Toxicity to vultures from veterinary drugs used in farm animals, the overview from France

Florence Roque – CNITV
Pascal Orabi – LPO
Virginie Lattard – USC 1233
Toxicological monitoring plans for vultures in France

- Since the early 2000s
- Different types of programs (LIFEs, FEDER, ...)
- « Vigilance Poison » plan, throughout of France, since 2009:
  - Concerns all raptors in France with a national action plan (vultures, but also kites, eagles...)
  - Is managed by 2 entities: LPO and ONCFS (National Office of Hunting and Wildlife)
  - Has several problems:
    - Cost of analytical research, need to find credits
    - No result available for the community if the analyzes of the bird are funded by ONCFS
- => Finally => everywhere application of the same protocole (LPO/CNITV) for all raptors programs
Monitoring protocol

Discovery of a carcass (dead bird)

Contact with the local concerned referent of ONCFS and LPO / National Plan Action manager

Removal of the carcass (ONCFS or local responsible person)
- commemorative collection
- environmental examination

Contact with CNITV or referent veterinary to set up the transport

X-ray and autopsy by CNITV or referent veterinary

Transmission of samples to reference laboratories

Autopsy and analysis by Laboratories

Autopsy report and analysis results registered in specific data-base and transmission to local and national responsibilities

Results recorded in the assessments of the national action plans and are available for any studies or research
Toxicological analyzes

• 3 different laboratories:
  – 1 for complete screenings (veterinary part of a forensic laboratory: drugs, pesticides, biocids, pollutants excepted metals)
  – 1 laboratory specialized in anticoagulant rodenticide (reference laboratory for the government and industry) + pesticides/biocids and drugs screening for cross validation.
  – 1 laboratory specialized in metals (accredited)

• ... other partnerships (lead in Italy, other collaborative projects)
The main drugs mentioned in the literature that may be involved in vulture poisoning

- NSAIDs, especially
  - Diclofenac
  - Flunixine
  - ......

- Antibiotics
  - In intensive breeding
  - Repeated ingestions needed

- Euthanizing products
  - One ingestion is sufficient
  - Short time to onset of troubles

- Anesthetics / neuroleptics
  - One ingestion is sufficient
  - Short time to onset of troubles

- Other drugs (benzimidazole, external pest control....)

- All are searched by screening
Some CNITV results (quarter south-east of France)

- 399 autopsied birds since 2005 (only by LPO/CNITV)
- Lead poisoning not included in these results (the discussion on this subject deserves all a congress)
- 41 poisoning confirmed by analyzes (excluded lead)
- Screenings permit to detect contaminations, without links to death (discussions on these subjects also deserve numerous congress!!!) but no vet drugs residues found
- Some suspicions because of necropsic examination but without analytic confirmation are not included in the results
- No analysis possible in some cases (too much degradation of the bird ... or lack of funding)
General results

Autopsied birds (n=399)
- Lesser kestrel (Falco naumanni) 13%
- Royal kites (Milvus milvus) 21%
- Others 10%
- Vultures 56%

Autopsied vultures (n=225)
- Griffon vulture 82%
- Cinereous Vulture 11%
- Bearded vulture 5%
- Egyptian Vulture 2%
Results of toxicology (all species) n=42
Results of toxicology (Vultures)

Confirmed poisoning by analysis in vultures (n=11)

- Carbofuran: 42%
- Mevinphos: 25%
- Pentobarbital: 17%
- Aldicarb: 8%
- Embutramide: 8%

Vet drugs
Euthanizing products

- Pentobarbital case (+/- embutramide in associated protocol)
- Long persistence even in carcass (and in compost)
- Very good oral absorption of barbiturates
- Accidental poisoning (lack of knowledge, negligence ...)
  => veterinary and farmers training

Table 3. Sodium pentobarbital sample concentrations in compost samples from equine mortality static compost piles based on dry sample weight

<table>
<thead>
<tr>
<th>Group</th>
<th>Day 7</th>
<th>Day 14</th>
<th>Day 28</th>
<th>Day 56</th>
<th>Day 84</th>
<th>Day 129</th>
<th>Day 233</th>
<th>Day 367</th>
<th>Significance level</th>
<th>SEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>65.69</td>
<td>65.34</td>
<td>35.32</td>
<td>59.83</td>
<td>47.06</td>
<td>74.43</td>
<td>93.83</td>
<td>33.95</td>
<td>0.591</td>
<td>22.64</td>
</tr>
<tr>
<td>Control</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1.0</td>
<td>0</td>
</tr>
</tbody>
</table>

Significance level1 = 0.001

1P-value across compost sample treatments and sampling times. Sample (n = 3).

