Advocacy for a Robust shrimp aquaculture strategy

Development of Madagascan *Penaeus monodon* breeding program

Bali, June 22th – 25th 2025

Dr Marc Le Groumellec

Breeding location :
Isolated and fully protected site

Designed for maximum biosecurity and optimal breeding performance.

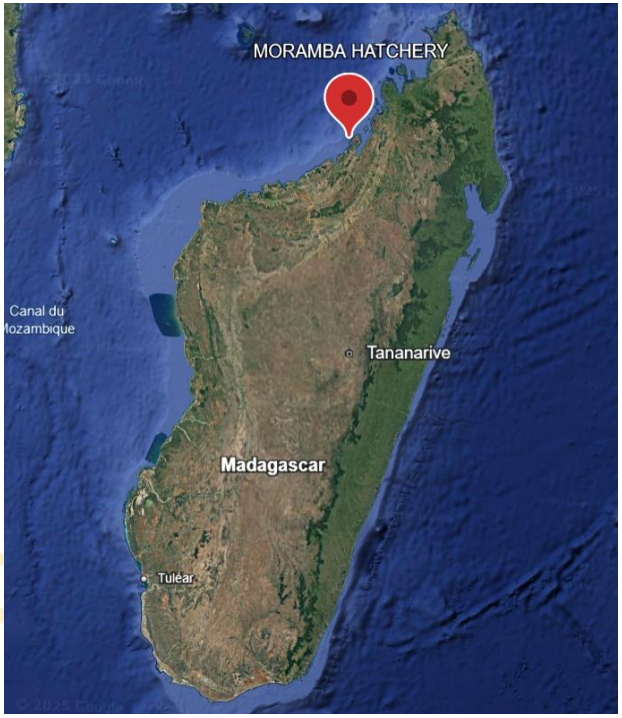
ROBUSTNESS

In the context of SPF Shrimp Breeding:

- **Resilience to stress, adverse environmental conditions and diseases. Remaining strong, healthy & vigorous.**
- **Consistent performance across diverse farming conditions.**
- **Stability in production despite variable feed quality or external disturbances.**

Madagascar experience

- Over 30 years of *P. monodon* farming under challenging conditions: cyclones, disease (WSSV), political unrest, market fluctuations, etc.
- Strategy: Develop an « all weather » and sustainable, SPF and robust stock—ensuring consistent performance and premium product quality.
- This domesticated SPF stock is the core element of sustainable biosecure strategy in all production sites of Aqualma in Madagascar.



✓ Particularities of Madagascar domesticated & robust SPF stocks:

- ❑ In hatcheries:
  - Tolerant to transport stress,
  - Capable of natural mating & maturing, and multiple spawning.
  - High and consistent nauplii output.
- ❑ On farms:
  - Strong growth
  - Good survival
  - and FCR across different rearing systems.

✓ Particularities of Madagascar domesticated & robust SPF stocks:

❑ On farms:

- Consistent performance with different brand feeds.
- Tolerant to local diseases, if reared under efficient biosecurity SOPs. Linked to the presence of EVEs?

❑ At processing plants:

- Head-on product quality, with no drooping heads.
- Uniform colour and good shelf life.
- Strong survival rates after live transport for fresh markets.

