

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Proceedings of the Thirteenth Vertebrate Pest
Conference (1988)

Vertebrate Pest Conference Proceedings collection

March 1988

HEALTH RISKS TO HUMANS AND DOMESTIC LIVESTOCK POSED BY FERAL PIGS (*Sus scrofa*) IN NORTH QUEENSLAND

Peter M. Pavlov

Queensland Rural Lands Protection Board, Robert Wicks Research Station, Queensland, Australia

Follow this and additional works at: <http://digitalcommons.unl.edu/vpcthirteen>



Part of the [Environmental Health and Protection Commons](#)

Pavlov, Peter M., "HEALTH RISKS TO HUMANS AND DOMESTIC LIVESTOCK POSED BY FERAL PIGS (*Sus scrofa*) IN NORTH QUEENSLAND" (1988). *Proceedings of the Thirteenth Vertebrate Pest Conference (1988)*. 29.
<http://digitalcommons.unl.edu/vpcthirteen/29>

This Article is brought to you for free and open access by the Vertebrate Pest Conference Proceedings collection at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Proceedings of the Thirteenth Vertebrate Pest Conference (1988) by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

HEALTH RISKS TO HUMANS AND DOMESTIC LIVESTOCK POSED BY FERAL PIGS (Sus scrofa) IN NORTH QUEENSLAND

PETER M. PAVLOV, Queensland Rural Lands Protection Board, Robert Wicks Research Station, Inglewood 4387, Queensland, Australia.

ABSTRACT: A sample of 608 adult pigs from Cape York and adjacent islands was examined for parasites and their serum tested for livestock diseases associated with the Queensland tropics. Feral pigs from North Queensland pose a significant health threat to humans with the incidence of Spargana (the plerocercoid of Spirometra erinacei) through the consumption of undercooked pork. Meliodosis (Pseudomonas pseudomallei), Leptospirosis (L. yar. pomona), and Brucellosis (Brucella suis) are capable of infecting humans directly during unhygienic butchering of infected carcasses. In North Queensland, the widespread intermingled distribution of feral pigs and cattle increases the potential for the transmission of Actinobacillus, Leptospirosis, and Brucellosis from feral pigs to cattle. Both Europeans and Aborigines on Cape York also raise wild-caught feral pigs for meat. It is important to realize that parasites and diseases are present in young pigs and that poor husbandry practices increase the risk of infection from several parasites, i.e., Lungworm (Metastrongylus sp.) Stomach worm (Physocephalus sexalatus, Hyostrongylus rubidus), Thorny headed worm (Macracanthorhynchus hirudinaceus) and Kidney worm (Stephanurus dentatus). Heavy infection of these parasites reduce growth rates and cause unthriftiness in infected animals.

Proc. Vertebr. Pest Conf. (A.C. Crabb and R.E. Marsh, Eds.),
Printed at Univ. of Calif., Davis. 13:141-144, 1988

INTRODUCTION

Domestic pigs were brought to Australia by European man and have been established in feral populations for 100 to 150 years, (Pullar 1950). The first survey of feral pig populations was by Pullar (1953), who mentioned distribution, agricultural damage and the potential risks to human and domestic animal health from diseases and parasites. Pullar also mentioned the potential of feral pigs to carry swine fever and foot and mouth disease, if they eventually reach Australian shores. Pigs are hosts to a wide variety of parasites and diseases (Bootes 1969, Belchner 1972). Surveys of pig parasites indicated the presence of the Large Roundworm Ascaris lumbricoides (Kauzal 1930, Robert 1940) and spargana (Pullar and McLennan 1949, Gordon et al. 1954, Appleton and Norton 1976). More detailed surveys of diseases and parasites of feral pigs were conducted in the Northern Territory by Barrett (1975) and in Western New South Wales by Giles (1980) and Pavlov (1980). Diseases of feral pigs have been investigated by the above workers and also Letts (1962) and Keast et al. (1963). The most detailed serological surveys done have been by Barrett (1975) and Corner et al. (1981). The presence of Murray Valley Encephalitis Virus and Ross River Virus in feral pigs was found by Gard et al. (1976). The presence of Brucellosis in North Queensland was recorded by Norton and Thomas (1976).

