

# EHP Disease Management in Shrimp Farm

A. Victor Suresh, Ravikumar Bangarusamy, Ramesh Arji - Growel Feeds Pvt. Ltd., India



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## Introduction & Abstract

EHP infection is one of the major diseases causing huge losses to Indian shrimp farmers. It is estimated that EHP infection alone is causing production loss of 1.80 t/Ha/Crop and in combination with WSSV Causing a loss of 1.89 t/Ha/Crop (Patil et al., 2021).

Farms that use unsustainable methods and poor feed and disease management will become less productive over time, resulting in operational and financial losses.

In this study we propose a plan to identify and handle EHP infection at farm level based on the farm data analysis correlated with EHP wet mount analysis to estimate the stage and degree of infection in *L. vannamei*.

## Materials & Methods

- Analysis of cumulative shrimp growth performance data across India.
- Wet Mount Analysis- To assess the stage and degree of EHP infection in Juveniles and Adults.
- Feed Management

## Results & Discussion

Analysis of ADG indicates a significant difference between normal and diseased ponds. So we suggest the following ADG ranges (Table 1) to monitor EHP infection in the pond. If the ADG of a pond falls in the mentioned EHP range we suggest careful monitoring of the pond.

Wet Mount analysis indicates the stage and degree of EHP infection, so that farmer can come to a conclusion on when to harvest. On analysing the farm data it was also observed that the mean ABW achieved in EHP infected ponds is appx. 15.50g. At this ABW, the FCR in EHP infected ponds was 17% more than the normal ponds even though the survival rates were similar.

