

Dung Beetles: Helping Them Work For You

In Atlantic Canada, we have 20 species of dung beetles. These beetles are related to June Bugs but are much less annoying and play a very important role in livestock farming systems and the wider ecosystem.

What makes dung beetles so helpful is their unique lifestyle and feeding habits. Adult beetles are filter feeders, removing the liquid portion of livestock dung and feeding off the rich community of microbes present. The beetles then use the dung to nest and lay eggs. Some species nest within the dung pile (dwellers), others roll up dung balls to bury in another location (rollers), and some dig tunnels beneath the dung to nest (tunnelers). In Atlantic Canada, our dung beetles are classified as tunnelers and dwellers.



Onthophagus nuchicornis - a small (approx. 6-8 mm), non-native but highly abundant tunnelling dung beetle (photo credit Matthew Dean).

The Many Benefits of Dung Beetles

Improving Soil Health and Fertility

Through their nesting and tunnelling behaviours, dung beetles speed up the decomposition of dung. The organic matter then enters the soil to build soil health and fertility. The tunnels also help reduce soil compaction, create soil pores, allow more water infiltration, and reduce erosion and standing water.

Increasing Carbon Sequestration

Carbon sequestration is an important role agricultural soils can play in combatting climate change. Tunneling dung beetles pull the dung deeper into the soil for nesting. This distributes the organic matter and carbon in the dung throughout the soil profile. This can protect that carbon from loss, adding to the carbon sequestration of that soil.



A mesocosm showing dung beetle tunneling behaviour (photo credit Matthew Dean).

Reducing Greenhouse Gases

Dung beetles interfere with methane production by decreasing the bacteria that produce methane that live in dung. Methane is a potent greenhouse gas and a major component of the greenhouse gases created from livestock production.

Reducing Flies

Dung beetles compete for resources with the larvae of pest flies in pastures (horn flies, face flies, and stable flies), disrupting the development of the flies and lowering populations. These flies bite livestock, causing irritation, reduced weight gain through fly avoidance, and overall have a negative effect on livestock welfare.

Managing for Dung Beetles

Increasing the number of dung beetles in a field can help maximize the benefits listed above.

Parasiticide Use

Use of parasiticides creates residues in dung and these residues can negatively impact dung beetles. There are

ways to reduce the negative effects of parasiticides on dung beetles. The strongest evidence supports selective treatment, splitting treatments within the herd, and ensuring that some untreated dung is always present in the pasture. Choosing less toxic products or application methods can also help, as can timing treatments to avoid peak dung beetle activity, which typically occurs from May to August.

Some products shown to impact dung beetles include Ivermectin, Doramectin, and Eprinomectin. Other products such as Cypermethrin, Dicyclanil, and Cyromazine have been shown to be less toxic to dung beetles. Paying attention to the type and amount of product used can help increase dung beetle populations.

Grazing of Livestock

Decreasing grazing animals in agriculture is also a major threat to dung beetles. Dung stored in lagoons or spread as a slurry cannot be used by dung beetles. Dung beetles also require soil to shelter in and form nests, so manure in a barn or storage facility does not provide the right conditions for the beetles' lifecycle.



A dung beetle in the field working on a fresh dung pat.

Grazing livestock on pastures not only helps dung beetles, but also improves soil health and increases carbon sequestration, increasing the benefits gained by the whole field ecosystem.



Cows grazing at one of the Living Lab – Nova Scotia Land Swap sites.

Addition of Livestock

Many farming systems no longer incorporate livestock. Bringing livestock into a system of vegetable production or grain cropping can have many benefits in addition to those listed above for dung beetles. To learn more about what this livestock-incorporated system could look like, what benefits can be gained, and considerations before adopting such a system, you can go to the Living Lab – Nova Scotia website (listed below) to learn about our Land Swap, where a temporary pasture is created in horticulture systems to build soil health. You'll find videos from producers participating in the land swap along with other factsheets and resources.

For more information:

Learn about the dung beetle work being done in our Living Lab – Nova Scotia project along with many other great topics such as cover cropping and perennial crop laneway management at:

<https://nsfa-fane.ca/livinglabs/>

Or you can email Cheryl Ritz, Environment and Climate Change Manager at critz@nsfa-fane.ca.

Funding for this project has been provided by Agriculture and Agri-Food Canada through the Agricultural Climate Solutions – Living Labs program.



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