The pestilential past of pthirus pubis

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Origins of Pthirus

Pthirus pubis, more commonly known as crab louse or pubic louse, has plagued populations from pre-historic apes to the present[1-2].
Lice are old creatures: fossils are estimated at 100 Ma (100-million years)[1]. Human species stemmed from the sucking lice (Phthiraptera: Anoplura) of great apes[3-4]. Sucking lice are obligate permanent ectoparasites of 12/29 eutherian mammalian orders: some became host specific. Currently 540 Anoplura species are described. Diversification of sucking lice occurred 77 Ma coinciding with mammalian diversification 75 Ma. Human body lice likely diversified from human head lice with the invention of clothing 1-200,000 years ago. These share a common origin with the chimpanzee louse Pe. Schaeffi. The host switch of P Gorrillae to humans resulted in the P. Pubis over 3-4 Ma [Figure 1][3-5]

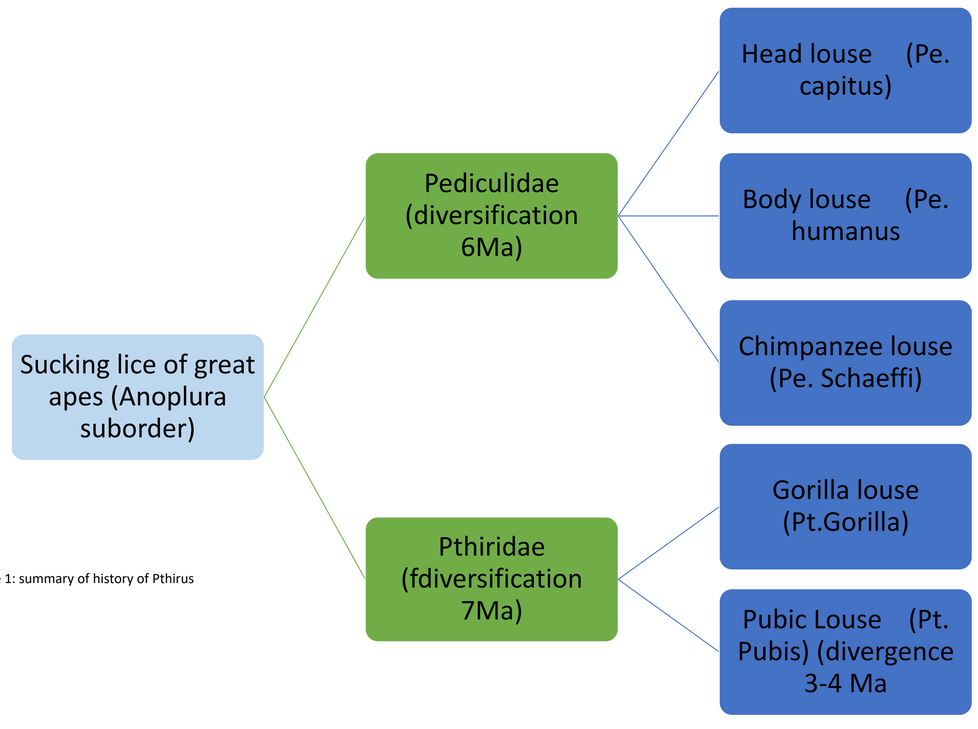

Figure 1: summary of history of Pthirus

This switch may have occurred as the human linage split from the gorillas[5]. An alternative hypothesis: louse duplication on the ancestors of gorillas, chimpanzees and humans resulting in the 2 lineages in humans but extinction of Pthirus in chimpanzees and pediculus in gorillas. However, other sources speculate shared bedding and feeding on Gorillas allowed humans to acquire Pthirus[4-5].

Habitat and homes

Pthirus resides in the pubic or perineal hair but can sometimes infest beards and eyebrows. It is transmitted via close contact, often sexual, or via sharing of fomites like bedding or clothing. The estimated incidence of pubic lice is 0.3-4.6% with an average global incidence of 2% in adult populations. However, accurate incidence is difficult as patients may not present or report the problem.

