Session E6: Monitoring Strategy of Sturgeon Behaviour to Ensure Functionality of Future Fish Passes: The Iron Gate II Case in the Danube River

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Monitoring strategy of sturgeon behaviour to ensure functionality of future fish passes: the Iron Gate II case in the Danube River

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Objectives:

• To conduct on site 3D bathymetry survey and ADCP velocity profiles
• Choose and adopt low stress inducing handling methods for tagging sturgeons
• To test bio-telemetry methods and equipment to achieve required resolution for locating sturgeons d/s Iron Gate II dams
• To choose molecular biology method to describe genetic diversity of tracked sturgeons
• To work out strategy for monitoring sturgeon behavior to ensure functionality of future up - and down stream fish passages
Materials and Methods

1. Fish handling in the nets to avoid lifting it of the water

Side electro-narcosis (2013)
Testing detection range of Vemco vs Thelma acoustic transmitters and receivers
Results: 1. ADCP velocity profiles & 3D bathymetry
2. Multibeam 3D bathymetry
3. Testing detection range of Vemco vs. Thelma acoustic equipment

Range test number 1. Signal strength (dB) on TBR - 700. Thelma tag ID 3 & 4

Range test number 2: # detections of Thelma Tag ID 3 / 15 min

Range test number 2. Signal strength (dB) on TBR - 700

Range test number 3. Signal strength (dB) and number of detections on TBR - 700
4. Testing detection range of ATS 3 stage radio transmitters

• Receiver SRX_600 from Lotec Inc. Canada, covering the frequency range from 142 to 143 MHz

• 4 element Yagi antenna + 2 m long coax (RG58) cable

• 12 mm rope with the whip antennas in a horizontal position at 0.5 m up from the bottom at water depth of 11.5 m

• Due to extremely high radio noise signals from radio tags could not be recorded at all
5. Screening genetic diversity of sturgeons at Iron Gate dams

**Beluga sturgeons**

*Cytochrome b RFLP haplotype* frequency in groups of YOY beluga sturgeons (2004 - 2014)

Neighbour Joining dendrogram (Nei's DA) based on gene frequencies at mtDNA in YOY beluga sturgeon groups captured during 2004 - 2014

*Populatia Frecventa haplotipurilor la puii de morun capturati in perioada 2004 - 2014*
Neighbour Joining dendrogram (Nei's DA) based on gene frequencies at mtDNA in YOY stellate sturgeon groups captured during 2000 - 2013.

Cytochrome b RFLP haplotype frequency in groups of YOY stellate sturgeons.
Conclusions:

1. Electro-narcosis proved adequate for reducing stress and subsequent drop back in adult sturgeons;

2. 3D bathymetry and ADCP velocity profiles are essential tools for understanding environmental conditions d/s Iron Gate dams;

3. Novel Thelma receiver TBR 700 has the capability to record signal strength;

4. A combination of Vemco and Thelma acoustic tags and receivers will be used to achieve required resolution of sturgeon movements d/s Iron Gate dams;

5. Existing DNA samples collected during 2000 – 2014 will be used as reference for understanding genetic diversity of sturgeons arriving at the dams

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Objectives:
- Capture and tag 10 adult sturgeons with acoustic transmitters
- Track their movements using submerged automatic receivers with depth sensor

Thank you for your attention!

Questions?