

R&D Technical Summary W2-582/TS

Effects of Electric Fishing on Fish

This research identified potential detrimental effects of electric fishing on several species of cyprinid fish: chub (*Leuciscus cephalus* (L.)), roach (*Rutilus rutilus* (L.)) and dace (*Leuciscus leuciscus* (L.)).

Chub, exposed to simulated Pulsed Direct Current (PDC) electric fishing operations, exhibited rapid elevations in plasma glucose and blood lactate, but plasma cortisol did not change significantly. These adrenergic disturbances, which persisted for up to 8 h, were greater in exposed fish than in fish which were instead subjected to 5 s emersion and handling stressor.

Simulated PDC electric fishing increased the metabolism of roach, dace and chub, exemplified by increased total ammonia (TA) efflux and weight-specific oxygen (MO_2) rates. The metabolic stress effect on roach was influenced by the intensity of the PDC electric field applied; low intensity field had a minimal effect whereas treatments with greater intensities induced a great elevation in TA excretion. Emersion and handling had a comparable metabolic effect as that of the simulated electric fishing procedure, although differences were observed between species. In addition, treatments with smooth Direct Current (DC) gear had a lesser effect than those with PDC.

Electric fishing treatments using PDC reduced the growth, food conversion, condition and survival of roach, chub and, to a lesser extent, dace. The decrease in growth rate was more marked following repeated treatments and simulated electric fishing operations than PDC exposure alone. The retarded growth was most likely due to a combination of stimulation of the stress axis and electric fishing-induced injury. Fish exposed to a high intensity $\frac{1}{4}$ sine-wave PDC electric field suffered severe and multiple spinal misalignments. Fewer injuries were observed in fish exposed to rectangular PDC treatments of lower intensity. Spinal injuries were not always fatal and the reduced survival of treated fish was probably due to the physiological effects of electric fishing.

Despite these findings, PDC electric fishing is still considered to be a suitable method of capture for the cyprinids studied, although it is recommended that the effects on wild fish *in situ* be evaluated.

This R&D Technical Summary relates to information from project W2-582 contained in the following output:

PhD Thesis submitted to the University of Hull by PJ Bracewell (October 1999): The Effects of Electric Fishing on Some Freshwater Cyprinid Fish Species

Internal Status: Released to Regions
External Status: Public Domain

Project Manager: Dr Phil Hickley, Head of National Coarse Fisheries Centre, Midlands
Research Contractor: University of Hull

A copy of the thesis will be lodged for reference at the Agency's National Coarse Fisheries Centre and will be made available to internal staff and external collaborators wishing to view it.

For other external interests normal thesis loan arrangements from the University of Hull will apply.

© Environment Agency
Rio House
Waterside Drive
Aztec West
Almondsbury
Bristol
BS12 4UD

Tel: 01454 624400

Fax: 01454 624409