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G91-1049 Controlling Internal Parasites in Swine

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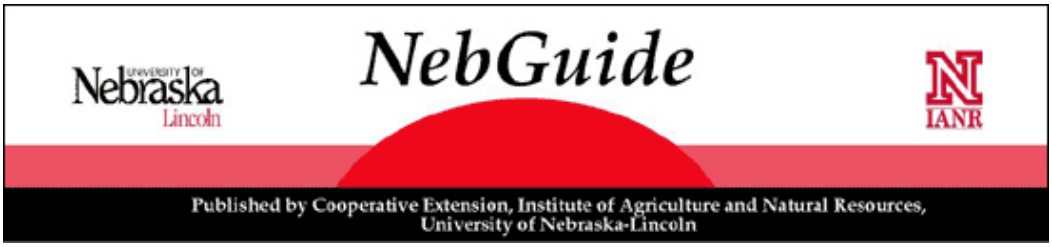

Controlling Internal Parasites in Swine

This publication addresses the identification, prevention and control of internal parasites in swine and lists characteristics of principle dewormers.

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Whether pigs are raised in confinement or on pasture, controlling internal parasites is essential to the overall herd health program. Recent studies by Tom Kennedy of A.E.F. Research, Inc, Waunakee, WI, have shown that worm infestation is prevalent on both a farm and individual pig basis. Of the farms examined, 91 percent raised pigs on concrete, wire or slotted floors, but more than 90 percent of all farms were infested with one or more kinds of worms.

Worms reduce growth rate and feed efficiency, and damage tissues, predisposing pigs to infection by other diseases. Hale and Stewart estimated that worm infestation could add $1 to $14 to the feed and maintenance cost of finishing a pig (*Table I*). Economic loss also will be incurred when affected tissues are condemned at the slaughter plant.

Table I. Prevalence and cost of parasites

	Prevalence of internal parasites in Midwestern hogs		Per pig cost ($) of worm damage at three levels of parasite infestation		
Parasite	**% Farms infested**	**% Pigs infested at slaughter**	**Light**	**Moderate**	**Heavy**
Ascaris suum (roundworm)	70%	60%	1.92	3.21	5.56
Trichuris suis (whipworm)	45%	19%	1.44	4.31	13.76
Oesophagostomum (nodular)	33%	4%	1.25	2.09	3.69

Metastrongylus (lungworm)	7%				
Stephanurus (kidney worm)			3.16	6.09	13.39
(Adapted from T. Kennedy material, personal communication; and O. M. Hale, and T.B. Stewart, Agri-Practice, April 1987)					

Roundworms

The large intestinal roundworm, *Ascaris suum*, is the most common internal parasite of pigs and is found in almost every herd in Nebraska. Eggs of *Ascaris suum* are small--about the diameter of a human hair and almost invisible. Eggs can withstand severe cold, dryness, most chemical disinfectants and can live at least seven years in soil. The eggs pass from pigs in manure. When they leave the body with the feces, they are in an early stage of development and are not infective. Within a few weeks a tiny larva develops inside the egg.

Pigs become infested by consuming food and water contaminated with infective worm eggs. When a pig swallows ascarid eggs, the shells rupture in the intestine and larvae are liberated. The larvae burrow through the intestinal wall and enter the blood stream, which carries them to the liver. From the liver, larvae travel in the blood through the heart to the lungs where they burrow through lung tissue and enter large air passages. The pig coughs and forces worms into the throat where they are swallowed and passed into the small intestine--this time to mature and grow to adults. It takes about four days for larvae to reach the liver, nine days to reach the lungs and 15 days to complete the trip to the intestine. Worms grow to egg-laying adults in about 60 days.

Clinical signs of roundworm infestation are primarily associated with larval migration through the lungs. Pigs have a dry nonproductive cough, loss of appetite and weight, rough hair coat, increased temperature, and an increased rate of respiration accompanied by thumping.

Both young and adult worms cause damage. Young worms destroy liver tissue, causing abscesses and scars. In the lungs they penetrate blood vessels, destroy tissue and plug smaller air passages. Damage to the integrity of the lung tissue predisposes pigs to pneumonia. Adult worms in the intestine rob the pig of food, block the gut and excrete substances which interfere with digestion.

Diagnosis is made by microscopic identification of eggs in the feces. Adult worms in the intestine and scars in the liver are seen on postmortem examination.

Whipworms

Trichuris suis, is called the whipworm because it is shaped like a whip. A mature whipworm is 1 1/2 to 2 inches long. It has one of the simplest life cycles known. Eggs are laid in the large intestine and pass from the body in manure. They develop into infective larvae in 21 days. After being swallowed by a pig, the young larvae burrow into the wall of the large intestine. Within a few days, the young worms emerge, attach to the lining of the large intestine and grow to maturity. A life cycle lasts 70-90 days.

Whipworms cause considerable inflammation and irritation of the intestine. Whipworm infestation is characterized by loose stools which in many cases progresses rapidly to a severe, bloody diarrhea. Diagnosis is made by finding worm eggs in the feces or by recovering worms at necropsy. If sexually immature worms are causing the damage, eggs may not be found in the feces.

