

How to tell them apart? Blackfish species discrimination using fin and body morphometrics obtainable from photos at sea

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Reliable identifications?

- There are four similar-appearing “blackfish” in tropical waters
 - Short-finned pilot whale
 - False killer whale
 - Pygmy killer whale
 - Melon-headed whale
- These species are often sympatric and sometimes associate (Baird 2016)
- Misidentifications of these species regularly occur, both in the field and in the literature
- A reliable technique to distinguish these species at sea or from photos is needed

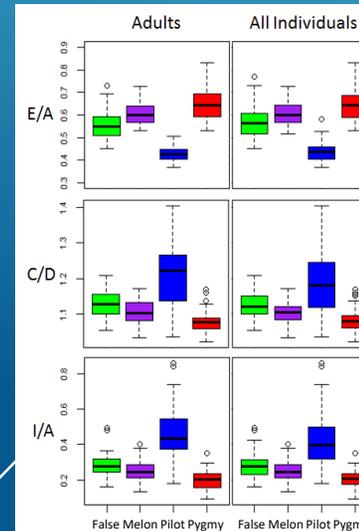
How to do that

- We developed a technique to quantify fin features from at-sea photos
- We conducted 10 standard measurements on 382 known individuals, and examined 14 ratios using ANOVA and PCA
- Inter-species comparisons were undertaken to determine which ratios were distinct and diagnostic
- Comparisons also assessed age and sex differences



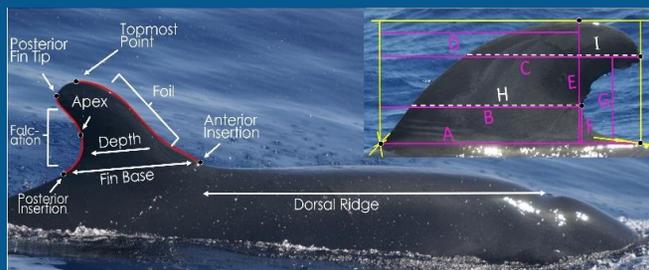
The golden ratios

- We identified three diagnostic ratios for mature adults:
 - 1) Fin height / base length (E/A)
 - 2) Depth / depth at topmost (C/D)
 - 3) Foil depth (see diagram) at posterior tip / base length (I/A)
- Foil depth at posterior tip / foil depth at falcation apex (I/H) was diagnostic when calves and sub-adults included



Intra-species findings

- Lateral ratios in adults were similar to calves but not sub-adults, indicating allometric fin growth during maturation in all species
- There was 90% consistency in the ratio relationships when calves and sub-adults were included in the analysis with mature adults
- Our findings indicate sexual dimorphism in the lateral fin proportions of short-finned pilot and false killer whales, but not of pygmy killer or melon-headed whales



The primary photo shows terminology and 5 fin markers used to orient the 10 standard measurements, as shown in the inset photo

These ratios were statistically diagnostic of species for both mature adults and all age classes

References

Baird, R.W. 2016. The lives of Hawai'i's dolphins and whales: natural history and conservation. University of Hawai'i Press, Honolulu. 342pp.
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Primary photo of a false killer whale; inset photo of a pilot whale