Effect of stocking density and photoperiod on growth and survival in cultured early juvenile pot-bellied seahorses *Hippocampus abdominalis* Lesson, 1827

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**Abstract**

The effect of stocking density and photoperiod on *Hippocampus abdominalis* was examined in this study. Stocking densities of 45, 30, 15 and 5 seahorses 3 L⁻¹ were tested on newborns. Growth and survival were independent of stocking density. A second stocking-density experiment aimed to remove the effect of an early mortality experienced in experiment 1 using older juveniles at 25, 15 and 5 seahorses 3 L⁻¹. There were no differences in the parameters measured. Also, the effect of photoperiod was investigated on seahorses cultured under 24:00, 16:08 and 08:16 (1:1) photoperiods. A single *Artemia* meal was delivered at 10:00 hours. Survival and body growth in 16:08 and 08:16 hours were higher than in 24:00 hours. In a second experiment, seahorses were cultured in the photoperiod and conditions described for experiment 1, except they were fed twice the amount in two meals delivered at 10:00 and 16:30 hours. The seahorses in 16:08 hours showed better growth than the other treatments, but there were no differences in survival. These results suggest that early juvenile *H. abdominalis* can be cultured at higher stocking densities than previously reported, without compromising growth and survival, and when feeding was not limiting, grew better in an extended photoperiod (16:08) but not in 24:00 hours.

**Keywords:** early juvenile, pot-bellied seahorse, stocking density, photoperiod, survival, growth

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**Introduction**

From the range of factors involved in fish culture, the manipulation of stocking density and photoperiod are considered useful tools for the optimization of culture practices (Tucker 1998). The use of high stocking densities in marine fish culture is required for cost-efficient commercial production of juveniles (Daniels, Berlinsky, Hodson & Sullivan 1996). However, the actual effect stocking density has on fish is species specific as it can be negative, positive or there may be no apparent effect at all (Woods 2003b). Seahorse density in their natural environment tends to be low with *Hippocampus abdominalis* among the species with the lowest mean densities recorded of 0.007 individuals m⁻² (Foster & Vincent 2004). However, commercial scale *H. abdominalis* culture is successfully conducted at a maximum stocking density of 100 adults in 1000 L tanks (Seahorse World, pers. comm.). There is considerable information on seahorse culture. However, few studies have focused in early stages due to the elevated possibility of high mortalities. A major constraint in the development of marine fish culture has been 'early stage' mortalities, which appear as an interaction of various factors such as chronic starvation (Shackley, Talbot & Cowan 1993) and negative social interaction (Hatzithambasou, Pasputis, Houbar, Kestemont, Stefanakis & Kentouri 2002).

The intensive culture of marine fish larvae also presents problems, such as poor water quality. The deterioration of the culture environment can occur