# Temporal analysis of changes in marks of bottlenose dolphins' dorsal fin in the Western Ligurian Sea

108

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Sex in bottlenose dolphins is confirmed by photos of the **genital area** or, for females, by constant **association with a calf**

Dolphins can be recognised by the **marks** they exhibit on their dorsal fins which can **change over time**


Is there any **difference**, between males and females, **in the rate of change in marks** on dorsal fins that could be used to predict sex in unsexed individuals?

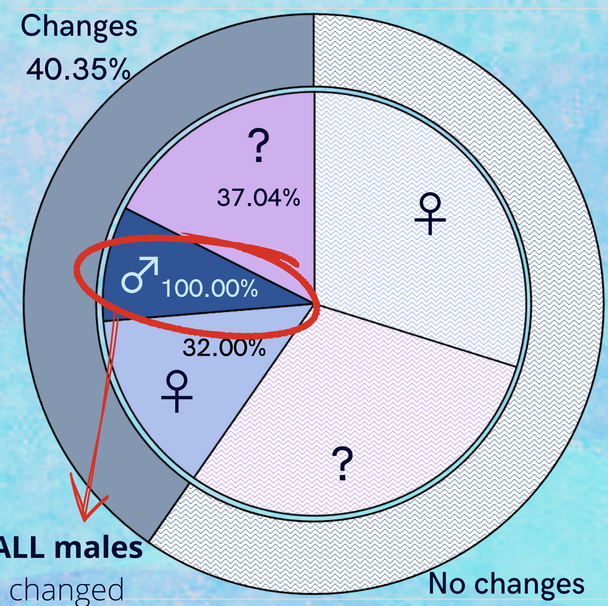
## STUDY AREA & METHODS

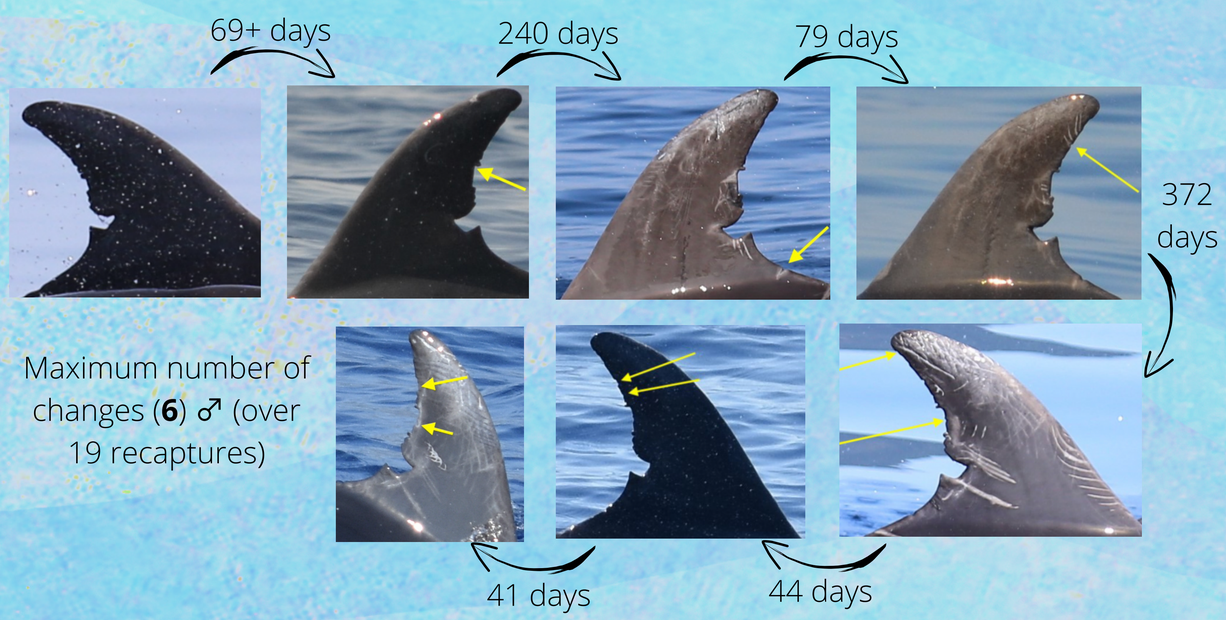
**Year-round monitoring**: April 2018 - Dec 2020
Western Ligurian Sea (ITALY)

191 boat-based surveys: 113 sightings + 123 dolphins identified
High-quality photos
Only dolphins with **≥ 3 recaptures**

Longest time without any changes: **874 days** (6 recaptures) - Unsexed

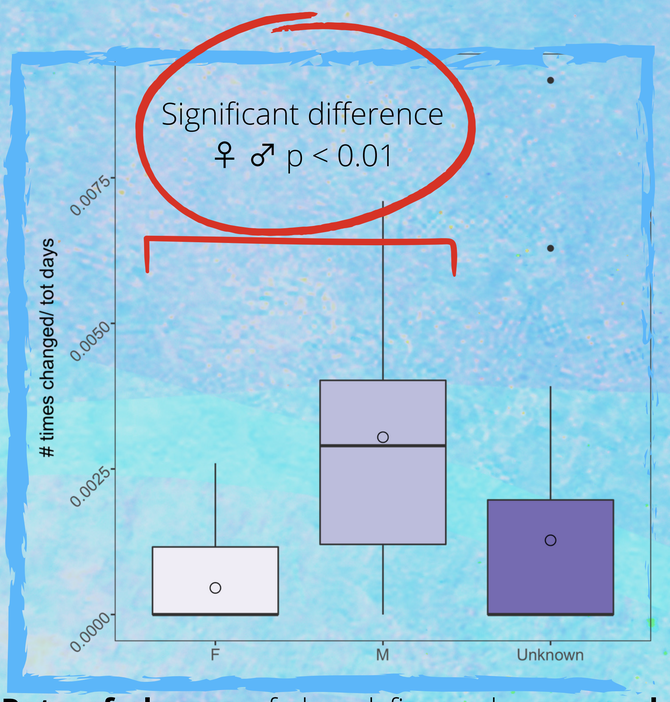
57 dolphins analysed: **25 ♀, 5 ♂ and 27 of unknown sex**




Maximum number of changes (**6**) ♂ (over 19 recaptures)

**830 days** (16 recaptures) - ♀




**Rate of change** of dorsal fin marks **grouped by sex** and calculated, for each individual dolphin, as the total number of changes/total number of days.

## RESULTS

**All** males dorsal fins changed

The **average days** passed between consecutive changes in males was **81.23** (SD = 95.40) and in females was **172.18** (SD = 190.20)

The rate of change is **significantly higher** in males (**0.003**, SD = 0.0027) compared to females (**0.0005**, SD = 0.0008) ($H(1) = 6.805$, $p < 0.01$)

## DISCUSSION

Fast changes in marks in males require **year-round monitoring**
A **significant difference** in the rate of mark change between sexes: males **6x faster** than females
This rate can be used to **predict sex in this population**

## NEXT STEPS

Development of **predictive models** based on this rate to **sex animals** (Rowe & Dawson, 2009; James et al., 2022)
Important information on population dynamic and social structure

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**References**


- Rowe, L.E. and Dawson, S.M., 2009. Determining the sex of bottlenose dolphins from Doubtful Sound using dorsal fin photographs. Marine Mammal Science, 25(1), pp.19-34.
- James, B.S., Gridley, T., McGovern, B., Fearey, J.L. and Elwen, S.H., 2022. Dorsal fin mark changes for assigning sexes to individual bottlenose dolphins, Tursiops truncatus. Marine Mammal Science, 38(3), pp.1140-1159.