A. Zaccaroni

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Monitoring of hormones in blubber of *Balaenoptera physalus* from Catalan coasts

Annalisa Zaccaroni[1], Beatriu Tort[2], Eduard Degollada[2]

[1]DIMEVET, University of Bologna, Italy; [2]EDMAKTUB Association, Barcelona, Spain

INTRODUCTION

Assessing cetaceans' population structure and reproductive status in conservation practices is crucial. When dealing with large cetaceans, non-invasive sampling, focusing on blubber biopsies, is a principal methodology. Biopsies can be used for genetics, contaminants detection and hormonal profile definition.

The quantification of steroid hormones can provide useful information on reproductive and health status and social dynamics. For instance, in females, an increase in estrogen levels may indicate an ovulation phase, an increase in progestin levels may indicate an ongoing pregnancy, while in males an increase in testosterone may lead to increased aggression.

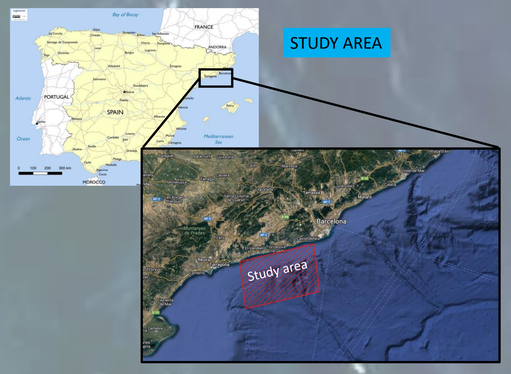
Among others, a goal in non-invasively quantifying hormones is to test whether endocrine biomarkers can be correct tools for the identification of pregnancy in female individuals and reproductive indices for both sexes.

AIMS

Present work reports about the analysis of sexual hormones in 39 blubber samples from Spanish fin whales (Balaenoptera physalus) to evaluate the usefulness of this tissue for sex and reproductive status determination.

MATERIALS AND METHODS

STUDY AREA



BIOPSIES ANALYSIS

39 blubber biopsies

- genetic analysis for sex determination
- analysis of hormones
  - cortisol
  - estradiol
  - progesterone
  - testosterone

HORMONES EXTACTION AND ANALYSIS PROCEDURE

1. Homogenisation
2. Centrifugation
3. Evaporation with nitrogen
4. Reconstitution in 5% EtOH
5. Analysis with commercial ELISA kits

RESULTS

E2 CONCENTRATIONS (ng/g) IN WHALES

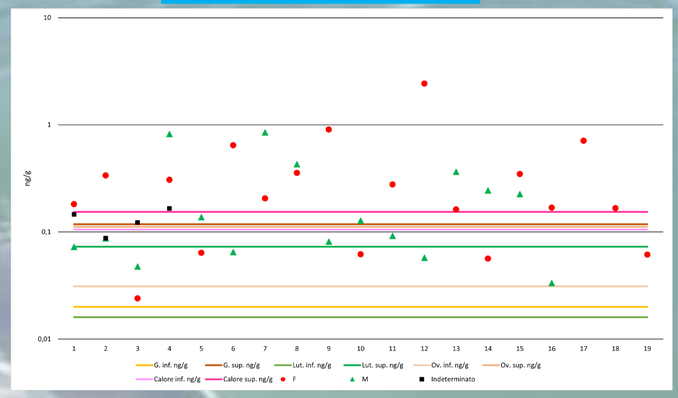


*Fig. 1 – E2 concentrations (ng/g) in each whale, by sex, and threshold of pregnancy (G.inf, and sup.), luteinic phase (Lut. inf. and sup.), ovulation (Ov. inf. and sup.) and heat (Calore inf. and sup.) as by Siliart et al., 2012. Graph is **semilogarithmic**.*