- **Breeding approach:**

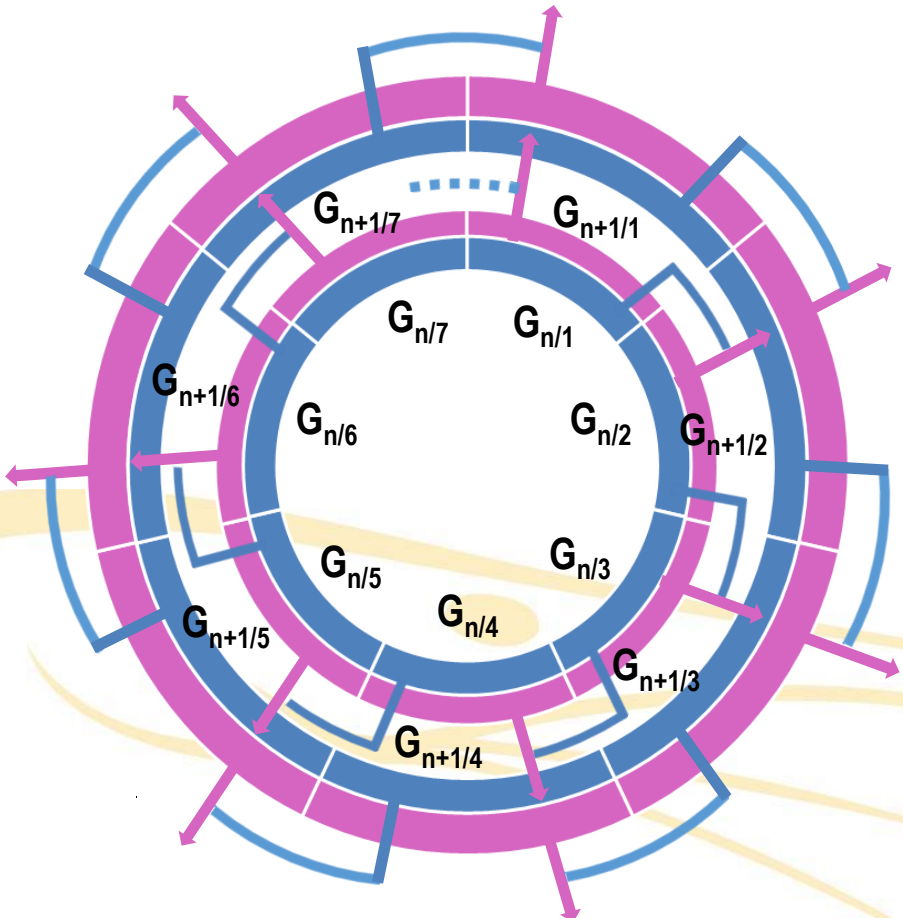
  - **Broad founder base from the whole Madagascan coast. 140 families selected out of 10,000 wild brooders.**
  - **Controlled / minimal inbreeding in the domestication program.**
  - **Generational robustness selection through stress testing.**
  - **At the same time selecting for improved growth rate – 30-40% gain over 20 years.**
  - **2024+ strategy: Build "All-Weather Prime™" stocks by selecting growth traits while keeping robust SPF genetics.**

Fully Domesticated Since 2003

Aqualma/Unibio Line

Robust & Vigorous | SPF Certified | Market Proven

Rotational mating scheme



- 140 families per generation in 7 rotating sub-cohorts.
- Effective population size: >250.
- Inbreeding rate: <0.2% per generation.

