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Abstracts

ABSTRACTS

STUDIES IN EQUINE ENCEPHALOMYELITIS IN MICHIGAN. Recent studies of the epidemiology of equine encephalomyelitis have emphasized the inapparent animal reservoir of the disease. Attention has been directed toward fowl, both wild and domestic, as being the most common intermediary host. Both the eastern and western strains of equine encephalomyelitis have been repeatedly isolated from the various species of fowl, indicating they may experience a mild or subclinical case of the disease. This, along with the recovery of the virus from species of mosquitoes which feed on avian hosts, has established the significance of the mosquito-fowl-mosquito-horse or man cycle of infection.

In serological tests carried out in Washington and California, it was found that the infection rates of fowl were higher than those of domestic mammals. However, these same results have not been obtained in other states. None of the fowl tested in Nebraska were infected, and only a small percentage were infected among those tested in Texas. This would indicate that not only the insect vector, but also the reservoir of infection may differ from one section of the country to another.

In the summer of 1943, the western part of Michigan suffered a particularly intensive epidemic of equine encephalomyelitis. The outbreak was mainly confined to 3 counties with scattered cases in the surrounding counties. The country was predominately farm land with many small lakes, much wooded land and many marshy areas which provided adequate breeding places for mosquitoes. In the center of the epidemic area was a 1,000 acre bird sanctuary, which included a 25 acre lake. All types of fowl inhabited this sanctuary, and by means of leg banding it was found these fowl migrated to lakes in the surrounding areas.

A total of 71 fowl of several different species were captured in this sanctuary and bled. Their individual sera were tested for antibodies against both eastern and western strains of equine encephalomyelitis viruses by both neutralization and complement-fixation tests.

In the neutralization tests, it was found the virus of the western strain was neutralized by the sera of three fowl, and the virus of eastern strain was neutralized by the sera of three fowl. The complement-fixation test was not as satisfactory as the neutralization tests, but sera from 2 of the fowl showing no neutralizing bodies fixed complement with the eastern and the western strains of virus, while serum from one of the fowl fixed complement with both strains.

Serum was obtained in the area from 11 horses that were recovering from clinical cases of equine encephalomyelitis. Virus neutralization and complement-fixation tests were made on the serum. Either neutralized or complement-fixation antibodies for one or both of the strains were demonstrated in 9 of the 11 horses. From the evidence supplied, it would seem that both of the strains existed in this area.

Until 1939, the Appalachian chain of mountains seemed to serve as a barrier between the two types. Since that time, however, a definite westward spread of the eastern virus has taken place. Since the surrounding states seem to harbor only the western strain, southern Michigan represents an isolated area for the eastern infection. Michigan is one of 3 states in which both types have been reported. The fact that several animals possessed antibodies for both strains raises the question of possible dual infection such as has been demonstrated for the viruses of St. Louis and western equine encephalomyelitis.

[*Gordon C. Brown. Studies in Equine Encephalomyelitis in Michigan: Jour. of Infections Diseases (July-Aug., 1947): 81, 1, 48–58.*]

BENZENE HEXACHLORIDE FOR THE DESTRUCTION OF SHEEP SCAB MITES. Benzene hexachloride has been reported to have an outstanding ability to kill mites. It has been used effectively in the control of the poultry red mite, and the hog mange mite, *Sarcoptes scabiei.* The author designed and carried out experiments to determine whether an unheated water suspension of wettable 50 percent benzene hexachloride, having a 6 percent gamma isomer content, would prove effective for the destruction of the common sheep scabies mite, *Psoroptes equi,* variety *ovis.* It was desirable to determine whether a single dipping with a necessary concentration would accomplish this purpose.

Since benzene hexachloride is somewhat irritating to the skin of man, toxicity tests were made on sheep before the experiments were run. It was found that sheep could be exposed to direct sunlight after dipping in a 4 percent benzene hexachloride (0.26 percent gamma isomeric content) with no apparent resultant injury to the skin or systemic disturbances. It was also determined that benzene hexachloride did not weaken the wool fibers, nor did it interfere with the scouring or dyeing properties of the wool.

