PANAMJAS
Pan-American Journal of Aquatic Sciences

# Size and number of newborn juveniles in wild *Hippocampus reidi* broods

ANA CECÍLIA GIACOMETTI MAI[1] & DANIEL LOEBMANN[2]

[1]*Laboratório de Ictiologia, Universidade Federal do Rio Grande - FURG, Av Itália km 8, CEP 96201-900, Rio Grande, RS, Brazil. E-mail: anacecilia_mai@yahoo.com.br*
[2]*UNESP, Rio Claro – SP, Instituto de Biociências, Laboratório de Herpetologia. Av. 24A, 1515, Bairro Bela Vista, CEP 13506-900 Rio Claro, SP, Brazil. E-mail: contato@danielloebmann.com*

**Abstract.** Four births of *Hippocampus reidi* Ginsburg, 1933 were monitored for the first time under natural conditions. This study provides the fish estimate of fecundity in the wild, which is an important parameter for assessing population dynamics and management strategies.

**Key words:** Seahorse, reproduction, fecundity, newborn size.

**Resumo. Número e tamanho dos recém-nascidos de *Hippocampus reidi* em ambiente natural.** Quatro eventos de nascimento de *Hippocampus reidi* Ginsburg, 1933 foram acompanhados pela primeira vez em ambiente natural. Este estudo traz a estimativa da fecundidade da espécie em ambiente natural, que é um importante parâmetro para avaliar a dinâmica populacional e estratégias de manejo.

**Palavras-chave:** Cavalo-marinho, reprodução, fecundidade, tamanho dos recém-nascidos.

Total reproductive success, ideally defined as the lifetime total offspring to reach maturity (i.e. to be able to breed), is the product of fecundity (number of offspring produced per mating event), number of mating events per season, adult reproductive life span and offspring survival (Clutton-Brock 1988). For seahorses, underwater surveys and catch data has been recently utilized in models to estimate the duration of the reproductive season, female spawning frequency, male brooding frequency, and batch fecundity (Curtis 2007).

In general, in most of the seahorses species, the males release about 100 - 300 young per pregnancy, but brood size can range from as few as five, for the small species *H. zosterae*, to approximately 2000 young by a single *H. ingens* male (Foster & Vincent 2004). The present study measures the number and size of juvenile *H. reidi* under natural conditions.

During the period of December 2006 to March 2007, throughout visual search method in the borders of the Camurupim River estuary, Piauí state, Brazil (UTM 0230727, 9676724; 24 M zone; Datum WGS 84), males found with distended pouch were encaged and monitored daily, until the offspring birth. The cage was rectangular with dimensions of 30 x 30 x 45 cm, covered with mesh of 0.5 mm, and containing an artificial holdfast for the male to grasp. The algae *Caulerpa sertularioides* or *Enteromorpha* sp. (and its associated fauna) were offered in order to complement the diet of the seahorses. Also, the cage was cleaned daily to avoid the mesh clogging by micro algae and sediment. This research was authorized by Brazilian Institute of Environment and Renewable Natural Resources (IBAMA - license number 10682-1).

From each male studied, the following parameters were taken: the height of the individuals measured according to Curtis & Vincent (2006) and the size of the brood pouch. After giving birth, the male was released to the same place where it had been found. Simultaneously, the total number of newborns was recorded. Ten individuals per brood were randomly chosen and photographed with Digital Machine (Cannon A620). The photographs were analyzed with the software *Image Tools* for Windows v. 3.0, making it possible to record the size of newborns. After this procedure, the offspring

were released in the environment.

During this study, three pregnant males were monitored. In order to avoid pseudo-replication, only the first brood recorded for each male was included in the analysis, recognized by the presence of nature tags. The monitored males ranged in height from 15.1 to 16.5 cm (mean 15.6 cm) and the newborns from 0.44 to 0.66 cm (mean 0.54 ± 0.051 cm; n= 30). Offspring number ranged from 202 to 652 (mean 375 ± 242.4; n= 3) (Table I).

