Dog-Gone Lawns

by Ann M. Mason, Fairfax Master Gardener

As I walk around my neighborhood, I see more 'Respect the Lawn' signs. This sign reminds dog-walking neighbors about their responsibility to pick up fecal matter and dispose of it appropriately. As a parent (and more recently as a grandparent), I read Everyone Poops by Taro Gomi, to my offspring. The bottom line of this children's book is that all living organisms who eat also poop. That goes for pee, too. Like humans, dog urine contains nitrogen containing compounds from food digestion. Thus, dogs need to pee and poop like every other living organism. Where they do this depends upon the oversight of their handler.

Scientists from the University of Helsinki report that leashed dogs prefer urinating near pathways including on lawns, trees and utility poles, often in areas to countermark the urine of other dogs. Their sampling data indicated a higher nitrogen level around path-side trees and poles compared to lawn areas next to the same pathway. They speculated that male dogs overmark, that is, urinate directly on trees and poles overmarking the urine of other dogs; female dogs adjacent mark, that is, urinate near but not at the same locations. Veterinarian research agrees with these urination behaviors.

photo: University of Maryland Extension

Dog urine damage on lawns

This pattern of urination debunks the widespread myth that urine from female dogs is more toxic. Scientists observe that female dogs, and puppies and elderly dogs of both genders, tend to squat to completely void the bladder; this urine flow into a localized spot tends to concentrate the nitrogen. In contrast, male dogs tend to lift their legs to urinate a small amount in many spots resulting in a dispersive pattern. Thus, certain localized spots can receive repeated nitrogen inputs as multiple dogs urinate in or near the same locations.
So, what is urine? Scientists report dog urine contains about 95 percent water, the other 5 percent includes a mixture of urea, creatinine, uric acid, carbohydrates, enzymes, fatty acids, hormones and a variety of minerals including sodium, potassium, chloride, magnesium, calcium and ammonia. Veterinarians report that dogs who drink lots of water have less concentrated urine than dogs who drink less water. Scientists from the University of Helsinki in Finland report the nitrogen content of dog urine can impact soil. Specifically, the nitrogen components in urine break down into ammonium ions through hydrolysis, which is available for plant uptake.

What is the impact of added nitrogen from dog urine to turfgrass? Nitrogen is one of the three macronutrients essential for plant growth. Plants need nitrogen to produce green foliage and good plant health. Nitrogen is fugitive in the soil and must be added periodically in a uniform pattern across the lawn. Sometimes, homeowners may see spots of either green, rapidly growing turfgrass or spots of brown turfgrass. When homeowners see circular patches, they may suspect dog urination. Green circles of turfgrass growth attributed to dog urine suggests that the nitrogen level in the soil is not sufficient for the turfgrass growth. This might be a signal to the homeowner to get a soil test and follow the recommendations for the application of nutrients. Spots of brown turfgrass ringed with green growth suggest that there is too much nitrogen in one area. (Note: dog urination is only one reason for turfgrass turning brown. Turf diseases such as summer patch and dollar spot also cause circular patterns.) Many horticultural experts

suggest watering the urination spot within eight hours to dilute the concentration of urine and limit the possible nitrogen overload. Thoughtful dog walkers might carry a water bottle and dilute the urination spot after their dog.

Horticultural experts report stressed turfgrass is more susceptible to damage from urine as well as turf diseases. Growing a lush lawn in Northern Virginia challenges homeowners. Our region is in a horticultural transition zone, meaning that we have cold winters and hot, dry summers. Compounding our weather challenges, the prevalence of compacted clay soils in most of our neighborhoods means selecting the turfgrass best suited to our area along with implementing routine turf maintenance based on a best practices calendar. While all turfgrasses require water, oxygen and proper soil temperature to grow, not all turfgrass cultivars grow well in our area. Fortunately, turf growers and nurseries have access to research from our local land grant universities (University of Maryland, Virginia Tech and Virginia State University) listing annual recommendations for turfgrass cultivars to the sod production industry. Turfgrass recommendations consider tolerance to stress, nutrient requirements, water usage, pest issues, sun light, level of grass management and other factors. Broadly, the experts recommend cultivars of cool season and warm season turfgrass.

Based on the experiences of Fairfax County Master Gardeners in the Fairfax County Home Turf, Healthy Virginia Lawns Program, most of the residential properties we visit have cool season grasses, usually a blend of Kentucky Bluegrass and tall fescue. Growing a lush turfgrass of Kentucky Bluegrass and tall fescue depends upon the annual application of 3 to 4 lbs. of nitrogen per square foot and a slightly acidic to neutral soil pH (6.0 to 7.5). Since most soil in Northern Virginia is slightly acid, periodic application of lime to raise the pH is important. A soil test every three years will inform homeowners about the levels of lime and fertilization that are needed for their lawns.

What can homeowners do to grow more resilient cool season turfgrass?
To minimize turf stress during the active growing seasons, homeowners can take several actions.
First, adjust the mowing height from about three inches in the spring to four or more inches (10 cm) during the summer dormancy months. Mowing higher especially in summer helps to shade the soil from sunburn and encourages deeper root growth. Higher turfgrass can help to diffuse the urine to a wider area.

Second, water deeply and slowly, especially during the summer as cool season turfgrass struggles in seasonal heat. Turf experts write that maintaining proper hydration in the turfgrass rootzone will encourage deeper roots that are less impacted by dog urine. Irrigate turfgrass slowly and deeply, especially during hot summers, to promote deeper turfgrass roots. The goal is turfgrass roots that penetrate about 4 to 6 inches or deeper into the compacted, clay rich, mid-Atlantic soil. This means avoiding the frequent application of small amounts of water this practice just encourages shallow turfgrass roots that are more susceptible to the added nitrogen from animal urine.

Third, for brown areas that do not respond to watering, scratch the soil and reseed. Remembering to spray water daily to encourage seed germination. And about the 'Respect the Lawn' signs? Consider them from a dog's perspective; it looks like a good target to mark.

References

- 2023-2024 Virginia Turfgrass Variety Recommendations, Virginia Cooperative Extension Publication
- What grass should I grow for my lawn?, Mike Goatley, Virginia Cooperative Extension
- Dog Urine has Acute Impacts on Soil Chemistry in Urban Greenspaces, John Allen, Keikki Setala, and David J. Kotze, Frontiers in Ecology and Evolution, Volume 8, 2020
- "Dog-on-it" Lawn Problems, Steve Thompson, DVM, Purdue University
- Kentucky Bluegrass, Grady Miller, North Carolina State Extension Turf Files
- Tall Fescue, Fred Yelverton, North Carolina State Extension Turf Files