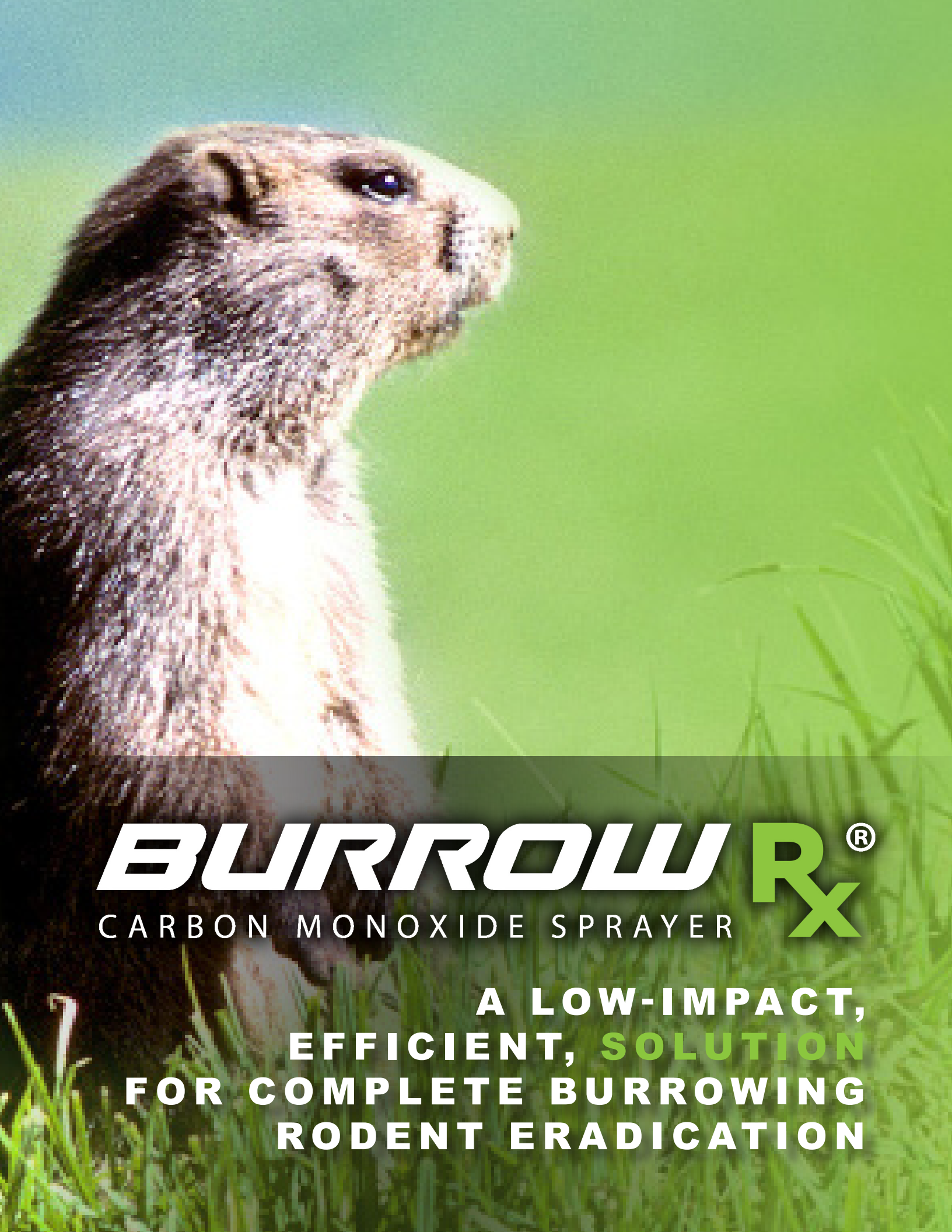
BURROW Rx®
CARBON MONOXIDE SPRAYER
A LOW-IMPACT,
EFFICIENT, SOLUTION
FOR COMPLETE BURROWING
RODENT ERADICATION

INTRODUCTION

Burrowing rodents can cause significant damage to crop production. Whether dealing with gophers, moles, ground squirrels, voles, rats, or others, burrowing rodents wreak havoc on and destroy crops in the field, stored foods, livestock feed, and structures.

