# A Focus of Sylvatic Plague on the Peruvian-Ecuadorian Frontier[1]

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SYLVATIC PLAGUE IS KNOWN TO EXIST in many parts of the world, especially in Manchuria, in South Africa, and on the North American continent. In South America what appears to be true sylvatic plague has been reported only from Argentina (*1, 2*). The importance of sylvatic plague in epidemiology, especially in explaining the sequence and persistence of plague infection in certain areas, makes it appear worth while to present this report of a new focus of sylvatic plague in South America.

Miño (*3*) and Sáenz Vera (*4*) declared that the plague which has been observed since 1918 in the frontier regions of Peru and Ecuador is strictly rural, without the characteristics of sylvatic plague. In May 1946 there began extensive epizootics on both sides of the frontier of these countries, at Bolasbamba, Cerro Negro, and Alamor, in Ecuador, and at Encuentros and neighboring areas, in the District of Lancones, Province of Sullana, Department of Piura, Peru. Our investigations were made in the Encuentros zone, from the Ecuadorian border (4°11′53″2 S.) south to approximately 4°30′ S., and from the Quebrada de Pilares to the Ecuadorian zone of Cazaderos. The terrain is mountainous, ranging in altitude from 600 to 700 meters, with small permanent rivers.

The principal focus of sylvatic plague found is located on the mountains, La Mesa and Cortezo, both of which are covered with dense vegetation consisting of large trees; the climate of this area is continental, hot in the daytime and cool at night (30°–15° C.). Small scattered fields have been cleared on the tops and slopes of these mountains for the cultivation of corn.

The chief findings which in our opinion warrant the classification of this plague focus as one of sylvatic plague are the following:

(1) There was a complete absence of domestic rats, *Rattus rattus rattus, R. rattus alexandrinus,* and *R. norvegicus,* and of the fleas of domestic rats, *Xenopsylla cheopis* and *Ceratophyllus londiniensis,* these being the only species of rats and fleas involved in plague transmission in the rest of the country.

(2) The region is very sparsely populated, with small rural settlements and scattered dwellings. Among these there occurred 19 human cases of bubonic plague; but epidemiological investigation did not bring to light any domestic factors to explain the local outbreak. On the other hand, we were able to confirm that nearly all of the patients had become infected with plague in the cornfields on the mountains specified, during the harvesting of the corn crop.

(3) There was an intense epizootic among squirrels and native field rats which inhabit the rocky gorges and the wooded areas, especially on the slopes and higher parts of the mountains.

(4) The following animals were found infected with plague in the woods of the region: (a) a black squirrel; (b) a lot of seven brown squirrels, tissues from which were pooled and inoculated into guinea pigs; (c) five rats which were found dead in the wooded areas bordering the cornfields; in this group were two distinct species of native field rats.

(5) Many mites, ticks, lice, and fleas were found on these squirrels and rats. The fleas were all of the genus *Rhopalopsyllus,* though possibly of more than one species. These fleas live away from their animal hosts in the cornfields, and we collected many on our clothing during our investigations in these fields.

(6) At least two species of mice, four of rats, and two of squirrels were collected, and these, with their ectoparasites, are now being classified. One of the rat species is *Akodon mollis.* None of the species found has been involved in plague elsewhere in Peru.

In summary, the plague outbreak observed at Encuentros, Department of Piura, Peru, fulfills the requisites which permit of its designation as sylvatic plague—that is, its occurrence independent of domestic rat infection, its appearance among wild rodents, the absence of fleas other than those of the wild rodents, and the occurrence of human cases of plague which were infected in the same areas where plague epizootic among the native wild rodents was found.

Studies are in progress of the reservoirs of the plague infection, of experimental transmission of the infection with the ectoparasites collected, of the experimental susceptibility to plague of the local rodents, and of the epidemiology and extent of the focus of sylvatic plague.

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## References

1. Alvarado, C. A. *Anal. Dept. Nac. Hig., Arg.,* 1935, **36,** 51.
2. De la Barrera, J. M. *Rev. Inst. Bact. Arg.,* 1940, **9,** 565–586.
3. Miño, C. *La peste Bubónica en Ecuador.* Quito: Imprenta Nacional, 1933.
4. Sáenz Vera, Cornelio. *Bol. Of. Sanit. Panamericana,* 1940, **19,** 661–667.