Studies of deforestation

A study in Leeds, UK monitored annual cases (1997-2003) of pubic lice, chlamydia and gonorrhoea[6]. The prevalence of pubic lice decreased (OR 0.41) whereas gonorrhoea (OR 2.18) and chlamydia (OR 1.31) increased. This decrease in women was marked in 2000 and was followed three years later in men. This was speculated to be secondary to extensive waxing of body hair e.g. the "Brazilian", in the UK from 2000 onwards. This reduced habitats for phthirus and therefore probably reduced sexual transmission.

A study in Milton Keynes, UK, documenting a reduced incidence of pubic lice between 2003-2013 of 1.8% to 0.07%[7]. 94% of those with pubic lice had no pubic hair removal. The researchers noted pubic hair removal had increased from 33% to 87%: with people giving hygiene and cosmesis as reasons.

Eviction without notice

Deforestation can have devastating impact on Pthirus as they are largely fixed to the pubic hair and move slowly. Without long-term housing the louse has to move on or die. People in the 2000s are more actively seeking help and self-treatment, reducing prevalence[3]

Pthirus in Mummies

Pthirus roamed the old and new world. A 2000-year-old Chilean mummy from the Atacama Desert demonstrated pubic lice [Figure2][8]. In Chiribaya Baja, Peru a 1000-year-old female mummy had both P pubis and humanus within pleats of clothing [Figure 3][8]. Egyptian pharaohs' tombs had fine tooth combs similar to modern lice combs[1-2]. Ebers papyrus reported natural remedies of hippopotamus fat to asphyxiate lice. Herodotus, the Greek historian, noted Egyptian priests shaved the whole body to help prevent louse infestation. Hence their bald and eyebrow-less representation in Egyptian art[1]. The mummified body of Italian King Ferdinand II of Aragon (1452- 1516) demonstrated infestation with pubic and head lice[9]. His mummy was poorly preserved but analysis of locks of head and public hair revealed 2 attached pubic louse nit fragments and head lice fragments. Incomplete nits were found cemented to the hairs and fragments away from the hair were detected via scanning electron microscopy [Figure 4-6][9-10]. His hair samples contained Mercury, possibly indicating a therapy attempt.

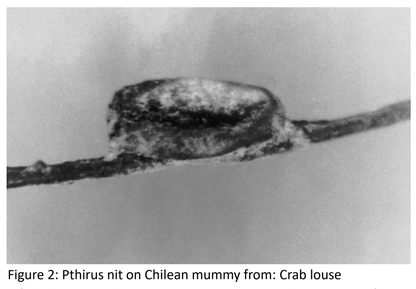

Figure 2: Pthirus nit on Chilean mummy from: Crab louse infestation in Pre-Columbian America. Rick F.M et al Journal of Parasitology

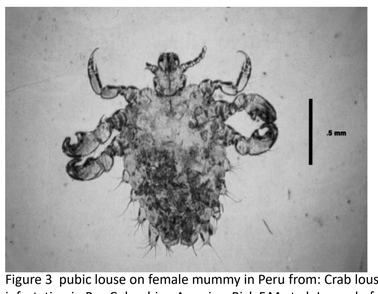

Figure 3 pubic louse on female mummy in Peru from: Crab louse infestation in Pre-Columbian America. Rick F.M et al Journal of Parasitology

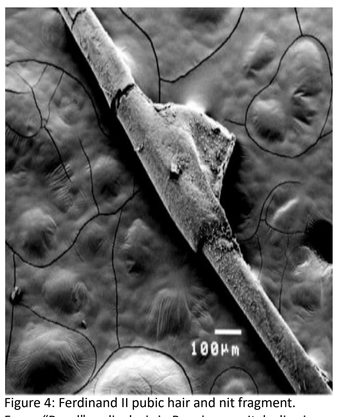

Figure 4: Ferdinand II pubic hair and nit fragment. From: "Royal" pediculosis in Renaissance Italy: lice in the mummy of the King of Naples Ferdinand II of Aragon (1467-1496). Fornaciarll G et al

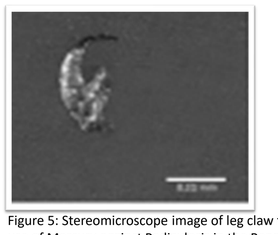

Figure 5: Stereomicroscope image of leg claw from head louse on Ferdinand II From: The use of Mercury against Pediculosis in the Renaissance: the case of Ferdinand II of Aragon, King of Naples, 1467-96. Fornaciari G et al. Medical History