Traps and baits utilizing nerve-inhibitors or anti-coagulant rodenticides are common methods deployed to eradicate a burrowing rodent infestation. However, these approaches can be time consuming and may present health risks to nontarget animals and humans, while producing inconsistent results.

Today, more advanced methods using Carbon Monoxide to eradicate burrowing rodents presents a more efficient, low impact solution that is greatly diminishing the need for rodenticides. This technology is now fast becoming the tool people are turning to as a first course of treatment in effectively eradicating burdensome burrowing rodent infestations.

The BurrowRx Carbon Monoxide Sprayer is classified as a pesticidal device that can be used by farmers and growers as well as other applicators.

BURROWING RODENTS: THE DEPTH OF THE PROBLEM

Rodents are considered the largest order of mammals in the world. There are an estimated 1,500-2,000 documented rodent species. With some burrowing rodent infestations, such as moles and rats, underground tunneling systems can extend tens to hundreds of feet. These underground pathways pose big problems on the surface above them.

For example, gophers pose challenges, especially on farms, where they rank among the most troublesome pests. In densities of up to 60 or more per acre, particularly in irrigated alfalfa fields or vineyards, gophers inhabit burrow systems covering 200 to 2,000 square feet. Their tunneling activity causes significant damage to cultivated farming areas, rangelands, orchards, and tree farms; impacting crops, interfering with farm machinery, reducing available livestock forage, and damaging irrigation systems, including plastic water lines and drip irrigation setups, ultimately leading to soil erosion.

Voles are capable of inflicting widespread damage across various landscape environments, including lawns, orchards, and agricultural fields. They feed on planted seeds and trim the tops of growing plants, resulting in gaps within crop vegetation, resembling crop circles, and facilitating the growth of unwanted weed species, particularly evident in soybean fields.

In orchards or blueberry farms, the presence of voles is indicated by girdling or gnaw marks on trees and bushes, further illustrating their destructive impact.

Farm plagued by mole holes

Moles live almost entirely underground in a vast network of interconnecting tunnels. They dig tunnels about 6 inches deep, leaving behind soil piles that serve as air vents. Their diet consists of 80 percent earthworms and 20 percent soil insects and grubs.

The primary damage inflicted by moles stems from their burrowing activity, which can dislodge plants and dehydrate their roots. This poses a significant threat to commercial bulb growers and row crop producers, as dislodged plants may wither and die, and raised mounds or ridges created by moles can damage harvesting equipment, resulting in economic losses.

BURROWRx CARBON MONOXIDE SPRAYER: A LOW-IMPACT CARBON MONOXIDE PRODUCING SOLUTION

There is a low-impact solution on the market today that not only eradicates burrowing rodent infestations, but greatly reduces liability and exposure for users while also bringing remarkable service delivery efficiency.

BURROW Rx®
CARBON MONOXIDE SPRAYER

BurrowRx Carbon Monoxide Sprayer

BurrowRx Carbon Monoxide Sprayer, with the use of an exhaust hose, pushes Carbon Monoxide gas into rodent tunnel systems to quickly eradicate them. In most cases, after only a few minutes of the gas being delivered into the tunnels, the rodent breathes in the Carbon Monoxide, which replaces the oxygen in its blood. Without oxygen, cells in the body die and organs shut down, killing the rodent quickly.

Rarely does a rodent have a chance to escape its burrow before it dies, eliminating the need to dispose of the carcass, which naturally decomposes inside the tunnel system. After the treatment method is finished, the entrance and exit holes should be entirely sealed off to complete the eradication.

Exposure to rodenticide is a non-issue, as BurrowRx Carbon Monoxide Sprayer does not require the use of rodenticides, and the Carbon Monoxide quickly dissipates after the system is turned off. A typical eradication can be completed in 3 minutes.

Mole carcasses

Smoke indicator in action

GROUND SQUIRREL INFESTATION STUDY

A 2017 report from Sierra Research Laboratories, Inc, in Modesto, Calif., involved a test site with dozens of open ground squirrel burrows, revealing a high infestation rate with tunnel systems located on berms and along ditch banks.

The experiment utilized BurrowRx Carbon Monoxide Sprayer for 23 active ground squirrel burrows and demonstrated a 95.7% efficacy rate. The comment below reveals how the smoke oil helped to unveil the complexity of the overall burrow system.