METHODS

Pigs were collected with trained dogs in most habitats encountered on Cape York and Prince of Wales Island, plus some smaller islands in the Torres Straits and off the eastern coast of Cape York Peninsula. The sampling period was from September 1981 to December 1985. Blood was clotted at

ambient temperature. Serum and obvious bacterial lesions were chilled and sent to the Oonoonba Veterinary Research Station, Townsville (Queensland Department of Primary Industry) for serology and culturing. Sera was also sent to the Queensland Institute of Medical Research, Brisbane, to screen for Murray Valley Encephalitis Virus and Ross River Virus.

RESULTS

Table 1 lists the bacteria identified from feral pigs in the sample. Actinobacillus is the bacteria responsible for causing Lumpy jaw in cattle. Pseudomonas pseudomallei is the causative agent of Meliodosis. Complete bacteriological surveys under the field conditions experienced were not possible. Table 2 indicates the helminth parasites encountered in the sample and the percent occurrence of each one. Most were similar between the contrasting sites. Lungworm was more prevalent on Prince of Wales Island and Sparganosis was more common on Cape York Peninsular. Table 3 gives a detailed account of the feral pig serology from the study. Agglutination and Indirect Hemagglutination test indicate the animal has been challenged with the disease. Complement Fixation tests indicate the current presence of the disease in the tested animal.

DISCUSSION

Feral pigs in Northern Australia pose a significant health risk, with common bacterial infections, helminth parasites that can infect humans (Sparganosis) and domestic pigs, and diseases that can infect humans and domestic livestock. Spargana can infect humans during the consumption of undercooked feral pig meat. After reaching the stomach/

Table 1. List of bacteria identified in North Queensland feral pigs.

<u>Actinobacillus</u>	<u>Aeromonas hydrophila</u>
<u>Bacillus sp.</u>	<u>Chromobacterium freundii</u>
<u>Chromobacterium violaceum</u>	<u>Enterobacter agglomerans</u>
<u>Enterobacter cloacae</u>	<u>Escherichia coli</u>
<u>Klebsiella pneumoniae</u>	<u>Proteus sp.</u>
<u>Providencia alcalifaciens</u>	<u>Pseudomonas pseudomallei</u>
<u>Serratia liquifaciens</u>	<u>Serratia marcescens</u>
<u>Staphylococcus aureus</u>	<u>Streptococci</u>

Table 2. Helminth parasites in North Queensland feral pigs

Parasite	Percent occurrence in sample	
	Cape York n = 450	Prince of Wales Island n = 158
Kidney worm	81	93
Lung worm	17	55
Sparganosis	60	10
Stomach worm	85	84
Thorny headed worm	81	93

small intestine, the plerocercoid burrows through the wall and then initiates the condition termed "visceral larval migrans." This normally causes subclinical discomfort but may lodge in a vital organ, i.e., eye or brain. Spargana were first noticed in a pig in Australia by Pullar and McLennan (1949). A survey of feral pigs in N.S.W. by Gordon et al. (1954) established its presence in the feral pig population. In the N.S.W. arid zone survey of feral pigs by Giles (1980), Pavlov (1980) and the Northern Territory tropical zone survey of Barrett (1975), Spargana had a low incidence. The current feral pig sample showed no differences in disease and parasite levels between the sexes. Spargana in Cape York feral pigs increases in incidence almost linearly with age; 20% are infected by one year of age and 50% are infected by two years of age. The data indicate that this parasite is "cumulative." There is no active inhibition to infection by the immune system as the pig matures. Commercial harvesting of the Cape York population as export meat for human consumption would not be viable due to high condemnation rates of carcasses. Local harvesting for meat would also be a

Table 3. Serology of feral pig diseases in feral pigs from Cape York and Prince of Wales Island.

Disease	Serology test*	Cape York		Prince of Wales Island	
		N	% occurrence	N	% occurrence
Brucellosis (<i>B. suis</i>)	Agg.	132	0.7	0	0
	Rose Bengal	422	1.9	0	0
	C.F.	57	8.8	0	0
Leptospirosis (<i>L. pomona</i>)	Agg.	504	5.0	142	3.0
	(<i>L. hardjo</i>)	Agg.	133	1.5	0
Meliodosis (<i>P. pseudomallei</i>)	I.H.	472	25.0	142	18.0
	H.	194	13.9	50	20.0
	C.F.	356	3.9	50	8.0
Ross River Virus	H.I.	135	17.0	0	0
Murray Valley	H.I.	135	42.0	0	0
Encephalitis Virus					

*Agg. = Agglutination
I.H. = indirect haemagglutination
H. = Haemagglutination
C.F. = Complement fixation
H.I. = Haemagglutination inhibition

significant health risk. Infection rates for Spargana are site-specific even in the tropics. On Cape York, where permanent swamps are common, Spargana is also common; on Prince of Wales Island, there are no semi-permanent or permanent swamp that would support freshwater copepods or frogs to rapidly complete the life cycle, and spargana in feral pigs is not often encountered.

