SMOOTH GREEN SNAKE USE OF DRIED COW "PATTIES" (FECES) AS COVER IN PRAIRIE IN SOUTHERN MANITOBA

James R. Duncan
P.O. Box 253
Balmoral, MB R0C 0H0

Finding a Smooth Green Snake *(Opheodrys vernalis)* in the wild has been a "bucket list" quest for me since moving to Manitoba about 40 years ago. Although active by day in prairie grasslands and associated treed savannahs, their unmarked grass-green colour makes them hard to find (Figure 1).[1,2] It is a small snake with a white, pale green or creamy belly, typically 30 to 50 cm long but some can grow to 80 cm.[3,4] It eats a variety of small terrestrial invertebrates including caterpillars, crickets, grasshoppers, and spiders.[2]

The Smooth Green Snake is "Secure" globally, but its status in the states and provinces in North America ranges from "Presumed Extirpated" to "Secure". In Manitoba it is ranked as "Vulnerable" and therefore of conservation concern.[2]

People sometimes find them under pieces of wood, tin or human-made materials such as plywood (aka coverboards) placed to monitor or research this and other species like the Northern Prairie Skink *(Plestiodon septentrionalis)* (A. Krause-Danielsen pers. comm. 16 December 2024).[1] In one Manitoba Smooth Green Snake study, 92 per cent of 232 captures were of snakes under cover, and 88 per cent of those were under plywood or particle boards.[1] These reptiles use natural cover or coverboards to hide from predators, look for prey, lay eggs, reduce moisture loss and/or regulate their temperature.[5]

It was with high hopes that my wife Patsy and I accompanied Brooks Duncan and Marcus Skakum to southwestern Manitoba on 20 July 2023 while they conducted biological inventories for skinks and other species at risk (Figure 2). The areas to be inventoried reportedly had plywood coverboards used in the past to monitor skink populations.

FIGURE 1. Smooth Green Snake in sparse mixed grass prairie.

FIGURE 2. Biologists conduct a biological inventory of the Assiniboine Corridor Wildlife Management Area in Manitoba.

We spent the morning searching for plant and animal species of conservation concern and coverboard locations within Spruce Woods Provincial Park. Sadly, no coverboards could be located, and no snakes were encountered. After a hasty lunch in the shade to escape the now very hot sun we headed 12 km southwest to the Assiniboine Corridor Wildlife Management Area, about 4.6 km east of Stockton, Manitoba.

On the drive there I confessed to my wife and fellow retired biologist Patsy that I did not think my Smooth Green Snake quest would be fulfilled that day. Walking through this diverse protected grassland area, managed in part by allowing cattle to graze it, it became apparent that the coverboards placed here many years ago were no longer present.

While stumbling along the prairie, trying to keep up with the younger biologists in our group, I paused to look at a dinner plate-sized, dried cow patty. Seeing it evoked fond childhood memories of growing up in rural Quebec. As kids my friends and I used dry cow patties as frisbees and as bases when playing scrub baseball. As many are aware, cow patties are also known as dung, pats, patties, pies or manure and they are the waste product (feces) of cattle. Dried cow feces are used in many parts of the world as fuel for fires and to build homes.

On a whim I picked up the cow patty, tugging it carefully from the sparsely grass-covered ground. To my surprise and delight, doing so exposed two Smooth Green Snakes, now gleaming bright green in the sun. I quickly reached down and gently grasped the snakes and called to my fellow field trippers over with a hoarse, squawk-like "snakes!" (Figure 3). A brief examination ensued before releasing them into the grass near the now replaced cow patty.

We next found one more Smooth Green Snake under a cow patty only 6 m south of the cow patty with two snakes under it. Then we randomly checked under a dozen or so cow patties on the rest of our walk (Figure 4). No more snakes were located but one particularly striking insect was uncovered beneath a cow patty, later identified by iNaturalist taxonomic experts as a Blue-bordered Pedunculate Ground Beetle *(Pasimachus elongatus)* (Figure 5). [https://www.inaturalist.org/observations/174482005].

FIGURE 3. Smooth Green Snake captured from under a cow patty.

iNaturalist is an important community science app that the public can use to observe and share occurrences of wild plants and animals. For example, one of the above records of the Smooth Green Snake can be observed at https://www.inaturalist.org/observations/254998697. The sharing of such observations through iNaturalist helps with periodic assessment of the conservation status of and research on wild species and helps inform decisions on creating or maintaining protected areas or identifying areas to avoid disturbing.

Experienced herpetologist Pamela Rutherford speculated that snakes could be under cow patties but never found them under the few that she and her graduate students checked; she felt that this discovery was therefore notable (pers. comm. 25 July 2023).

FIGURE 4. Patsy Duncan near a cow patty under which two Smooth Green Snakes were located.

