



Abstract

Effects of a Pyrethroid Pesticide on the Behaviour of Native and Non-Native Cypriniformes Fish [†]

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Abstract: River ecosystems are exposed to a multitude of stressors, of which pesticide run-off is increasingly becoming a global environmental concern due to adverse effects on aquatic organisms. Of those, pyrethroids are now the fourth major group of insecticides in use worldwide; however, their sublethal effects on freshwater fish are still largely unknown. The present study aimed to assess the effects of an acute 2 h sublethal exposure to different levels of the pyrethroid pesticide esfenvalerate on the behaviour of two Cypriniformes species: the native Iberian barbel (*Luciobarbus bocagei*) and the non-native invasive bleak (*Alburnus alburnus*). Fish were previously exposed to three esfenvalerate concentrations (control, 1.2 µg/L (mild), and 2.0 µg/L (severe)), before being placed into a three-artificial-flume channel mesocosm for behavioural trials on (i) routine activity, (ii) shoal cohesion, and (iii) boldness. Significant differences in fish behaviour were detected for the barbel, as individuals were found to spend a higher proportion of time holding their position (i.e., resting) from the control to the severe esfenvalerate concentration. Behavioral changes were also detected for boldness, measured by the proportion of fish attempts to negotiate the upstream ramp, which were significantly higher in the control and in the severe concentration compared to the mild one. For the invasive bleak, there were no significant differences in any of the behavioural parameters upon previous exposure to an increasing esfenvalerate concentration. The present study demonstrated that even a short-term exposure to the pyrethroid esfenvalerate was sufficient to alter the behaviour of a native fish species, while not affecting the non-native, which may confer them greater competitive advantages in the context of global changes.

Keywords: pyrethroids; freshwater fish species; boldness; schooling; conservation



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