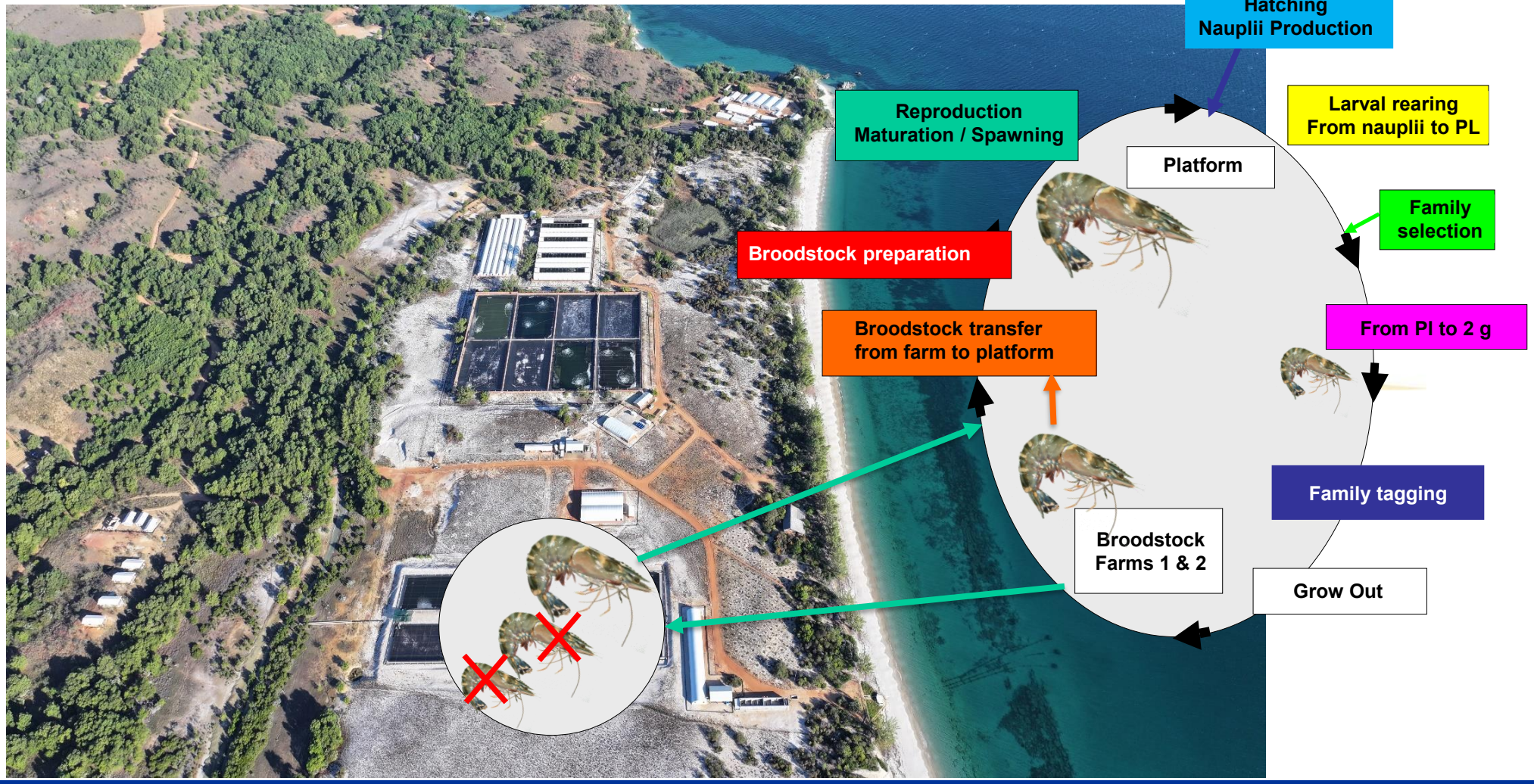
Preserving genetic diversity to ensure broodstock robustness