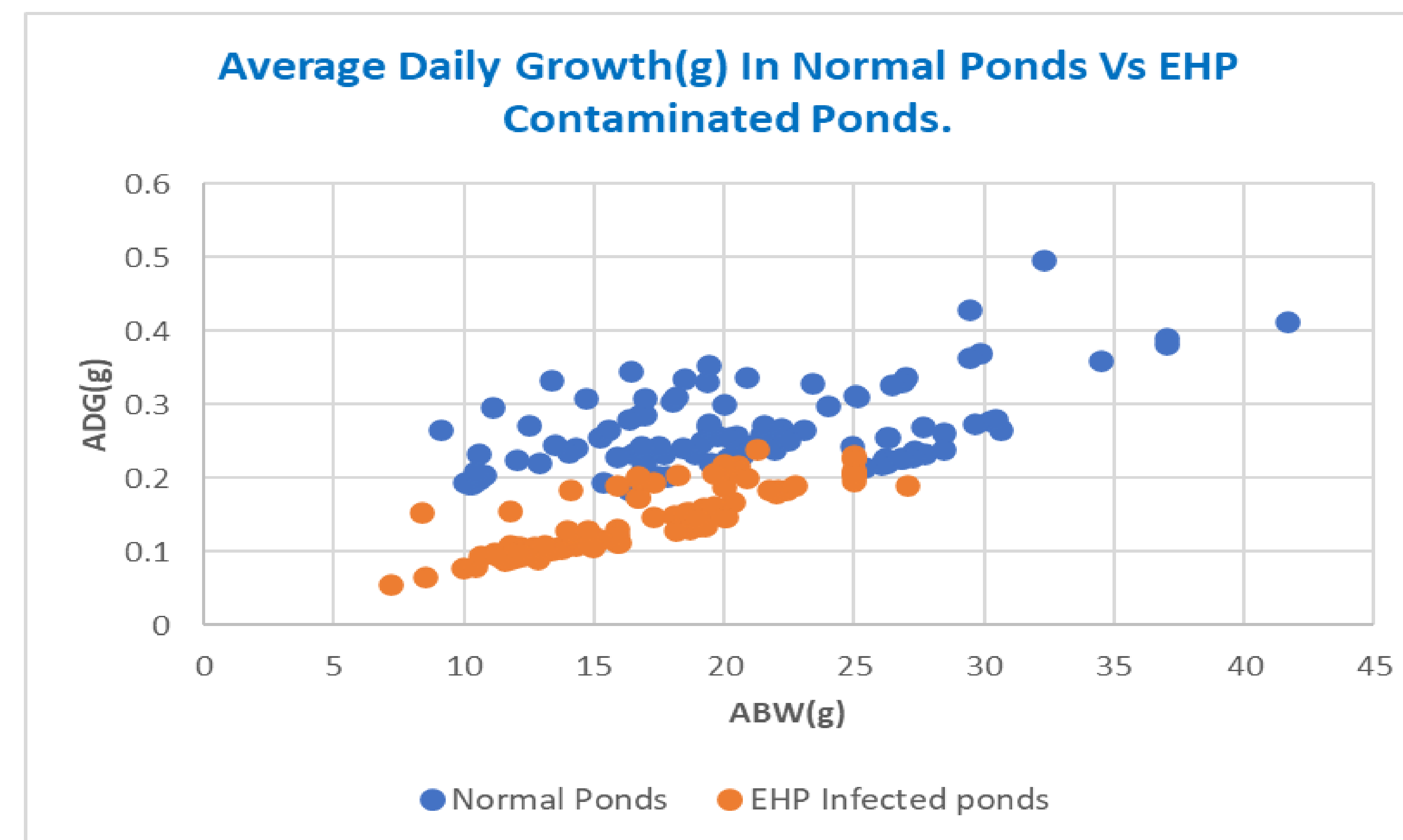
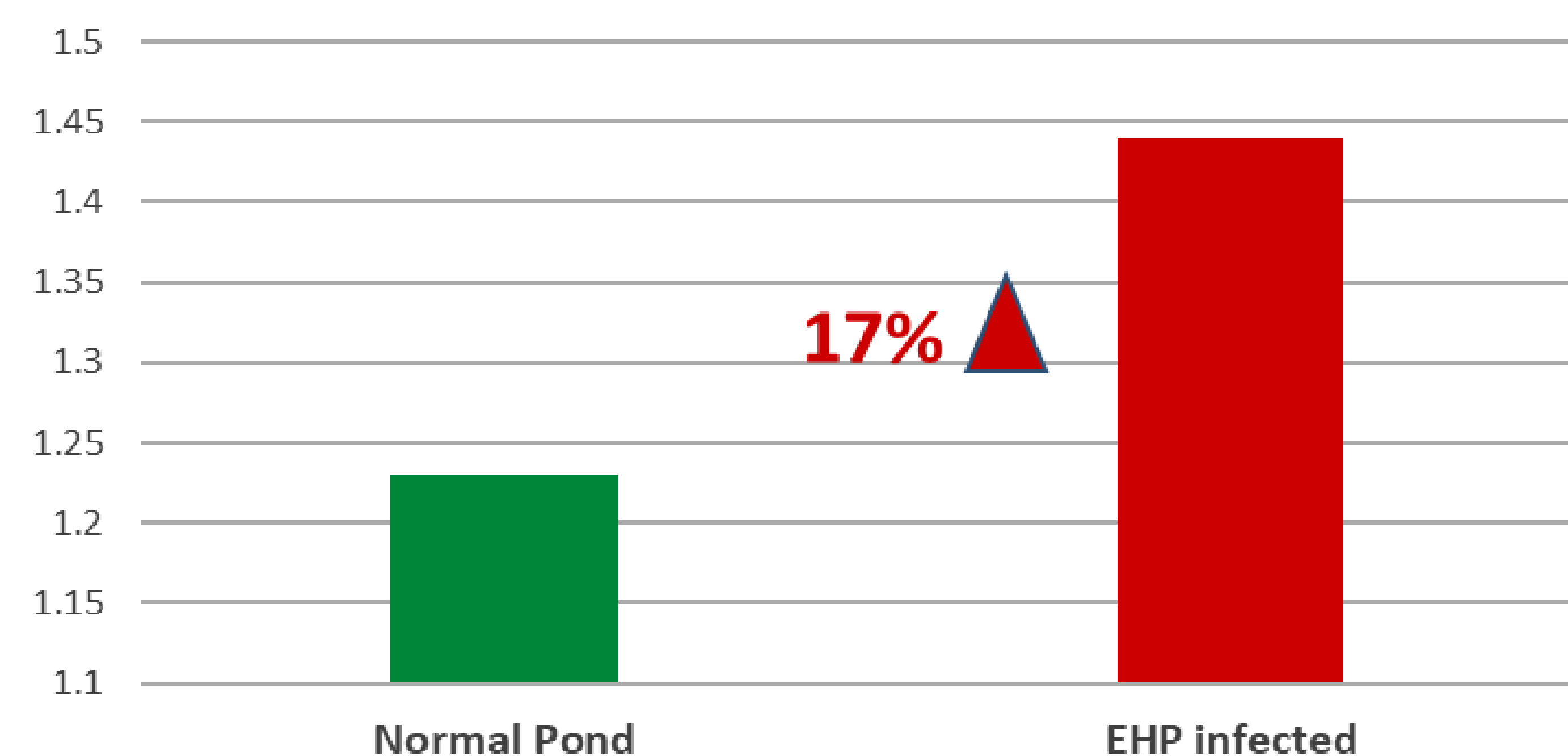


