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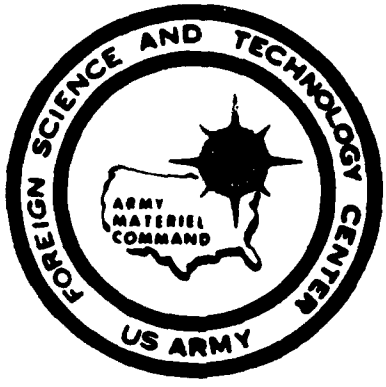

ON THE EPIDEMIOLOGY OF SWAMP FEVER

REPORT NO. 5, DISEASES IN CONNECTION WITH THE USE OF INFECTED FOODSTUFFS

by

D. I. Drankin and M. V. Godlevskaya

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NOTICE

Swamp fever diseases caused by the transmission of infection through foodstuffs are rare and apparently for this reason they have only recently been isolated as separate types of infections. Tokarevich (1957) relates these diseases to the "stock-raising type" of outbreaks of swamp fever, notwithstanding the fact that the genesis is different than for diseases associated with the care of sick animals. Only Terskikh and Kokovin (1964), in the newest monograph on leptospirosis, isolated these diseases as independent type of infections. We completely support the isolation of alimentary infections as a separate epidemiological type of diseases, since foodstuffs in epidemiology are examined as an independent factor in the transmission of infection.

The aim of the present work is the generalization of published data concerning the transmission of swamp fever through foodstuffs.

The propagation of swamp fever through foodstuffs is determined by the possibility of the infection of foodstuffs by swamp fever pathogens and by their preservation in foodstuffs, as well as the probability of the infection of man in connection with the use of infected food.

On the basis of factual data available at the present time it is possible to mention two variants in the infection of foodstuffs by swamp fever pathogens.

First, products obtained from agricultural animals, (meat, milk), ill with leptospirosis, may be infected. This possibility was proved by the work of Tsyss (1951), who established that leptospirae are present in the blood, lymphatic nodes, lungs, liver, kidneys and in the meat of cattle infected with leptospira. Shitov (1955) revealed in an experiment that it is possible to infect gophers with the blood and meat of puppies artificially infected with leptospirae. The possibility of secreting leptospirae with cows milk was established by Sokol'skaya (1952) with respect to L. pomona. Shitov points out that cows may secrete leptospirae in the course of two months. Baker and Little (1948) reported that cows secreted leptospirae with milk for 53 days (the reference is by Zemskov, (1960). Thus the presence of leptospirae in the milk and meat of agricultural animals affected by this infection must be regarded as proved.

Secondly, the infection of foodstuffs by swamp fever pathogens may occur secondarily--as a result of the presence in these products of secretions from sick animals, in particular rodents, as well as from infected water and flies. Proofs of the reality of such an infection are thus far not available, although Kiktenko (1954) also assumes this possibility. It seems to us that the conclusions of Gromashevskiy and Vayndrakh (1947) are correct with respect to the fact that in contrast to the Vasil'yev-Weil disease, in which synanthropic rodents are the source of the infection, in connection with swamp fever the basic carriers are field rodents, and the infection of foodstuffs by the excreta of these animals is considerably less likely.

The possibility of preserving swamp fever leptospirae in foodstuffs has been clarified in a number of experimental investigations. Thus Tsyss points out that normally occurring processes of aging of meat unfavorably affect the viability of leptospirae, but when this process is disrupted, inactivation of leptospirae does not occur. The author points out that heating for a period of 2 hours at a temperature of not less than 80°, as well as salting for a period of 10 days with a 4.8% salt concentration leads to decontamination of meat infected with leptospirae. Kotova (1955) reported that meat infected with leptospirae was freed from the pathogen after freezing for a period of 10 days. Drying of the meat was considerably less effective.

