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Effect of sarcoptic mange mite infestation on the growth and immunity in growing-finishing pigs

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EFFECT OF SARCOPTIC MANGE MITE INFESTATION

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ON THE GROWTH AND IMMUNITY IN GROWING-FINISHING PIGS

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Summary

Twenty-eight pigs were used to evaluate the effect the sarcoptic mange mite infestation on growth and immunity of growing-finishing pigs. Although mange mite infestation did not affect gain, the white blood cell counts were increased (23.6 vs. 28.6) two weeks after the infestation, corresponding to the mite generation. Two weeks after the infestation lymphocytes were decreased (61.0 vs. 51.3%) and neutrophils were increased (25.7 vs. 35.1%). It appears from these data that sarcoptic mange mite infestation may influence immune status of growing-finishing pigs.

Introduction

Very little is known about the effect of sarcoptic mange on hogs. It has been postulated by several researchers that mange will affect the performance and the immune systems of hogs but very little research has been done to document these claims.

Surveys have been conducted which show that 50-60% of the hogs in the midwest are infested with mange. Therefore, the objective of this study was to evaluate the effects of the sarcoptic mange mite infestation on the growth and immunity of growing-finishing pigs. Also, we were interested in evaluating the effects of the sarcoptic mange mite infestation on the different blood parameters in the pig and in establishing a method of enumerating the mites.

Experimental Procedures

Twenty-eight pigs were placed in artificial rearing cages within 12 hours of birth, and reared in these cages for three weeks. The pigs were removed from the mothers very shortly after birth so there would be very little maternal contact to break the life cycle of the mite. The pigs then were moved to isolation chambers for 5 weeks where the pigs remained for the duration of the trial. Each chamber allowed for approximately 20 square feet per pig. One chamber served as a control (non-infested) chamber and one as a treatment (infested) chamber. The pigs were allotted to the groups by weight and sex.

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Infestation was done by isolating mites from encrusted ear lesions on donor sows. A 2 x 2 cm² section was placed in each ear of the pigs in the treatment group. Pigs were infested only one time during the trial. At the conclusion of study, ears were scraped and mites were enumerated. No mites were found on the control pigs.

Pigs were weighed at the beginning of the trial and weekly during the trial. Blood samples also were taken at the beginning of the trial and weekly during the trial. The blood parameters that were measured included: 1) packed cell volume, 2) hemoglobin, 3) erythrocytes, 4) total leukocytes, and 5) differential white blood cell examination.

Phytohemagglutinin (PHA) was injected interdermally into the flank as an indicator of in vivo cell-mediated immunity. Initially, rear flanks of each pig were measured for skin-fold thickness with a constant pressure micrometer. After the measurement was recorded, the PHA (250 ug) was injected into one flank of each pig and a saline solution was injected into the other flank. Twenty-four hours later the flank skin-fold thickness was remeasured and the change in skin-fold thickness was recorded.

Results and Discussion

At the beginning of the test, pigs averaged approximately 92 pounds. There was no difference in weight gain between the groups (table 1), which indicates that pigs can tolerate minimal levels of mites without affecting weight gain. Possibly, if the pigs had been infested more than one time, there may have been a difference in weight gain.

Table 1. Effect of Mange Infestation on Weight Gain

Week	Weight, lbs.		SE
	Control	Infested	
0	93.6	90.5	1.2
1	100.5	99.2	1.2
2	114.4	111.9	1.4
3	125.5	123.0	1.4
4	139.6	137.6	1.4
5	161.4	162.1	1.4

The infestation of mites significantly increased the white blood cell counts (WBC) at week 2 (table 2). It is believed that the reason for the change in the WBC at this time was due to the mite generation being approximately 10-14 days. But beyond that 2-week point, there were no differences in WBC counts between

Table 2. Effect of Mange Infestation on Blood Parameters

Item	Week	Control	Infested
WBC, $\times 10^3$ ^a	0	21.9	21.1
	2	23.6 ^c	28.6 ^d
	3	27.9	28.9
	5	27.2	26.2
Lymphocytes, % ^{ab}	0	65.8	67.0
	2	61.0 ^c	51.3 ^d
	3	57.8	54.6
	5	61.4	62.2
Neutrophils, % ^{ab}	0	23.7	23.9
	2	25.7 ^c	35.1 ^d
	3	27.2	32.0
	5	23.8	21.6

^aPeriod effect ($P < .05$)^bPeriod by treatment interaction ($P < .05$)^{c,d} $P < .05$

treatments. The WBC count was highly correlated with mite count. Correspondingly, 2 weeks after the infestation the lymphocytes were decreased and the neutrophils were increased. Lymphocytes (percent of the WBC count) significantly decreased for the treatment group at week 2, indicating that the immunity of the infested pigs was decreasing. Neutrophils (percent of the WBC) significantly increasing in the treatment group at week 2. This also indicates that the immunity of the pig was changing due to the infestation.

Overall, there was no effect on the PHA-skin test reaction (data not shown), week 2 treatment group tended to be higher than the control group, which is difficult to explain and contrary to the lymphocyte data. It was expected that the PHA reaction would decrease as immunity decreased.