

## INFORMATION OF INTEREST

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Seaweeds make up 50 % of all mariculture production: [comments](#) by President of the International Seaweed Association

Tilapia [podcast series](#) (free): a development out of the North Carolina State University's "Practical Feeding Strategies" project providing useful information on tilapia aquaculture, primarily aimed at tilapia farmers, hatchery managers and students in the Philippines

European Aquaculture Technology & Innovation Platform, 3rd Stakeholders Meeting, February 3, 2009 - Ghent, Belgium: [presentations](#)

The do's and don't's of [submitting scientific papers](#).

Coping with Water Scarcity: what Role for biotechnologies?  
FAO 2008 Land and Water [Discussion Paper](#)

Estrella Santos, N. and C.E. Nauen (eds.), 2008. Catalogue of synopses of International S&T Cooperation (INCO) projects on challenges in fisheries, coastal zones, wetlands and aquaculture. [ACP-EU Fish.Res.Rep.](#), (17): 292 p.

Rice Fish Culture in China. 1995 treatise out of print but now [online version](#) thanks to IDRC Canada.

A short [handbook](#) on catfish feed for Nigeria. Jauncey et al., 2007  
AquaBreeding-ReproFish workshop, Paris, October 1-3, 2008: [workshop documents and presentations](#)

[IFFO datasheet](#): The importance of dietary EPA & DHA omega-3 fatty acids in the health of both animals and humans

[IFFO guide](#): the long chain omega-3 fatty acids, EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid) in fish oil

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ANALYSIS OF BACTERIAL POPULATIONS IN THE GUT OF DEVELOPING COD LARVAE AND IDENTIFICATION OF VIBRIO LOGEI, VIBRIO ANGUILLARUM AND VIBRIO SPLENDIDUS AS PATHOGENS OF COD LARVAE

Helen I. Reid, James W. Treasurer, Berit Adam, T. Harry Birkbeck-2009

Aquaculture 288(1-2): 36-43

Abstract:

Poor larval survival rates currently limit production in aquaculture and a better understanding of the bacterial flora in the larval digestive tract is essential to improving survival in hatchery reared larval fish. Identification of bacteria alone is insufficient, as the concentrations of key bacterial species may be important in determining survival. Here, we analysed bacteria, principally vibrios, in developing cod larvae from a Scottish hatchery. Six tanks of larvae were sampled weekly in parallel to monitor the microbial populations in larvae successively fed on rotifers and *Artemia* before weaning onto dry feed. When cod larvae were fed on rotifers the digestive tract microbiota was dominated by *Ruegeria/Roseobacter*, *Pseudoalteromonas*, and *Microbacterium* but when the diet was changed to *Artemia* over 90% of the microbiota consisted of vibrios. Polymerase chain reaction denaturing gradient gel electrophoresis (PCR-DGGE) analysis was used to identify the vibrios present and this showed that the microbiota was affected by changes in larval diet. Whilst feeding on *Artemia*, the larval digestive tract microbiota was dominated by *Vibrio alginolyticus*, but the population rapidly switched to one dominated by *V. splendidus* when larvae were weaned onto dry feed. Other *Vibrio* species were detected at lower levels at various times. During the survey, one tank experienced heavy mortalities associated with an elevated level of *Vibrio anguillarum*. The *V. anguillarum* isolates differed from those typically associated with mortalities in gadoid fish. Apparently healthy larvae from the tank experiencing heavy mortalities had a culturable microbiota almost equally represented by *V. anguillarum* and *V. logei*. Both species, as well as a *V. splendidus* strain isolated from turbot larvae, were pathogenic to cod larvae in laboratory experiments, and these vibrios could be targets for intervention to control the microbial flora of the larval digestive tract.

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#### CULTURE POTENTIAL OF THE RAZOR CLAM SOLEN MARGINATUS (PENNÁNT, 1777)

Fiz da Costa, Dorotea Martínez-Patiño-2009

Aquaculture 288(1-2): 57-64

Abstract:

The objective of this study was to determine whether *Solen marginatus* could be cultured to commercial size. Fertilized eggs measured 156.2 µm in diameter and they were surrounded by a 30-µm-thick chorionic envelope. Settlement occurred on day 9 when a length of 302.6 µm was reached. The percentage of settlement varied between 28.2 and 80.9%. Growth of post-set razor clam spats was described by the equation  $L = 0.006x1.644$ , where  $L$  = length in mm and  $x$  is the number of days of culture. The razor clam seed reached a length of 19.1 mm at 4 months. One-year-old juveniles measured 38.5 mm and commercial size was reached with three-year-old individuals (80.1 mm). Survival in the ongrowing experiment ranged between 50 and 83%. The life cycle of this species was closed, obtaining larvae from the individuals reared in the ongrowing experiment.

