Transmission of *Oesophagostomum* Species in Swine on Pasture in the Maritime Provinces

H. J. SMITH*

**SUMMARY**

Field experiments carried out in the Maritime area of Canada failed to demonstrate overwinter survival of porcine nodular worms, *Oesophagostomum quadrispinulatum* and *O. dentatum*. Pastures were contaminated by carrier animals with subsequent transmission of infection to susceptible pigs. One approach to control of oesophagostomiasis in grazing swine is the treatment of all infected pigs prior to going on pasture.

**RÉSUMÉ**

Transmission des espèces d'*Oesophagostomum* chez des porcs en paissance aux Maritimes

Des expériences effectuées sur des pâturages des Maritimes ne réussirent pas à démontrer la survie hivernale des parasites nodulaires du porc: *Oesophagostomum quadrispinulatum* et *O. dentatum*. Des sujets porteurs de ces parasites contaminèrent les pâturages et les porcs vulnérables se contaminèrent subseqüemment. Le traitement de tous les porcs parasites, avant de les envoyer au pâturage, représente une approche valable du contrôle de l'oesophagostomiase, chez les porcs qu'on envoie en paissance.

**INTRODUCTION**

In 1972, Smith reported on anthelmintic trials in a herd of swine, heavily parasitized with several helminth species including nodular worms. *Oesophagostomum quadrispinulatum* and *O. dentatum*, which had grazed on a permanent pasture prior to treatment (3). Heavy infections with nodular worms were also observed in two large swine herds where sows routinely pastured (unpublished data). Since little was known about the transmission of nodular worms in pastured swine in the Maritime area of Canada, investigations were carried out in 1972-73 and repeated in 1976-77. The results of these investigations are presented in this report.

**MATERIALS AND METHODS**

**1972-73 Investigations**

On June 20, 1972 three sows naturally infected with nodular worms, based on fecal cultures, were placed in a paddock (35 x 35 m) built on marshland pasture at Sackville, New Brunswick. Marshland is defined as Acadian silty loam alluvially deposited by tidal action and reclaimed from tidal flooding over 200 years ago by construction of dikes and drainage control gates. Pasture herbage was a mixture of native grasses, timothy, couch grass and *Agrostis* spp. producing a thick sod or mat. As far as it is known, pigs had never grazed this pasture. On June 28, one sow farrowed three piglets which remained with the sow. On October 3, two sows and the three piglets were killed and examined for nodular worms. The third sow was used in another study.

On July 10 of the following grazing season, a fourth sow and her seven piglets, farrowed on June 24, were put out to graze in the same paddock. This sow had been treated three times with thiabendazole (125 mg/kg) between June 2 and 12, 1973 and was parasite-free based on fecal examinations. On September 28, two piglets were killed and examined for nodular worms. On October 19, the sow and remaining five piglets were stabled. Single piglets were killed and examined for parasites on November 5 and 28, on December 14 and the last two on January 3, 1974.

While on pasture, all pigs were fed dry sow ration pellets *ad libitum*.

**1976-77 Investigations**

On June 30, 1976 a sow naturally infected with nodular worms (based on fecal culture) was used to seed with worm eggs the same paddock used in the earlier study. The sow was housed on October 14.

On July 5, 1977 six 45 day old piglets which had been raised under parasite-free conditions by a sow whose feces were negative for worm eggs, were placed in the paddock. On October 12, the piglets were housed. Fecal examinations were carried out weekly until the pigs were slaughtered on November 22 for parasitological examination.

As in the previous investigation, grazing pigs were fed dry sow ration pellets.

**Parasitological Examinations**

Fecal examinations were performed either by the simple flotation method using saturated sodium nitrate as the flotation solution or by the McMaster technique. The simple flotation method was used on all samples that gave negative results by the McMaster technique.

---

*Atlantic Area Laboratory, Animal Pathology Division, Health of Animals Branch, Agriculture Canada, P.O. Box 1410, Sackville, New Brunswick, Canada E0A 3C0.
Fecal cultures and differential larval counts were carried out as described by Dunn (2).

Parasites were recovered by vigorously rubbing and washing the mucosae of the large intestine in water. Washings and intestinal contents were passed through a stack of sieves (sieve openings 2 mm, 850 μm, 425 μm, and 212 μm).

RESULTS

1972-73 Investigations

Biweekly fecal examinations of the three sows used to seed the paddock revealed mean strongyle egg counts of 538, 2,371 and 2,933 eggs per gram (epg) of feces. Fecal cultures showed the three sows to be infected with *Oesophagostomum* spp.

Parasitological examinations of the large intestines of two sows and three piglets following the 1972 grazing season revealed the two sows and two of three piglets to be infected with *O. quadrispinulatum* and *O. dentatum*. Worm counts indicated the sows had 146 and 624 nodular worms respectively while the infected piglets had 59 and 103. The seven piglets grazing in the paddock during the next grazing season (1973) did not become infected with nodular worms.

1976-77 Investigations

Fecal counts and cultural examinations of feces of the sow used to seed the paddock in 1976 revealed the presence of *Oesophagostomum* eggs in excess of 10,000 epg.

Fecal and necropsy examinations of the six piglets grazing the paddock in 1977 did not reveal the presence of nodular worms.

Climatic Conditions

The mean monthly maximum and minimum temperatures recorded at Sackville, New Brunswick for the period of 1972-77 are given in Table I. Mean annual total precipitation and snowfall for the area were 123.7 cm and 284.2 cm respectively.

DISCUSSION

Under the climatic conditions of this area, the findings suggest that porcine nodular worms, *Oesophagostomum quadrispinulatum* and *O. dentatum*, do not survive overwinter on pasture. In this regard, the porcine nodular worms are similar to the ovine strongyle, *O. columbianum*, which also was shown not to survive overwinter on pasture in the Maritime area (4). On the other hand, the author has observed large numbers of *Oesophagostomum* eggs in the feces of naturally infected sows during late winter and spring prior to the grazing season (unpublished data) which demonstrate that infections are either maintained or built up overwinter in the host. Connan (1) has shown that infections are readily transmitted in housed pigs when conditions in the bedding and quarters facilitate the development and survival of infective larvae.

Notwithstanding the apparent lack of overwintering residual pasture infections, infected pigs can contaminate pastures with subsequent transmission of infection to susceptible pigs. This is demonstrated by the nodular worm burdens established in two of three piglets born and raised in the infected paddock in 1972.

The findings in these trials have practical application with regard to control of oesophagostomiasis in pastured pigs under Maritime conditions. Since residual pasture infections are not maintained overwinter and pasture contamination only results from the introduction of infected animals, one approach is the treatment of all infected pigs with an appropriate anthelmintic prior to going on pasture. In the ultimate control of oesophagostomiasis on a premise, the application of sound husbandry and management practices (good treatment regime, thorough cleaning and disinfection, regular removal of feces and litter, provision of dry bedding, etc.) in the rearing of housed swine is a prerequisite.

ACKNOWLEDGMENTS

The author appreciates the technical assistance of Messrs. K.E. Snowdon, D.R. Green and R.D. Beal.

REFERENCES