

PLAGUE IN NORTH AMERICA

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Four cases of human plague, one of which was fatal, have occurred in New Mexico since July, 1949. These persons resided in rural areas of Taos, Sandoval, Lincoln, and Lea Counties and gave a history of contact with wild rodents. Because New Mexico lies on the United States-Mexican border and because wild rodent plague has been found in California, Arizona, New Mexico, and Texas, the question has been raised as to whether or not plague constitutes an important border public health problem. In order to render an opinion and support it satisfactorily, it is necessary to review the history of plague in North America and point out particularly the experience with this disease in the United States.

Plague has been a concern to North American public health officials since the inception of the present pandemic in the Orient in 1894. At first, it was primarily a matter for maritime quarantine officials who attempted to prevent the importation of the human disease. During the late 1890's, it was apparent that plague was spreading from the Orient to other parts of the world along shipping routes. Plague cases not uncommonly were found on board ships at sea or upon arrival at the ship's destination. It is not surprising, therefore, that the first instances of plague in North America were the three occasions in 1899 and 1900 when human cases were diagnosed on ships arriving at San Francisco, California; New York, New York; and Port Townsend, Washington.

Apparently, no spread occurred to the mainland from these ship-borne cases. However, because little was known then of the rat's role in the spread of plague, maritime quarantine precautions against the human disease did not prevent the importation of rodent plague. Rats in San Francisco eventually became infected and the first epidemic in North America began there in March 1900. Since that time the United States has reported over 500 cases; Mexico has recorded nearly 900 cases; Panama, 2 cases; and Canada, 1 probable case.

As early as 1903, epidemiological evidence suggested that ground squirrels in Contra Costa County, California, were infected with plague. In 1908, following the occurrence of human cases in Contra Costa and Los Angeles Counties in California, ground squirrel infection was

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definitely proved. Surveys for the detection of wild rodent plague were instituted in 1909 for the purpose of determining how many counties in California were involved. These surveys have continued to the present time. For a number of years there was no indication that the disease had spread to the wild rodents of any other State, even though reconnaissance surveys were made during 1911 and 1912 in the adjacent portions of Oregon, Nevada, and Arizona. Not until 1935 were infected wild rodents found in Oregon and Montana. In 1936, plague was demonstrated in Idaho, Nevada, Utah, and Wyoming. In 1938, plague foci were discovered in Arizona, New Mexico, and Washington. Subsequent surveys uncovered plague in Colorado and North Dakota in 1941, in Oklahoma in 1944, in Kansas in 1945, and in Texas in 1946. By the end of 1949, plague had been found nearly 4,000 times in 129 counties of these 15 states. Many species of animals are known to be involved in the disease spectrum, and with but few exceptions most of them are wild rodents. Surveys have been extended eastward to a line drawn down through the center of that tier of states extending from North Dakota to Texas.

During the course of these surveys, every county along the United States-Mexican border from San Diego County, California, to Kinney County, Texas, has been investigated one or more times. During the period from 1937 to 1949, some 50,000 rodents were shot or trapped in these border counties. Only eight positive rodents were found during this period in two of those counties. One infected animal was recovered in Doña Ana County, New Mexico, and seven in San Diego County, California. There is some question as to the validity of the single Doña Ana County finding. Nearly 5,000 animals have been examined in that county since then in order to confirm this one positive, but without success. There is a broad area north of the border which is particularly arid in character and apparently not suitable for the propagation of wild rodent plague. On the Mexican side of the border the country is similar, with no known record of wild rodent plague, as far as is known. Because of this natural barrier on both sides of the border, it is considered that plague is not an important border public health problem and that there is very little danger of wild rodent plague being exported into or imported from either country. There is always the danger that infected humans or domestic rodents may cross the border. However, there is no record of this having occurred in the past and it may never happen in the future.

Even though plague does not appear to be an important public health problem in the territory immediately adjacent to the border, it is probably of interest to those on either side of this boundary to know what preventive measures have been taken in the United States.

During the time that wild rodent plague was limited to California

large sums of money were spent by the Federal and State Governments in an attempt to eradicate the disease in the California ground squirrel. Although these operations were on a wide scale and destroyed literally millions of squirrels, neither the squirrels nor the disease were eradicated. Plague in the California ground squirrel as well as in other wild rodents has exhibited a stubborn persistence which makes one believe that it is permanently seeded into wild rodent populations. Because of the widespread territory and the many species involved, it is probably biologically and economically impossible to eradicate plague in the wild rodents of the 15 Western States.