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#### POSSIBILITIES OF ARTIFICIAL INCUBATION OF SIGNAL CRAYFISH (PACIFASTACUS LENIUSCULUS DANA) EGGS AT HIGH DENSITIES AND REDUCED FLOW RATE USING FORMALDEHYDE AS ANTIFUNGAL TREATMENT

M. Sáez-Royuela, P.M. Melendre, J.D. Celada, J.M. Carral, A. González, R. González, V. García-2009

Aquaculture 288(1-2): 65-68

Abstract:

The aim of this study was to determine the possibilities of increasing egg density in artificial incubation using low flow rates. Eggs of signal crayfish (*Pacifastacus leniusculus*) were incubated at three densities: 6.6, 20 and 42 eggs cm<sup>-2</sup> and two flow rates: 0.5 and 1 l min<sup>-1</sup> (0.0095 l cm<sup>-2</sup> min<sup>-1</sup> and 0.019 l cm<sup>-2</sup> min<sup>-1</sup>, respectively). Formaldehyde doses of 3000 and 2500 ppm were

administered as antifungal treatment. In experiment 1, the best survival to stage 2 juvenile (84.3%) was obtained with the administration of 3000 ppm of formaldehyde at a density of 6.6 eggs cm<sup>-2</sup>, but differences were not significant either with a higher density (20 eggs cm<sup>-2</sup>) or with a lower formaldehyde concentration (2500 ppm). In experiment 2, the best final survival (88.8%) was obtained with the administration of 2500 ppm of formaldehyde at a density of 20 eggs cm<sup>-2</sup>, and a flow rate of 0.5 l min<sup>-1</sup> (0.0095 l cm<sup>-2</sup> min<sup>-1</sup>), without significant differences either with the same density and a flow of 1 l min<sup>-1</sup> (0.019 l cm<sup>-2</sup> min<sup>-1</sup>), or with the density of 42 eggs cm<sup>-2</sup> (around 86%). The progressive reduction of formaldehyde concentration we have tested may have found its limit at 2500 ppm since, although was shown to be effective, a light fungal growth could be observed. Nevertheless, with 3000 ppm the growth of fungi was kept out completely with densities up to 20 eggs cm<sup>-2</sup>. Antifungal treatment seems to be a key factor to make feasible artificial incubation of crayfish eggs at high densities such as 42 eggs cm<sup>-2</sup>, even with a limited water flow.

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#### QUANTIFICATION OF ANAMMOX ACTIVITY IN A DENITRIFICATION REACTOR FOR A RECIRCULATING AQUACULTURE SYSTEM

Ori Lahav, Iris Bar Massada, Dimitry Yackoubov, Ruth Zelikson, Noam Mozes, Yossi Tal, Sheldon Tarr-2009

Aquaculture 288(1-2): 76-82

Abstract:

The activity of anammox bacteria in a denitrification reactor in a recirculating aquaculture system (RAS) for gilthead seabream production was investigated. Organic matter, extracted from the pond's solid filter, was used as the electron donor and carbon source for the denitrification reaction. The reactor was operated at four solid retention times (SRT). At steady state, anammox activity showed similar activity at SRTs of 12.5, 8 and 6 days (approximately 35 mg N l reactor<sup>-1</sup> day<sup>-1</sup>), and a much lower activity of 12 mg N l reactor<sup>-1</sup> day<sup>-1</sup> at a SRT of 4 days, indicating that anammox bacteria were washed out of the reactor at SRT < 6 days. These results were corroborated by fluorescence in situ hybridization (FISH) that showed that at SRT of 12.5, 8 and 6 days the anammox bacteria population in the denitrification reactor was on the order of 10<sup>8</sup> cells ml<sup>-1</sup> as compared with 10<sup>6</sup> cells ml<sup>-1</sup> at SRT of 4 days.

The reportedly long cell division time of anammox bacteria together with the relatively short SRT for anammox washout in the denitrification reactor suggested that a substantial quantity of anammox bacteria were being supplied on a daily basis to the denitrification reactor with the solids captured in the pond's filter system. Since close-to-saturation conditions for oxygen prevailing in both the pond and the solids filter do not favor anammox growth, it was further conjectured that anammox bacteria propagate in fish intestines. This paper shows qualitative evidence that anammox bacteria are indeed present in significant quantities in both the feces of seabream fish and in the solids backwashed from the pond's filter.