"The smoke oil during treatment made the complexity of the burrow systems easy to observe and helped improve efficacy by allowing applicators to thoroughly treat an entire system."

The BurrowRx Carbon Monoxide Sprayer smoke indicator oil also provides peace of mind to alert the user to gas approaching homes, buildings or going into a neighbor's yard. When used as directed, the smoke from the BurrowRx Carbon Monoxide Sprayer should have little effect on soil, too. Once the BurrowRx Carbon Monoxide Sprayer is turned off, the smoke quickly clears and the Carbon Monoxide dissipates, with no risk to anything or anyone in the area.

TRACING CARBON MONOXIDE FOR SAFETY AND EFFICACY

The BurrowRx Carbon Monoxide Sprayer is easy-to-use and utilizes a smoke indicator oil that allows the user to see where the gas is traveling in the underground tunnels. Even the most experienced person sometimes cannot find every tunnel in a complex system that has been in place, and growing, for a long period of time.

Simply pour the patented BurrowRx Carbon Monoxide Sprayer oil into the reservoir housing on the sprayer prior to starting engine. When the machine is running, the operator will soon see smoke coming from the ground allowing the technician to see the extent of the underground tunnels and can alert a PMP to exit holes not previously seen. Exit holes will produce more smoke, and the efficiency of the treatment can be increased by quickly closing those holes with sandbags or dirt.

Using the BurrowRx Carbon Monoxide Sprayer

SUMMARY OF BENEFITS WHEN TREATING RODENT INFESTATIONS WITH BURROWRx CARBON MONOXIDE SPRAYER:

- Direct targeting of rodents within the burrow system
- Carbon Monoxide makes for quick extermination, a more humane kill.
- No reliance on bait acceptance that sometimes hinders rodenticide and trapping efforts.
- No secondary toxicity concerns for scavengers, predators, humans, pets.
- Seldom requires handling of animals after treatment, which reduces the risk of disease and parasite transmission to humans.
- Designated as a pesticidal device by the U.S. Environmental Protection Agency (EPA).

USERS SEE RESULTS

Guardians of the Vineyard: How Jean-Pierre Wolff Battles Burrowing Rodents with the BurrowRx Carbon Monoxide Sprayer

Jean-Pierre Wolff, leader of the Wolff Pack at Wolff Vineyards near San Luis Obispo, CA, understands the challenge of burrowing rodents. Spanning 125 acres of sustainable land influenced by the nearby Pacific Ocean, the vineyard faces a frequent gopher presence.

To combat this, Jean-Pierre invested in a BurrowRx Carbon Monoxide Sprayer, training his crew to use it regularly, especially during the spring months when gopher activity peaks.

“With our upgraded BurrowRx Carbon Monoxide Sprayer, we tackle the issue at least twice a week,” Jean-Pierre explains. “It’s crucial for protecting our vines from potential damage, which could cost us tens of thousands of dollars, particularly for younger vines.”

Recognizing the machine’s versatility, Jean-Pierre views the BurrowRx Carbon Monoxide Sprayer as a sound investment for ongoing pest control, addressing not only gophers but also moles, voles, and ground squirrels.

“I’m impressed with its sturdiness and user-friendly design,” he remarks. “The smoke oil feature is especially effective in pinpointing multiple burrowing galleries.”

Jean-Pierre remains satisfied with the BurrowRx Carbon Monoxide Sprayer’s performance, understanding its pivotal role in preserving the vineyard’s economic viability and ecological integrity.

Conquering Gopher Woes: The BurrowRx Carbon Monoxide Sprayer Solution in Oregon’s Willamette Valley

At 6:00 AM, Cory Stewart readies for his day, ensuring the BurrowRx Carbon Monoxide Sprayer is securely placed inside his van. In Oregon’s Willamette Valley, gophers pose a significant challenge for agricultural businesses due to the lush landscape and diverse enterprises, from Christmas tree farms to vineyards.

As the founder of Oregon Gophers LLC, Cory collaborates closely with farmers to combat pocket gophers and moles, notorious for their crop-damaging habits. “The camas pocket gopher, found here, is particularly aggressive,” notes Cory. Targeting gophers during mating season is crucial, eliminating both adult gophers and their offspring before they cause crop damage.