Sheep of the open fleeced type and of mixed breeding that were showing lesions of psoroptic mange, exhibiting 10-50 mites per animal, were used in this experiment. The sheep were in 3 different flocks and the following concentrations of commercial wettable 50 percent benzene hexachloride solutions were used on the different flocks: 0.56 percent, 1.0 percent, and 1.5 percent (0.033 percent, 0.06 percent, and 0.09 percent of gamma isomeric, respectively). The temperature of the water mixture varied from 72-80° F.

The sheep were examined 10, 24, and 39 days after dipping. In no case were any live mites found, and the lesions showed decided improvement at 10 days. Improvement continued through the twenty-fourth day, and by the thirty-ninth day the skin had returned to normal color and pliability.

The fleeces of the dipped sheep retained the musty odor of benezene hexachloride throughout the 39 day observation period. However, those dipped in the 0.56 percent solution retained only a very slight odor. No determination was made as to whether or not the meat of the dipped sheep had absorbed the odor of benzene hexachloride. Slaughter of the sheep while the fleece retained this odor would not be indicated.

An interesting observation was made on the indirect effect of benzene hexachloride on the healing of the so-called "fly-sores" that existed on 20 percent of the sheep at the beginning of the experiment. These "fly-sores" are apparently the result of irritation of wounds on the sheep, which are incurred at shearing and other times, by the horn fly. The first post-dipping observation revealed an abscence of any flies on the sheep and that the so-called "fly-sore" lesions were beginning to heal. Subsequent observations during the 39 day period revealed a continued absence of horn flies and a progressive healing of the lesions.

It can be concluded that water suspensions of wettable, 50 percent benzene hexachloride powder in concentrations as low as 0.56 percent with a gamma isomer content of 0.033 percent is destructive to

sheep scab mites with one dipping. The sheep will be free of mites for at least 39 days under ordinary circumstances, during which time the horn fly will be repelled. Although the sheep remained free from scabies mites for the duration of the trials, the author hesitates to draw any sweeping conclusions from the work described, because of the fact that the scabies mites were not virile and the scabies lesions were not active and progressive at the time of dipping.

[*H. F. Kemper. Benzene Hexachloride for the Destruction of Sheep Scab Mites. Vet. Med. (Feb., 1948):93, 2, 76–79.*]

AN EXPERIMENT ON THE RELATIONSHIP OF DIET TO HOOKWORM DISEASE IN LAMBS. Previous reports have been rather inharmonious regarding the effect of the hookworm, *Bunostomum trigonocephalum,* on the rate of gain of lambs, and on the degree of anemia produced. In view of these discrepancies, the authors carried out an experiment to determine the relationship of dietary conditions on the incidence and effect of hookworm disease in lambs.

At the United States Department of Agriculture Research Center at Beltsville, Md., a pair of lambs on a good diet (alfalfa hay and grain) and a pair on a poor diet (chiefly timothy hay) were infected experimentally with *Bun. trogonocephalum.* One member of each pair was exposed to a total of about 50,000 infective larvae, and the second member was exposed to a total of about 139,000 infective larvae of that hookworm species. The larvae were administered serially by skin, commencing when the lambs were about 2 months old. Administration of the larger number of larvae was spread over a 38 day period, but the smaller number was given within 1 week.

Extreme anemia developed in both lambs on the poor diet and caused their death. The 1 exposed to 50,000 larvae died 50 days after infection and yielded 4,641 hookworms. Its dietary mate was slaughtered at 80 days, suffering from extreme emaciation and anemia, and yielded 1,663 hookworms. Thus anemia developed more rapidly in the former than in the latter lamb. A pair of uninfected controls on the same diet showed no anemia in 80 days.

The infected pair on the good diet also became anemic, but only moderately so. They not only survived, but about 7 months after infection their red-cell values had regained, or nearly regained, normality. The minimum hematocrit reading recorded for the lamb exposed to 50,000 larvae, which yielded 1,331 hookworms when slaughtered 224 days after infection, was 20.75 percent. The minimum recorded for its dietary mate, which at the same time yielded 612 hookworms, was 23.00 percent. Anemia developed more rapidly in the former than in the latter lamb. A control pair on the same diet did not become anemic.