- **Broodstock Market Expansion**

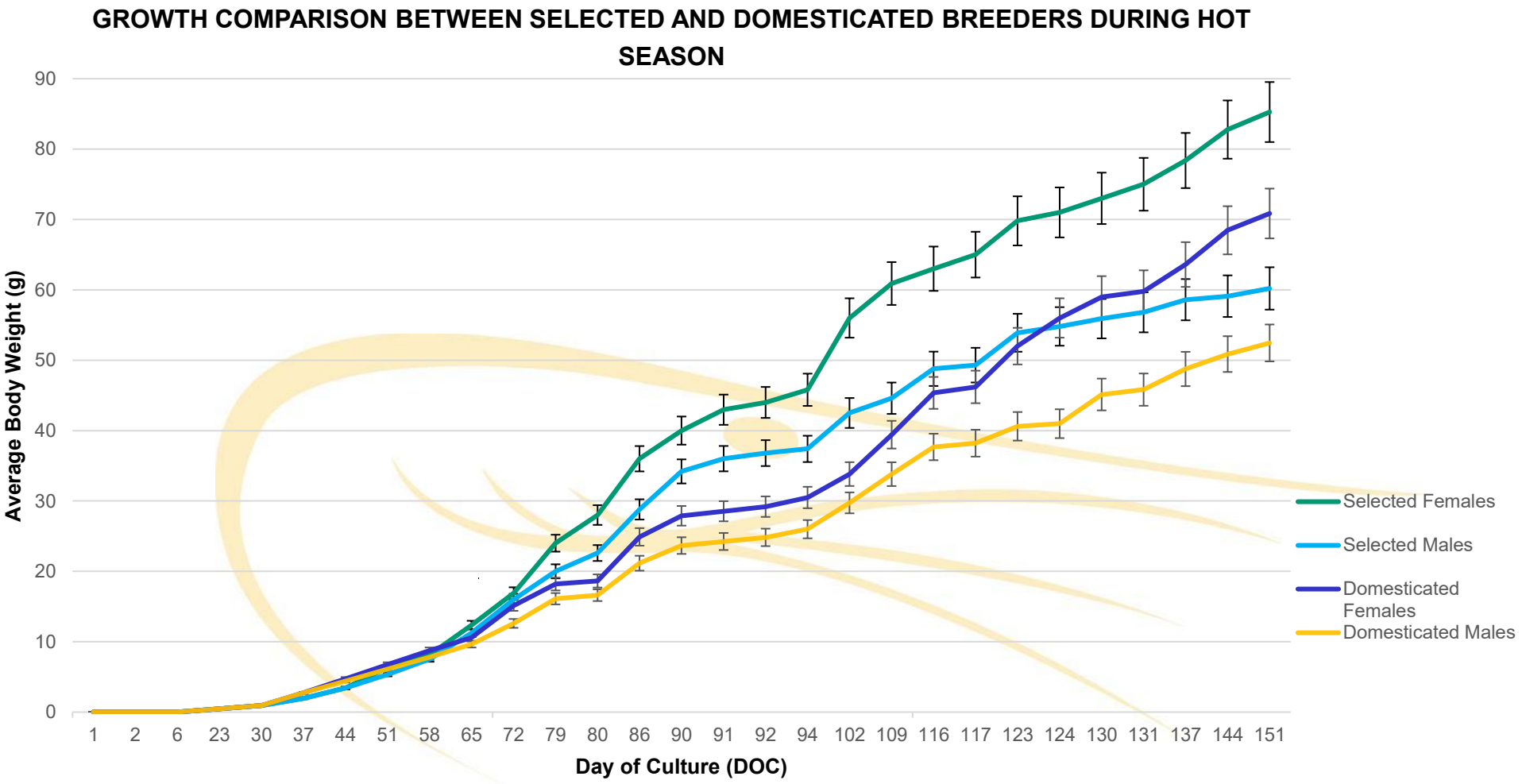
  - Since late 2023: Leading revival of *P. monodon* farming in India.
  - 1.6 billion Post-Larvae being sold in 2025 in India only.
  - Expansion planned across Southeast Asia.
  - Making the best stocks and genuine SPF PLs to be available to farmers through partnership production.

Domestication: closing *Penaeus monodon*'s biological cycle

- **Entire breeding in biosecure, closed systems over multiple generations. Mass selection repeatedly applied since early 2024.**



Mass selection for growth improvements



Broodstock Reproductive Performances

Case Study

No. of broodstock used for Nii production.	No of Animal Sourced (Nos)	No of Animals Spawned (Nos)	Egg count (millions)	Harvested Naupli (millions)	Hatch rate (%)
1 913	17 574	13 461	7 376	5 473	74,2

Eggs/spawn (thousands)	Nii/spawn (thousands)	% Spawn to no. of females (daily)	Avg. no. of Spawns / female	Avg. duration of broodstock use	Avg. total production of Nii/ female (thousand)	LRT: Avg. SR to PL12 (%)
550	410	8,3	7,1	84	2900	50-65*

PLs ready for packing

PLs produced in India from Aqualma/Unima broodstock

At 50 g in 140 days, <10/m², 90% survival.