“One of my clients owns a 100-acre Christmas tree farm,” he shares. “A single gopher can destroy 10-15 saplings, posing a severe threat to their business.”

Cory employs drones to survey the area and identify gopher networks, particularly beneficial for large areas like 100 acres or more. Administering 50 to 60 applications of the BurrowRx Carbon Monoxide Sprayer for 3-4 minutes each, Cory ensures thorough eradication of gophers, revisiting treatment sites to confirm success.

He commends the BurrowRx Carbon Monoxide Sprayer for its ease of use and the helpfulness of its instruction manual, emphasizing its safety compared to traps. “Setting a trap can damage your fingers pretty easily. The machine is safer and more efficient, offering a higher success rate.”

Cory believes the BurrowRx Carbon Monoxide Sprayer offers farmers a reliable solution to their gopher problems, enabling them to effectively protect their crops and livelihoods.

Cory Stewart

HOW EFFICIENT IS THE BURROWRX?

In 2022, The BurrowRx Carbon Monoxide Sprayer was featured in a pilot study by Stephen Vantassel from the Montana Department of Agriculture. The study was performed to determine how long a black-tailed prairie dog burrow needed to be fumigated with a BurrowRx Carbon Monoxide Sprayer to obtain control.

Another goal of the study was to better understand the prairie dog burrow structure. BurrowRx Carbon Monoxide Sprayer allows users to use “smoke oil,” which adds color to the exhaust, permitting applicators to see whether other burrows are connected to the one being treated.

One test site was on an alfalfa farm on the eastern side of the Helena Valley. The soil was classified as a Musselshell-Crago complex with 2-8 percent slopes. Prairie dogs were concentrated in the areas outside the pivot circle but were encroaching. The area treated was approximately 8 acres.

The pilot study obtained 92% efficacy with a four minute injection, 86.7% with a 3:34-minute injection, and 90% efficacy with a three-minute injection.

During the pilot study, several previously unknown issues arose. The primary concern was the engine’s throttle, which was not identified until hole number 5 in Site 2. Initially set at approximately ¾ open, it was subsequently adjusted to full throttle for the remaining treatments. The potential impact of this adjustment on treatment efficacy remains uncertain, but it likely had some marginal effect, possibly a few percentage points.

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Black-tailed prairie dog

Additionally, a secondary issue involved hose length, with both short (10 feet) and long (25 feet) options available. While the shorter hose was predominantly used, the longer hose was utilized for certain burrows in Site 2. While it’s unlikely that hose length significantly affected control, there’s a possibility that the longer hose, combined with shorter injection times, reduced the amount of carbon monoxide entering the burrow.

Time	Throttle	Opened	Total	Opened/ Total	Efficacy
4:00	3/4	2	24	0.08333	92%
3:45	3/4	2	15	0.13	86.7%
3:00	Full	2	20	0.10	90%

Vantassel, S. M. (2022). Use of BurrowRx® Carbon Monoxide Generator to Control Black-tailed Prairie Dogs in Montana: A Pilot Study. Proceedings of the Vertebrate Pest Conference, 30. Retrieved from https://escholarship.org/uc/item/1h06s11j 7

EASE OF USE, MAXIMIZING TREATMENT EFFORTS

To get the best performance out of the BurrowRx Carbon Monoxide Sprayer, use the following simple steps to get started and to treat infestations.

- ASSEMBLE THE MACHINE AS INSTRUCTED BY THE OPERATIONS MANUAL.
- FILL SMOKE OIL CUP, LOCATED ON THE MANIFOLD, WITH SMOKE OIL. OPEN VALVE TO DROP OIL INTO MANIFOLD. MAKE SURE TO CLOSE VALVE.
- KEEP THE BURROWRX CARBON MONOXIDE SPRAYER NEAR THE HOLE BEING TREATED; KEEP IT LEVEL OR TIPPED SLIGHTLY FORWARD.
- PLACE THE EXHAUST NOZZLE INTO THE BURROW, START THE ENGINE.
- PLACE SOIL OVER AREAS WHERE SMOKE IS ESCAPING.
- RUN BURROWRX CARBON MONOXIDE SPRAYER FOR THREE MINUTES AND SHUT IT OFF.
- REPEAT, IF NECESSARY. DUE TO DIFFERENT SIZE TUNNELS/BURROWS, SOIL TYPES AND OTHER CONDITIONS, SEVERAL TREATMENTS MAY BE NEEDED.