Table-1: Average Daily growth (ADG) in Normal vs EHP Ponds at various ABW & Stocking Densities of *Litopenaeus vannamei*

ABW(g)	5.00g		10.00g		15.00g		20.00g		25.00g		33.33g	
Stocking Density	Normal	EHP	Normal	EHP	Normal	EHP	Normal	EHP	Normal	EHP	Normal	EHP
< 40 pcs/Sqm	0.20	0.13	0.25	0.16	0.28	0.19	0.31	0.23	0.34	0.26	0.38	0.29
> 40 pcs/Sqm	0.16	0.08	0.21	0.12	0.24	0.16	0.27	0.20	0.30	0.21	0.34	0.25

## Average FCR at 15.5g ABW



Precision feeding with targeted FCR and weekly growth will help in effective feed management. Ideal feed management is achieved with a combination of feeding tables and check tray observation correlated with intestine color check (Ching, 2011) at various time intervals before and after feeding.

GRADE	External Symptoms	Pictures	Wet Mount Images
GRADE I	White Gut and Low Size Variation		 
GRADE II	White Gut, Low Size Variation and LSS		 
GRADE III	White Gut, High Size Variation and LSS		 

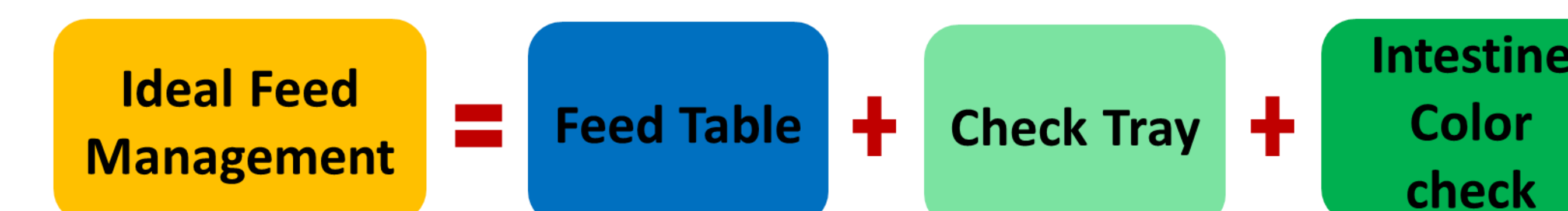
Wet Mount Analysis of EHP infection at various Stages / Grades

## Conclusions

EHP infection is a progressive disease which increases in severity as the culture progresses. Early diagnosis and precision feeding will minimise the problems associated with overfeeding such as white feces and loose shell problems.

Farmers need to implement significant changes in the production to increase profitability and reduce disease risk by following immediate changes such as selection of

- High quality PL, preferably from non-ablated females
- Adoption of nursery techniques
- Soil treatment of EHP affected ponds
- Implement bioremediation protocols
- Increasing the standards of biosecurity
- Use of Immunity boosting Functional feeds and stringent feed management.



## References

- Patil et al., (2021). Economic loss due to diseases in Indian shrimp farming with special reference to *Enterocytozoon hepatopenaei* (EHP) and white spot syndrome virus (WSSV). Aquaculture 533.
  - Ching, (2011). Intestine color check complements feed management in white shrimp. Glob. Aqua. Advocate.
- EMAIL: ravikumar.b@growelfeeds.com

