

MESOPARASITIC COPEPOD (*Pennella balaenopterae*) INFESTATION OF A STRANDED OFFSHORE ORCA (*Orcinus orca*) IN SOUTHEAST ALASKA: REVIEW OF SIGNIFICANCE AS A HEALTH INDICATOR IN CETACEANS

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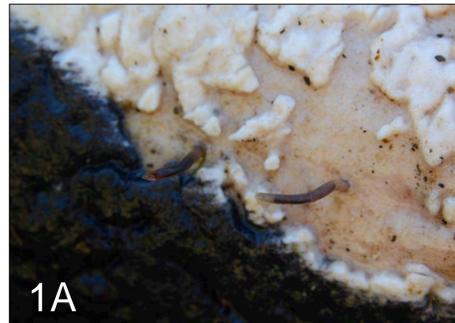
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INTRODUCTION

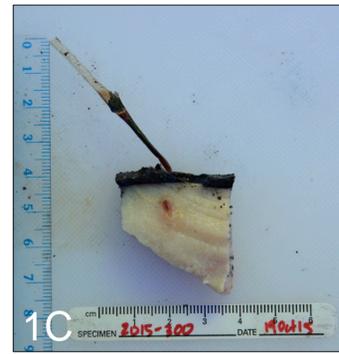
An emaciated adult female offshore killer whale (*Orcinus orca*), at least 40 years of age, stranded dead in Portage Bay, AK. Approximately, 30-40 parasitic copepods (*Pennella balaenopterae*) were found embedded within the blubber, extending from the head region along the lateral aspect of the body to the peduncle with increased densities around the genital and mammary slits. To our knowledge, this is the first case of parasitic copepods in a killer whale.

GROSS APPEARANCE

Along the lateral and ventral aspects of the orca, parasitic copepods presented as long (up to 12 cm), thin (~0.2 cm diameter) dark brown to black, hard and brittle cylindrical structures extending from discrete circular defects of the epidermis (Figs. 1A and B).

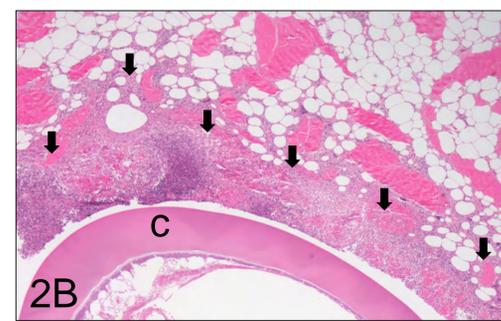
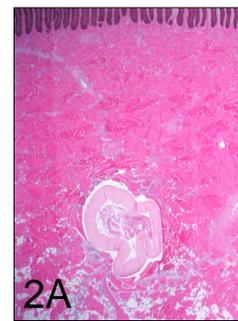


On cut section, pennellid copepods were found embedded within the deep dermis and blubber layer, though penetration into the skeletal muscle was not appreciated. The copepods formed serpentine tracts within the blubber. The grossly evident anatomy of the copepods included the tubular bodies – the anterior horns were not identified and distal portions were often broken off (Fig. 1C).

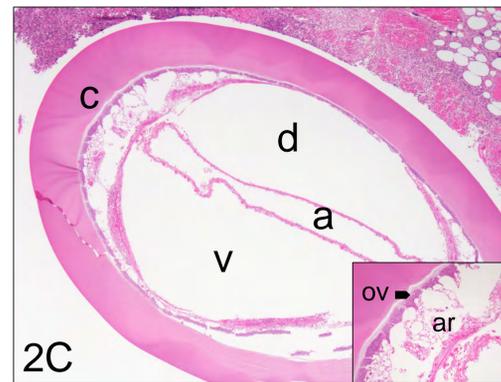


HISTOLOGIC FINDINGS

Histologic evaluation of affected skin and blubber revealed a chronic pyogranulomatous response (arrows) surrounding the copepods within the superficial to deep dermis (Figs. 2A and B). There was also evidence of bacterial infection within some of the copepod tracts.



Microscopic features of the copepods included: a chitinous wall (c), dorsal (d) and ventral (v) spaces, an alimentary canal (a) (Fig. 2C). The ovary (ov) and areolated tissue (ar) are shown in the inset image of Fig. 2C.



SUMMARY

Death of this aged orca was attributed to severe periodontal disease and subsequent inanition and debilitation, though other presumably age-related disease processes contributed to demise. Pennellid ectoparasitism has been reported in several cetacean species, including dolphins and baleen whales with rare reports in pinnipeds.^{1-3,5-9} While low numbers of pennellid copepods are detected in seemingly healthy cetacean hosts, heavy infestations particularly of delphinid species have been correlated to poor health status and disease states including emaciated body condition, lymphoid depletion, concurrent infections (viral, bacterial, fungal), and high contaminant loads.^{1,4,7,10} Continued quantitative and qualitative assessment of *Pennella balaenopterae* infestations during photographic identification surveys of free-ranging animals and postmortem examinations of stranded individuals is needed to better elucidate the correlation of these parasites to health and disease status of cetacean species. To date, there have been no other reports of pennellid parasitism in any of the orca ecotypes.

CONCLUSIONS

- This is the first known report of pennellid (copepod) ectoparasitism in a killer whale.
- In this case, an aged female offshore killer whale had extensive pennellid infestation and other gross and histologic evidence of poor health.
- Mesoparasitic copepod infestation can be an external indicator of poor health in cetaceans.

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