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#### COMPARISON OF IN VITRO ANTIMICROBIAL SUSCEPTIBILITY IN FLAVOBACTERIUM PSYCHROPHILUM ISOLATED FROM RAINBOW TROUT FRY

Cavit Kum, Sukru Kirkan, Selim Sekkin, Ferda Akar, Murat Boyacioglu-2008

Journal of Aquatic Animal Health 20(4): 245-251

Abstract:

The aim of this study was to demonstrate the presence of *Flavobacterium psychrophilum* in the west Aegean region of Turkey and to evaluate the in vitro susceptibility of *F. psychrophilum* (isolated from the fry of rainbow trout *Oncorhynchus mykiss*) to seven antimicrobial agents, as determined by the disk diffusion and agar dilution methods. A total of 250 rainbow trout fry (weight = 2-5 g; total length = 3-6 cm) were examined, and 20 bacterial isolates were phenotypically identified.

Antimicrobial agents included in this investigation were amoxicillin–clavulanic acid (AMC), erythromycin (E), enrofloxacin (ENR), florfenicol (FFC), gentamicin (CN), oxytetracycline (OT), and sulfamethoxazole–trimethoprim (SXT). Disk diffusion and agar dilution methods were performed according to published standards. Minimum inhibitory concentration (MIC) ranges were determined using the agar dilution method for *F. psychrophilum* isolates. Resistance of *F. psychrophilum* to CN (disk diffusion method: 70%; agar dilution method: 95%), E (65%; 100%), and SXT (75%; 100%) was high using both methods. Resistance to ENR (10%; 15%) and FFC (25%; 25%) was low with both methods; MIC<sub>90</sub> (minimum concentration required to inhibit bacterial growth by 90%) was 4 µg/mL for ENR and 16 µg/mL for FFC. Ninety percent of the *F. psychrophilum* isolates were resistant to AMC based on the disk diffusion method, while only 15% of isolates showed resistance based on the agar dilution method. For OT, 20% of isolates were resistant based on disk diffusion, while 75% exhibited resistance based on agar dilution. The importance of susceptibility testing when facing an outbreak of *F. psychrophilum* at a fish farm is obvious; however, the discrepancies between testing methods for AMC and OT require further studies.

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#### ONTOGENETIC DIFFERENTIATION OF SWIMMING PERFORMANCE IN GILTHEAD SEABREAM (*SPARUS AURATA*, LINNAEUS 1758) DURING METAMORPHOSIS

G. Koumoundouros, C. Ashton, G. Xenikoudakis, I. Giopanou, E. Georgakopoulou, N. Stickland-2009

Journal of Experimental Marine Biology and Ecology 370(1-2): 75-81

Abstract:

The critical swimming speed (U<sub>crit</sub>) of gilthead seabream (*Sparus aurata*, Linnaeus 1875) was studied in two ontogenetic phases, early (13.7-18.7 mm total length, TL) and late metamorphosis (20.4-34.3 mm TL, after the full development of fin meristics and during squamation ontogeny), under four exercise temperatures (15, 20, 25 and 28 °C). Both the exercise temperature and the ontogenetic stage had a significant effect on the relative U<sub>crit</sub> (RU<sub>crit</sub>) of *S. aurata*, with the fish of early metamorphosis phase (E group) presenting significantly higher RU<sub>crit</sub> than those of the late metamorphosis stage (L group). This ontogenetic shift in swimming performance was accompanied by significant ontogenetic shifts of body shape and of muscle anatomy. Compared to the L group, *S. aurata* of the E group were characterized by a streamline body shape and significantly higher relative contribution of the slow-red muscle to the cross-sectional area of the body (31.0 ± 1.3% vs 12.0 ± 1.2% in the L group).

