Potential of silver pomfret (*Pampus argenteus*) as a new candidate species for aquaculture

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Research on developing the culture technology for the silver pomfret Pampus argenteus Euphrasen was initiated for the first time during 1998 by the Mariculture and Fisheries Department (MFD) of Kuwait Institute for Scientific Research (KISR) and succeeded in larval rearing of this species with the eggs collected from the wild (Almatar et al., 2000). Since then several investigations have been carried out at MFD, Kuwait, relevant to hatchery larval rearing (Al-Abdul-Elah 2001), feed requirement and growth under tank culture conditions (Cruz et al., 2000; Almatar and James 2007), breeding under domesticated culture conditions (James and Almatar 2007) and health management (Azad et al., 2007) of this species. In more recent years, during 2005, East China Sea Fisheries Research Institute and Shanghai Fisheries University in China have initiated research on the culture of silver pomfret and has succeeded in the larval rearing of this species based on the eggs collected from the wild (personal communication, Huang Xu-xiong, Shanghai Fisheries University, China). Other countries in Asia are also showing interest in developing the culture technology for this species because of its depleting wild stock, market demand and high price.

Silver pomfret fingerlings produced in the hatchery.

Hatchery and larval rearing

The hatchery performance of silver pomfret shows that it is possible to produce about 3.5 g size fingerlings for grow-out stocking within 50 days after hatching from the egg. Another advantage is that the larvae readily accept inert feed after a brief exposure to Artemia nauplii. This makes it easy to wean them to formulated feeds, enabling reduction in usage of costly live feed such as Artemia nauplii during the larval rearing period. Furthermore, unlike other carnivorous marine fish species, there is no cannibalism during the larval rearing period, making this species easier to handle. Research efforts have improved the survival rate of larvae from less than 1% during 1998 and 1999 to about 4% as of 2000 due to the improvements made in the administration of live feed in the hatchery. It is anticipated that further research will continue to improve larval survival and facilitate commercial ventures.

Growth performance

To understand the optimum growth of silver pomfret, species specific formulated feed is required but it has not yet been developed. However, investigations carried out at MFD, Kuwait with an objective of screening the commercially available formulated feeds for this species have observed the suitability of salmon feed for the grow-out culture of silver pomfret. Research carried out at MFD during 2004 enhanced the growth rate of this species by using feed additives along with salmon feed and achieved growth rates of up to 1.5 g/fish/day. Recent investigations carried out on the growth performance of silver pomfret under tank culture conditions, using tank capacities varying from 4m^3 to 125m^3, show that the growth is fast in the initial period before winter under Kuwait's climatic conditions. Under ambient seawater culture conditions the average body weight increased from 3.7g to 81.9g within three months of culture. The growth rate is significantly higher during summer and early winter when the ambient seawater temperature is above 26°C. In general, the growth rate of fish in relation to the tank culture water temperature shows a linear relation in which the fish growth rate increases with temperature up to 30°C. After 14 months of grow-out the combined male and female size ranged from 74-315 g (mean size 182.7±50.5 g). Wide size variation occurred in the population due to the smaller size of males compared to that of females. Furthermore, the males dominate in the population constituting 60-70% during the culture trials.

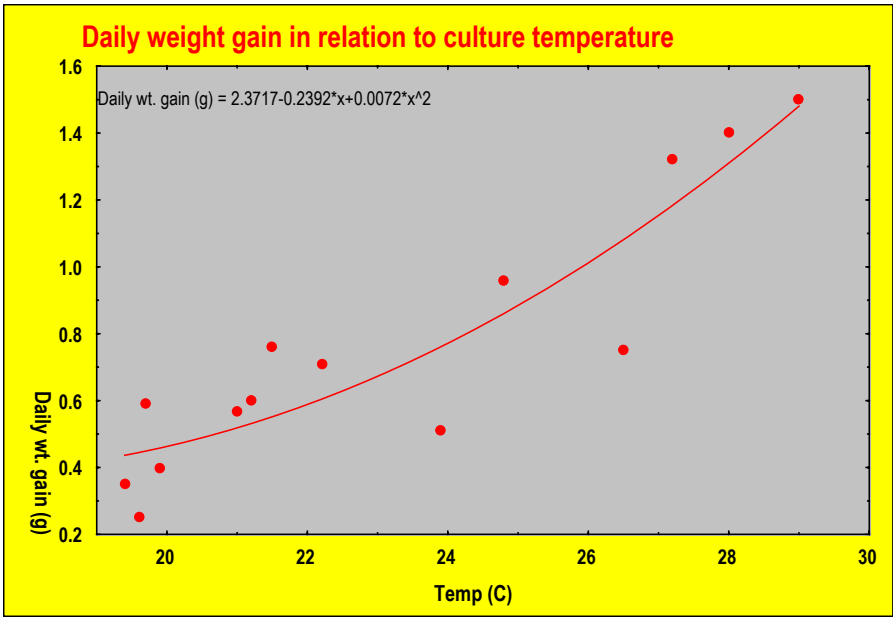
The grow-out studies under tank culture conditions show that it is possible to obtain marketable size fish of over 250 g size after 20 months (1.8 years) culture period. This growth rate is considerably higher than the estimated