NOTE: THE BURROWRX CARBON MONOXIDE SPRAYER MUST BE SHUT OFF PRIOR TO ADDING ADDITIONAL SMOKE OIL.

Burrows must be located away from actively-inhabited buildings; the setback may vary from state to state and we recommend that users of the BurrowRx Carbon Monoxide Sprayer consult with their state lead agency for any state-specific regulations that may apply to the commercial use of BurrowRx Carbon Monoxide Sprayer. If smoke enters a structure, ventilate with fans for at least 15 minutes. Repeat treatment as needed. Visit the site a few days later to see if burrows have moved or if the rodents have been properly eradicated.

OTHER CONSIDERATIONS:

SOIL TYPE:

If soil is loose or rocky, multiple treatments may be required. Loose soil can dissipate Carbon Monoxide in larger tunnel systems.

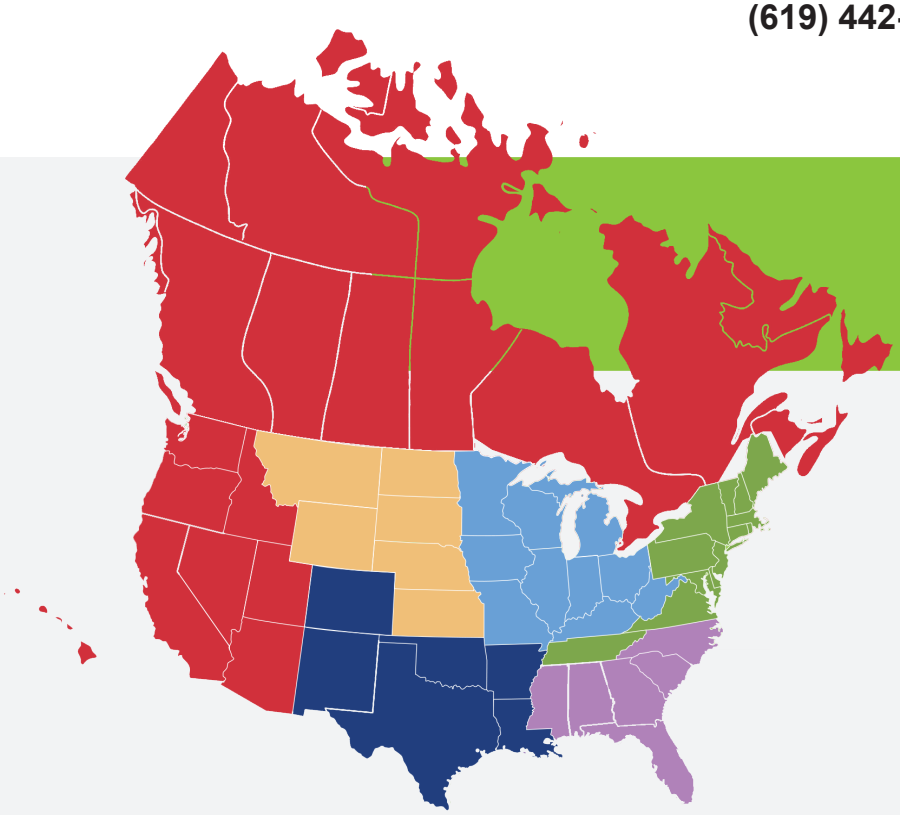
TIME OF DAY:

Most rodents leave tunnels at night, but stay inside to avoid predators during the day. Make sure you run BurrowRx Carbon Monoxide Sprayer during the day, as this will also allow you to better see the smoke oil and tunnel systems.

LARGER TUNNEL SYSTEMS:

Gophers, rats, and moles on a hillside may have refuge areas that are difficult for the Carbon Monoxide to reach. This may require a single treatment one day, then multiple treatment in one to seven days after new activity is found.

TO LEARN MORE ABOUT BURROWRX CARBON MONOXIDE SPRAYER, VISIT BURROWRX.COM OR CALL (619) 442-8686.



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