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#### INFLUENCE OF WATER TEMPERATURE ON MORPHOLOGICAL DEFORMITIES IN CULTURED LARVAE OF JAPANESE EEL, *ANGUILLA JAPONICA*, AT COMPLETION OF YOLK RESORPTION

Tadahide Kurokawa, Takuma Okamoto, Koichiro Gen, Susumu Uji, Koji Murashita, Tatsuya Unuma, Kazuharu Nomura, Hajime Matsubara, Shin-Kwon Kim, Hiromi Ohta, Hideki Tanaka-2009

Journal of the World Aquaculture Society 39(6): 726 -735

Abstract:

The occurrence of morphological deformities under different rearing water temperatures (18, 20, 22, 24, 26, 28, and 30 C) was examined in Japanese eel larvae. The rates of hatching and survival until yolk resorption at 22–26 C were higher than those at other water temperatures. Fertilized eggs never hatched at 18 and 30 C. The rates of occurrence of abnormal larvae reared at the water temperatures 24–28 C were lower than those at 20 or 22 C. Pericardial edema and lower jaw deformities occurred most frequently at lower temperatures (20 and 22 C). In contrast, the incubation temperature did not significantly affect the relative frequency of some neurocranial deformities and of spinal curvature. These results imply that the optimal temperatures for rearing Japanese eel eggs and embryos are 24–26 C from the viewpoints of survival and deformity.

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VIBRIO PARAHAEMOLYTICUS ASSOCIATED WITH MASS MORTALITY OF POSTLARVAL ABALONE, HALIOTIS DIVERSICOLOR SUPERTEXTA (L.), IN SANYA, CHINA

Lu Cheng, Jie Huang, Chengyin Shi, Kim D. Thompson, Bernard Mackey, Junpeng Cai-2009

Journal of the World Aquaculture Society 39(6): 746-757

Abstract:

Outbreaks of mass mortality in postlarval abalone, *Haliotis diversicolor supertexta* (L.), have swept across south China since 2002 and in turn have resulted in many abalone farms closing. Twenty-five representative bacterial isolates were isolated from a sample of five diseased postlarval abalone, taken 15 d postfertilization during an outbreak of postlarval disease in Sanya, Hainan Province, China in October 2004. A dominant isolate, referred to as Strain 6, was found to be highly virulent to postlarvae in an experimental challenge test, with a 50% lethal dose (LD50) value of  $3.2 \times 10^4$  colony forming units (CFU)/mL, while six of the other isolates were weakly virulent with LD50 values ranging from  $1 \times 10^6$  to  $1 \times 10^7$  CFU/mL, and the remaining 18 isolates were classified as avirulent with LD50 values greater than  $1 \times 10^8$  CFU/mL. Using both an API 20E kit and 16S recombinant DNA sequence analysis, Strain 6 was shown to be *Vibrio parahaemolyticus*. It was sensitive to 4 and intermediately sensitive to 5 of the 16 antibiotics used when screening the antibiotic sensitivities of the bacterium. Extracellular products (ECPs) prepared from the bacterium were lethal to postlarvae when used in a toxicity test at a concentration of 3.77 mg protein/mL, and complete liquefaction of postlarvae tissues occurred within 24 h postexposure. Results from this study implicate *V. parahaemolyticus* as the pathogen involved in the disease outbreaks in postlarval abalone in Sanya and show that the ECPs may be involved in the pathogenesis of the disease.

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THE EFFECTS OF STRESSFUL BROODSTOCK HANDLING ON HORMONAL PROFILES AND REPRODUCTIVE PERFORMANCE OF RHAMDIA QUELEN (QUOY & GAIMARD) FEMALES

Auren Benk Soso, Leonardo José Gil Barcellos, Maria José Ranzani-Paiva, Luiz Carlos Kreutz, Rosmari Mezzalira Quevedo, Marina Lima, Leonardo Bolognesida Silva, Filipe Ritter, Alexandra Calliari Bedin, Jovani Antônio Finco-2009

Journal of the World Aquaculture Society 39(6): 835-841

Abstract:

A stressful environment induces cortisol that might affect fish breeding and reproduction. In the present work, which aimed to mimic aquacultural conditions of the jundia (*Rhamdia quelen*) hatcheries in southern South America, females were submitted to normal or stressful handling and the effects of cortisol on serum levels of  $17\beta$ -estradiol (E2) and testosterone (T) were determined. In addition, the effect of stress on reproductive parameters such as eggs and swim-up fry production was also measured. Eight females from a group submitted to stressful handling (SH) conditions and eight females from a group with normal handling (NH) conditions were captured for blood sampling at D 0 and at D 1, 10, 20, 30, and 40 of the experiment. A typical cortisol response was observed in the SH females group in that they presented higher cortisol level in contrast to the NH female group, in all days sampled, except at D 0. In the 10th and 20th d, the E2 levels were lower in SH females, but cortisol levels were higher, suggesting an effect of cortisol on E2 production and/or release. Stressful handling appeared to affect both the number and the quality of the gametes because a lower number of oocytes was stripped from SH females, and from SH fertilized eggs, a lower number of viable swim-up fry was obtained to be transferred to earthen larviculture ponds. Taken together, the results indicated that stressful handling of broodstock impairs *R. quelen* reproduction.

