Arthritis caused by mycoplasmal infections in pigs is a problem in production units in many parts of the world. It ranks second in the United States as a cause of condemnation of whole or parts of carcasses in packing plants. Among the known causes of swine arthritis are two mycoplasm species: Mycoplasma hyopneumoniae and M. hyorhinis (Rome, Maurer and Duncan, 1973; Rome and Spear, 1973; Duncan and Rome, 1973). Preliminary studies indicate that another species of mycoplasm, M. hyopneumonae associated with enzootic pneumonia of swine (Goodwin, Polstrom and Whittlestone, 1965; Yard and Wirth, 1965; Williams and Gallagher, 1978) may also cause an arthritic condition. Recent findings indicate that pigs intravenously administered M. hyopneumonae become lame and develop clinical signs of arthritis (Lloyd and Etheridge, 1981a, 1981b). In addition, M. hyopneumonae may disseminate by hematogenous spread from lung or brain in pigs and cause osteoarthropathological effects not only in respiratory tissues but also to the central nervous system resulting in locomotor disturbances which may resemble an arthritic condition (Williams, 1979; Williams and Gallagher, 1982; Williams, Gallagher and Pircle, 1982).

The purpose of this investigation was to induce arthritis in experimental animals by either cervicocaudal or joint inoculations with M. hyopneumonae. Strain virulence was assessed by necropsy and culture of M. hyopneumonae from affected tissues. Evidence of infection was based on positive culture and positive serology or pathology.

Three reference (J, 11 and JP49) and four field (2069, 21, 30, TAF-41) strains of M. hyopneumonae were each inoculated into separate groups of pigs varying in live-weights from 57 to 110 kg. Pigs under light anesthesia were either cervicocaudally inoculated (4×10⁶ cfu in 1 ml/pig), by subcuticular puncture in the midline at the level of a line that joins the anterior borders of the wings of the atlas, or into synovial fluids of leg and shoulder joints (4×10⁶ cfu in 0.1 ml/ joint).

The intensity of clinical signs varied depending on strain of M. hyopneumonae used, route of inoculation, and the age of the animal being tested. Following cervicocaudal inoculation, particularly with strains 2069, 30 and JP49, pigs at 21 to 55 days were lame. These pigs when first disturbed were reluctant to get up. On rising they tended to rest on their anterior surfaces of carpal regions and held their affected legs forward or picked up, indicating pain. Pigs that showed labored breathing also arched their backs, performed exaggerated stretching motions, placed their hind feet more anteriorly and uplaid their toes from increased weight bearing. Following synovial fluid inoculations, pigs were slow (32 to 165 days) to show clinical signs regardless of mycoplasmal strain being tested.

Antibodies to M. hyopneumonae were revealed in blood sera of the experimentally infected animals. Indirect hemagglutination titers were relatively low: 1:10 or 1:20, with a high of 1:128 registered 21 days post-inoculation in 1 animal that had been cervicocaudally inoculated.

In affected pigs necropsy, synovial fluid from shoulder, elbow, carpal, hip, stifle and tarsal joints of lame limbs was increased in volume and was serofibrinous or serosanguineous. Severe fibroblast, synovial hypertrophy and cartilage damage characteristic of the arthritis of swine mycoplasm was not observed.

Mycoplasma hyopneumonae was frequently isolated and cultured from joints, lungs, brain, synovial fluids, spleens and lymph nodes of affected pigs but never from control pigs. Stained smears of synovial fluids revealed neutrophilic granulocytes and fibrin comparable to control (uninoculated) animals. In the chronic phase, granulocytes were sparse. By Giemsa and DTA staining techniques, mycoplasm were not reliably demonstrated in synovial fluid, but were in bronchial mucus.

Because of the comparatively short life span and high incidence of respiratory and arthritic diseases in pigs raised under commercial conditions, an underestimation of M. hyopneumonae as a pathogen capable of disseminating and causing osteoarthropathological effects at multiple sites of the body is of considerable importance. Lameness in pigs would seem to seriously affect the reproductive efficiency of breeding pigs, shorten the longevity and cause culling of breeding stock.

Conclusions: Mycoplasma hyopneumonae was established as a pathogen causing pneumonia, lameness and clinical signs of arthritis. The organism could be isolated in the first 3 weeks of infection. Data presented suggest M. hyopneumonae plays a greater role in the disease process of swine by causing pneumonia and arthritis, two of the three most common condemnations of carcasses.