



What's in Your Cow Pie?

Hopefully you can find dung beetles.

by **Troy Smith**, field editor

What's in a cow pie? To most people, it's just animal waste — icky, nasty, toxic stuff that complicates mankind's existence. People with a better understanding of the circle of life realize that the excrement of living creatures contains nutrients meant to replenish those removed from the soil by growing plants. It's a cycle. It's how things are meant to work.

Manure is pretty good fertilizer, containing nitrogen, phosphorus, potassium and other nutrients. In cow-pie form, however, the nutrients present in manure are not readily available to plants. Nutrients are made available by the "livestock" that live in the soil. We're talking about the countless kinds of organisms that break down organic matter and make it part of the soil. Many are microorganisms that go unseen. More visible, to those who look for them, are certain worms and insects that contribute to the process.

Among the latter group are dung beetles, and it is a good thing when dung beetles can be found in pasture cow pies.

"If there are no dung beetles or very few are present, the pasture or range probably isn't yielding as much forage as it could," says entomologist Sean Whipple. "Grazing management definitely can affect dung beetle populations."

Now employed by ISK Biosciences, Whipple previously was a researcher at the University of Nebraska Panhandle Research and Extension Center. He spoke at the 2013

Nebraska Grazing Conference about the interrelationship of dung beetles, grazing land quality and cattle production.

"Dung beetles are extremely important ecologically," states Whipple. "They are a major component of the biological removal of dung and control of pests and parasites which use dung for breeding."

It takes all kinds

The term "dung beetle" often conjures up an image of a rather large and determined black bug rolling a relatively large ball over the ground. The dung ball is used as a brooding chamber after the beetle and its mate take it to a chosen site and bury it underground. However, not all dung beetles are "rollers." Some species are "tunnelers" that bury dung wherever they find it. Other dung beetles are "dwellers" that simply live in piles of dung.

According to Whipple, dung beetles are present on every continent except Antarctica. Worldwide, there are some 7,000 different species. Africa has the greatest diversity of dung beetles, with more than 2,000 species.

Whipple says it is not unusual in South Africa to see road signs warning drivers against running over dung beetles. The bugs are recognized for their importance in ridding the savanna of large deposits of elephant dung. Dung beetles can be picky, though.

Some species feed exclusively on the dung of certain kinds of animals.

"When the beef industry was first developing in Australia, there were no native dung beetle species that were adapted to feed on cattle dung. So, in the 1960s, 50 dung beetle species from Africa and Europe were introduced," explains Whipple. "Along with breaking down cattle dung, the beetles caused a marked reduction in fly pests."

In the United States

In the United States, there are fewer than 100 dung beetle species, but they have a significant impact. Whipple says dung beetles save U.S.

farmers and ranchers an estimated \$380 million annually in costs associated with yield loss, pesticide applications and fertilizer use. Not included in the estimation are costs associated with environmental and animal-health problems related to pests that breed or spend part of their life cycles in manure. Dung



PHOTO BY SEAN WHIPPLE

► Considering the U.S. cattle industry's annual \$800-million investment in fly control, Sean Whipple thinks cattle producers ought to realize that dung beetles are their allies. While eliminating the manure horn flies and face flies need to reproduce, dung beetles also feed on eggs and larvae of flies and other parasites.

beetles disrupt the reproductive cycles of horn flies, face flies and gastrointestinal parasites.

Dung beetles are important, if only because of their role in decomposing manure. Whipple says every cow brute deposits 10-20 cow pies every day. Weathering and the activities of earthworms, ants and termites will eventually break them down, but decomposition of a cow pie can take four years.

Meanwhile, cow pies occupy soil surface area that otherwise could support forage plant growth. Because cattle generally avoid

grazing in close proximity to their own feces, utilization of available forage is hindered.

Whipple estimates that, in the absence of adequate dung-beetle populations, forage availability can decrease as much as 5%-10% per acre per year. That makes it easier to understand why the Australians wanted dung beetles with a taste for cattle manure. They understood how significantly the rate of manure decomposition increases as a

result of dung-beetle activity. Whipple says dung beetles can, under optimum conditions, break down a cow pie in 48 hours.

“While they are at it, dung beetles efficiently cycle nutrients into the soil, create healthier rangelands and reduce greenhouse gas emissions,” says Whipple. “If dung is not removed by beetles, 80% of the nitrogen is lost to the atmosphere. In addition, burial of animal dung by beetles increases soil aeration and the eventual leaching of water and nutrients deeply into the soil.”

Considering the U.S. cattle industry’s annual \$800-million investment in fly control, Whipple thinks cattle producers ought to realize that dung beetles are their allies. Not only do they eliminate

manure that horn flies and face flies need to reproduce, but dung beetles will feed on eggs and larvae of flies and some other parasites. In Whipple’s estimation, a 95% reduction in these pests could be achieved by adequate dung-beetle populations.

A new awareness does appear to be spreading among livestock producers. Whipple says growing numbers of producers are becoming interested in maximizing

the benefits beetles bring to pastures and rangeland. They need to know that some products used to control insect pests and parasites can be hard on dung beetles, too. Oral larvacides and injectable pesticides (like ivermectin) may have a negative impact on dung-beetle populations when used in the summer, when dung beetles are most active. Topical insecticide treatments, in the form of dusts or sprays, typically are less detrimental to beetles.

Whipple says grazing management also impacts dung-beetle populations. Diversity of livestock species will attract more and different species of dung beetles. Concentrating cattle numbers into larger herds, as with mob grazing or management-intensive rotational-grazing systems also appears to enhance dung-beetle populations. However, excessive stocking rates and overgrazing will ultimately result in reduced numbers of dung beetles.

“Research data suggests that well-managed grazing systems have more dung beetles, and that’s a good thing,” says Whipple.

So take some time to walk through your pastures next summer. Look closely to see what you can find in your cow pies.



PHOTO BY TROY SMITH

► “Dung beetles are extremely important ecologically,” says entomologist Sean Whipple. “They are a major component of the biological removal of dung and control of pests and parasites which use dung for breeding.”

Editor’s Note: Troy Smith is a freelancer and cattleman from Sargent, Neb.