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## USE OF CYCLOPOID COPEPOD APOCYCLOPS DENGIZICUS AS LIVE FEED FOR PENAEUS MONODON POSTLARVAE

Omidvar Farhadian, Fatimah Md. Yusoff, Suhaila Mohamed, Che Roos Saad-2009

Journal of the World Aquaculture Society 40(1): 22-32

Abstract:

In this study, the suitability of cyclopoid copepod *Apocyclops dengizicus* as a live food for black tiger shrimp, *Penaeus monodon*, postlarvae was investigated. After 14 d, *P. monodon* postlarvae (PL1) had survival rates of  $41.7 \pm 2.9\%$  (mean  $\pm$  SE),  $28.7 \pm 1.2\%$ ,  $56.3 \pm 3.7\%$ ,  $4.4 \pm 1.9\%$ , and  $2.8 \pm 1.0\%$  when fed *A. dengizicus* (CC), *Artemia nauplii* (AN), mixture of *A. dengizicus* and *Artemia nauplii* (CC + AN), artificial shrimp feed (SF), and microalga *Tetraselmis tetrahele* (TT), respectively. Specific growth rates (SGRs) of *P. monodon* were maximum ( $14.2 \pm 0.6\%/d$ ) in CC + AN, followed by CC ( $11.0 \pm 0.4\%/d$ ), AN ( $9.3 \pm 0.7\%/d$ ), SF ( $6.1 \pm 0.2\%/d$ ), and TT ( $6.0 \pm 0.5\%/d$ ). The total n-3 fatty acids of postlarvae increased from 20.6 to 25.8% when fed with CC, 28.8% with AN, and 29.0% with CC + AN. Better survival and SGRs of *P. monodon* postlarvae could be attributed to docosahexaenoic acid : eicosapentaenoic acid : arachidonic acid ratio of CC (10.2:3.2:1) diet. The results of this study showed that *A. dengizicus* has a potential to be used as a substitute live feed for *P. monodon* postlarvae because of better survival, growth, and high polyunsaturated fatty acids.

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## EVALUATION OF THE MICROALGAE PASTE VIABILITY PRODUCED IN A MOLLUSK HATCHERY IN SOUTHERN BRAZIL

Moira Nunes, Adriana Pereira, Jaime Fernando Ferreira, Fanny Yasumaru-2009

Journal of the World Aquaculture Society 40(1): 87-94

Abstract:

The present study was conducted to define a methodology to produce and store small-scale microalgae paste to be used in a mollusk hatchery. Microalgae were cultured in 500 L fiberglass tanks, under temperature of  $20 \pm 2$  C, Guillard f/2 culture medium, and continuous light intensity of 203–226  $\mu\text{mol photons}/\text{m}^2/\text{sec}$ . Cultures were centrifuged at 2000 g at the exponential growth phase. Microalgae cell quality after centrifugation and during storage was determined by analyses with Evan's blue stain and by counting the number of total marine bacteria. Treatments with and without additive were applied to the microalgae paste produced, which was distributed into 100 mL plastic containers, capped, and stored under refrigeration at  $4 \pm 1$  C. Results indicated that in the *Chaetoceros muelleri* paste, centrifugation did not damage the cells and the number of total marine bacteria reduced significantly from  $2.9 \times 10^6$  to  $8.3 \times 10^5$  colony-forming units per milliliter. *Chaetoceros muelleri* and *Chaetoceros calcitrans* pastes stored with addition of 0.1% ascorbic acid had a shelf life shorter than 2 wk. For the treatment without additive, results with Evan's blue stain showed that cells (99%) remained viable until the sixth week of storage for *C. muelleri* and seventh week of storage for *Skeletonema* sp. and *C. calcitrans*. The number of bacteria did not increase during storage for *C. calcitrans* and *Skeletonema* ( $P > 0.05$ ). For *C. muelleri*, an increase in bacteria ( $P < 0.05$ ) was observed after the sixth week of storage. This study demonstrated the feasibility to produce and store microalgae paste for a period of 2–8 wk, which allows it to be used as food source and also optimizes the use of microalgae cultured in laboratory.

