A Guide to Field Indentification

Dung Beetles

of Vermont & New York

University of Vermont
Extension
College of Agriculture and Life Sciences

Dung Beetles

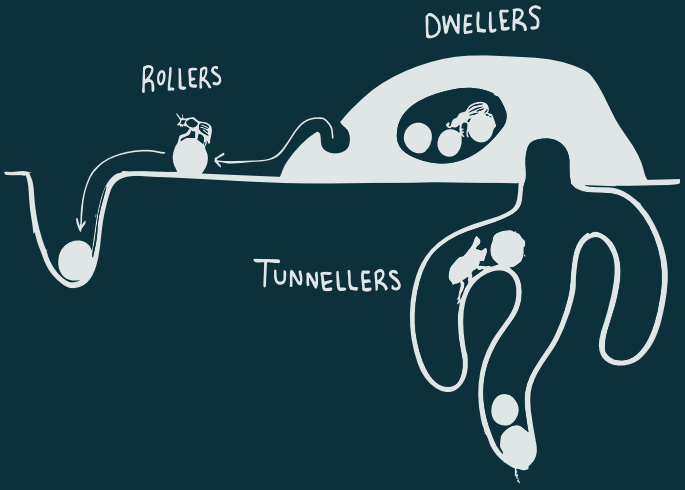
Dung beetles are a very important part of the pasture ecosystem. They are beneficial insects which provide a variety of ecosystem services on pastures including:

- 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 (functionalgroups) 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!**

Populations in Decline

Dung beetle populations are in decline globally. This is a result of many factors including loss of pastureland 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.

How to Help

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

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 antiparasitic 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, diatomaceous earth, and fly traps.
- Choose dung beetle-friendly treatments. Some veterinary parasiticides such as fenbendazole and moxidectin are known to be less harmful to beneficial insects.

Finding and Identifying

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.

There are approximately 170 species of dung beetle in America North of Mexico. In our surveys of grazing, dairy, and beef farms in Vermont and New York, we have found twenty four species of dung beetles. These included both dwelling and tunnelling beetles in the sub-families *Aphodiinae* (the small dung beetles), *Scarabaeinae* (the true dung beetles), and the family *Geotrupidae* (the earth boring dung beetles)

Earth-boring dung beetles

[Family Geotrupidae]

Large round or oval beetles which dig tunnels up to 2 foot deep! They lay their eggs in brood balls made of dung which they have dragged down into the tunnels. This tunneling behavior is called 'paracoprid'.

Small dung beetles

[Subfamily Aphodiinae]

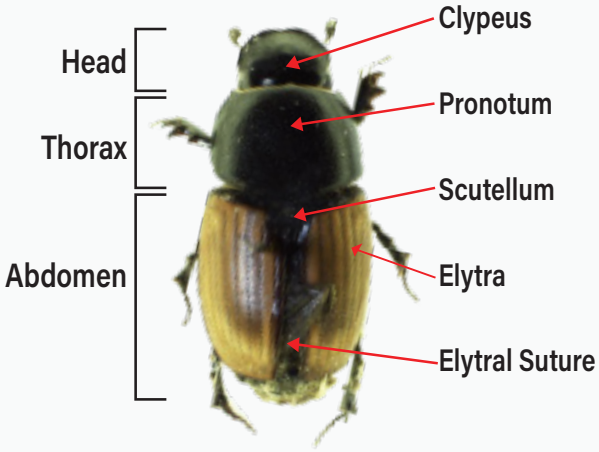
Smaller more elongate beetles which live in dung on the pasture surface. They lay eggs in the dung pat or at the soil interface. This is called 'endocoprid' behavior.

True dung beetles

[Subfamily Scarabaeinae]

Stout round medium sized beetles (usually <12mm), also 'paracoprid' and drag dung down into underground tunnels to provision their young.

Beetle Anatomy Guide



Geotrupes Stercorarius

16—25 mm shiny black on top with metallic often blue/purple/green underside

Geotrupes splendidus

13—18 mm vivid metallic beetle with copper, green, yellow, and red reflections.

Geotrupes semiopacus

10—18 mm black with a metlic copper/ green sheen top and underside.

Onthophagus hecate

5-10 mm dull black, covered in small pale hairs. Male has horn like projection on pronotum (absent in female).

Onthophagus taurus

16-11 mm dull black with a sheen and sometimes a brown hue. Male (right) has two large curved horns (absent in female, left)

Onthophagus nuchicornis

6—8 mm head and pronotum black, elytra light brown with black mottling. Male has a single horn on head (absent in female).