Lungworms

There are three species of *Metastrongylus* or lungworms. Lungworms are thread-like, white worms up to 2 1/2 inches long. Female lungworms live in air passages in the lungs where they produce large numbers of thick-shelled eggs, which the infected pig coughs up, swallows and passes in manure. Earthworms swallow the eggs, which hatch in the earthworm's intestine and become infective in three to four weeks.

Pigs become infested by eating earthworms which harbor the infective larvae. Lungworm infestation causes coughing and shallow breathing. Hemorrhages occur on the surface of the pig's lungs during early stages of lungworm invasion. Constant irritation by lungworms can bring about consolidation of lung tissue around sites occupied by worms. Tips of lungs become grayish or whitish and very hard in some cases. Secondary pneumonias are common. Pigs infected with lungworms tend to go off feed, become unthrifty and fail to grow.

Diagnosis is made by isolating eggs or larvae from feces or by demonstrating larvae in nasal secretions. Frothy mucus may be found at necropsy. When it is collected in a dish containing water and examined microscopically, the worms are easily observed.

Prevent lungworm infestation by keeping pigs in lots where they cannot contact earthworms. Earthworms thrive in old hog lots in which manure and litter have accumulated, or on permanent pastures and in low fields that receive drainage from higher ground.

Nodular Worms

The nodular worm, *Oesophagostomum dentatum*, is a small, whitish worm about 1/3 to 1/2 inch long that lives in the large intestine. Worm eggs pass from the pig in manure and under favorable conditions of moisture and temperature, develop to form infective larvae in three to seven days. These larvae can survive up to 10 months in mild climates but will die in cold temperatures. In the Midwest, these parasites survive by wintering in breeding stock. The pig will eat infective larvae with feed or water. The worms encyst in the lining of the large intestine and cause nodules to form. This condition is called "pimply gut". Within six to 10 days after infection, the young worms emerge from the nodules and grow to maturity. The life cycle requires 50 to 53 days.

These immature worms can cause loss of appetite, diarrhea or constipation, and anemia. Diagnosis is made by microscopically identifying the characteristic worm eggs in the feces, or by recovery and identification of adult worms at necropsy.

Anthelmintics for Swine

When selecting a dewormer for swine, consider these five factors: efficacy of compound, spectrum of activity, mode of administration, margin of safety and cost of treatment. The spectrum of anthelmintic activity determines the number of species affected by the dewormer. Certain swine anthelmintic drugs are highly effective against only one species. If the herd problem involves several species of parasites, use a dewormer that effectively removes many species.

Prevention and Control

Since moisture favors the development of worm eggs into larvae and dryness kills them, reduce moisture to decrease parasitic contamination. Pastures should be well drained and feeding areas should be raised above ground. Many worm eggs can survive for long periods in dirt. Research has shown that ascarid eggs on unplowed pasture lots remained infective for seven years--whipworm eggs can remain infective up to six years. Rotating hog lots will help prevent infestation.

Worm eggs are easily carried by the wind or water and have been recovered from soil on roofs, window sills,

and sides of buildings.

Table II. Approved claims of principle dewormers (listed alphabetically by trade name)							
	Types of worms controlled						
	roundworm	whipworm	nodular worm	kidneyworm	threadworm	lungworm	relative cost*
Atgard (dichlorvos)							
• Mixed in feed and fed for 1 to several days, according to directions, to pigs of any age	adult L4	adult L4	adult L4	---	---	---	medium
• Top dressed on feed for 1 day to sows, boars, gilts	adult L4	adult L4	adult L4	---	---	---	low
Banminth (pyrantel tartrate)							
• Continuous use in feed, 96 g/ton, or a 1 day treatment in feed at 800 g/ton	adult L3, L4	---	adult	---	---	---	high
• 3 day treatment 96 g/ton	adult	---	---	---	---	---	low
Hygromycin B							
• 12 g/ton continuous in feed	adult	adult	adult	---	---	---	medium
Ivomec (ivermectin)							
• Subcutaneous injection 300 µg/kg	adult L4	---	adult L4	adult	adult L3, L4	adult	high
Levasole, Tramisol (levamisole)							
• 1 day treatment in feed, water, or oral gel	adult	---	adult	adult	adult	adult	medium
Piperazine							
• 50 mg/lb							

body weight 1 day, in water or feed	adult	---	---	---	---	---	low
Safe-Guard (fenbendazole)							
• 1.36 mg/lb body weight in feed/day, 3 to 12 day treatment	adult L3, L4	adult L3, L4	adult	adult L3, L4	---	adult	medium
TBZ (Thiabendazole)							
• Fed continuous 45.4 to 908 g/ton	adult	---	---	---	---	---	depends on dose
TBZ paste (Thiabendazole)							
	---	---	---	---	adult	---	medium

* Relative cost at the time of publication. Low is less than $.15 per 100 lbs body weight, medium is about $.30 to $.50 per 100 lbs body weight, and high is over $.85 per 100 lbs body weight.
L3 = Third stage larvae are those that migrate (liver, lungs or within tissue)
L4 = Fourth stage larvae are those immediately preceding adulthood (in the gastrointestinal tract)
Atgard is a product of Fermenta Animal Health; Banminth is a registered trademark of Pfizer, Inc; Ivomec and TBZ are registered trademarks of Merck and Co.; Levasole is a registered trademark of IMC/Pitman-Moore; Safe-Guard is a registered trademark of Hoechst-Roussel Agri-Vet Co; Tramisol is a registered trademark of American Cyanamid

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