

Swine Internal Parasites: Prevalence and Management Systems

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Story in Brief

A survey of internal parasites in Oklahoma swine herds indicates that most of the internal parasites common to swine are widespread in the state, although numbers are somewhat lower than those reported in surveys of states with a greater concentration of swine.

A total of 90 growing-finishing swine were used to study the effect of anthelmintic treatment regimes and management systems on pig performance, liver lesions and intestinal worm burdens. Anthelmintics had no significant effect on rate of gain in pigs fed in confinement, but significantly ($P < .05$) improved rate of gain in pigs fed in pasture lots. Similar but nonsignificant trends were observed for feed conversion. Anthelmintics were effective in reducing liver lesions in pigs fed on pasture, but not in confinement-fed pigs. The internal parasite control system which would be most economical for each swine producer may be determined by type of management system as well as the types of parasites involved.

Introduction

Infections of swine by internal parasites is considered to cause sizeable monetary losses in the swine industry because of growth retardation, uneconomical gains and occasional deaths. These losses have been estimated to average as much as \$3.00 per pig.

A number of drugs with anthelmintic properties are available. However, conflicting results as to the effectiveness of these compounds in improving rate of gain and efficiency of feed utilization appear in the literature. These inconsistent responses may result from environmental differences and/or disease variables. Swine reared in total confinement may require a different parasite control program than those reared in pasture lots.

The purpose of this study was to determine the effect of two anthelmintic treatment programs on rate of gain, efficiency of feed conversion, liver damage and number of internal parasites in Specific Pathogen Free (SPF) pigs fed in total confinement or in pasture lots.

Experimental Procedure

Survey

Swine fecal samples were collected from a total of 97 Oklahoma swine farms in the summer of 1978 to determine the prevalences of internal parasites. Fecal samples were collected from five animals or the total number, whichever was less, for each class of swine on each farm. Classes of swine for this survey were sows, nursing pigs, weaning pigs and growing-finishing hogs. Swine herds to be surveyed were randomly selected from a listing of Oklahoma swine producers.

Feeding trial

A total of 90 SPF Yorkshire pigs from the Oklahoma State University research and teaching herd were used in this experiment. Sows that served as the source for the experimental pigs were treated with dichlorvos (Atgard) at approximately 110 days of gestation. The pigs were reared in total confinement and received no additional anthelmintic prior to allotment to treatment. The pigs, averaging 68 lb initially, were randomly allotted to one of six pens on pasture or in total confinement in solid concrete floored pens. Each pen contained a self-feeder and automatic waterer. All pens had been used in a continuous swine feeding program for years, but were free of swine for approximately 1 year prior to the initiation of the trial. Care was taken to clean and disinfect the concrete pens prior to the initiation of the trial. Composition of the basal grower diet used throughout the trial is shown in Table 1. Treatments were as follows:

Treatment 1: Basal diet with no anthelmintic.

Treatment 2: Basal diet plus treatment with approximately 50 mg of piperazine dihydrochloride per pound of body weight at the initiation of the trial and at monthly intervals thereafter.

Treatment 3: Basal diet plus 96 g/ton of pyrantel tartrate (Banminth) fed continuously.

Pigs were removed from trial at an average weight of 236 lb. At the end of the trial, pigs were examined for liver lesions, and an intestinal parasite count was made.

Results and Discussion

Survey

The prevalence of all parasites is shown in Table 2. The prevalence of all gastrointestinal parasites was lowest in nursing pigs. Growing-finishing swine had the high prevalence for some species, and sows for others. This suggests increased exposure to internal parasites with increasing age and/or variation in time required for the parasite to mature.

Evidence of gastrointestinal worms was found in 80 percent of the farms surveyed. The prevalence of ascarids ranged from as low as 10 percent of all farms where nursing pigs were sampled to as high as 62 percent of all farms with growing-finishing pigs. Overall, ascarids were present on 47 percent of the farms sampled. This estimate is

Table 1. Composition of basal diet.

Ingredient	%
Yellow corn	75.50
Soybean meal (44%)	21.15
Dicalcium phosphate	1.50
Calcium carbonate	0.75
Salt	0.50
Vitamin trace-mineral mix ^a	0.50
CTC-50 ^b	0.10
Total	100.00

^aSupplied 4,000,000 IU vitamin A, 300,000 IU vitamin D, 4 g riboflavin, 20 g pantothenic acid, 30 g niacin, 800 g choline chloride, 15 mg vitamin B₁₂, 10,000 IU vitamin E, 2 g menadione, 200 mg iodine, 90 g iron, 20 g manganese, 10 g copper, 90 g zinc and 100 mg selenium per ton of feed.

^bContains 50g chlortetracycline per lb of premix.

Table 2. Prevalence of specific types of internal parasites in Oklahoma farms by age group of swine.

