DISEASE RISK ASSESSMENT ON INVASIVE ALIEN SPECIES

EVALUATION OF THE RISK OF INTRODUCTION OF NEW INFECTIONS AND SPREAD OF LOCAL ONES

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Invasive alien species (IAS)

- Impacts
  - Health
  - Biodiversity
  - Economy

- Increasing trend

- Reg UE 1143/2014
  Species «of Union concern»
Invasive alien species (IAS)

- Aim of the work
  Methodology to assess the health risk of IAS
- Invasive species’ **health risk**
Materials and methods

- Model species
  - American gray squirrel (*Sciurus carolinensis*)
  - Raccoon (*Procyon lotor*)
  - Coypu (*Myocastor coypus*)
Disease Risk assessment

- **Steps**
  - Risk question
  - Hazard identification
  - Pathways identification
  - Collection of information
  - Risk assessment

- **Qualitative Risk Assessment**
  - Preliminary context
  - Lack of information

Which are the *pathogens* affecting IAS and their effects on animal and human health?
1. Hazard Identification

Bibliographic review on some of the major scientific databases

- Infectious agents
- Infection prevalence
- Infection area

<table>
<thead>
<tr>
<th></th>
<th>Nº suitable articles</th>
<th>Nº infectious agent species</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raccoon</td>
<td>259</td>
<td>197</td>
</tr>
<tr>
<td>Gray squirrel</td>
<td>86</td>
<td>136</td>
</tr>
<tr>
<td>Coypu</td>
<td>43</td>
<td>44</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>388</strong></td>
<td><strong>377</strong></td>
</tr>
</tbody>
</table>
2. Risk assessment

Risk = Impact × likelihood

<table>
<thead>
<tr>
<th>Impact</th>
<th>Consequences</th>
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<tbody>
<tr>
<td>HIGH</td>
<td>Human: Fatal or disabling</td>
</tr>
<tr>
<td></td>
<td>Livestock: Reg CE 652/2014</td>
</tr>
<tr>
<td></td>
<td>Wildlife: Wildlife populations reduction</td>
</tr>
<tr>
<td>MODERATE</td>
<td>Human: Serious but treatable</td>
</tr>
<tr>
<td></td>
<td>Livestock: OIE Notifiable disease</td>
</tr>
<tr>
<td></td>
<td>Wildlife: Influence on wildlife dynamics</td>
</tr>
<tr>
<td>LOW</td>
<td>Human: Treatable</td>
</tr>
<tr>
<td></td>
<td>Livestock: Treatable</td>
</tr>
<tr>
<td></td>
<td>Wildlife: Limited influence on wildlife dynamics</td>
</tr>
<tr>
<td>NONE</td>
<td>Human: No infection</td>
</tr>
<tr>
<td></td>
<td>Livestock: No infection</td>
</tr>
<tr>
<td></td>
<td>Wildlife: No infection</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Prevalences</th>
</tr>
</thead>
<tbody>
<tr>
<td>HIGH</td>
<td>≥50%</td>
</tr>
<tr>
<td>MODERATE</td>
<td>50%&lt;x≤5%</td>
</tr>
<tr>
<td>LOW</td>
<td>&lt;5%</td>
</tr>
<tr>
<td>OCCASIONAL</td>
<td>Sporadic reports</td>
</tr>
<tr>
<td>NONE</td>
<td>Absent</td>
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</table>
## 2. Risk assessment

### Risk estimation

#### Introduction risk

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<thead>
<tr>
<th>IMPACT</th>
<th>Occasional</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Moderate</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Low</td>
<td>Insignificant</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>None</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
<td>Insignificant</td>
</tr>
</tbody>
</table>

#### Amplification risk

<table>
<thead>
<tr>
<th>IMPACT</th>
<th>Absent</th>
<th>Occasional</th>
<th>Low</th>
<th>Moderate</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>Low</td>
<td>Low</td>
<td>Moderate</td>
<td>High</td>
<td>High</td>
</tr>
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</table>

#### Total risk
3. Uncertainty

- Amount and quality of the information
- Biological variability of the phenomena

I. Impact uncertainty
   - High
   - Medium
   - Low

II. Likelihood uncertainty

Risk uncertainty
Results

**Impact**

- Human
- Livestock
- Wildlife

- None
- Low
- Moderate
- High

**Introduction risk**

- Human
- Livestock
- Wildlife

**Amplification risk**

- Human
- Livestock
- Wildlife

- Insignificant
- Low
- Moderate
- High
Introduction

Risk

Amplification

Risk
Total risk

Human

Livestock

Wildlife

Uncertainty
Discussion

- Definition of a **methodology** to evaluate the health risk of invasive alien species
- Possibility to obtain different type of **output**:
  - Introduction/amplification risk
  - Risk towards human/livestock/wildlife

- **Uncertainty**
  - Need for insights
  - Precautionary principle

- **Communication** all along the process
- Application of the defined methodology to the most important species in Europe
Thanks for your attention