P4 CONCENTRATIONS (ng/g) IN WHALES

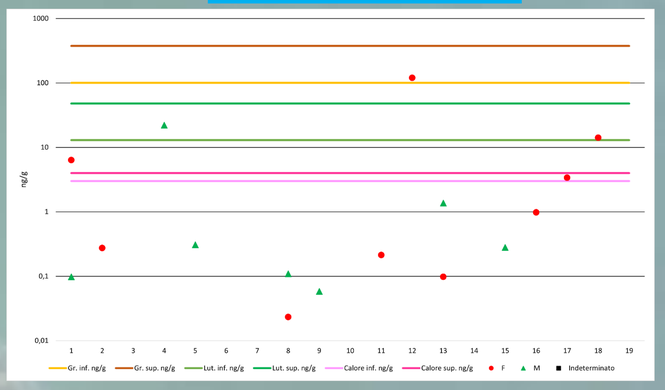


*Fig. 2 – P4 concentrations (ng/g) in each whale, by sex, and threshold of pregnancy (G.inf, and sup.), luteinic phase (Lut. inf. and sup.) and heat (Calore inf. and sup.) as by Siliart et al., 2012. Graph is **semilogarithmic**.*

P4 vs E2 CONCENTRATIONS (ng/g) IN FEMALES

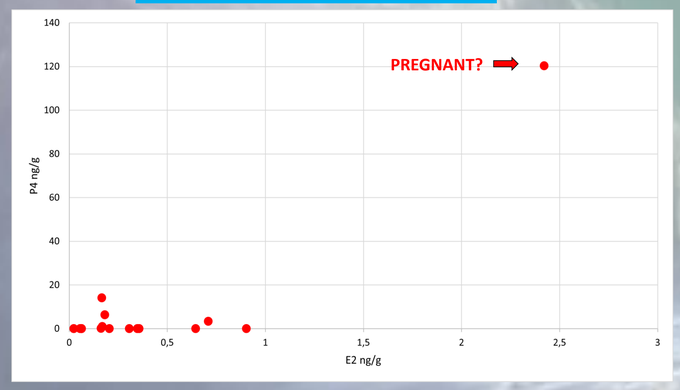


Fig. 3– P4 vs E2 (ng/g) concentrations in females The arrows indicates the only potentially gravid female.

T CONCENTRATIONS (ng/g) IN WHALES

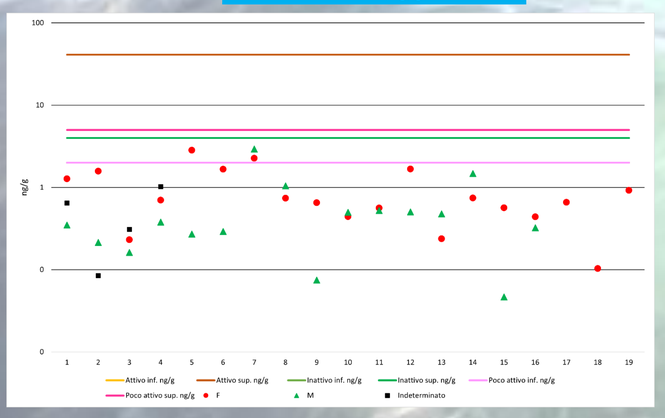


*Fig. 2 – T concentrations (ng/g) in each whale, by sex, and thresholds of male activity as by Siliart et al., 2012. Graph is **semilogarithmic**.*

CONCLUSIONS

No significant differences for the various hormones considered according to the sex of the individuals. This homogeneity is probably attributable to the fact that the specimens were sampled in the spring period, outside the breeding season, when hormone levels do not reach the peaks typical of the reproductive phases.

This observation confirms what has been hypothesised on the basis of behavioural observations alone, which leads one to consider the Balearic area as a feeding and transit area and not a mating and/or breeding area.

One of the females was with high probability pregnant, and one male was already reproductively active.

By means of the combined analysis of steroid hormone levels and E2/T and P4/T ratios, it was possible to hypothesise what the sex of the 4 specimens not yet genetically determined, which appear to be males.

REFERENCES

Siliart, B., Berder, C., Legavre, T., Rivallan, R., Risterucci, A. M., Ody, D., & Tasciotti, A. (2012). Étude préliminaire à l'évaluation de l'activité reproductrice du rorqual commun en Méditerranée. Scientific Reports of Port-Cros national Park