Onthophagus pennsylvanicus

Smaller beetle 3.5—5 mm dull black with short pale hairs covering body.

Onthophagus Orpheus

5-9mm dark green-bronze with metallic sheen. Male has horn-like projection on pronotum (absent in female

Phanaeus vindex

11—22 mm metallic green with red/yellow reflections. Male with single large horn.

Colobopterus erraticus

6—8 mm head and pronotum black, elytra yellow/brown with black line at center. Long scutellum.

Acrossus rubripennis

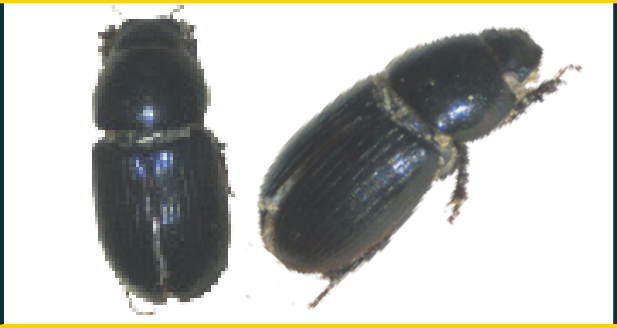
6-13 mm head and pronotum black, elytra red/brown with dark markings at apex. Head a smooth rounded semicircle.

Oscarinus rusicola

13–6 mm shiny dark brown to black, head with angles and bumps. Very similar to *Calamosternus granarius.*

Calamosternus granarius

3 –6 mm shiny dark brown to black, head with angles and bumps, very similar to *Oscarinus rusicola*



Agoliinus leopardus

5—7 mm head and pronotum dark brown, elytra light brown with discrete dark markings. Head with angles and bumps.

Aphodius pedellus

6—10 mm head and pronotum black with reddish front corners, elytra red.

Blackburneus stercorosus

3—5 mm shiny reddish brownbeetle with yellowish edges.

Dialytes striatulus

3—5 mm dull black with large grey pronotal punctures and ridged elytra.

Dialytes truncatus

4—6 mm dark red/brown beetle with punctures on pronotum and prominent teeth on 'shoulders' of elytra, but no ridges

Eupleurus subterraneus

7 mm black, slightly flattened, with sparse coarse punctures on pronotum, long scutellum, and ridged elytra.

Otophorus haemorrhoidalis

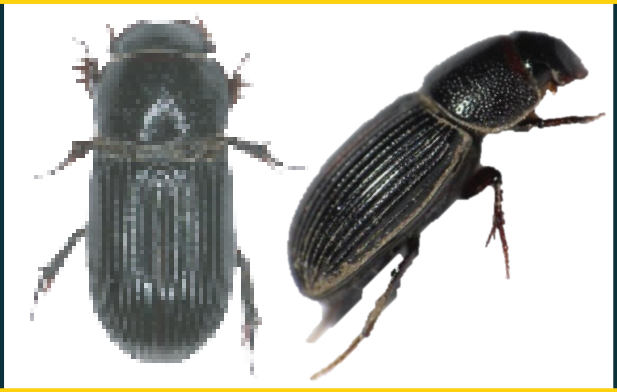
4—6 mm black with red hue at apex of elytra. Long and punctured scutellum.

Teuchestes fossor

8—12 mm convex shiny black beetle with long scutellum.

Ataenius strigatus

4-6mm shiny black or dark brown, elongate body with nearly parallel sides.



Trichonotulus scrofa

3-4mm dull black, body covered with short pale hairs.

Chilothorax distinctus

4-6mm black or dark reddish brown head and pronotum with mottled yellow and black elytra.

Other Beetles

Not all beetles in a dung pat are 'dung beetles'. Other beetles you may find include:

Rove beetles *[Family Staphylinidae]*
Long narrow beetles with short elytra and exposed abdomen. Predatory: eat other invertebrates in the dung such as pest flies, mites, and nematodes.

Clown beetles *[Family Histeridae]*
Shiny convex beetles with tip of abdomen exposed. Also predatory: eat other invertebrate eggs and larvae in the dung

Water scavenger beetles
[Family Hydrophilidae]
Oval convex beetles, elytra cover abdomen completely. Usually black, brown or with color pattern pictured. Abundant in cattle dung and larvae are predatory: eat other insects such as pest fly larvae.

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