Other helminth infections are specifically hosted by other pigs, and infection rates found in Northern Queensland compare generally with data of Barrett (1975) for the Northern Territory. Except for Kidney worm, these parasites were also recorded by Giles (1980). He mentioned that in the arid zone the presence of these parasites was directly related to the seasonal conditions. On Cape York and on islands in the Torres Straits, the practice common to both Europeans and Aborigines of catching feral pigs to fatten for the table would

involve risks of transmission of helminth parasites, especially in pigs over weaning age. The data presented here show that by 6-12 month of age, 70% to 90% of feral pigs can be infected with Lung worm, Kidney worm and Stomach worm. These parasites may continually reinfect pigs kept in cramped unhygienic conditions of allowing them to free range where feral pigs also forage. The resulting worm burdens cause poor health and poor food-to-meat conversion efficiency. There are possibly three infection types with feral pig helminths. The first is a heavy infection achieved early in life and continually maintained at that level throughout life, i.e., Stomach worm. The second is a cumulative path indicating no host response as the animal ages, i.e., Spargana on Cape York. The third is a heavy infection while young but infection rate reduces with age, i.e., Thorny headed worm and Lung worm on Cape York.

Figure 1 illustrates the effect of age on the infection rate of kidney worm and Spargana from North Queensland feral pigs. Almost 80% of feral pigs under 2 years of age have kidney worm infections. The infection rate in older animals increases at a slower rate. Prince of Wales Island feral pigs had slightly higher infection rates with age and showed a slight downturn in the infection rate for 5-6 year old animals, compared to feral pigs from Cape York. Sparganosis infections were dramatically different in the two populations. On Cape York infection rates increased constantly with age. On Prince of Wales Island, the infection rate fluctuated around 10 percent over all age groups.

Figure 2 illustrates the infection rate with age of stomach worm and lungworm for feral pigs from Cape York and Prince of Wales Island. Pigs are heavily infected with stomach worm by one year of age and maintain a 70% to 90% infection rate throughout life. The infection rates from the two populations are similar. Lungworm infection rates do vary between populations with pigs from Prince of Wales Island, having higher infection rates than Cape York animals. Highest infection rates occur by 2 years of age and fall in older age classes.

Figure 3 illustrates the infection rate of Thorny Headed worm in the feral pig populations. On Cape York Peninsular, infection rates fall with age (i.e., similar to Lungworm infection). On Prince of Wales Island, infection rates are quite different; infection rate increases with age to the 3-4 year age class, reaching almost 90% and then drops

The serological survey of the current feral pig sample establishes the presence of Brucellosis, Melioidosis, and Leptospirosis, which can all directly infect humans during field butchering of carcasses. Brucella and Leptospira can directly enter the body via open cuts and abrasions. The Melioidosis bacteria commonly enters the body via hand-to-mouth or hand-to-eye contact. In the tropics it is a common soil inhabitant. Brucellosis was recorded on Cape York at a lower incidence than found by Norton and Thomas (1976) in Central Queensland. Tuberculosis (*Mycobacterium tuberculosis* var *bovis*) has been reported from feral pigs in the Northern Territory (Letts 1962, Barrett 1975). In North Queensland the disease is present in low frequency in sparsely distributed cattle and opportunities for its transfer to

