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Live prey enrichment and artificial microdiets for larviculture of Atlantic red porgy *Pagrus pagrus*

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ABSTRACT

In the first experiment the effects of rotifer enrichment and feeding frequency on larval performance of red porgy *Pagrus pagrus* were studied. Larvae (2 days post-hatching = 2 dph) were fed s-type rotifers (~20 rotifers/mL) enriched with one of the four different treatment media: Rotifer Diet (microalgae *Nannochloropsis oculata* and *Tetraselmis chuii*), DHA Protein Selco, Algamac 3000 (*Schizochytrium* sp.) and Algamac + ARA (arachidonic acid). Larvae were fed daily at full ration or twice daily at half ration. Larval growth and survival (mean = 22.8%) were satisfactory through 16 dph under all treatments; however, resistance to hyposaline challenge (Survival Activity Index = SAI) was positively correlated ($P < 0.01$) with DHA concentration of rotifers, and SAI appeared highest in the Algamac + ARA treatment. In the second experiment the effects of *Artemia* enrichment on larval performance were compared from 18 dph through pre-metamorphosis (33 dph). Larvae were fed *Artemia* (0.5–3.0/mL) enriched with two different media Algamac 3000 and DC DHA Selco, or unenriched *Artemia* (control). Both media improved DHA levels in *Artemia* and growth and survival (36.7–54.6%) of larvae, while larvae fed unenriched *Artemia* showed poor growth and survival (5.2%). In the third experiment a University of North Carolina Wilmington microbound diet (MBD) and two commercial microdiets (Gemma Micro and Otohime) were evaluated. The MBD contained different protein sources (i.e., menhaden, squid and krill meal, soy protein concentrate) and attractants. Beginning 16 dph, live feeds and microdiets were co-fed to three treatment groups of larvae: (1) Gemma, (2) MBD, and (3) Otohime. Larval performance on the UNCW-MBD was comparable to the commercial microdiets, with no significant differences in larval survival, DHA, or total n-3 PUFA content through 32 dph. Results delineate more effective rearing protocols for larviculture of Atlantic red porgy juveniles.

1. Introduction

The red porgy *Pagrus pagrus*, also known as sea bream, silver snapper, or pink snapper, is a valuable marine finfish in the family Sparidae, inhabiting the Mediterranean Sea, the eastern Atlantic (from the British Isles to Senegal), and the western Atlantic (from North Carolina to Mexico and from Venezuela to Argentina) (Morris et al., 2008). An important component of the snapper–grouper complex in the coastal Atlantic off the SE US (particularly NC and SC), red porgy populations have declined severely (SAFMC, 2006, 2010; Vaughan and Prager, 2002), and stringent requirements for capture of red porgy have been established (SAFMC, 2006, 2010). Due to declining natural populations, high market value, and suitability for intensive culture in tanks and cages, red porgy are considered a promising species for farming in the Mediterranean (Kolios et al.,

Abbreviations: MD, microdiets; MBD, microbound diets; EFAs, essential fatty acids; PVC, polyvinyl chloride; LRTs, larval rearing tanks; 2 dph, 2 days post-hatching; EPA, eicosapentaenoic acid; DHA, docosahexaenoic acid; ARA, arachidonic acid; DPA, docosapentaenoic acid; ALA, alpha linolenic acid; MUFA, monounsaturated fatty acid; PUFA, polyunsaturated fatty acid; SFA, saturated fatty acid; TFA, total fatty acids; ANOVA, analysis of variance; FBW, final body weight; SAI, survival activity index; FAMEs, fatty acid methyl esters.

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