

# Establishing culture parameters for noble crayfish (*Astacus astacus*, L.) in recirculating aquaculture systems

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## Introduction

A consumer and restaurant inquiry indicates there's a potential market for locally produced indigenous crayfish in Belgium and therefore crayfish culture might be an interesting activity regarding agricultural diversification.

In its Aquaculture Research Facility (Aqua-ERF), the University College KAHO Sint-Lieven is investigating the technical requirements for the production of noble crayfish in RAS up to consumption size. Meanwhile, the University College of Brussels (HUB) is making an economic feasibility study for noble crayfish production in Belgium.

A first trial was conducted on one summer old *A. astacus*, testing different stocking densities. Although the high density production of crayfish may result in a lower production cost per animal, the cannibalistic nature of noble crayfish and aggressive behavior may become problematic if stocking densities are too high. Therefore, growth, survival and cheliped loss were evaluated for three different stocking densities.



## Materials and Methods

- 1 350 one summer old noble crayfish (ABW:  $1.83 \pm 0.64$  g), sex ratio:  $\pm 50\%$  male/ $50\%$  female;
- nine tanks ( $0.5 \text{ m}^2/1 \text{ m}^3$  each), all connected to a RAS;
- 3 different densities ( $100, 300 \text{ \& } 500 \text{ m}^{-2}$ ); 3 replica's per treatment;
- PVC pipes ( $32 \times 60 \text{ mm}$ ) providing one hiding place per individual;
- water temperature  $18\text{--}20^\circ\text{C}$ , photoperiod: 24h light;
- ad libitum feeding with dry crayfish feed, feed leftovers were siphoned daily;
- after 111 days, individual weight, cheliped loss and survival were measured;
- logistic regressions (proc genmod, SAS 9.2) evaluated the effect of density on each parameter.



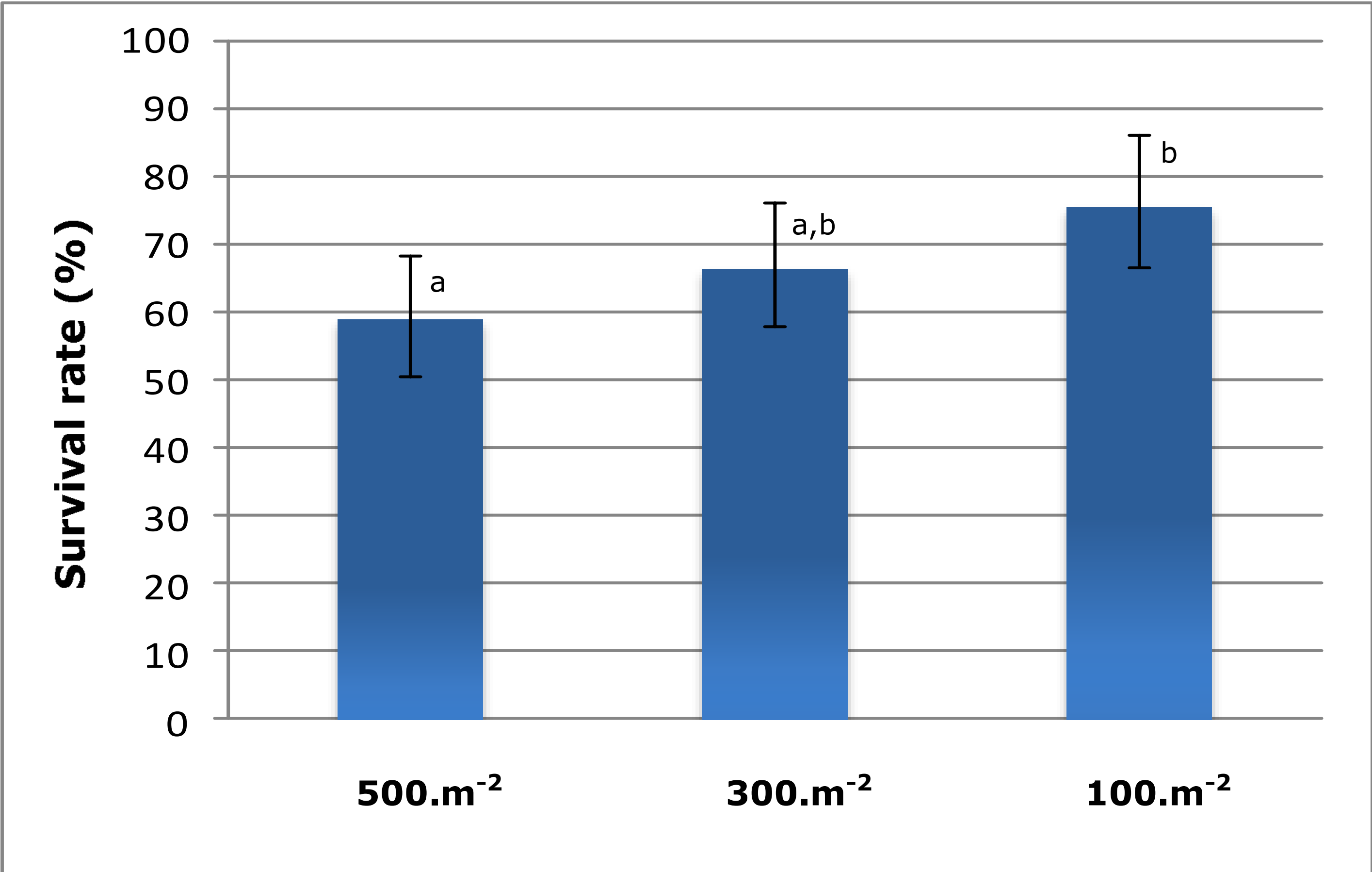
## Results

- Density had a significant effect on survival rate. Survival was lower in the highest density compared to the low density treatment ( $p=0.036$ );
- Loss of chelipeds was observed in all treatments. Although no significant difference was found between different densities, the highest density did show the highest percentage of cheliped loss;
- The different densities showed no significant differences in average body weight gain or specific growth rate.

	100.m <sup>-2</sup>	300.m <sup>-2</sup>	500.m <sup>-2</sup>
Survival (%)	75.51 $\pm$ 0.04 <sup>a</sup>	66.21 $\pm$ 0.06 <sup>a,b</sup>	58.67 $\pm$ 0.01 <sup>b</sup>
Cheliped loss (%)	18.21 $\pm$ 0.15	21.10 $\pm$ 0.06	27.95 $\pm$ 0.01
ABW gain (g)	1.19 $\pm$ 0.10	1.14 $\pm$ 0.10	1.00 $\pm$ 0.05
SGR (%.day <sup>-1</sup> )	0.47 $\pm$ 0.03	0.46 $\pm$ 0.03	0.41 $\pm$ 0.02

Table 1: Final results per stocking density (average  $\pm$  stdev)

### Survival rate per treatment



## Discussion

A high stocking density for noble crayfish production seems possible at this life stage. However, stocking density clearly affected survival rate. An economic analysis will be necessary in order to determine which survival rate and stocking density will be required to be financially feasible.

Although the other measured parameters - cheliped loss, weight gain and SGR - weren't significantly affected by density, they do show a trend of lower performance and a larger influence of agonistic behavior at higher densities. The possible influence of density on different production parameters should be taken into account when producing noble crayfish.

As crayfish grow and mature, optimal stocking densities will most likely become much lower. In order to determine the optimal stocking density in later life stages, an other trial has been started to compare different stocking densities for 3 to 4 summer old noble crayfish.

## Acknowledgement

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