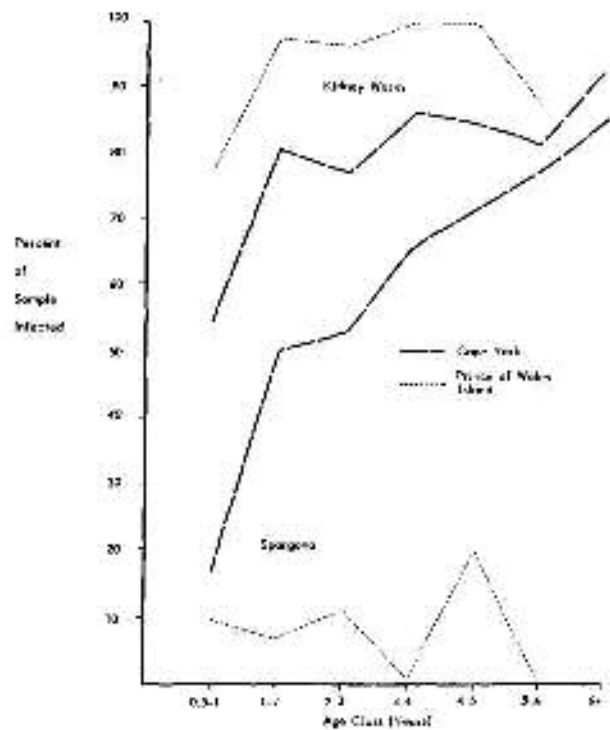


Fig. 1. The effect of age on kidney worm and Spargana infection of feral pigs from two areas of North Queensland.

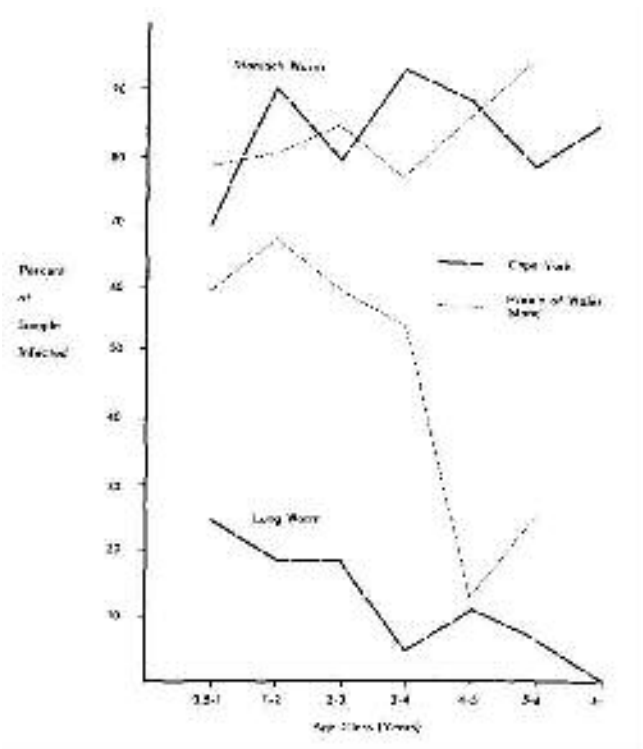


Fig. 2. The effect of age on stomach worm and lung worm infection of feral pigs from two areas of North Queensland.

feral pigs are low. In the Northern Territory, a high incidence is recorded in the feral buffalo (*Bubalis bubalis*) which occur in high numbers in close association with large populations of

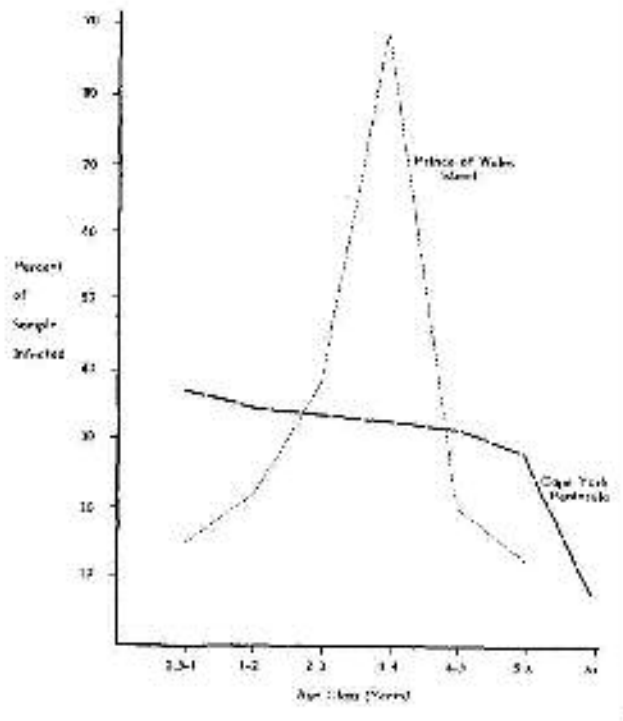


Fig. 3. The effect of age on Thomy-Headed worm infection of feral pigs from two areas of North Queensland.

feral pigs. During dry season die-offs of buffalo, there is ample opportunity for transmission to the feral pig. Most mammals act as reservoirs of Murray Valley Encephalitis Virus and Ross River Virus. The established presence of these viruses in feral pigs (Gard et al. 1976) has been reinforced during this survey.