**Table I.** Morphometric data of *Hippocampus reidi* from each reproductive male and their respective offspring, birth date, and captivity period of the males in the cage.

| | A | A | B | C |
|---|---|---|---|---|
| Height (mm) | 151 | 152 | 140 | 165 |
| Pouch length (mm) | 31.1 | 31.3 | 30.3 | 35.6 |
| Birth date (month/day/year) | 12/29/2006 | 02/09/2007 | 01/06/2006 | 03/15/2007 |
| Days in the cage | 3 | 1 | 6 | 6 |
| Offspring number | 202 | 274 | 652 | 271 |
| Mean offspring height (mm) | 5.4 | 4.9 | 5.1 | 5.8 |
| Standard deviation in offspring height | 0.38 | 0.61 | 0.41 | 0.56 |
| Range in offspring height (mm) | 5-5.9 | 4.1-6.1 | 4.4-5.7 | 5-6.6 |

There is no published data which describes the reproduction of *H. reidi* in the wild (Rosa *et al*. 2002). On laboratorial conditions the number of offspring ranged from 1000 to 1536 and measured approximated 0.7 cm for *H. reidi* samples from latitude 13°N (Vincent 1990). So, the fecundity and the mean height of the newborns found in this study are lower to those previously recorded. It is expected a relationship between latitude and several life-history variables, mainly because environmental factors such as temperature and photoperiod that vary with latitude are known to affect the physiological function in many species (Thresher 1988). According to Foster & Vincent (2004) the size of the adults, eggs, and young increase with increasing latitude, although brood size does not.

The male A had two events of pregnancy monitored, with a number of 202 and 274 offspring respectively, and showed a time interval of 42 days between each born. The breeding season of *H. reidi* extends for at least eight months (Vincent 1990). In most study sites from Brazil *H. reidi* has been reported as a species reproductively active year-round, however, peaked from October to February (summer months) (Rosa *et al.* 2007). According to Silveira (2000), which studied this species under laboratorial conditions, a male is able to mate two days after the birth of offspring and its pregnancy lasted from 12 to 20 days, depending on the water temperature. In this way, it is not possible to conclude if the gap of 42 days between the pregnancies of male A could characterize a consecutive pregnancy.

The morphometric comparison of an adult male with a newborn (Fig. 1a, b) shows that although embryos and adults are similar in the external aspect, some measurements showed an expected and pronounced non-proportionality. For example, although the newborns were 26 times smaller than adults in height, juvenile head length, and snout diameter were on average only 18 and 11 times smaller, respectively (Table II). This non-proportionality of newborn is important once it allows the capture of bigger prey from the mesoplancton (0.2-20 mm), as can be seen for many other fish species.

**Table II**. Length relationships of adults and newborns *Hippocampus reidi*. All measurements are in millimeters.

| | Adult | Newborn | Adult/newborn |
|---|---|---|---|
| Height | 136 | 5.14 | 26 |
| Head length | 32.8 | 1.86 | 18 |
| Trunk length | 56.1 | 1.66 | 34 |
| Tail length | 69.4 | 2.46 | 28 |
| Snout diameter | 4.6 | 0.42 | 11 |

Evidence suggests that many seahorse populations are declining due to unsustainable exploitation and more seahorse species have been included in the World Conservation Union red list of threatened species (IUCN 2007). Also, the genus *Hippocampus* was listed by the Convention on International Trade in Endangered Species of Wild Fauna e Flora (CITES 2004). To the date, the conservation status of *Hippocampus reidi* is considered as 'data deficient' for IUCN's red list. For this reason, these findings may contribute to the development of effective fisheries management strategies for this species.