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## GROWTH OF CHAETOCEROS CALCITRANS IN SEDIMENT EXTRACTS FROM ARTEMIA FRANCISCANA CULTURE PONDS POINTS TO PHOSPHORUS LIMITATION

Chau Minh Khoi, Vo Thi Guong, Nguyen Van Hoa, Patrick Sorgeloos, Roel Merckx-2009

Journal of the World Aquaculture Society 40(1): 104 - 112

Abstract:

*Chaetoceros calcitrans* is one of the most suitable algal strains to feed *Artemia* because of its appropriate size, digestibility, absence of toxins, and nutritional value. Apart from light and temperature, the growth of *C. calcitrans* in *Artemia* ponds in the Mekong Delta of Vietnam depends

on the supply of nutrients, especially nitrogen (N) and phosphorus (P) released from the pond bottom sediments. This study was carried out to investigate the growth of *C. calcitrans* in relation to the availability and proportions of N and P present in the extracts of Artemia pond bottom sediments. The results show that the sediments are depleted in dissolved reactive P (DRP) and highly unbalanced in terms of the ratio of dissolved inorganic N (DIN) to DRP. Algal density and biomass were significantly higher in the extracts with DRP concentrations above 0.1 mg P/L and DIN/DRP ratios below 100.

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#### DOCOSAHEXAENOIC ACID (DHA) REQUIREMENT OF LARVAL BROWN SOLE PLEURONECTES HERZENSTEINI

Nobukazu Sato, Toshio Takeuchi-2009

Nippon Suisan Gakkaishi 75(1): 28-37

Abstract:

We examined the effect of dietary docosahexaenoic acid (DHA) on larval development, growth rate, survival rate, and starvation resistance of brown sole *Pleuronectes herzensteini* larvae fed live foods (rotifer or *Artemia* nauplius) enriched with different levels of DHA. In Expt. I, one-day-old larvae were fed rotifers *Brachionus rotundiformis* enriched with four levels of DHA for 15 days at 15°C. In Expt. II, 20-day-old larvae were fed *Artemia* nauplii enriched with four levels of DHA for 27 days at 15°C. The fatty acid profile of the larvae reflected the fatty acid composition of their diet in both experiments. In Expt. I, larval survival rate increased with the DHA level in rotifers increasing from 0 to 0.6% on a dry matter basis, but decreased with the DHA level from 0.6 to 3.3%. This suggested that the DHA requirement of brown sole larvae during the rotifer feeding period might be 0.6% on a dry matter basis of rotifers. Meanwhile, in Expt II, larval survival rate improved markedly in response to the increase of DHA content in *Artemia*, and reached a plateau from 1.4 to 2.8% of DHA level in *Artemia* on a dry matter basis. This characteristic is exceptional and unique in larvae of marine species. It was also demonstrated that DHA in live foods promoted larval development but survival was clearly depressed in larvae fed rotifer with high percentages of DHA (3.3%).

(Hokkaido Mariculture Fisheries Experiment Station, Muroran, Hokkaido 051-0013, Japan)

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#### ONTOGENETIC CHANGES OF BODY DENSITY AND VERTICAL DISTRIBUTION IN REARING TANKS IN GREATER AMBERJACK SERIOLA DUMERILI LARVAE

Kazuhisa Teruya, Katsuyuki Hamasaki, Hiroshi Hashimoto, Toshiyuki Katayama, Yoshiro Hirata, Koya Tsuruoka, Tomohiro Hayashi, Keiichi Mushiake-2009

Nippon Suisan Gakkaishi 75(1): 54-63

Abstract:

To obtain basic knowledge on sinking death syndrome which has been considered to be one of the causes of early mortality during the seedling production of greater amberjack, ontogenetic changes of larval body density were examined. A rearing experiment was conducted to investigate the effects of aeration rate (0.1-2.0 L/min) on the vertical distribution, feeding, survival, growth and initial swim bladder inflation of larvae reared in 500-L tanks for 10 days post hatching. Greater amberjack larvae showed negative buoyancy. In tanks with aeration of 0.1-1.0 L/min, larvae were distributed in the upper layer in the daytime and on the tank bottom in the nighttime after 3 days post hatching. Excessive aeration (2.0 L/min) caused larvae to disperse in tanks. However, feeding amounts, and rates of survival, growth and initial swim bladder inflation of larvae were low in those tanks with rearing seawater of high turbulence. To prevent the larvae from sinking to the tank bottom, rearing techniques with less physical stress on larvae should be developed.

(Stock Enhancement Technology Development Center, National Research Institute of Aquaculture, Fisheries Research Agency, Saiki, Oita 879-2602, Japan)

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