Product – Uniform size, texture, and colour.

Broodstock performance

KPI (Key Performance Indicators) of the breeders

- Natural mating & maturation.
- High nauplii output: >2 million per female.
- LR phasis survival is above 60%
- Average growth: >2.5g/week @10/m² survival >90% in grow-out tanks / ponds till harvest.
- Homogeneity and uniform colour of shrimp at harvest.

Conclusion: robustness, consistent performance in hatcheries, good survival, growth rates, and better colour uniformity.

Unibio stocks

VS

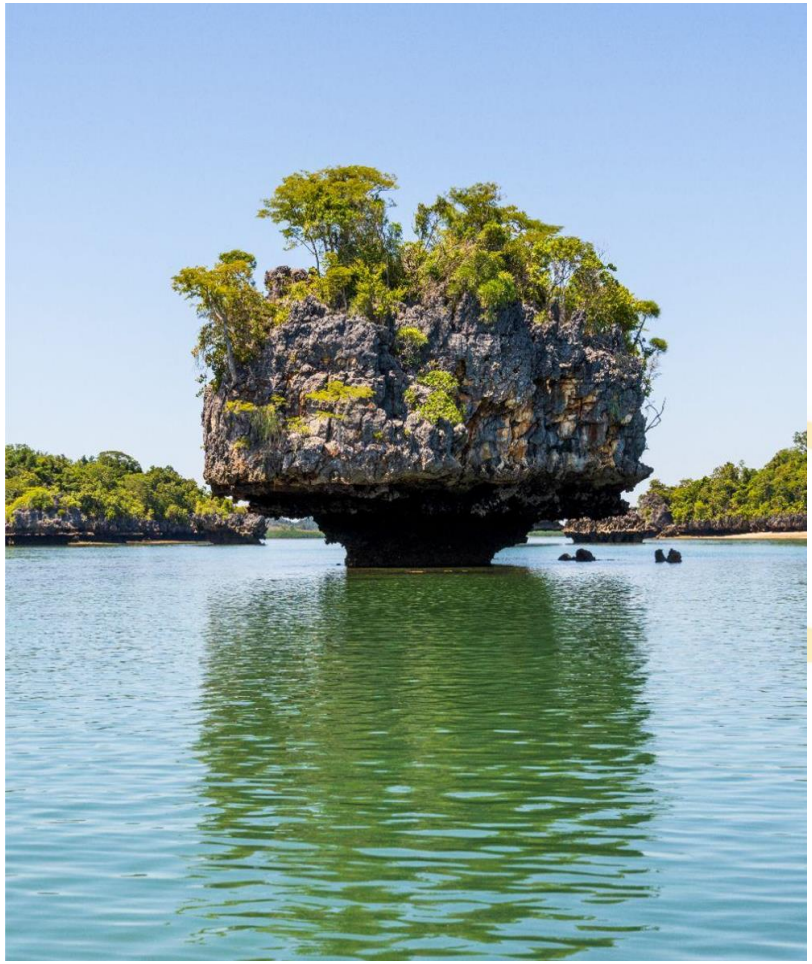
Some other SPF *P. monodon* stocks

Supporting Farmer Success

Breeding for robustness is aligned with good practices, low input needs, and animal welfare. Plans for future is to listen to customers needs and sustain continuous progress.

- ✓ Custom maturation facilities for quality nauplii supplies.
- ✓ Focus on Shrimp well being, genuine SPF status, process compatible with certifications.
- ✓ Providing hatchery and farm technical support for customers to become successful.
- ✓ Data-driven continuous improvement (hatcheries and farms).
- ✓ Working on genetic selection using markers of a specific panel and continuous progress.
- ✓ Building partnerships with customers for long-term success.

Thank you for your attention!



Misaotra Betsaka !