

# Individual variation in orca (*Orcinus orca*) tail fluke pigmentation as a tool for photo-ID

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## Results

- **Underside** of tail flukes occasionally presented during travel (or foraging/social interactions).
- **Unique** pigmentation pattern (**Fig 1**).
- **Examples** from two ID catalogues, from geographically separate populations (**Fig. 1**).
- **Variation** in other orca populations (not shown).
- **Longevity** (**Fig 2**) (>6 years 6 months).
- **Stability** maintained over time and as tail changes shape (e.g., subadult to adult male, **Fig. 2**).
- **Notches**, shape etc are also variable, yet congenital pigmentation remains stable.
- **Both** sexes show variation (**Fig. 3**).

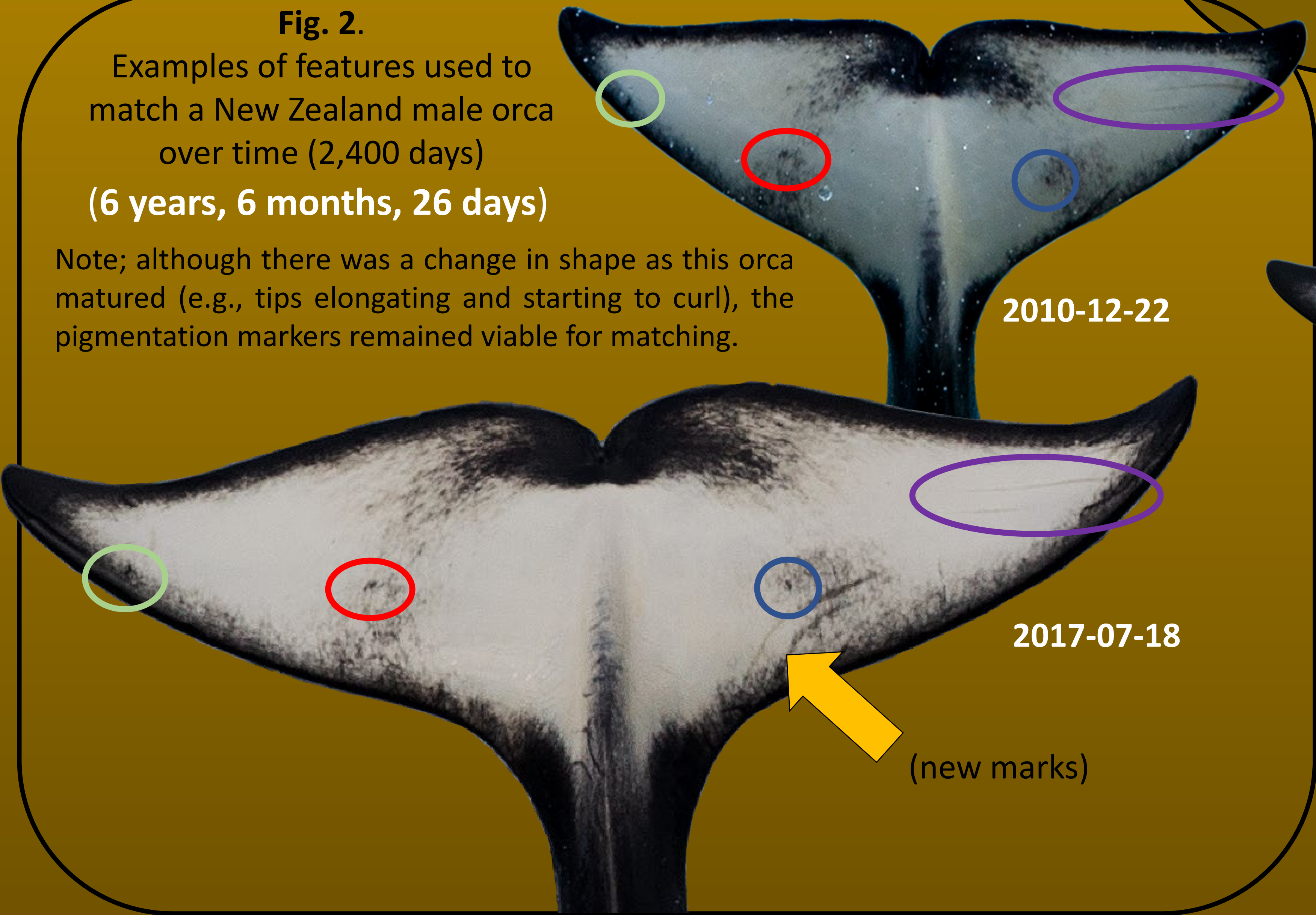
## Conclusions

- Tail fluke pigmentation has been under-utilized.
- We recommend tail flukes are added to the non-invasive identification toolbox for orca.
- Its use will have a flow-on effect; increasing the robustness of datasets and therefore enhancing management / conservation / recovery plans.