Interesting data were obtained during a study of the duration of the preservation of leptospirae in milk. Thus, Shitov points out that leptospirae in milk are preserved for not more than 3 hours, Grigor'yev (1952) maintains that leptospirae are preserved in milk up to 24 hours while the figure of Ashmarina (1953) is 6-32 hours (L. grippotyphosa). Although the data cited do not fully coincide, it is nevertheless certain that milk is freed from leptospirae rather rapidly; Kirschner and Maguire (1955) see a reason for this in the presence in milk and in colostrum of a factor which inactivates leptospirae. Zemskov and Sokol'skaya (1953), as well as Shitov,

explain the rapid distruction of leptospirae in milk by the presence of antibodies in the milk.

Concerning the duration of the swamp fever pathogen presence in other products, we have the remarks of Grigor'yev who observed that leptospirae are preserved from 1 to 24 hours in the juices of berries and vegetables.

In summing up the published data cited above, we must note that although the period of survival of leptospirae in foodstuffs of various types (in particular in milk and meat) is not particularly long, it is nevertheless sufficient for the alimentary transmission of infection, although only in special cases.

The possibility of human infection by swamp fever in connection with the use of infected food is certain in the light of experimental and epidemiological data. We have outlined these considerations in preceding reports.

In passing to an analyses of epidemiological data considering the transmission of swamp fever through foodstuffs obtained from sick animals, we consider this possibility to be unquestionable, notwithstanding the rarity already mentioned above. Thus the transmission of infection through milk has already been pointed out by Alisova (cited by Zemskov, 1960), Laskin (1950), and Guzacheva (1960). Terskikh and his coauthors (1956) describe a case of infection after the use in food of cream obtained from the milk of a cow infected with leptospirosis.

With respect to meat, we were successful in finding indications in the work of Kmetu and his coauthors (1956), who reported the infection of four men through fresh pork; Valova and her coauthors (1965) also observed such cases in the use of raw deer meat by inhabitants of the far northern regions of the Tyumen oblast'.

We were not able to find reliable data concerning the transmission of infection through foodstuffs subjected to secondary infection. However, such a possibility is suggested in two works which are known to us. This concerns a report by Ivanov and his coauthors (1952) involving an analysis of an outbreak of swamp fever (pathogens L. grippotyphosa and pomona) in the city of Rtishchevo of the Sartov oblast', in which the proposal was expressed that water and foodstuffs infected by rodents (the rodents were not inspected) were the transmission factors. The second communication relates to the Donetsk oblast' (Gazhiyev, 1965), where 73 miners were observed who were ill with swamp fever (L. pomona and the Sud'yin strain). Many grey rats were in the mine, and leptospirae antibodies were detected in one of these. An assumption was expressed of the possibility of the infection of the miners' food by these rodents. It is known that diseases of

such origin have been observed among miners in Scotland and Japan, but in these cases the affair concerns the spread of the Vasil'yev-Weil disease. According to data known to us, and with respect to swamp fever, the proposal concerning the infection of food products by rats in mines has been expressed for the first time.

In the overall balance of infection, alimentary infections in connection with swamp fever apparently occupy a very unimportant place. Thus according to the data of Guzacheva (1960), of 540 illnesses in the Stavropol'sk Kray only 2 (0.4%) were caused by infection through foodstuffs.

Conclusions

1. Foodstuffs (meat, milk) obtained from animals infected with swamp fever may contain the pathogens of this infection. Apparently secondary infections of foodstuffs are also possible as a result of the presence in these products of the excreta of rodents infected with swamp fever leptospirae.

2. The length of time that swamp fever leptospirae are preserved in foodstuffs, especially in milk, is not long; nevertheless it is sufficient for the transmission of the infection to people.

3. Only rare, sporadic infections of people through foodstuffs obtained from animals suffering from leptospirosis are known.

4. In agreement with the fact that foodstuffs are considered as an independent factor in the transmission of the infection, human alimentary infections must be isolated as an independent type of swamp fever infections.

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13. ABSTRACT

The purpose of this article is to generalize published data concerning the transmission of swamp fever through foodstuffs. Swamp fever can be transmitted through foodstuffs through the consumption of products obtained from infected animals or through products secondarily infected with swamp fever leptospirae from rodent excreta. Since food products are considered as an independent factor in the transmission of infection, human alimentary infections should be isolated as an independent type of swamp fever infections.

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