To conclude, feral pigs in Northern Australia should be controlled but not used for human consumption due to the potential for the transmission of their disease and parasite burdens to humans and domestic livestock.

ACKNOWLEDGMENTS

Field work and writing up were fully supported by the Rural Lands Protection Board of Queensland through the Executive Director, Mr D. Grant. My Ph.D. Supervisor, Dr J.E. Nelson, from the Zoology Department, Monash University, Melbourne, provided consistent support. Serological work was conducted by the Queensland Department of Primary Industries at the Oonoonba Veterinary Research Laboratory, Townsville. I appreciated the support from the Queensland National Parks and Wildlife Service, through the Northern Regional Director Mr. Peter Stanton. Many people provided hospitality, support and encouragement during the field work, particularly Ritchie and Debbie Carrigan, Ron and Lyn Stannard, Rick and Carol Streatfield, and Bill and Mary Witherspoon. Sampling in those conditions was impossible without trained dogs, and I am indebted to Scrofa, Blue,

Rusty and Nellie who made it through; to Emma, Kelly, Bundy and Sam, cut down in their prime, and to all those other dogs who attended training school but didn't graduate.

LITERATURE CITED

- APPLETON, P.L. and J.H. NORTON. 1976. Sparganosis. A parasitic problem in feral pigs. Queensland Agric. J. July-August: 339-343.
- BARRETT, R.H. 1975. An outline of C.S.I.R.O. feral pig project results to date. May. unpub.
- BELSCHNER, H.G. 1967. Pig diseases. Angus and Robertson publishers, Sydney.
- BOOTES, B.W. 1969. Worms in pigs. Agric. Gaz., N.S.W. 80:15-22.
- CORNER, L.A., R.H. BARRETT, A.W.D. LEPPER, V. LEWIS, and C.W. PEARSONS. 1981. A survey of mycobacteriosis of feral pigs in the Northern Territory. Aust. Vet. J. 57(12):537-542.
- DOHERTY, R.L., H.A. STANDFAST, R. DOMROW et al. 1981. Studies of the epidemiology of arthropod borne virus infections at Mitchell River Mission, Cape York Peninsular, North Queensland. IV. Arbovirus Infection of Mosquitoes and Mammals. Trans. Roy. Soc. of Tropical Med. and Vet Hygiene:504-513.
- GARD, G.P., J.R. GILES, R. J. D WYER-GRA Y. 1976. Serological evidence of inter-epidemic infection of feral pigs in New South Wales with Murray Valley Encephalitis Virus. Aust. J. Exp. Biol. and Med. Sci. 54(3):297-302.
- GILES, J.R. 1980. The ecology of the feral pig in Western New South Wales. Unpublished Ph.D. Thesis, University of Sydney.
- GORDON, H.McL., B.A. FORSYTH and M. ROBINSON. 1954. Sparganosis in feral pigs in New South Wales. Aust. Vet. J. 30(5): 135-138.
- KAUZAL, G. 1930. A survey of the helminth parasites of swine in N.S.W. Aust. Vet. J. pp. 51-56.
- KEAST, J.C., I.R. LITTLEJOHNS, L.C. ROWAN, et al. 1963. The role of the feral pig as a disease reservoir. Aust. Vet. J. 39:99.
- LETTIS, G. 1962. Early livestock introductions to the top end of the Northern Territory. Aust Vet. J. 38(5):282-287.
- NORTON, J.H. and A.D. THOMAS. 1976. Brucellosis in feral swine. Aust. Vet. J. 52:293-294.
- PAVLOV, P.M. 1980. The diet and general ecology of the feral pig in the Girilambone district of N.S.W. Unpublished M.Sc. thesis. Monash University, Melbourne.
- PULLAR, E.M. and G.C. McLENNAN. 1949. Sparganosis in a Victorian pig. Aust. Vet. J. 24(11):302-304.
- PULLAR, E.M. 1950. The wild (feral) pig of Australia and their role in the spread of infectious diseases. Aust. Vet. J. 25:99-110.
- PULLAR, E.M. 1953. The feral pig of Australia. Their origin, distribution and economic importance. Memoirs of the National Museum, Melbourne, 18:7-23.
- ROBERTS, F.H.S. 1934. Worm parasites of domestic animals in Queensland. Old. Ag. J. 41(3):245-252.

