

Wildlife Services

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Factsheet

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Questions and Answers: Sodium Nitrite Toxic Bait for Feral Swine



Wildlife Services (WS), a program within the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS), provides Federal leadership and expertise to resolve wildlife conflicts that threaten the Nation's agricultural and natural resources, human health and safety, and property.

Created in 2014, the APHIS National Feral Swine Damage Management Program is a nationally-coordinated effort among Federal, State, Tribal and local entities to manage feral swine damage and stop their spread.

Wildlife Services is developing and testing swine-specific bait delivery systems and baiting strategies.

Q. Why do we need a toxic bait for feral swine?

A. Feral swine (also called wild pigs, Eurasian boar, or feral hogs) are a harmful and destructive invasive species causing damage and disease threats to crops, public property, native ecosystems, livestock health, and human health. More than 6 million feral swine are located in at least 35 states across the United States. Their damages to agricultural crops alone are estimated at \$190 million each year.

Although trapping, aerial operations, and recreational hunting of feral swine have effectively reduced damage in some areas, studies show that at least 70 percent of feral swine must be removed each year in order to prevent population growth. A toxic bait for use with feral swine is another tool in the toolbox for integrated feral swine damage management. Since 2013, Wildlife Services' National Wildlife Research Center (NWRC) scientists and collaborators have been evaluating the potential use of a bait containing sodium nitrite as a feral swine toxicant.

Q. What is sodium nitrite?

A. Sodium nitrite (NaNO_2) is a meat preservative commonly used to cure meats such as sausage and bacon. When eaten in high doses over a short period of time, it is toxic to feral swine.

Q. How does it work?

A. An overdose of sodium nitrite reduces the ability of blood to transfer oxygen to tissues, a condition known as methemoglobinemia. The mode of death is similar to carbon monoxide poisoning. Once enough sodium nitrite bait is eaten, the feral swine gets faint, is rendered unconscious, and quickly dies. In most cases, feral swine die within 2.5 to 3 hours after eating a lethal dose.

Q. How is the toxicant delivered?

A. A micro-encapsulation coating is placed around sodium nitrite prior to manufacturing the feral swine bait. This helps to protect sodium nitrite from breaking down, and hides its odor and salty flavor. The micro-encapsulated



sodium nitrite is mixed with an oil-based bait (peanut paste) to attract feral swine and improve stability. The micro-encapsulation coating rapidly dissolves once eaten by feral swine, allowing the active ingredient (nitrite) to enter the bloodstream. Studies using bait with 10% sodium nitrite have resulted in feral swine mortality rates as high as 95%. Approximately 1/3 lb. of bait of this concentration is lethal to a 70 lb. feral swine.

Q. What are the risks to non-target species, scavengers and the environment?

A. Many factors are considered when developing a toxic bait. Not only must it be effective and humane in eliminating feral swine, but also low risk for those handling it, the environment, and wildlife. Other wildlife, such as raccoons, bears and deer, may be attracted to the bait. Sodium nitrite can be toxic to other animals if eaten at high amounts over a short time period. To prevent other species from accessing the bait, NWRC scientists are developing and testing swine-specific delivery systems and baiting strategies.

The majority of sodium nitrite eaten by feral swine is metabolized prior to death. Any remaining sodium nitrite in the carcass continues to break down, limiting the risk of hazards to scavenging animals. The compound also degrades quickly when exposed to environmental elements, such as microorganisms, sunlight, heat, and moisture.

Q. How will hunters know if a feral swine has eaten sodium nitrite bait and what are human health impacts?

A. It is unlikely that a hunter will shoot a feral swine exposed to a lethal dose of sodium nitrite because animals die within a few hours of eating the bait. If a swine does not eat enough bait to become sick, it simply metabolizes the remaining sodium nitrite. If a treated feral swine is killed by a hunter before it succumbs to the toxicant, its blood would be unusually thick and chocolate brown in color.

Preliminary data show low levels of nitrite in the meat of feral swine killed with sodium nitrite. However, the EPA assessment of human health impacts is ongoing. The stomach and digestive tract of treated feral swine will contain sodium nitrite residues and residual bait. These organs should be discarded. Skin contact with sodium nitrite bait is not considered harmful under normal circumstances. However, persons with a peanut allergy should avoid all contact with the bait or digestive tract contents. Pesticide labels typically require the use of gloves when handling products and health experts recommend hunters wear gloves and other protective equipment when processing feral swine to protect against diseases the animals may carry.

Federal and state regulations concerning the use of a sodium nitrite toxicant have not yet been developed. The U.S. Environmental Protection Agency (EPA) will evaluate any potential risks to human health during the registration process.

Q. Is the toxic bait available for use?

A. No. The goal is to register the sodium nitrite bait for use with feral swine with the EPA by 2020-2021. In 2016, an application was submitted to the EPA by APHIS Wildlife Services for an experimental use permit to conduct field trials starting in 2018.

Q. Who will be allowed to use the toxic bait?

A. If registered by the EPA, the toxic bait will be available for use by APHIS Wildlife Services certified applicators or those working under their authority.

Q. How can I learn more?

A. For more information, please go to www.aphis.usda.gov/wildlife-damage/feral-swine or www.aphis.usda.gov/wildlifedamage/nwrc on the Web.



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