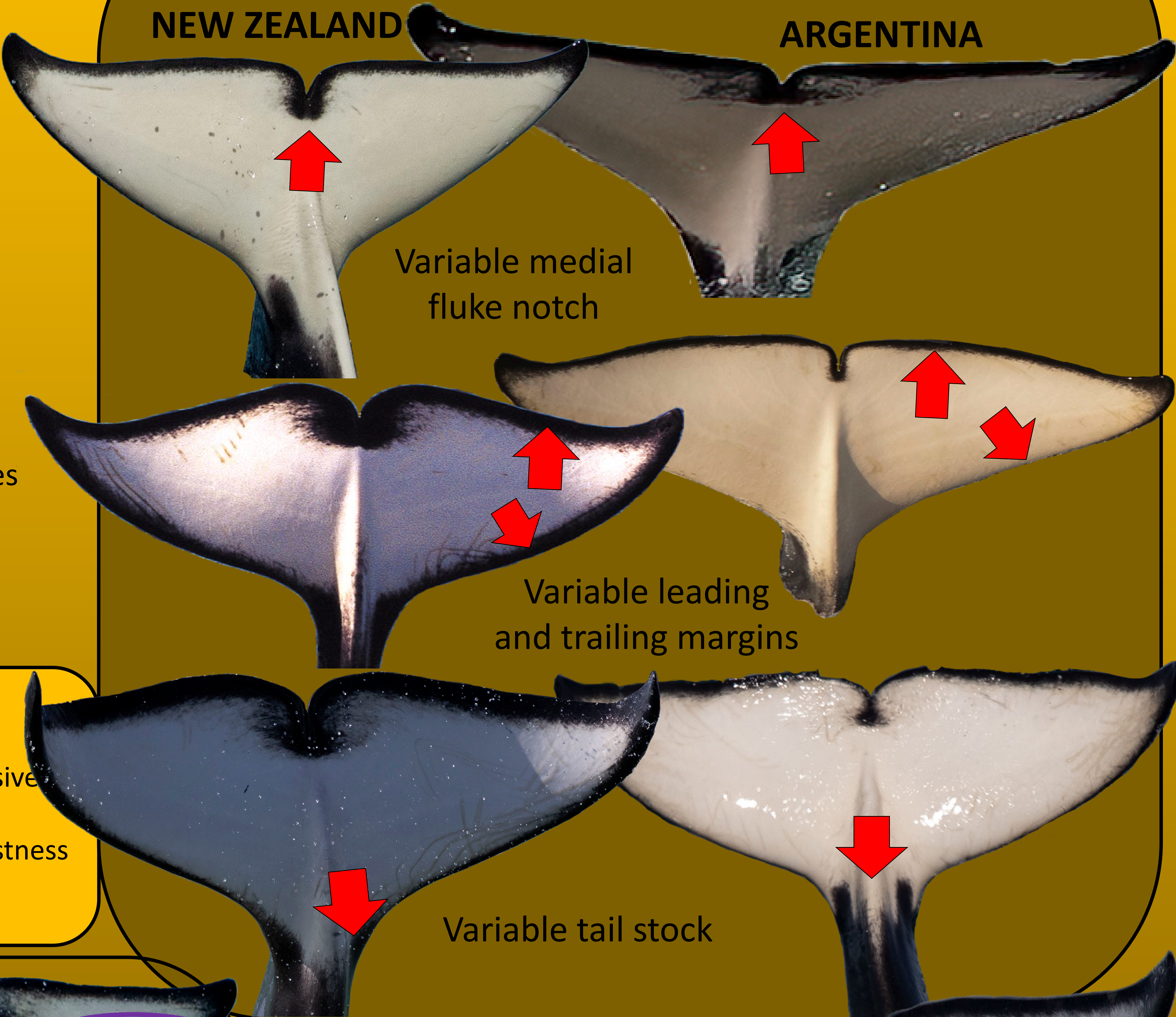
**Fig. 2.**

Examples of features used to match a New Zealand male orca over time (2,400 days)  
**(6 years, 6 months, 26 days)**

Note; although there was a change in shape as this orca matured (e.g., tips elongating and starting to curl), the pigmentation markers remained viable for matching.



**Fig 1.** Individual tail fluke pigmentation from New Zealand (below left) and Argentina (below right) (note that each example may be found in each region).



## Background

Orca (*Orcinus orca*) were one of the first cetacean species to be recognised by field researchers as having pigmentation that was distinguishable between animals and stable enough to enable long-term monitoring. Typically, the key pigmentation zones assessed for orca are; (1) the overall body pigmentation, (2) saddle-patches and (3) the eye-patches. These three zones are useful when the animals are photographed in the traditional 'side-on' position. However, if the animals are moving away these features are not as readily accessible to researchers. Evans & Yablokov (1982) first described variation of orca fluke pigmentation, but little work on this topic has been done since then.

## More Details

- Evans W.E. & Yablokov A.V. (1978). Intraspecific variation of the color pattern of the killer whale (*Orcinus orca*). In: *Advances in studies of cetaceans and pinnipeds*. Moscow, 102-115.
- Punta Norte Orca Research (2021). Orca ID Guide Argentinean Orca. Available at: [www.pn-orca.org/id-guide/](http://www.pn-orca.org/id-guide/).
- Visser I.N., Cooper T.E. (2020). Orca Research Trust Guide to New Zealand Orca. available at: [www.orcaresearch.org/nz-orca-id-guide/](http://www.orcaresearch.org/nz-orca-id-guide/).
- Visser I.N., et al. (2022). Abstract & Poster. Individual variation in orca (*Orcinus orca*) tail fluke pigmentation as a tool for photo-ID. Available at: [www.orcaresearch.org](http://www.orcaresearch.org)



