# EXPLORING THE EFFECT OF AMINO ACIDS AS POTENTIAL METAMORPHOSIS INDUCERS IN *Venerupis corrugata* LARVAE

Sandra Joaquim[1,2*], Ana Rato[1,3], Marisa Castro[1], Eric Guévélou[4], Andreia Cruz[4], Domitília Matias[1,2]

[1]Portuguese Institute for Sea and Atmosphere, I. P. (IPMA, IP), 8700-305, Olhão, Portugal [2]Interdisciplinary Centre of Marine Environmental Research (CIIMAR), University of Porto, Terminal de Cruzeiros do Porto de Leixões, Av. General Norton de Matos s/n, 4450-208 Matosinhos, Portugal; [3]CCMAR, University of Algarve, Campus of Gambelas, 8005-139, Faro, Portugal; [4]Oceano Fresco S.A, Porto de Abrigo, 2450-075 Nazaré, Portugal

*E-mail: sandra@ipma.pt

## Introduction

- In bivalves, settlement and metamorphosis were critical steps, usually characterized by high mortality, representing the most challenging events in bivalve hatchery production.
- Chemical compounds, like catecholamines (e.g. epinephrine) and neurotransmitters (e.g. γ-aminobutyric acid (GABA), and serotonin) were used to induce settlement and metamorphosis.
- Depending on their concentration and exposure time, these compounds may be toxic to the larvae and might not be easily affordable.

***Objective***: Explore the role of some amino acids, namely the precursors of the catecholamines (L-tyrosine and L-phenylalanine) and serotonin (L-tryptophan) as potential metamorphosis inducers in larvae of the pullet carpet shell (*Venerupis corrugata*).

## Material and Methods

*V. corrugata* larvae were obtained from Oceano Fresco® and transferred to the Molluscan Experimental Station of Tavira (EEMT, IPMA, I.P), where they were kept until they were competent to settle and metamorphose (12 days). Competent larvae were placed in Petri dishes (in triplicate; 100 larvae/10 ml), with filtered and UV-treated seawater, and fed once a day. Larvae were exposed to amino acids and neurotransmitters:

**Amino acids ($10^{-5}$M):**
- L-tyrosine;
- L-phenylalanine;
- L-tryptophan

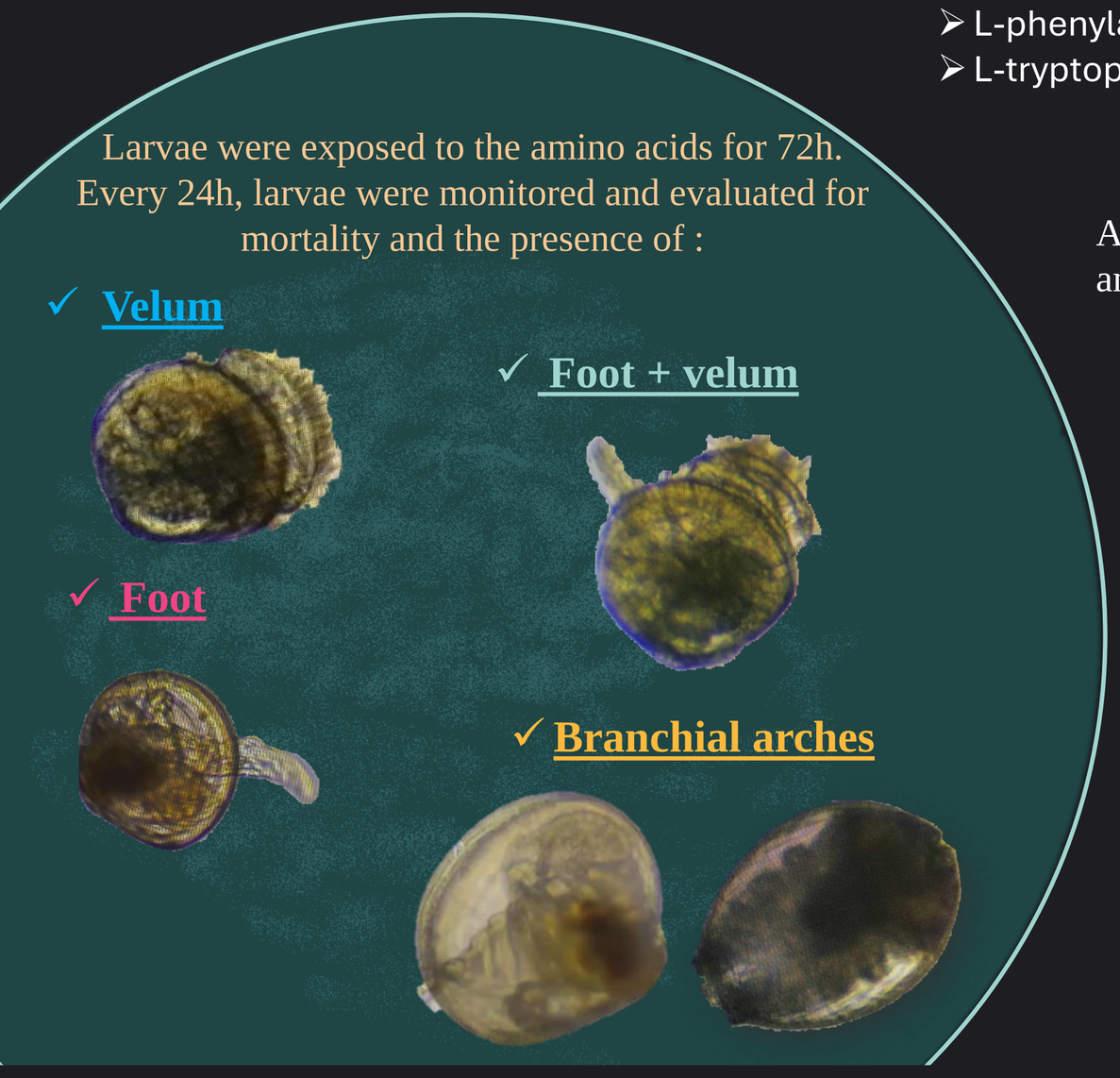
**Neurotransmitters ($10^{-2}$M; $10^{-4}$M; $10^{-6}$M):**
- Epinephrine hydrochloride (adrenaline)
- γ-aminobutyric acid (GABA)

