



POPULAR ARTICLE

Feed management in shrimp culture

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Introduction

Efficient feed management plays a central role in the success of shrimp farming operations. Feed expenses typically represent a significant share of production costs, often ranging between 40% and 60%. Beyond economics, feeding practices directly influence shrimp growth, pond water quality, and the overall environmental footprint of the farm. Since shrimp tend to feed intermittently and are more active during low-light periods, feeding schedules must be aligned with their natural behavior to achieve optimal results.

Economic considerations and feed selection

Choosing the right type of feed is a key management decision that affects both productivity and profitability. Farmers must consider several factors, including the target market, species being cultured, financial capacity, and the level of farming intensity. For low-value production systems, especially those supplying local markets, farmers often rely on natural productivity, supplemented with farm-prepared or locally available feeds. In contrast, intensive systems producing high-value shrimp for export generally depend on nutritionally balanced commercial pellets designed for specific growth stages.

Types of feed: commercial vs. farm-prepared

Commercial feeds are manufactured using standardized processes and are formulated to meet the nutritional requirements of shrimp at different life stages. They offer consistency in quality and nutrient composition, although they can be relatively expensive and require careful financial planning.

On the other hand, farm-made feeds provide flexibility and can reduce costs by utilizing locally sourced ingredients. However, their nutritional quality may vary depending on ingredient availability and formulation expertise, which can affect shrimp performance if not managed properly.

Key determinants of feed performance

The effectiveness of shrimp feed depends on several interrelated factors:

- The nutritional composition of the feed
- Physical characteristics such as pellet durability and water stability
- Storage and transport conditions before use

- Feeding methods and distribution practices
- Culture system conditions, including stocking density and water quality

Feed producers are primarily responsible for formulation and physical quality, while farmers influence storage, feeding practices, and pond management.



Feed storage and handling

Maintaining feed quality requires proper storage conditions to prevent nutrient loss. Shrimp feeds contain essential components such as proteins, lipids, vitamins, and minerals that can degrade when exposed to heat, moisture, sunlight, or air. Feed should be stored in cool, dry, and well-ventilated areas, protected from direct environmental exposure and pests. In warmer climates, feed is best used within a few months, whereas cooler conditions may allow longer storage. Using a first-in, first-out system helps minimize spoilage and ensures freshness.

Feeding strategies and practices

Unlike terrestrial animals, shrimp cannot be directly observed during feeding, making it necessary to estimate feeding rates based on biomass and average body weight. Feed can be distributed manually or using mechanical systems, typically multiple times per day. Providing smaller quantities at frequent intervals is generally more effective than large,

infrequent feedings. This approach improves feed utilization, supports steady growth, and reduces the risk of water quality deterioration (Table 1).

Factors affecting feed intake

Body size: As shrimp grow larger, their relative feed consumption decreases due to changes in metabolic rate.

Water temperature: Temperature has a strong influence on feeding activity and growth. Optimal performance is usually observed within a narrow temperature range, and even small deviations can significantly impact growth rates and oxygen availability.

Natural food availability: Shrimp consume more artificial feed when natural food sources are limited. As biomass and stocking density increase, natural productivity often declines.

Feed quality: Palatability, nutrient balance, and physical stability of the feed directly affect consumption and growth efficiency.



Table 1: Feeding regime development and implementation

Time interval	Average Body weight (g)	Amount of feed of biomass (%)	% of feed put feeding tray (4-6 trays/1 h)	Feed tray monitoring time (hr)
1-7	0.02 - 0.4	20.0 – 17.0	0.6	2.5
8-14	0.5 – 1.3	16.8 – 14.2	0.6	2.5
15-21	1.4 – 1.9	14.02 – 11.8	0.8	2.0
22-28	2.0 – 2.7	11.6 – 9.9	0.8	2.0
29-35	2.8 – 3.4	9.7 - 8.4	0.8	2.0
36-42	3.5 – 4.2	8.2 – 7.1	1.0	1.5
43-49	4.3 – 5.1	6.9 - 6.1	1.0	1.5
50-56	5.2 – 6.0	6.0 – 5.3	1.0	1.5
57-63	6.2 – 7.0	5.2 – 4.6	1.0	1.5
64-70	7.2 – 8.1	4.5 – 3.9	1.0	1.5
71-77	8.3 – 9.3	3.8 – 3.4	1.2	1
78-84	9.5 – 10.8	3.3 – 3.0	1.2	1
85-91	11.0 – 12.5	2.9 – 2.7	1.2	1
92-98	12.7 – 14.1	2.6 – 2.5	1.2	1
99-105	14.4 – 15.9	2.5	1.2	1
106-112	16.2 – 17.8	2.5	1.2	1
112-119	18.1 – 19.8	2.5	1.2	1

Monitoring and feed adjustment

Use of feeding trays: Feeding trays are widely used to monitor feed consumption. Proper placement and regular inspection allow farmers to assess feeding behavior and adjust rations accordingly.

Biomass estimation: Biomass can be estimated by combining feed consumption data with feeding rates and average body weight. This helps determine population size and survival rates.

Feed adjustment: Feed quantities should be modified based on observed consumption.

- Low oxygen levels or poor water quality should prompt immediate feed reduction.
- Aeration before feeding can improve shrimp activity and feed intake by increasing dissolved oxygen levels.

Advanced feeding concepts

Feeding rates that maximize growth are often slightly higher than those that optimize feed

Gradual increases or reductions help maintain efficiency while preventing overfeeding or underfeeding.

Seasonal and environmental considerations

Feeding practices must be adapted to changing environmental conditions:

- During warmer periods, feeding may be increased, but care should be taken to avoid waste.
- In cooler conditions, feeding is best done later in the day when temperatures rise.
- Rainfall and molting periods often require reduced feeding.

conversion efficiency. While increased feeding can accelerate growth, it may also lead to higher feed conversion ratios and require closer monitoring of water quality. Shrimp tend to consume a larger portion of their daily ration at night, although environmental conditions during this time must be considered.

When changing feed size, a gradual transition helps maintain consistent feeding behavior. Maintaining adequate dissolved oxygen levels is essential, as low oxygen can suppress feeding and growth even if it does not immediately cause mortality.

Environmental impact

Excess feeding is a major contributor to water quality deterioration in shrimp ponds. Uneaten feed decomposes, increasing organic load and oxygen demand, which can harm shrimp and the surrounding environment. Careful feed management reduces waste, maintains pond health, and minimizes environmental impact. Strategic feed placement can also help prevent the accumulation of organic matter in certain pond areas.

Best practices and recommendations

Successful feed management relies on continuous observation and timely adjustments. Key practices include:

- Regular monitoring of feed consumption
- Training farm personnel in feeding techniques
- Maintaining proper feed storage conditions
- Integrating natural productivity with supplemental feeding
- Adapting feeding strategies to environmental conditions

Consistent management and attention to detail are critical for achieving high productivity and sustainability in shrimp farming.

Conclusion

Feed management is one of the most influential factors in shrimp culture, affecting growth, profitability, and environmental sustainability. A well-planned feeding strategy that combines quality feed, proper monitoring, and adaptive management can significantly enhance farm performance.