EXTENSION

AGRICULTURE

Dung beetles in Vermont and New York

Part 1: what are dung beetles and why are they important?

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Dung beetles

Dung beetles are a very important part of the pasture ecosystem. They are beneficial insects which provide a variety of ecosystem services on pastures including:

- Dung decomposition
- Livestock pest and parasite suppression
- Soil bioturbation
- Nutrient cycling
- Soil health

Livestock manure does not decompose on its own — studies have shown it can remain on pastures for over a year without the action of beneficial insects. There are three types (functional groups) of dung beetles which each have a different role. **Dung dwelling** (endocoprid) beetles live, eat, and breed in the dung and lay their eggs within a dung pat or at the soil interface. They fragment or shred the dung, drying it out quickly so that pest flies and parasitic nematodes of livestock are less able to live and breed in it. **Tunnelling** (paracoprid) dung beetles make tunnels underneath the dung which can be several feet deep, and drag the dung down underground. These tunnels improve soil structure and water infiltration, and recycle the nutrients and organic matter back into the soil. Tunnelling beetles lay their eggs underground in brood balls made from the dung. **Roller** (telecoprid) dung beetles make balls out of dung and roll them away bury them in a safe place. We do not have roller dung beetles in the VT and NY. Finally, **stealer** dung beetles (kleptocoprid) steal the brood balls of tunneling beetles and lay their eggs in them!

Dung beetles in decline

Dung beetle populations are in decline globally. This is a result of many factors including loss of pasture land and fewer farms grazing their livestock, habitat fragmentation, and negative impacts from pesticides and fertilizers. Veterinary treatments for livestock pests and parasites are excreted in dung and are particularly toxic to dung beetles. Practices that help to protect dung beetles will support pasture ecosystem services related to dung decomposition, pest and parasite suppression, and soil health. Dung beetles also support other farmland biodiversity like birds and bats which rely on them for food. Some countries like Australia and New Zealand even release dung beetles to help clear up livestock dung from pastures!

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How can I help dung beetles?

Dung beetles need access to good quality dung for their habitat. To support dung beetle populations on pastures:

- Graze livestock
- Extend grazing season as long as possible so that dung is available year-round
- Use Integrated Parasite Management (IPM)

Practices that can reduce the need for livestock pest and parasite treatments include:

- Rotational grazing and maintaining a sward height of 4+ inches. This helps to prevent the transmission of gastrointestinal parasites which live near the base of the grass
- Mixed grazing with other livestock. Parasites are often host specific so ingestion by the wrong host will break their life cycle
- Diverse pastures. Some forages contain anti-parasitic compounds (e.g. chicory, birdsfoot trefoil)
- Good livestock health and nutrition encourages natural resilience
- Targeted treatment. Use Fecal Egg Counts/other diagnostics to find out which animals need treating instead of treating the whole herd
- Try alternative treatments. Parasitoid wasps, essential oils, and diatomaceous earth, fly traps
- Choose dung beetle-friendly treatments. Some veterinary parasiticides such as fenbendazole and moxidectin are known to be less harmful to beneficial insects

How can I find dung beetles?

Dung beetles are present in pastures along with a whole host of other insects which live, eat , or breed in livestock dung. These include beneficial species of flies, beetles, wasps, and mites. Some of these eat dung, some breed there, and some are predators and parasitoids of other insects such as pests and parasites in the dung. You can see if there are dung beetles in a pasture by simply breaking open a cow pat. You can also place dung in a bucket of water—dung beetles will float to the surface. They can also be trapped by placing dung on a wire mesh over a buried bucket as bait—they will tunnel into the dung and be collected in the bucket.

A dung baited pitfall trap to collect dung beetles

In a 2022 survey of grazing dairy farms in Vermont and New York, twenty species of dung beetles were found. These included both dwelling and tunnelling beetles in the subfamilies Aphodiinae (the small dung beetles), Scarabaeinae (the true dung beetles), and the family Geotrupidae (the earth boring dung beetles). These are shown in detail in the factsheet Dung beetles in Vermont and New York—Part 2: identifying dung beetles.

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