# Performance of Pelleted vs. Extruded Functional Feed

A. Victor Suresh, Ravikumar Bangarusamy, Ramesh Arji - Growel Feeds Pvt. Ltd., India



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## Introduction & Abstract

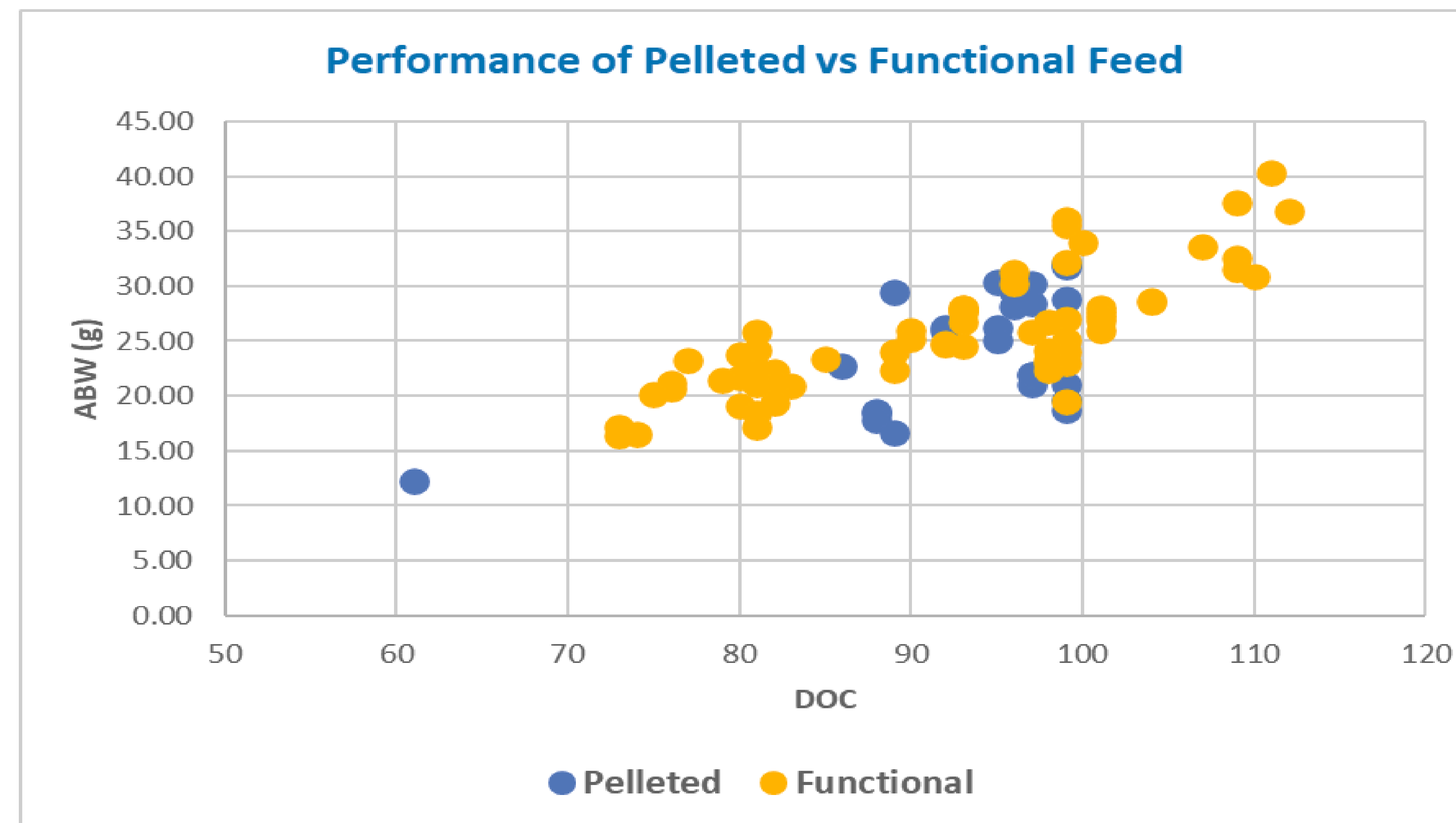
- Shrimp production in many regions across the world continues to suffer from economic losses due to the impact of weak growth performance and wide variety of diseases. At this point shrimp needs better source of nutrition not only for growth but also for the enhancement of immunity to overcome diseases.
- Functional feeds are such special feeds that are developed with selective novel ingredients which improve appetite, digestion and enhance the shrimp health, immunity, survival and helps in maintaining microbial balance in the gut, to replace antibiotics.
- We have extensively conducted farm trials across India to understand the competence of our Functional Feed, Nutriva-F15 in comparison to our regular feed, Nutriva for Growth, Survival and FCR.

## Materials & Methods

- Onsite farm trials were conducted in around 500 + grow out ponds across India since 2018 to test the competence of our Functional feed Nutriva-F15 (trial) vs regular Pellet feed (Control).
- Data has been correlated with control ponds with respect to Shrimp's Growth rate, Survival, Biomass and Yield .
- Apart from the Grow-out trials, Nursery trials were also conducted using Pre-Grower Nursery feed in Lined Earthen Nursey.