Can cow patties be used for sampling or monitoring reptiles?

An increase in cover density positively influenced the number of captures of Prairie Skink (*Plestiodon septentrionalis*) in Manitoba.[6] Cover may be more critical to small reptiles in sparsely vegetated native prairie habitat where temperature variation is less moderated due to a lack of plant structure heterogeneity.[6]

Cow patties transform and degrade at variable rates depending on cattle stocking rates (trampling), abiotic (rain, temperature) and biotic factors (microorganisms and invertebrates that consume them), and may not persist from year to year. However, they are renewed

FIGURE 5. Blue-bordered Pedunculate Ground Beetle *(Pasimachus elongatus)*.

FIGURE 6. Broken cow patty after lifting and replacing it.

each season when cattle are present.

Fresh cow dung is about 80 per cent water, full of nutrients and microorganisms (bacteria, fungi, nematodes), and provides a home for more than 300 insect species on Canadian prairies including mites, flies, wasps and beetles.[7] Some of these organisms relocate dung material from the patties, live within them, or make tunnels beneath them creating a variety of microhabitats.[7]

Fresh cow manure is often expelled as a viscous liquid that forms puddles on the ground and adheres to plant material. When it dries it sticks to grasses and shrub stems, and contracts as it dries. Lifting a dry cow patty for the first time takes a controlled force as grass and other debris anchor the cow patty to the ground. Cow patties may break in half or into smaller fragments when lifted (Figure 6). Once lifted, a dry cow patty is never the same.

The temperature, humidity and fauna found under a cow patty before and after it has been lifted and replaced likely vary considerably. Measuring the first two aspects with microclimate data loggers may be an interesting field experiment for students or others to conduct. If the before and after differences in microclimate conditions under the cow patty are considerable then the act of looking under one may render it less attractive to Smooth Green Snakes after it has been replaced, affecting their usefulness as cover for repeated monitoring of reptiles.

In conclusion, searching for snakes under cow patties can be useful as a one-time inventory method, but doing so may not be repeatable for monitoring populations over time (within or between years). Relatively permanent wood or tin coverboards are better to use for standardized long-term monitoring of lizard and snake populations.[5]

If you lack a sensitive nose, studying the ecology of manure is a fascinating pursuit. Systematically searching under cow patties may be an important new method to help inventory for a myriad of species. Cow patties now hold another special place in my heart. They gave me a special memory of encountering my first Smooth Green Snakes!

Acknowledgements

Thanks to Brooks Duncan and Marcus Skakum, Biologists with the Manitoba Habitat Conservancy, for allowing me and Patsy to join them for a day during their field surveys for the Manitoba Conservation Data Centre. Brooks Duncan recorded and shared snake location coordinates. Thanks to Allison Krause Danielsen, Habitat Biologist, Environment and Climate Change Canada and Dr. Pamela Rutherford, Associate Professor, Department of Biology, Brandon University, for helpful comments on the manuscript. Brooks and Patsy Duncan also reviewed and improved earlier drafts of this paper. Thanks to Annie McLeod and an anonymous reviewer for additional edits that improved the manuscript.

1. Rutherford, PL, Cairns NA (2020) Morphology, reproduction, seasonal activity and habitat use of a northern population of the smooth greensnake *(Opheodrys vernalis). Journal of North American Herpetology* 1-7. https://doi.org/10.17161/jnah.vi.13613

2. NatureServe Explorer. *Opheodrys vernalis* Smooth Greensnake. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.103123/Opheodrys_vernalis (Accessed 13 December 2024).

3. NatureNorth.com. Species Accounts: Snakes. http://www.naturenorth.com/Herps/MHA_Snakes.html (Accessed 8 January 2025).

4. Canadian Herpetological Society. Smooth Greensnake *Opheodrys vernali.* https://canadianherpetology.ca/species/species_page.html?cname=Smooth%20Greensnake (Accessed 1 January 2025).

5. Dollen C, Coleman TJ, Robbins TR (2023) Assessment of fall season habitat and coverboard use by snakes in a restored tallgrass prairie community. *Acta Herpetologica* 18(1)53-60. https://doi.org/10.36253/a_h-14358

6. Krause-Danielsen A, Rutherford P, Koper N (2014) The Importance of Vegetation Structure and Artificial Cover for Prairie Skinks (*Plestiodon septentrionalis*) on Exurban Land. *Journal of Herpetology* 48(1):67-73 (1 March 2014). https://doi.org/10.1670/12-112

7. Floate KD (2023) Cow patty critters: An introduction to the ecology, biology and identification of insects in cattle dung on Canadian pastures. Agriculture and Agri-Food Canada, Lethbridge, Alberta, Canada. 224 pp. https://publications.gc.ca/collections/collection_2023/aac-aafc/A59-90-2022-eng.pdf