Use of electro narcosis to immobilize adult sturgeons during surgical implantation of internal acoustic transmitters

Marian Iani, Marian Paraschiv, Ștefan Honț, Radu Suciu
Sturgeon Research Group, Danube Delta National Institute, Babadag Street, 165, RO – 820112, Tulcea, Romania
iani@indd.tim.ro

Introduction

• tranquilizing of large size (TL>200 cm) wild adult beluga sturgeons for surgical implanting of acoustic transmitters requires lifting the specimen out of the river and use of chemical tranquilizers (MS 222 / clove oil)
• these activities induce additional stress to the fish and lengthen the duration of overall implanting procedure
• to avoid these inconvenient we tried to adapt the direct current (30 V) electro narcosis apparatus of Henyey, Kynard & Zhuang (2002) to river (Danube) conditions

Experimental design and procedure

System composed of:
1. Electro narcosis apparatus: inverter, voltage regulator, digital display, and connecting cables (Fig.1 & 4);
2. 40 – 60 cm diameter plastic pipeline tube with perforated stainless steel electrode plates inserted in slots cut at both ends (Fig 4 & 5);
3. 12 V marine battery of 56 Ah

Procedure:
1. beluga sturgeon captured in trammel nets are tied with 6mm diameter cord (with silicon rubber tube coating) through the opercular opening and mouth;
2. the fish is pulled in the plastic pipeline tube with the head upstream
3. the second electrode plate is inserted and DC is switched on and regulated as needed (28 – 30 V DC)
4. local anaesthesia is performed by injection of Xylocaine 2% in the appropriate abdominal site
5. surgical implanting procedures as usual
6. fish is freed in the river by turning DC off and lifting the first electrode plate (Fig. 6)

Results

• typical reaction of the fish to 28 – 30 V DC is to take dorsal decubitus position (Fig.2);
• the procedure requires two operators, one is holding the fish with a textile strap at the water surface, the second is performing the surgical procedures;
• usually the duration of a complete implanting procedure is under 20 minutes;
• effectiveness of this novel system was successfully tested / used during 2011 – 2012 in the Lower Danube River on over 50 adult wild specimens of all three anadromous species of sturgeon (beluga, Russian and stellate sturgeon)

Discussion & Conclusions

• the system was exhibiting all known advantages (shorter induction and recovery time, low risk of mortality, no visible sub lethal effects and currents are imperceptible to operators) as when it was used in a holding tank with flow-through / recirculating / aerated water (Henyey, Kynard & Zhuang 2002)
• the handling and captivity stress in large sturgeons captured in the river is reduced to maximum which is essential for normal / unchanged behaviour of sturgeons during tracking their movements using acoustic telemetry

Acknowledgements

Boyd Kynard of CAFRC Turners Falls introduced us the use of 30 V DC electro narcosis in sturgeons and Torstein Kristensen of NIVA Oslo inspired us to adapted the system to the free flowing river. Funding was provided by Innovation Norway and the Romanian Ministry of Environment / BestCombat project (KrRin / 2008 / 112231)

Literature cited