In the past 25 years, 25 human cases have been reported in 6 Western States. Twenty-four of these were caused by contact with wild rodents. These were sporadic, widely scattered, single cases. No secondary cases resulted from any of them. While this is not a large number of cases, there is good reason to believe that it represents only a fraction of the actual number which did occur. However, with the recent advent of streptomycin and sulfadiazine therapy, it should be possible to save the lives of almost all future cases provided that a correct diagnosis is made in time, and that adequate, early treatment is administered.

Wild rodent plague is a very important potential source of epidemics because there is constant danger that the infection will be transmitted to domestic rodents. Rats and mice have a much more intimate contact with man and have been responsible for all of the important bubonic epidemics which have occurred in the past. There is also the danger that a human case of wild rodent origin will develop pneumonic signs and spread organisms directly from man to man without the necessity of rodents or insects to assist in the transmission. This was the case in the Oakland, California, pneumonic epidemic in 1919.

Anti-plague measures in the United States therefore have taken the following form:

1. Surveys to locate wild rodent plague foci;
2. Domestic rodent control in urban areas, near known wild rodent plague foci, to prevent the infection of those domestic rodents;
3. Early treatment of human cases of wild rodent origin, in order to save life, and prevent development of pneumonic symptoms.

No doubt we shall continue to see occasional sporadic cases of human plague which can be traced to association with wild rodents. However, by diligent control of domestic rodents in urban areas near known plague foci, we should be able to prevent the infection of domestic rodents by wild rodents and thereby prevent those epidemics which might result if we neglected this preventive measure.

PESTE EN NORTE AMÉRICA (*Sumario*)

Cuatro casos humanos de peste ocurridos en el estado de Nuevo México desde julio de 1949, han suscitado la interrogante de si la peste constituye o no un importante problema sanitario en la frontera mexicano-estadounidense. Para contestar a esta pregunta, el A. hace una revisión de la peste en los roedores silvestres de Estados Unidos.

En 1908 se obtuvo evidencia por primera vez de que la peste humana la producía el contacto con roedores silvestres infectados. Hasta 1934 la presencia de roedores pestíferos estuvo limitada al estado de California. La defunción de un pastor en el estado de Oregon en 1935, provocó el hallazgo de roedores infectados en el Estado. Sucesivamente se descubrió peste en Montana, 1935; Idaho, Nevada, Utah y Wyoming, 1936; Washington, 1937; Arizona y Nuevo México, 1938; Colorado y North Dakota, 1941; Oklahoma, 1944; Kansas, 1945; y Texas, 1946. Para fines de 1949 ya se habían informado 4,000 casos de peste en 129 condados de estos 15 Estados. Se realizaron estudios en una zona que se extendía hacia el Este, hasta una línea trazada por el centro de esa hilera de estados que se extiende desde North Dakota hasta Texas.

Durante el transcurso de este estudio, cada condado que bordea la frontera entre Estados Unidos y México, desde el Condado de San Diego, California, hasta el Condado Kinney, Texas, fué inspeccionado una o más veces. De 1937 a 1949, unos 50,000 roedores fueron atrapados o sacrificados en estos condados fronterizos, descubriéndose solo 8 infectados en 2 condados. Uno de ellos fué capturado en el Condado Doña Ana, de Nuevo México, y 7 en el Condado de San Diego, California. La validez del hallazgo del Condado Doña Ana es controvertible ya que cerca de 5,000 animales han sido examinados en el Condado desde entonces, sin haberse podido confirmar un solo caso positivo. Existe una amplia zona al norte de la frontera que es singularmente árida y aparentemente inadecuada para la diseminación de roedores pestíferos. Al lado mexicano de la frontera el terreno es similar, no habiéndose informado jamás casos de peste en roedores. La existencia de esta gran barrera natural a ambos lados de la frontera, permite suponer que la peste no constituye un problema sanitario fronterizo, y que no existe peligro alguno de que sea importada o exportada de un país a otro. Existe siempre el peligro de que humanos infectados o roedores domésticos transporten la epidemia de un lado a otro. Sin embargo, no hay indicios de que esto haya ocurrido en el pasado, y probablemente tampoco ocurra en el futuro.

A pesar de que no constituye un problema fronterizo, la peste posee gran importancia en los Estados Unidos. Ha ocasionado un promedio de uno o dos casos humanos cada año. Existe el peligro constante de que sea transmitida a roedores domésticos. De ocurrir esto en una ciudad se produciría un brote epidémico. Por lo tanto, el control de roedores domésticos es la mejor medida preventiva.