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The effects of the pyrethroid insecticide, bifenthrin, on steroid hormone levels and gonadal development of steelhead (Oncorhynchus mykiss) under hypersaline conditions.

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Abstract

The San Francisco Bay Estuary and Sacramento-San Joaquin Delta (Bay-Delta) is an important breeding and nursery ground for fish. Of particular interest are salmonids that migrate through fresh and saltwater areas polluted with various contaminants including bifenthrin, a widely used pyrethroid insecticide. Male steelhead (Oncorhynchus mykiss) exposed to bifenthrin (0.1 and 1.5μg/L) for two weeks had a lower gonadosomatic index (GSI) in freshwater but were not affected by concurrent bifenthrin exposure and saltwater acclimation. Plasma estradiol-17β (E2) levels and ovarian follicle diameter of fish exposed to bifenthrin (0.1 and 1.5μg/L) in freshwater significantly increased. Under hypersaline conditions, fish exposed to bifenthrin had significantly reduced E2 levels and smaller follicles, and unhealthy ovarian follicles were observed. Given the occurrence of bifenthrin in surface waters of the Bay Delta, understanding the impact of bifenthrin on wildlife is necessary for improving risk assessments of pyrethroids in this important ecosystem.

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