

## TESTING BLACK SOLDIER FLY LARVA MEAL AS A FEED INGREDIENT TO IMPROVE AQUARIUM DIET SUSTAINABILITY

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### Abstract

Research efforts are needed to decrease aquafeed manufacturer's dependency on fishmeal and to utilize alternative and more sustainable aquatic food sources (Glencross *et al.* 2007). Insect meal is considered an alternative, more sustainable source to fishmeal. Insects have different feeding habits that enable them to be reared on by-product waste with low water inputs (Sanchez-Muros *et al.* 2014). Enviro Meal (EnviroFlight, Maysville, KY), the alternative protein source that was used in this study, is derived from black soldier fly (BSF) larvae. When BSF meal was fed to European seabass at inclusion rates from 6.5-45% to reduce fishmeal, no differences were observed in growth performance or apparent digestibility of BSF meal (Magalhães *et al.* 2017). We hypothesize that no difference will be observed in palatability and growth parameters between fish fed with or without the inclusion of insect meal. Our objectives were: 1) test the palatability of a new, more sustainable, nutritionally complete gel diet for marine teleosts and 2) produce a more sustainable gel with the inclusion of insect protein meal and the reduction of fishmeal. The trial diet was formulated with insect meal as 30% of the final mix at the expense of fish meal. The total diet was offered at a ratio as fed at 33% complete gel product and 67% as a 50/50 mix of superba krill and clam. We utilized a group of young sailfin snappers (*Symphoricthys spilurus*) (population, n = 40).

Fish were weighed and measured, then sorted into groups of ten, by bodyweight (BW) and blocked into paired tanks by initial BW. Bodyweights and fork length were collected every four weeks; on days 0, 28, and 56 of the trial periods. Fish were acclimated to their tanks over seven weeks, while ensuring good consumption on the control diet before introduction of the test diet. Fish were fed either control or experimental diet to satiation, three times daily. The total amount fed per tank was recorded at each feed to track total daily feed intake. The study was a cross-over design, with each tank being fed both the control and experimental diets over repeated eight-week periods, with a four week wash-out period between treatment periods. There were no apparent differences in feed intake or final BW for the trial diets at the end of the study. Based on our initial results, we are planning further investigation into this product as a more sustainable diet item for fish species. Next steps in this investigation include testing higher inclusion rates of the BSF meal in the total diet formulation, testing the BSF meal in feed processing, and feeding the experimental diets to larger groups of fish for longer duration of time.

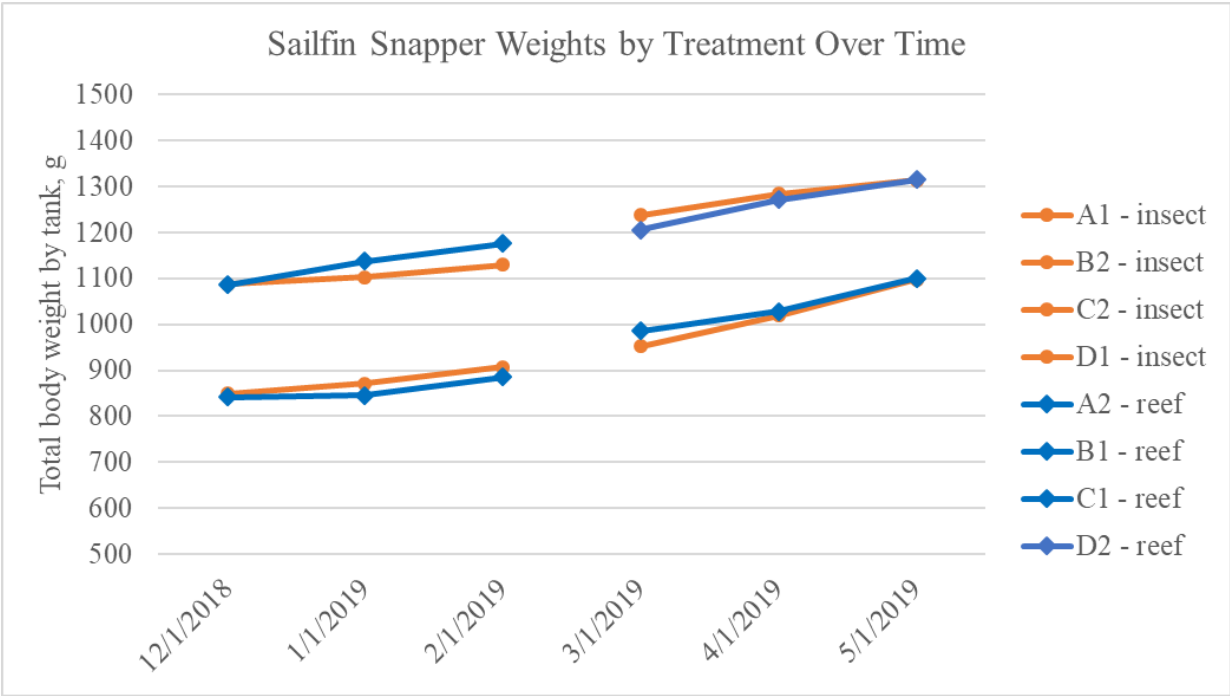
### **Acknowledgements**

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### **Literature Cited**

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Magalhães R, Sánchez-López A, Leal RS, Martínez-Llorens S, Oliva-Teles A, Peres H (2017) Black soldier fly (*Hermetia illucens*) pre-pupae meal as a fish meal replacement in diets for European seabass (*Dicentrarchus labrax*). *Aquacult* 476: 79-85.



<sup>1</sup>Treatments are listed by tank (letter) and period of the feeding study (1 or 2) with the diet fed (insect for the experimental diet and reef for the control diet).

**Figure 1.** Total body weights by tank of sailfin snapper (*Symphoricthys spilurus*) fed either control (reef) or experimental (insect) diet