**Control:**
- Seawater with no stimulus

A larva was considered to have undergone metamorphosis when it lost its velum, and it showed a completely formed and functional foot.

Larvae were exposed to the amino acids for 72h. Every 24h, larvae were monitored and evaluated for mortality and the presence of :

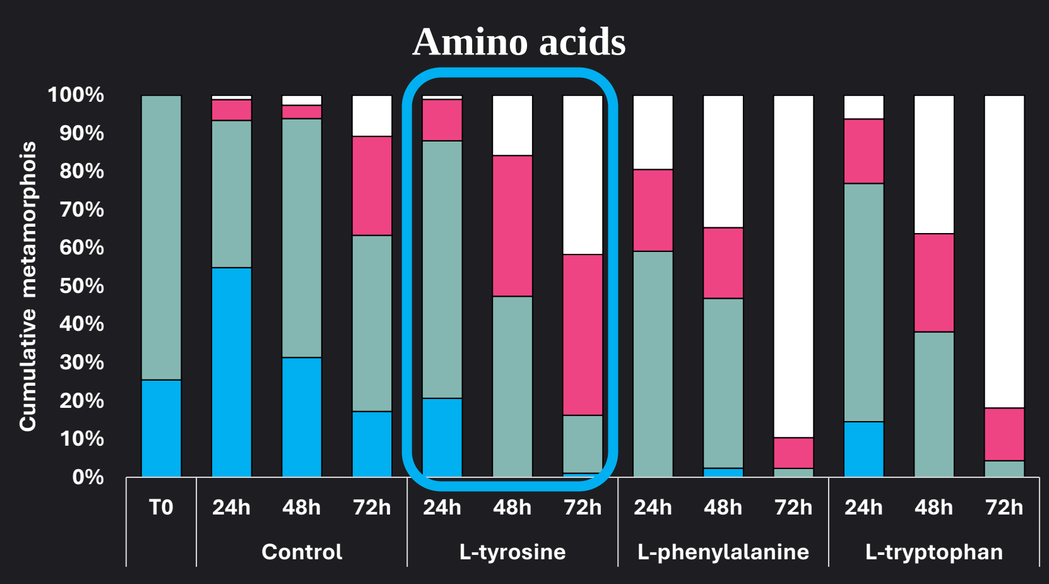
- ✓ **Velum**
- ✓ **Foot + velum**
- ✓ **Foot**
- ✓ **Branchial arches**



## Results and discussion

- Epinephrine ($10^{-6}$M) showed the best results.
- L-phenylalanine and L-tryptophan failed to induce metamorphosis in *V. corrugata* larvae and revealed to be toxic after 48h of exposure (35% of mortality).
- Even though L-tyrosine (figure 1) were toxic after a longer exposure (42% of mortality after 72h of exposure), it appears to be a potential inducer of metamorphosis: after 48h of exposure, all larvae had lost swimming ability, and almost 40% of the larvae had the foot completely formed, whereas in the control, 30% of the larvae still showed swimming ability and exhibited a lower percentage of foot+velum and foot.
- GABA ($10^{-2}$M) was toxic to the larvae.




## Conclusion

Further research is needed to fully understand the potential of amino acids as metamorphosis inducers.

This knowledge may contribute to enhancing bivalve hatchery practices through diet supplementation with amino acids during settlement and metamorphosis events.

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