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Abstract

Upstream Movement Capacity of Invasive Signal Crayfish (*Pacifastacus leniusculus*) under Different Environmental and Biometric Factors †

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Abstract: The spread of invasive crayfish species is a major threat to endemic species worldwide. This threat affects native crayfish as well as flora and fauna species in general. In order to limit their dispersal, different methods have been used, the most promising of which are those related to physical barriers. For their design, it is essential to know the limits in the capacity of crayfish to move under different hydraulic scenarios, although to date, there are few studies on this topic. The present work analyzes the volitional upstream movement capacity of the signal crayfish (*Pacifastacus leniusculus*) in a laboratory open flume, with different configurations of environmental and hydraulic variables (bed roughness, flow velocity, water temperature, times of day) and accounting for the possible effect of biometric factors (carapace length, sex). Twenty-four different trials with five individuals per trial were carried out, tracking all crayfish movements individually by visual tags and with a video monitoring system. Data were analyzed using survival analysis techniques and parametric models were developed, considering as response variables the maximum distance traveled and the movement speed. The results showed that the combination of bed roughness and flow velocity were the best predictors to explain crayfish movement performance, with a flow velocity greater than 0.8 m/s together on a non-rough bed being the limiting factor; the water temperature and the sex also have a significant effect. This information can serve as a basis for the design of future barriers to the dispersal of invasive crayfish species in the Iberian Peninsula.

Keywords: invasive species; alien species; dispersal barriers; survival analysis

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