berson^{1,2}  | Penelope B. Edwards³  | T. James Ridsdill-Smith^{1,2}  |
 Christopher K. Taylor^{1,4}  | Daniel J. Anderson^{1,2}  | Nigel R. Andrew^{5,6}  |
 Russell A. Barrow⁷  | David A. Cousins⁸  | Robert N. Emery^{8,9}  |
 Laura L. Fagan⁸  | Rhiannon M. Foster¹  | Lucas G. Harwood¹  |
 Zac Hemmings^{5,10}  | Megan J. Lewis^{1,2}  | Sherralee S. Lukehurst¹  |
 Jake Manger¹  | John N. Matthiessen¹¹  | Marcela D. C. Vieira¹  |
 Paul A. Weston¹²  | Raphael K. Didham^{1,2}  | Theodore A. Evans¹ 

¹School of Biological Sciences, The University of Western Australia, Perth, Western Australia, Australia²CSIRO Health and Biosecurity, Centre for Environment and Life Sciences, Floreat, Western Australia, Australia³Independent Researcher, Sunshine Coast, Queensland, Australia⁴School of Earth and Planetary Sciences, Curtin University, Bentley, Western Australia, Australia⁵Insect Ecology Lab, School of Environmental and Rural Sciences, University of New England, Armidale, New South Wales, Australia⁶Faculty of Engineering and Science, Southern Cross University, Lismore, New South Wales, Australia⁷Gulbali Institute of Agriculture, Water and Environment, Charles Sturt University, Wagga Wagga, New South Wales, Australia⁸Department of Primary Industries and Regional Development, Perth, Western Australia, Australia⁹Centre for Biosecurity and One Health, Harry Butler Institute, Murdoch University, Murdoch, Western Australia, Australia¹⁰New South Wales Department of Primary Industries, Department of Regional NSW, Coffs Harbour, New South Wales, Australia¹¹Independent Researcher, Perth, Western Australia, Australia¹²Graham Centre for Agricultural Innovation, Charles Sturt University, Wagga Wagga, New South Wales, Australia

Correspondence

Jacob D. Berson

Email: jacob.berson@uwa.edu.au

Funding information

Western Australian Department of Agriculture and Food Western Australia (DAFWA), currently known as the Department of Primary Industries and Regional Development (DPIRD); Australian Government, Department of Agriculture, Fisheries and Forestry, Rural Research and Development for Profit Program, Grant/Award Number: 16-03-016; Natural Heritage Trust; Meat and Livestock Australia; Queensland Department of Primary Industries (DPI)

Abstract

Since 1968, the Australian Dung Beetle Project has carried out field releases of 43 deliberately introduced dung beetle species for the biological control of live-stock dung and dung-breeding pests. Of these, 23 species are known to have become established. For most of these species, sufficient time has elapsed for population expansion to fill the extent of their potential geographic range through both natural and human-assisted dispersal. Consequently, over the last 20 years, extensive efforts have been made to quantify the current distribution of these introduced dung beetles, as well as the seasonal and spatial variation in their activity levels. Much of these data and their associated metadata have remained unpublished, and they have not previously been synthesized into a cohesive dataset. Here, we collate and report data from the three largest

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial](https://creativecommons.org/licenses/by-nc/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes.

© 2024 The Authors. *Ecology* published by Wiley Periodicals LLC on behalf of The Ecological Society of America.

Handling Editor: Miguel A. Acevedo

dung beetle monitoring projects from 2001 to 2022. Together, these projects encompass data collected from across Australia, and include records for all 23 species of established dung beetles introduced for biocontrol purposes. In total, these data include 22,718 presence records and 213,538 absence records collected during 10,272 sampling events at 546 locations. Most presence records (97%) include abundance data. In total, 1,752,807 dung beetles were identified as part of these data. The distributional occurrence and abundance data can be used to explore questions such as factors influencing dung beetle species distributions, dung beetle biocontrol, and insect-mediated ecosystem services. These data are provided under a CC-BY-NC 4.0 license and users are encouraged to cite this data paper when using the data.

KEYWORDS

biological control, dung beetle, insect, monitoring, species distribution, surveillance

ACKNOWLEDGMENT

Open access publishing facilitated by The University of Western Australia, as part of the Wiley - The University of Western Australia agreement via the Council of Australian University Librarians.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

DATA AVAILABILITY STATEMENT

The data set is available as Supporting Information to this paper. Associated data are also available in Zenodo at <https://doi.org/10.5281/zenodo.10983740>. Code used to prepare the data is available in Zenodo at <https://doi.org/10.5281/zenodo.11003131>.

ORCID

Jacob D. Berson  <https://orcid.org/0000-0002-7059-2131>

Penelope B. Edwards  <https://orcid.org/0009-0009-1205-6769>

T. James Ridsdill-Smith  <https://orcid.org/0000-0003-0660-1934>

Christopher K. Taylor  <https://orcid.org/0000-0002-2513-4828>

Daniel J. Anderson  <https://orcid.org/0000-0003-3363-837X>

Nigel R. Andrew  <https://orcid.org/0000-0002-2850-2307>

Russell A. Barrow  <https://orcid.org/0000-0002-3248-1246>

David A. Cousins  <https://orcid.org/0009-0001-0042-6007>

Robert N. Emery  <https://orcid.org/0000-0002-4742-5917>

Laura L. Fagan  <https://orcid.org/0000-0002-1633-6284>

Rhiannon M. Foster  <https://orcid.org/0009-0009-4395-2355>

Lucas G. Harwood  <https://orcid.org/0009-0003-0373-4085>

Zac Hemmings  <https://orcid.org/0000-0003-1116-736X>

Megan J. Lewis  <https://orcid.org/0000-0002-8707-9211>

Sherralee S. Lukehurst  <https://orcid.org/0009-0005-1650-526X>

Jake Manger  <https://orcid.org/0000-0002-0686-4788>

John N. Matthiessen  <https://orcid.org/0009-0001-2404-0096>

Marcela D. C. Vieira  <https://orcid.org/0000-0002-9669-7628>

Paul A. Weston  <https://orcid.org/0000-0002-9720-8283>

Raphael K. Didham  <https://orcid.org/0000-0001-6685-7005>

Theodore A. Evans  <https://orcid.org/0000-0002-0558-3036>

SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

How to cite this article: Berson, Jacob D., Penelope B. Edwards, T. James Ridsdill-Smith, Christopher K. Taylor, Daniel J. Anderson, Nigel R. Andrew, Russell A. Barrow, et al. 2024. "Deliberately Introduced Dung Beetles in Australia: 12 years of Occurrence and Abundance Records from 2001 to 2022." *Ecology* 105(7): e4328. <https://doi.org/10.1002/ecy.4328>