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**Title:**

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**Abstract:**

The key to many long-term field studies of cetaceans has been the ability to uniquely identify individuals. Orca (*Orcinus orca*) were one of the first species to be recognised by researchers as having pigmentation that was distinguishable between animals and stable enough to enable long-term monitoring. Typically, the key pigmentation zones assessed for orca are; (1) the overall body pigmentation (black or grey), (2) saddle-patches (grey) and (3) the eye-patches (white). These three zones are useful when the animals are photographed in the traditional 'side-on' position, however, if the animals are moving away these features are not readily accessible to researchers. Nevertheless, the underside of tail flukes (typically white with black margins exhibiting unique pigmentation patterns) are occasionally presented during travel (or they may be visible during social interactions / foraging). We present a range of orca under-flukes from two geographically separate populations (New Zealand & Argentina) illustrating the unique pigmentation pattern for each animal and we discuss the stability and longevity of the colouring. Previously, this pigmentation zone on orca has been underutilized by researchers, however we recommend that it is added to the identification toolbox for orca, as a way to enhance researchers' abilities to track individuals when using non-invasive photo-identification. This should result in improved field identification of each animal, which would have a flow-on effect, increasing the robustness of datasets which in turn can provide the opportunity for enhanced management / conservation / recovery plans to be developed.

**Abstract Tweet:**

Orca tail fluke pigments are as unique as fingerprints; variation, stability & longevity R illustrated using NZ & Argentina examples. Improved photo-ID = enhanced datasets & superior conservation measures