Obviously, within each dietary group, differences in exposure to infection affected the intensity of the subsequently induced anemia; speed of development as well as minimum red-cell values ultimately recorded being regarded as an index of intensity. However, diet was regarded as the determinant of the differing severity of the hookworm diseases induced in the lambs equally exposed to infection.

Details of the data were considered to suggest that diet affected both susceptibility to infection and ability to compensate for blood loss. Compared with the good diet, the poor diet was deficient in protein, iron, calcium, and certain vitamins.

[*John T. Lucker, B.S., M.A., and Eleanor M. Neumayer, B.A., M.A. An Experiment on the Relationship of Diet to Hookworm Disease in Lambs: Am. Jour. of Vet. Research (Oct., 1947):8, 29, 400–412.*]

SENSITIVITY TO PENICILLIN OF MICROORGANISMS ASSOCIATED WITH BOVINE MASTITIS. The favorable reports of numerous investigators on the chemotherapeutic value of penicillin in certain human infections, and the growing demand from the veterinary profes-

sion for information regarding the use of this drug, prompted the sub-committee on veterinary medicine of the National Research Council to initiate a program to test the sensitivity to penicillin of microorganisms responsible for certain diseases in lower animals. Bovine mastitis was chosen as the first disease to be investigated. The study was started in January, 1945, and cultures of bacteria employed in this investigation were isolated from the udder secretions of cows having varying degrees of mastitis and were tested by streaking on blood plates containing definite amounts of penicillin.

One hundred and fifty strains of different microorganisms from 7 herds were tested during the course of this work, and all cultures were tested 2 or more times, usually at intervals of a week or longer.

The results of the examination for sensitivity show that the inhibition range for *Streptococcus agalactiae* and *Streptococcus uberis* varied between 0.031 and 0.125 units of penicillin per cc of medium, and with the exception of 2 cultures, the inhibition range for *Staphylococcus aureus* varied between 0.062 and 0.25 units of penicillin per cc of the medium, which was the highest concentration employed in this investigation.

Results of these tests indicated that, with few exceptions, streptococci and staphylococci commonly associated with bovine mastitis are sensitive to the action of penicillin.

[*J. O. Heishman. Sensitivity to Penicillin of Micro-organisms Associated with Bovine Mastitis: Amer. Jour. of Vet. Research (July, 1947): 28, 257–259.*]

It is interesting to note that in respect to the milk of Massachusetts, the State Board of Health for 1871, shows that human beings may contract foot and mouth disease by the use of infected milk. and in rare instances the latter is accompanied by eruptions on the body, but when the milk is used by growing children and invalids, more serious consequences may result.

Leptospirosis

An elusive and often fatal form of yellow jaundice has been spreading among American dogs for the past 10 years. The disease known as infectious canine leptospirosis, was first identified in this country in 1923, but has been diagonsed with increasing frequency since 1937.

Although many cases are fatal, some cases are so mild that they go unrecognized. Col. Raymond Randall of the Army Veterinary Corps says that the disease is now known to be a common infection of widespread distribution in the United States.

Symptoms of leptospirosis include yellowish discoloration of the skin, high temperature, depression, loss of appetite, bleeding gums and intestinal trouble.

"While a typical case can be tentatively diagnosed from clinical findings," Colonel Randall says, "final proof should depend upon laboratory tests. Serum and penicillin are of distinct value in treating the condition; especially if employed early in the course of the disease."

Aphthous Fever Control

Even though there are differences in language and customs, American and Mexican veterinarians have achieved almost ideal international cooperation in the battle against foot-and-mouth disease in Mexico.

Social, legal, educational, and even religious influences have played an important role in gaining the cooperation of the Mexican people in the drastic measures being taken in Mexico to stamp out the disease.

Other favorable factors in the fight include excellent relations between officials of Mexico and the United States, prompt action of Congress in authorizing the cooperative program, public support in both countries, and active aid by various agencies of the United States government.

Among unfavorable factors were the time needed to work out methods of operation and the difficulty in transporting the necessary equipment for full-scale field operations.