

## PREVALENCE OF MELIOIDOSIS IN ANIMALS IN NORTHERN QUEENSLAND

A survey of melioidosis in animals in northern Queensland from January 1975 to December 1979 has shown that 75 strains of *Pseudomonas pseudomallei* were recovered from 30 pigs, 9 sheep, 5 goats, 2 native birds, one horse and one tree kangaroo (Table 1).

As melioidosis is endemic in some local piggeries, abscesses discovered at slaughter are requested by this laboratory for examination. These provided the majority of specimens surveyed. The remaining samples were obtained from sheep of the laboratory flock found to be positive to the complement fixation test for melioidosis (Laws 1967); and specimens, particularly abscesses of unknown etiology, where infection with *P. pseudomallei* could not be excluded. These were mostly abscesses of the lung, liver, spleen, limbs and associated lymph nodes. All *P. pseudomallei* strains were isolated in pure culture except in 2 pigs where *Pasteurella multocida* was also present.

The majority of isolates were cultured after the commencement of the "wet" season. At this time of the year, the climatic conditions are conducive to the growth of the organism (Strauss *et al* 1969), which is found in the surface soil and water and gains entry into the animal by ingestion, inhalation or through wounds (Howe *et al* 1971; Thomas *et al* 1979).

Except in rare cases of intra-uterine transmission (Rogers and Anderson 1970), melioidosis in pigs is chronic and normally diagnosed at the abattoir (Laws and Hall 1963; Little 1979). Substantial economic losses can occur due to condemnation of positive carcasses because of human health risk. In the pig, the mandibular lymph node is a major site of localization of *P. pseudomallei* (Laws and Hall 1963), however, abscesses are

also common in the spleen, liver and lung (Little 1979). These are often encapsulated, to a degree which depends upon the duration of infection. The positive isolation from porcine specimens submitted to this laboratory were recorded from spleen (29), liver (7), lung (5), hepatic lymph node (1), bronchial lymph node (1) and 2 pus samples of unknown origin.

The clinical symptoms in sheep seen on this property are mainly lameness and respiratory distress. The sheep tend to congregate under shady trees during the hot, wet season and churn up the muddy ground in the area. Infection via cuts in the feet (especially after paring) or in lambs after tail docking occurs (unpublished data). Inhalation and ingestion of the organisms can also take place. Of the 39 sheep examined, *P. pseudomallei* was isolated from lung (5), spleen (4), bronchial lymph node (1), foot (1) and prescapular lymph node (1).

The disease in goats may be manifested by nasal discharge, lameness or central nervous system disorders although in the majority of cases, it is symptomless. Mastitis can occur (Olds and Lewis 1954) and we have isolated the organism from milk samples (unpublished data). Of the 21 samples submitted during the period, positive isolations were made from lung (2), retropharyngeal lymph node (2), mediastinal lymph node (1), spleen (1), kidney (1), heart (1), vertebrae (1) and foot (1).

Birds have always been regarded as relatively resistant to infection with *P. pseudomallei* (Laws and Hall 1963) however there were two isolations in this period. Both were from captive native birds (Thomas *et al* 1978; Thomas *et al* 1980). Isolations were made from liver (2), spleen (1) and small intestine (1). Only the liver was examined in the first case. In the

TABLE 1

Number of Animals Submitted, Isolates Obtained and Percentage Positive Results for *P. pseudomallei* from January 1975 to December 1979. §

Species	Number of Animals*	Number of Isolates†	Number of Farms
Pigs	30/110 (27.3%)#	45/150	19
Sheep	9/ 39 (23.1%)	12/48	1
Goats	5/ 10 (50.1%)	10/21	4
Birds	2/ 8 (25.0%)	4/16	2
Horses	1/ 8 (12.5%)	1/ 8	1
Tree kangaroo	1/ 1 (100%)	3/ 3	1
Cattle	0/ 32 ( - )	0/33	0
Dogs	0/ 11 ( - )	0/13	0
Deer	0/ 1 ( - )	0/ 1	0
Total	48/220 (21.8%)	75/293	28

\* Numerator — number of animals positive for melioidosis; Denominator — number of animals submitted for suspect melioidosis.

† Numerator — number of strains of *P. pseudomallei* isolated; Denominator — number of specimens submitted as suspect melioidosis.

# Number in brackets represent the percentage positive.

§ Recorded at Oonoonba Veterinary Laboratory

second case, culture of *P. pseudomallei* from the liver, spleen and small intestine and histopathological evidence of the organism in the brain, lungs and kidney indicated generalised infection.

There have been very few cases reported in cattle (Laws and Mahoney 1964) but isolations are being reported from horses with increasing frequency. In this survey, melioidosis was diagnosed in a horse showing nervous system symptoms (Ladds *et al* 1980) not dissimilar to that reported by Laws and Hall (1963). Apart from these, most of the clinical signs seen in horses involved the respiratory system (especially the lung) and the lymphatics of the limbs (Stanton *et al* 1927; Davie and Wells 1952; Baharsefat and Amjadi 1970; Bourrier 1978). The contagious spread of colic in a stable in France due to melioidosis (Desbrosse *et al* 1978) has not been reported in Australia.

The remaining positive isolation was from a tree kangaroo. Melioidosis was first reported in this animal by Egerton (1963) in a zoo in Papua/New Guinea. Based on observations carried out on a captive colony of this species held by the National Parks and Wildlife in Townsville, it would appear that this animal is very susceptible to infection. Isolations in the survey case were from lung, liver and spleen. Nasal discharge is common and death is rapid. Further deaths in the colony were attributed to melioidosis during the period on the basis of symptoms, but samples were not submitted for bacteriological examination.

The confirmed melioidosis abscesses varied in size, encapsulation, and consistency and appeared similar to those formed by some other well known pathogens. Of the specimens submitted where melioidosis was a possible diagnosis, 75 isolations of *P. pseudomallei* were made (25.6%). Of the remaining 218 samples, other micro-organisms recovered included *Corynebacterium ovis* (23), *Escherichia coli* (22), *C. pyogenes* (18), *P. multocida* (16), *Staphylococcus aureus* (13),  $\beta$  streptococci (9), *Brucella suis* (5), *Mycobacterium avium* (2), *Salmonella* spp. (2), *Streptomyces/Nocardia* spp. (2) and other Gram-negative bacilli (19). No organisms were isolated from 34.1% of the submissions.

The percentage isolation rate of *P. pseudomallei* from animals in north Queensland has not changed appreciably since the last survey was undertaken, being 21.8% compared with 21.2% reported by Laws and Hall (1963). The decline in the number of porcine specimens received (from 226 to 110) may be due to the present trend of raising pigs on concrete and allowing no access to soil which harbours the organisms (Fournier 1965; Strauss *et al* 1969) and to the fact that not all lesions from pigs from known positive herds are submitted for examination. The number of farms from which isolates were obtained increased from 21 to 28 and most of these were within a 40 kilometre radius of Townsville.

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