

## Crab Louse Infestation in Pre-Columbian America

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**ABSTRACT:** Until now, *Pthirus pubis* infestation in ancient human populations had only been recorded in the Old World. We found crab lice on South American mummified bodies from the Atacama Desert region. Crab louse eggs were found attached to the pubic hairs of a 2,000-yr-old Chilean mummy. Well-preserved adults were found in sediment and clothing from a Peruvian mummy dated 1,000 yr ago. Paleoparasitological evidence expands the knowledge of the distribution of this ectoparasite in ancient populations. As with many other parasites, pubic lice recorded in Andean populations show the antiquity of this parasite in the New World. It is likely that *P. pubis* entered the continent with early human migration to the New World.

Louse infestation in ancient human populations has been recorded in different geographic regions throughout the world. Greek, Egyptian, Chinese, and other Old World ancient medical texts referred to head and body lice infestation (Hoepli, 1956; Doby, 1996). The first paleoparasitological studies were carried out by Ruffer (1921) in Egyptian mummies, in which *Pediculus humanus* was found. Later, South and North American Indian mummies were also found to be infested with lice (Ewing, 1924). In recent studies, louse eggs, nits, and adults have been recovered from the mummified scalps, archaeological sediments, and coprolites (Reinhard, 1990; Araújo et al., 2000).

Here, we describe the first paleoparasitological record of crab louse (*P. pubis*) infestation in the New World. All existing paleoparasitological discoveries of crab lice have been in Europe from the first century up to the 18th century (Kenward, 1999, 2001). All ancient European specimens are adults found in sediment samples, preserved by anoxic water logging or partial mineralization. There is no record of *P. pubis* from the Old World mummies.

*Pthirus pubis* is normally restricted to the pubic and perianal hairs, but occasionally other hairy parts of the trunk, legs, arms, and face may be infested (Mueller, 1973; Burgess, 1995). The ectoparasite is sexually transmitted, but close proximity or the use of the same bed or clothing of an infested individual may result in infestation. The crab louse moves very slowly on the human host, remaining attached to the same pubic hair for a long period of time (Burns and Sims, 1988). Although itching and secondary bacterial infection can result from bites, *P. pubis* does

not have the same epidemiological significance as does *P. humanus* in typhus transmission (Burgess, 1995).

Two cases of crab louse infestation in South American prehistoric indigenous populations are presented here. Both were recorded in the Atacama Desert, one in Peru and the other in Chile. San Pedro de Atacama in Chile is a small oasis village near the Andean Cordillera. During pre-Columbian times it was a trading center for different cultures from the Pacific coast to the Amazon forest on the opposite side of the Andes. Because it was located in an oasis, the village attracted people and their domestic animals, and diseases as well (Ferreira et al., 2000).

Because of the climatic conditions in Atacama, the driest desert in the world (Berenguer et al., 1985), many mummified bodies have been found in the proximity of the oasis. Some of these mummies are radiocarbon-dated, but the majority have estimated dates based on cultural artifacts or burial accompaniments (Junqueira and Llagostera, 1994).

Thirty-seven mummies from San Pedro de Atacama, dated up to 2,000 yr old, were examined for parasites. All of them date to before

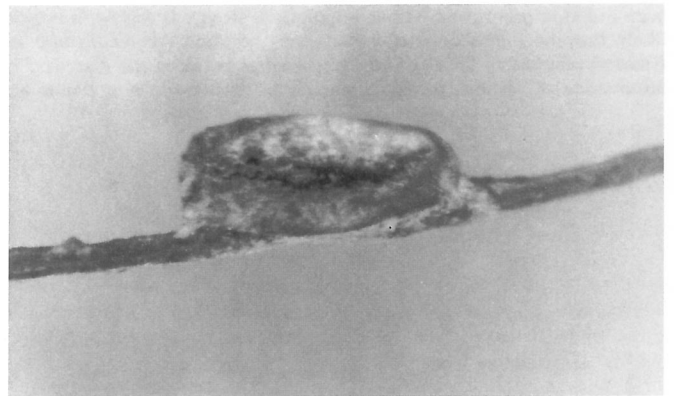


FIGURE 1. *Pthirus pubis* egg found in pubic hair of a Chilean mummy, Atacama desert.