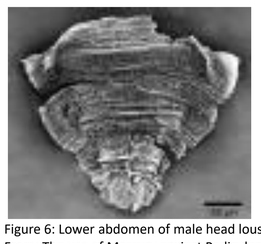

Figure 6: Lower abdomen of male head louse on electron microscope found on Ferdinand II From: The use of Mercury against Pediculosis in the Renaissance: the case of Ferdinand II of Aragon, King of Naples, 1467-96. Fornaciari G et al. Medical History

Treatment across the ages

Aristotle's book "the history of animals" proposed that lice live on juices from living flesh, that nits are produced after intercourse and can be produced from the flesh of other creatures[11]. Another theory from Aristotle was that bugs are formed from the moisture in the bodies of animals and this can cause disease or death. He also commented on lice in other animals such as birds, hogs and dogs.

Avicenna (Abu Ali Sina)'s 10-11th Century Persian "The Canon of Medicine"[12] discusses lice therapy or *"remedies against Vermin... mercury, oil long birthwort or wearing wool smeared with oil or mercury ensures against lice."*

"Trotula"[13] was an important 11-12th Century European text on the disease of women. They were probably of multiple authorship but attributed to a historic female medical writer Trota of Salerno, Italy. Written in Latin and translated during the 15th century, they had sections on conditions, treatments and cosmetics for women. A mixture of ash with oil was recommended for pubic and axilla lice. For lice around the eyes *"take on ounce of aloe, one ounce each of white lead and frankincense, and bacon as needed. Let it be prepared thus. We grind the bacon very finely and we place {in it} the remaining ingredients which have been powdered."*

The 16th Century receipt book had various remedies [14]. *"For to kill lyce. Take the whare that remayneth of cheese making and put to it a little vinaigre, and drinke of it cartayne days: and all the lyce will dye and ther will breede no more aboute yow"* [Figure 7]

"To kill lise, and nittes in the heade. Take the pouder or scrapinge of Hartes horne, & make the pacient to Drinke of it, and ther will no lise nor nittes breede in his head, but if yow strowe the sayde pouder vpon his heade, all the lise & nittes will die." [Figure 8]

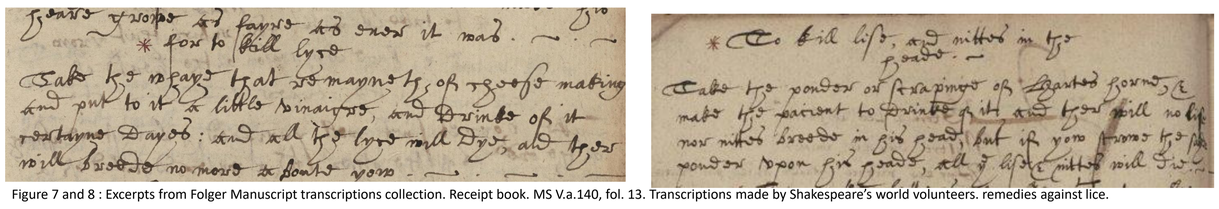

Figure 7 and 8 : Excerpts from Folger Manuscript transcriptions collection. Receipt book. MS V.a.140, fol. 13. Transcriptions made by Shakespeare's world volunteers. remedies against lice.

The English physician book[16] 1788 advised for lice :

- Black alder tree bark boiled in vinegar *"to cure the itch and take away the scabs as this solution dries them up"*
- *Broom or broomrape boiled in oil is the safest and surest way to kill head and body lice. Also helpful for joint pain and swelling from the "falling down of humours".*
- Henbane, Hyssop oil, Southern wood, Tamarisk tree and even tobacco in a juice was recommended for headlice in children.
- *Meadow rue root boiled in water and washed over the affected areas will destroy them*. In Italy this was used against the plague and in saxony against jaundice.

In modern times the CDC recommends 1% permethrin solution or mousse containing pyrethrin's and piperonyl butoxide. If resistant then Lindane can be used but has neurological toxicity. Topical ivermectin is also licensed in the UK for pubic lice.

Treatment for lice over the years has evolved and but lice are ancient and resourceful so it is likely that they will outsmart mankind and be here long after humans are gone.

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