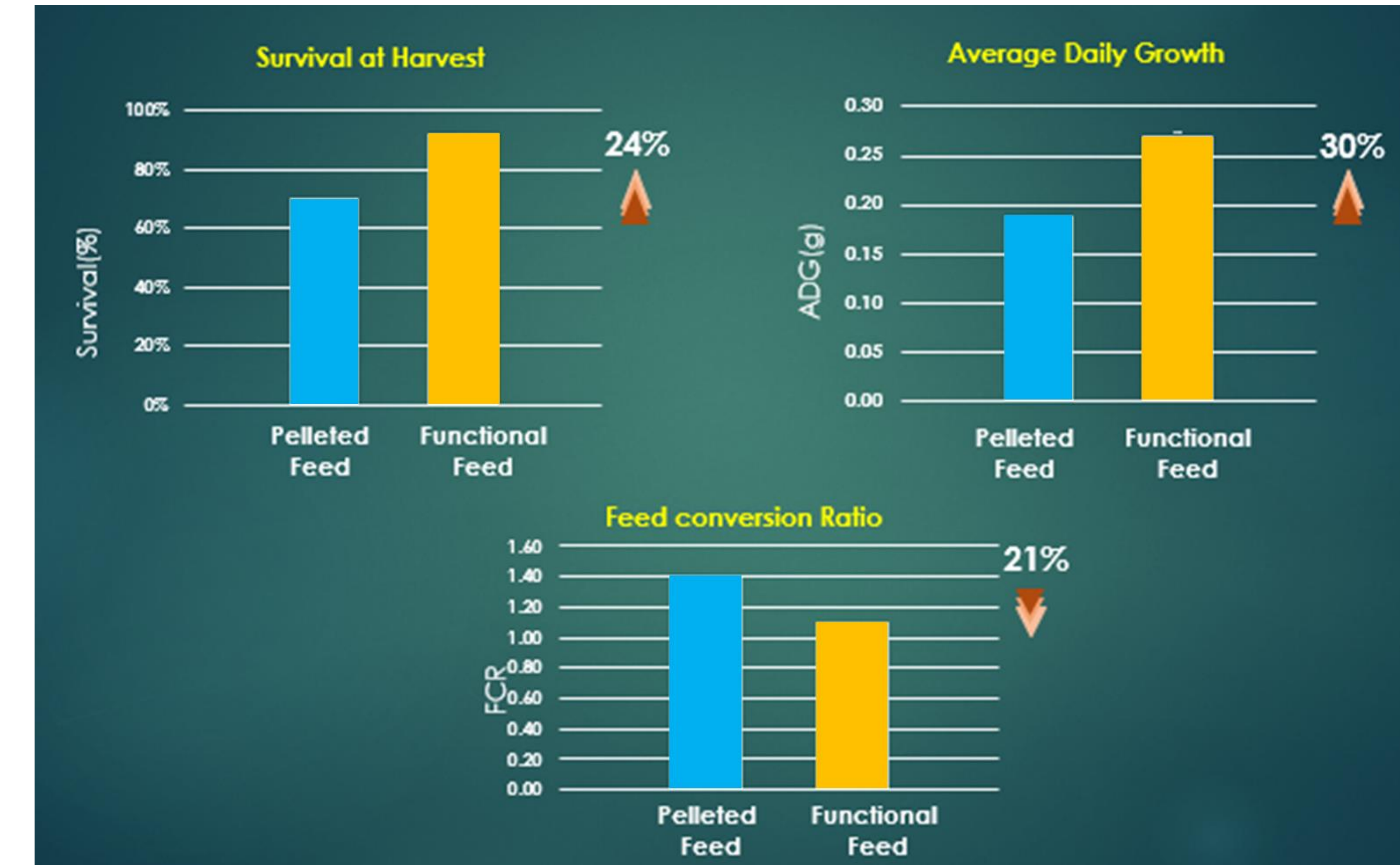
## Results & Discussion

- In Ponds where functional feeds were used, the crop has extended with minimal disease outbreaks and harvested at better ABW.



Nursery Phase							
Feed Type	Nursery Type	No. of Ponds	DOC	Harvested ABW (g)	Density Pcs/ M <sup>2</sup>	FCR	Survival (%)
Pre-grower	Lined Earthen	8	22-26	0.2 to 0.4	500 -1000	0.58 - 0.69	85-92

- When compared to the control ponds, trial ponds were harvested at 24% higher survival rate; 30% higher in ADG and 21% lower in FCR.
- In Nursery Ponds, Shrimp juveniles were harvested between 0.2 to 0.4g at 85-92% Survival and an FCR ranging between 0.58 to 0.69. Use of functional feed at Nursery level has improved the quality of juveniles in health and immunity.



**Performance of the Functional Feed (Nutriva-F15, Growel Feeds, India) against a regular feed (Nutriva, Growel Feeds, India) for Growth, Survival and FCR.**

## Conclusions

With the increasing risk of diseases leading to production losses in shrimp farming, incorporation of functional feed in shrimp diet right from the Nursery level to grow-out will enhance the crop success rate with improved survival, growth rates and reduced FCR.

As most of the functional feeds are high in crude protein (>36%), stringent feed management to reduce overfeeding is very important. This will minimise the production costs and increase the profit margin to the farmers.

EMAIL: ravikumar.b@growelfeeds.com