Best practice on post-mortem investigation and tissue sampling

Sandro Mazzariol - University of Padova
2016: ASCOBANS Resolution 8.10 work on best practice guidelines for response to stranding events and in the establishment of an updated post-mortem protocol.

2016: ACCOBAMS endorsed Resolution no. 6.22 and reviewed the common definitions, common data collections and common post-mortem protocols during the triennium.

ASCOBANS & ACCOBAMS Resolutions recommended a joint work with IWC and ECS.

2018: during the 24th ASCOBANS AC and 12th ACCOBAMS SC a joint workshop was proposed to harmonize the existing initiatives.
Joint ACCOBAMS/ASCOBANS workshop

Workshop on harmonization of the best practices for necropsy of cetaceans and for the development of diagnostic frameworks

Padova, Italy, 2019

With contributions from:

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- Maria Morell
Keywords

- Glossary and review of parameters
- Multi-tier triage approach
- Evidenced based approach
- Cooperation and multidisciplinary approach
- Risks
- Carcass disposal
- Sampling

Best practice documents

<table>
<thead>
<tr>
<th>Analytical procedure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Comments/recommendations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Genetics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>For DCX or S, histopathological procedures may be required on account of degraded tissue (e.g. extracting tissue from boneneider)</td>
</tr>
<tr>
<td>Diet and marine debris</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>If diet is not intact, e.g. from post mortem scavenger damage, results are compromised</td>
</tr>
<tr>
<td>Age determination</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Depending on analysis planned</td>
</tr>
<tr>
<td>Fatty acids and stable isotopes</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Depending on analysis planned</td>
</tr>
<tr>
<td>Parasitology</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Depending on analysis planned</td>
</tr>
<tr>
<td>Morphometrics</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Birth measurements can be disrupted by bleeding due to amniocentesis (DCX 5)</td>
</tr>
<tr>
<td>Gross pathology</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Recommended for DCX 5 in cases of forensic investigation</td>
</tr>
<tr>
<td>Reproductive studies</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td></td>
</tr>
<tr>
<td>Toxicology</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Depending on pollutants, DCX 2 for bacteriology investigation</td>
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<tr>
<td>Ear investigation</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Inner ear analysis specifically DCX 1, histopathology of fixed ears possible up to DCX 5</td>
</tr>
<tr>
<td>Microbiology</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Depending on analysis planned. For DCX 4 microbiology can still be worthwhile for detection of certain bacteria and fungi using specific culture methods. Should a seafalls be suspected in DCX 4 animals, then microbiological investigations should be undertaken on the tyloids, as the tissue is resistant to microbial post mortem invasion using specific culture methods.</td>
</tr>
<tr>
<td>Histopathology</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Recommended for DCX 5 in cases of forensic investigation</td>
</tr>
<tr>
<td>Virology</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Depending on analysis planned</td>
</tr>
<tr>
<td>Biotoxins</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Gas bubble analysis</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>Availability of brain samples and/or cerebral spinal fluid, the latter of which should be collected as soon as possible. In heavily nucleated specimens, alternatives are &quot;gill&quot; obtained from skeletal muscle or long, vitreous humour or pericardial fluid</td>
</tr>
<tr>
<td>Serology</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
</tbody>
</table>

5th Conference on Cetacean Conservation in South Mediterranean Countries, 13 - 15 April 2021, Online
MAIN RESULTS

TIER 1 - external examination and stranding data collection

- **Who**: Wide range of personnel who have basic training.

- **To be assessed**: External examination only, aiming to collect
  
  . basic morphometric data,
  
  . assessment of decomposition condition,
  
  . sex and age class determination,
  
  . photographs of external features

- **DO NOT** permit any reliable assessment of health status nor allow conclusions to be drawn as to the cause of death.
MAIN RESULTS

TIER 2 - dissection for sampling

- Assessment level: trained responders with skills and experience.

- To be assessed: thorough post-mortem investigation, involving the visualization and gross inspection of all organ systems and a detailed description of findings.

- Samples should be collected to allow assessment of health status but not the cause of death (i.e. diet, life history, contaminant)

- Findings should be considered informative, but not conclusive on the cause of death.

- Marine litter presence/ingestion and interaction with fisheries could be assessed at this level
TIER 3 - necropsy (dissection with diagnostic aim)

Assessment level: by professional (e.g. an experienced veterinary or biologists), and always including a veterinary pathologists.

To be assessed: cause of death.

This involves additional or detailed analysis of the data and samples collected during post-mortem investigation (tier two), aiming to understand also wider parameters of ecological health.

This tier often requires specialized laboratories and can be carried out in collaboration with other stranding investigation groups.
CONCLUSIONS and RECOMMENDATIONS

- Tool for building a functional stranding network depending on resources, skills and expertise
- Post-mortem investigation vs Necropsy
- No short-cuts but guidance
- Forensic medicine
- Veterinarian vs biologists
- Cooperation with all Institutions
- Capacity building and remote assistance
ACCOBAMS NECROPSY TRAINING IN 2021

Sandro MAZZARIOL (Padoue) + Thierry JAUNIAUX (Liège)

- Online training end of June with 40 participants/ evaluation
- A first face to face training session in Liege, end of September with 20 participants
- A second face to face training session in Padoue, in October with 20 other participants
- Certification at the end of the training

- to train experts from the different ACCOBAMS countries to collect further data and tissues + to gain information on possible threats;
- to encourage harmonisation to allow regional analysis and interpretation