Groups	No. farms	Ascarid (large roundworm)	Trichuris (whipworm)	Strongyle (nodular worms)	Strongyloides (threadworm)	Coccidia	Spirurid	All helminths (worms)
		% positive	% positive	% positive	% positive	% positive	% positive	% positive
Nursing pigs	10	10.0	0.0	0.0	0.0	10.0	0.0	10.0
Weanling pigs	31	35.5	16.1	16.1	3.2	9.7	0.0	45.2
Growing-finishing pigs	55	61.8	34.5	27.3	10.9	38.2	0.0	61.8
Brood sows	84	26.2	13.1	46.4	14.2	50.0	4.8	64.3
Total farms	97	47.4	29.9	52.6	18.6	53.6	4.1	80.4

lower than that observed by Todd (1973), who observed ascarids on 75 to 91 percent of the farms surveyed. This difference may be due to Oklahoma swine harboring lower worm burdens, which could result in negative findings in a positive animal. The fact that density of swine on Oklahoma farms is not as great as that observed in other areas could also result in lower exposure rates and hence lower prevalence. These findings suggest a slightly lower problem with ascarids in Oklahoma.

Other internal parasites which might be a problem in Oklahoma include *Trichuris* (whipworms), *Strongyloides* (threadworm) and *Strongylus* (nodular worm). The prevalence of these parasites on Oklahoma farms was 30, 19 and 53 percent, respectively. Nodular worms and threadworms were more prevalent in the breeding herd than in pigs, while whipworms had the highest prevalence in growing-finishing hogs. The actual prevalence and incidence of threadworms may be greater than that observed in this survey since adult threadworms are found only in very small numbers beyond several weeks following initial exposure of the nursing pigs. The negative sow, however, may have larvae in her tissues that can be passed in colostrum to subsequent litters of pigs.

The finding of a high prevalence of swine coccidians (54 percent of the herds) is consistent with recent national surveys. Since all species of coccidians have been found to cause extensive tissue damage in host populations studied, it appears that coccidians may represent a major disease threat to swine.

Feeding trial

Performance data are presented in Table 3. Anthelmintics had no significant effect on rate of gain in pigs fed in solid concrete pens, but gain was significantly ($P < .05$) affected in pigs fed in pasture lots. Pigs fed Banminth in pasture lots gained significantly faster than the untreated control pigs (12.2 percent) or pigs treated with piperazine (15.3). Although no significant interaction was observed, it should be noted that average daily gain in pigs fed on pasture, compared to pigs fed on concrete, tended to decrease in pigs fed either the untreated control diet or the piperazine diet but not the Banminth diet. Differences in efficiency of feed utilization tended to follow the trends observed in average daily gain, although differences were not statistically significant. Efficiency of feed utilization was very similar among all treatment groups for pigs fed on concrete, but pigs fed Banminth in pasture lots were more efficient than pigs fed either the untreated control diet (15.2 percent) or the pigs treated with piperazine (5.9

Table 3. Effect of anthelmintics and management system on average daily gain and feed efficiency.

Management	Treatment		
	Control	Piperazine	Banminth
Concrete			
Avg daily gain, lb	1.61	1.64	1.67
Feed per lb gain, lb	3.32	3.32	3.30
Pasture			
Avg daily gain, lb	1.48 ^a	1.44 ^a	1.66 ^b
Feed per lb gain, lb	3.75	3.38	3.18

^{ab}Means with different superscripts within management system are significantly different ($P < .05$).

percent). Pigs treated with piperazine on pasture were almost 10 percent more efficient than the untreated controls.

The effect of anthelmintics and management system on necropsy evaluation are presented in Table 4. The number of liver lesions were significantly affected by treatment in pigs fed on pasture but not on concrete. Feeding Banminth significantly reduced liver lesions in pigs fed on pasture when compared to the untreated control pigs or pigs treated with piperazine. Ascarids and whipworms were the only parasites found in the intestine upon necropsy. The number of both parasites was somewhat higher in pigs fed on concrete than pigs fed in pasture lots, but the total number of parasites was very low in pigs on all treatments and both management systems. Pigs fed 96 g of Banminth continuously on pasture or concrete had no ascarids, and Banminth reduced the number of whipworms in pigs fed on concrete.

These preliminary data indicate that anthelmintics are available which can effectively control ascarids in swine fed on pasture or in total confinement. It appears, however, that the control system which would be the most economical for each swine producer may be determined by the type of management system used as well as the type of parasite involved.

Literature Cited

Todd, A.C. 1973. National prevalency of swine parasites. Proc. Second Live and Learn Symposium, Grand Bahamas, 1-16.

Table 4. The effect of anthelmintics and management system on average number of liver lesions and intestinal parasites.

Management	Treatment		
	Control	Piperazine	Banminth
Concrete			
Liver lesions	30.9	6.9	12.2
Ascarids	5.0 ^a	2.8 ^a	0.0 ^b
Whipworms	23.4 ^a	2.31 ^b	0.33 ^b
Pasture			
Liver lesions	60.5 ^a	68.3 ^a	25.1 ^b
Ascarids	0.14	0.0	0.0
Whipworms	0.07	0.00	0.00

^{ab}Means with different superscripts within management system are significantly different ($P < .05$).