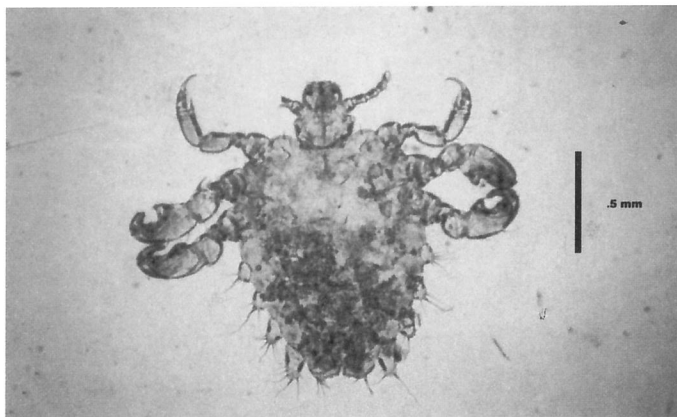


FIGURE 2. *Pthirus pubis* found in sediment and clothing associated with a mummified human body, Chiribaya Culture, Peru.

the European conquest. Pubic hairs were present in four mummies, and eggs were found attached to the pubic hair in 1 adult male mummy (Fig. 1). The attachment site, morphology, and egg size (1 mm) confirm the diagnosis of *P. pubis*.

The other *P. pubis* specimens came from a Peruvian archaeological site named Chiribaya Baja, dated 1,050 to 800 yr before present. The Chiribaya culture was situated in the south of Peru, in the Moquegua Valley. Two *P. pubis* specimens and several *P. humanus* specimens were found in the pleats of a piece of cloth associated with a female mummy. It was not possible to determine the function of the piece of cloth. One of the *P. pubis* specimens was only fragmentary, but the other is well preserved (Fig. 2). Both are females. The foreleg is quite slender, with a long fine claw (Busvine, 1951). The mid and hind legs are strong with thick claws, and the characteristically compressed abdomen is wider than it is long. The preserved specimen measured 1.63 mm, which lies in the 1.5- to 2.0-mm distribution recorded for modern crab lice (Matheson, 1950).

Crab lice are usually attached to the pubic and perianal hairs. It remains unclear why *P. pubis* and *P. humanus* were found in the same piece of cloth. Pubic hair of the mummy could not be found, so no additional information regarding distribution or infestation levels could be provided for paleoepidemiological inferences. Chiribaya mummies are typically buried in textile wrappings, which includes the dead individual's shirt, belt, hat, and other textiles. The textile might have been part of this person's clothing. The finding of *P. pubis* and *P. humanus* is consistent with this hypothesis. The lice possibly moved into the clothing after their host died.

Both findings expand our knowledge of crab lice distribution in prehistoric times in pre-Columbian America. The discovery of crab lice adds to the inventory of parasites that affected Andean peoples. Body lice, head lice, and intestinal parasites such as pinworm, whipworm, the tapeworm *Diphyllobothrium pacificum* (Reinhard et al., 1986), and *Trypanosoma cruzi* (Guhl et al., 1999; Ferreira et al., 2000) already had been found in prehistoric human populations from this region. It is quite likely that the interchange of populations between the Andes and the Amazon resulted in the exchange of parasites between the 2 areas. The discoveries of ancient parasites show that prehistoric Americans and

Europeans had more parasites in common than was traditionally thought. Furthermore, there appear to be no morphological differences between archaeological and the present-day *P. pubis*. Their organic conservation allows for further studies in molecular biology aimed at genetic comparisons.

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