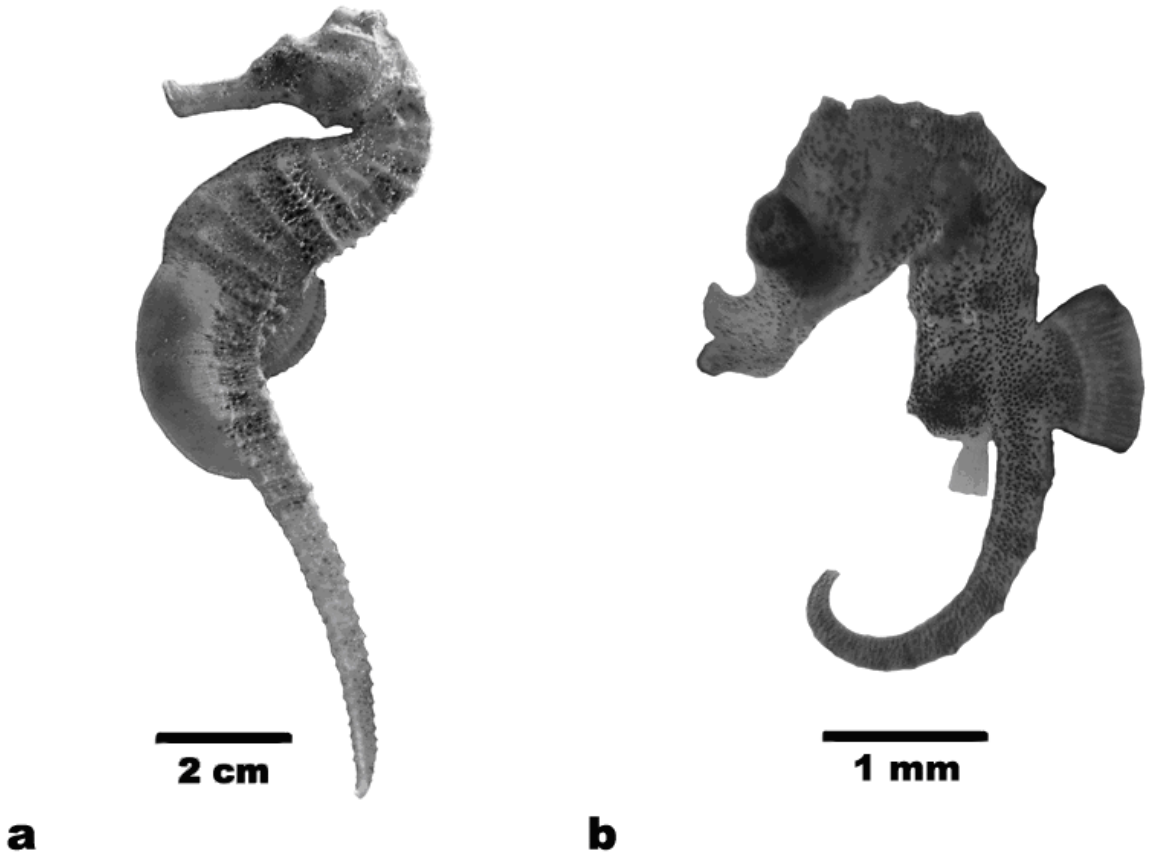


**Figure 1.** Specimens of *Hippocampus reidi*: a) brooding male and, b) newborn.

## Acknowledgments

We are very thankful to Maria Cristina Oddone (Secretaria Especial de Aqüicultura e Pesca (SEAP), Brasília, DF) and Mônica G. Mai (Universidade Federal de São Carlos) for revising and improving the grammar and style of the manuscript. To unidentified referees for valuated suggestions on earlier versions of the manuscript. This study was support for financial recourses from PADI-Foundation. ACGM was supported by master degree scholarship from the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior (CAPES) and DL is supported by doctoral scholarship from the Conselho Nacional de Pesquisa e Desenvolvimento (CNPq).

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Received February 2008
Accepted February 2009
Published online April 2009