

## Microscopy of Thylacine Hair

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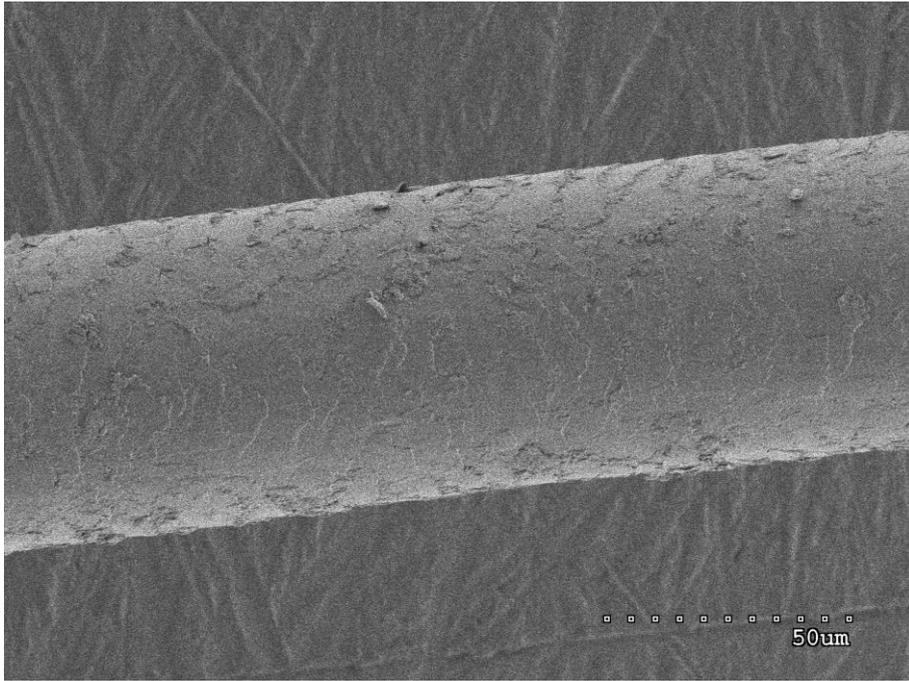
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Australian fauna is varied and unique. An example of this fauna was the Tasmanian Tiger (*Thylacinus cynocephalus*), a carnivorous marsupial also known as the thylacine. While thylacines are known through the fossil record to have existed on the Australian mainland and Papua New Guinea, by the time of European settlement in Australia the thylacine was believed to persist only on the island state of Tasmania. The last known member of the species died in captivity on the night of September 7<sup>th</sup> 1936 at Beaumaris Zoo in Hobart, Tasmania. Fifty years later, with the absence of verifiable proof that there were any still living in the wild, (the time required under international conventions) the species was declared extinct. There have been many unconfirmed sightings of the thylacine and allegations of photographs or film footage captured in both Tasmania and on mainland Australia and in Western Papua since the death of the last known member of the species. It has been however impossible to positively identify the animals involved in these claims. There are also a number of nests or dens that have been discovered by thylacine searchers that conform to the structure of thylacine bedding material described in the 1800's and documented in a single photograph from 1902. While there is no suggestion that these nests are in current use by thylacines, if thylacine hairs are found in them, it would confirm to researchers that these were most likely used by thylacines at some point and to our knowledge regarding the thylacine's habitat, areas of occupation and use of natural resources.

One of the authors (CR) obtained a small envelope containing hairs, labelled "Thylacinus Cynocephalus" was obtained from the auction of a naturalist's collection in the United Kingdom. The first objective of this study was to verify that the hairs were indeed from a thylacine. An unusual feature of the hairs in a thylacine pelt - as opposed to all other native Tasmanian land mammals is that there are three hair types; guard, over and under. One publication<sup>1</sup>, includes low magnification images and descriptions of each of these hair types. The hairs which are the subject of this study match the gross morphology of each of the hair types exactly.

In this work, the surface morphology and internal structure of the hairs are shown and described using several techniques: optical, confocal laser scanning, scanning electron and transmission electron microscopy providing details of the hairs which have not yet been described. The microscopy also illustrates that the hairs match the key diagnostic features presented in the publication by Taylor, thus verifying the origin of the hairs being thylacine. Features such as scale structure, frequency and height, hair diameter and degree of medullation (regions of the hair which have internal voids) are detailed. Figures 1 and 2 show images of over hairs imaged in an SEM and confocal laser scanning microscopes respectively.

<sup>1</sup>Taylor, R.J.; Papers and Proceedings of the Royal Society of Tasmania V 119, 1985. pp 69 - 82.



*Figure 1: SEM image of Over Hair*



*Figure 2: Confocal Laser Scanning Microscope Image of Over Hair*