Drugs in France and risk management

• Legislation:
  – Products with European marketing authorization
  – Products with French marketing authorization
  – No diclofenac use in France on livestock (but in Spain and Italy)
  – Reduction of antibiotics used and systematic registration of used drugs in a breeding register in France

• Veterinary pharmacovigilance
  - Obligation to report serious cases / with mortality occurring on wildlife with veterinary drugs
  - Questionable efficacy on this "environmental" aspect: only 1 cas reported en PVV in 2013... and it's me who reported it
Real reasons for the low reported cases of intoxication/poisoning by veterinary drugs in France!

• Vultures live in a part of France of extensive pastoral systems of breeding
  – Summer pastures or mountainous areas where few treatments are done on animals
  – They feed on supplementary feeding stations, managed by the protection associations that know the risks
  – They feed on supplementary feeding stations held by farmers, also informed on the risks
  – They are fed with small ruminants whose price is low, often treated at least

  => Good management?
Real reasons for the low reported cases of intoxication/poisoning by veterinary drugs in France!

- All dead birds are not collected and analyzed
  - only partners with funding for the analyzes collect the cadavers and transmit them for autopsy and analysis
  - Wildlife preservation centers for example do not transmit sample of live or dead birds except emblematic species
  - ONCFS limits the number of analysis to some emblematic birds

=> We must build a more ambitious project
Focus on the raptor species covered by National Action Plans (NAP)

- Critical danger (IUCN): *Aegypius monachus*,
- Danger (IUCN): *Aquila fasciata, Gypaetus barbatus, Neophron percnopterus*,
- Vulnerable (IUCN): *Milvus milvus, Falco naumanni, Pandion haliaetus*,
- Minor concern (UICN): *Gyps Fulvus*.

... and also sentinel species
Submission of a Life Project (2)

• Set up an unique analytical system in France, especially for wildlife, to
  – Detect accidental or criminal poisoning
  – Reveal potential contaminations
  – Reduce the cost of analysis to increase the number of birds tested

⇒ Detect the main toxic risks (lethal and sub-lethal effects)

⇒ the research laboratory with which we work devotes a lot of energy to this development.
Submission of a Life Project (3)

- Consolidate the toxic threat surveillance network and program interactions
  - Consolidate the french vigilance network and contribute to strengthening it in Europe
  - Develop an information exchange network (France, Spain, Italy...) by using the experience acquired during projects such as LIFE to improve toxic risk prevention and management.
Submission of a Life Project (4)

• Multiply actions to reduce the number of intoxications and contamination
  – Assess the actual proportion of intoxications in raptor populations (or not !),
  – Organize audit of abandoned legal proceedings in France and draft a protocol to enable the completion of investigations and the legal validity of proceedings,
  – Sensitize the magistrates to the treatment of the cases of destruction of wild species,
  – Adapt solutions implemented in other European regions to the local problem of poisoning
Conclusion

• In France, the toxic threat is rather represented by pesticides, less by drugs
• Some cases of poisoning by euthanasia products exist
• The screenings can detect contaminations but it is necessary to work on the sublethal effects and the different sensitivities of species
• To progress, it is necessary to be able to multiply the analyzes in France and to exchange the relevant information between European countries
• It would also be useful to make interlaboratory exchanges to verify the results obtained.
• The research laboratory that develops multiresidue screening for futur Life offers free research on anticoagulants.
Thank you for your understanding and interest

....... Σας ευχαριστούμε για την κατανόηση και το ενδιαφέρον σας