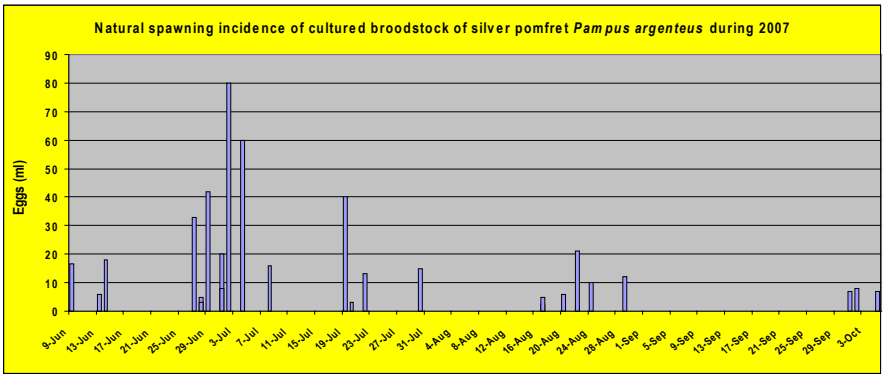
Silver pomfret eggs from the cultured brood-stock and hatching out of larvae.

age of 2.86 years requirement for the wild stocks of silver pomfret to reach about 300 g size (males and females combined) under Kuwait's climatic conditions. The results obtained till now are very encouraging to identify silver pomfret as a potential new candidate species for aquaculture.

Broodstock development and spawning

The present cultured brood-stocks of silver pomfret at MFD/KISR originated from the wild eggs collected during 2004. Spawning of cultured silver pomfret under captive culture conditions was a challenging issue and remained elusive over the years untill 2006. Overcoming some of the technical constraints the MFD/KISR made a breakthrough for the first time during 2006 in achieving natural spawning of two-year old cultured brood stocks kept in 125 m3 capacity tanks. Although matured males were present in the population, the eggs were not fertilized during 2006. However, during 2007 fertilized eggs were obtained through natural spawning in the brood-stock holding facility as well as through hormone induction. This has enabled us to produce hatchery reared progeny of this species for the first time and showed the possibility of breeding the fish for commercial applications. Furthermore, breeding the fish under culture conditions will enable commercial hatchery production and farming of this species to meet market demand. Aquaculture of silver pomfret will alleviate the pressure on capture fishery and thereby allow for the recovery of its rapidly depleting wild stocks.





Prospects

The temperature dependent growth of silver pomfret shows the possibility to achieve increased growth under tropical climatic conditions (26-30°C) thereby shortening the grow-out culture period. This will be a considerable economic advantage for commercial farming since this species is widely distributed in the tropical waters and fetches a very high market price. Further research requirements augment for refinements to enhance the egg quality and spawning of domesticated broodstock, hatchery larval survival and grow-out production assessments using earthen ponds and sea-cages.

References

Al-Abdul-Elah K.M., Almatar S., Abu-Rezq T. and C.M. James. 2001. Development of hatchery technology for the silver pomfret *Pampus argenteus* (Euphrasen): effect of microalgal species on larval survival. Aquaculture Research, 32: 849-860.

Almatar S.M., Al-Abdul-Elah K. and T. Abu-Rezq. 2000. Larval developmental stages of laboratory-reared silver pomfret *Pampus argenteus*. Ichthyological Research, 47: 137-141.

Almatar S.M. and C.M. James. 2007. Performance of different types of commercial feeds on growth of juvenile silver pomfret, *Pampus argenteus*, under tank culture conditions. Journal of the World Aquaculture Society, 38: 550-556.

Azad I.S., Al-Marzouk A., James C.M., Almatar S. and H. Al-Gharabally. 2007. Scuticociliatosis-associated mortalities and histopathology of natural infection in cultured silver pomfret (*Pampus argenteus* Euphrasen) in Kuwait. Aquaculture, 262: 202-210.

Cruz E.M., Almatar S., Abdul-Elah K. and A. Al-Yaquout. 2000. Preliminary studies on the performance and feeding behaviour of silver pomfret (*Pampus argenteus* Euphrasen) fingerlings fed with commercial feed and reared in fiberglass tanks. Asian Fisheries Science, 13: 191-199.

James C.M. and S. Almatar. 2007. A breakthrough in the spawning of domesticated silver pomfret. Aquaculture Asia-Pacific, 3 (1): 26-28.