



**Oral treatments for monogenean
parasites of farmed yellowtails,
Seriola spp. (Carangidae)**

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Title page images from L – R: *Seriola quinqueradiata* (Carangidae) sea-cage, Kyushu, Japan; *Benedenia seriolae* (Capsalidae) on the eye of a *Seriola lalandi* (Carangidae); *Heteraxine heterocerca* (Heteraxinidae). Images: R. E. Williams.

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Rissa Williams
30 November 2009

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DEDICATION



To my parents, Daisy and Terry Williams

You taught me how to watch, listen and learn. You gave me the freedom to grow and be independent and a loving home to come back to. Thank you for believing in me.

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PUBLICATIONS ARISING FROM THIS PHD

Williams, R.E., Ernst, I., Chambers, C.B., Whittington, I.D., 2007. Efficacy of orally administered praziquantel against *Zeuxapta seriolae* and *Benedenia seriolae* (Monogenea) in yellowtail kingfish *Seriola lalandi*. *Diseases of Aquatic Organisms* 77, 199-205. doi: 10.3354/dao01824

ABSTRACT

Japanese yellowtail *Seriola quinqueradiata* has been commercially farmed in Japan since the 1940s. In comparison, sea-cage farming of yellowtail kingfish *Seriola lalandi* in Australia is still developing, with commercial production commencing in 1998. In Australia, *S. lalandi* is parasitised by *Zeuxapta seriolae* and *Benedenia seriolae*. In Japan, *S. quinqueradiata* is parasitised by *Heteraxine heterocerca* and *B. seriolae*. These monogeneans affect industries in both countries and management of these parasites is required to prevent impacts on fish health and commercial losses.

I investigated efficacy (% reduction of mean parasite abundance) for orally administered praziquantel, fenbendazole and oxfendazole against *Z. seriolae* and *B. seriolae* on *S. lalandi* and the efficacy of orally administered praziquantel and febantel against *H. heterocerca* and *B. seriolae* on *S. quinqueradiata*. Medications were administered to fish by surface coating feed pellets or via direct intubation of the stomach. *Seriola lalandi* administered fenbendazole and oxfendazole by surface coating of feed had lower abundance of the gill parasite *Z. seriolae*. *Seriola quinqueradiata* intubated with febantel had lower abundance of the gill parasite *H. heterocerca*. Neither fenbendazole nor oxfendazole administered to *S. lalandi* in Australia, nor febantel administered to *S. quinqueradiata* in Japan resulted in a lower abundance of the skin parasite *B. seriolae*.

Praziquantel was first administered to *S. lalandi* by surface coating of feed. Fish rejected medicated feed, suggesting praziquantel affected its palatability. Fish treated with feed medicated with praziquantel had fewer *Z. seriolae* and *B. seriolae* than untreated fish. Praziquantel administered to *S. lalandi* by intubation allowed a more accurate dose to be tested without differential feeding or reduced palatability obstructing results, and resulted in fewer *Z. seriolae* (99.5-100 % reduction) and *B. seriolae* (91 – 97.7 % reduction). Intubated praziquantel also led to fewer recruitment life stages of *Z. seriolae* and *B. seriolae*, even at low doses, but did not completely eliminate them from *S. lalandi*. Praziquantel administered to *S. lalandi* alone and combined with cimetidine had high efficacy (>99%) against *Z. seriolae*. In comparison, praziquantel administered alone resulted in fewer *B. seriolae* (68.3 –

69.7 % reduction) than the same doses of praziquantel combined with cimetidine (36.9 – 40.9 % reduction). A 90.4 -100 % reduction in *H. heterocerca* was achieved when praziquantel was administered by intubation to *S. quinquerediata* in Japan but there was only a 22-77.8 % reduction in *B. seriola*. The dose of PZQ (150 mg kg⁻¹ body weight day⁻¹ for 3 days) on the label of a commercially available product used to treat *B. seriola* in Japanese aquaculture resulted in a 50.9% reduction against *B. seriola*, but completely eliminated *H. heterocerca*.

In trials against *Z. seriola* and *B. seriola* on *S. lalandi* in South Australia, I also screened 27 other anthelmintics and antiparasitics from the chemical groups: amprolium derivatives, benzimidazoles, benzyl ureas, diphosphate salts, imidazothiazoles, macrocyclic lactones, nitromidazoles, organophosphates, piperazines, salicylanilides, substituted phenols and tetrahydropyrimidines. Of these, only the benzimidazole, albendazole, was effective against *Z. seriola* and none appeared to have an effect against *B. seriola*.

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