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Shrimp postlarvae: Know your starting point

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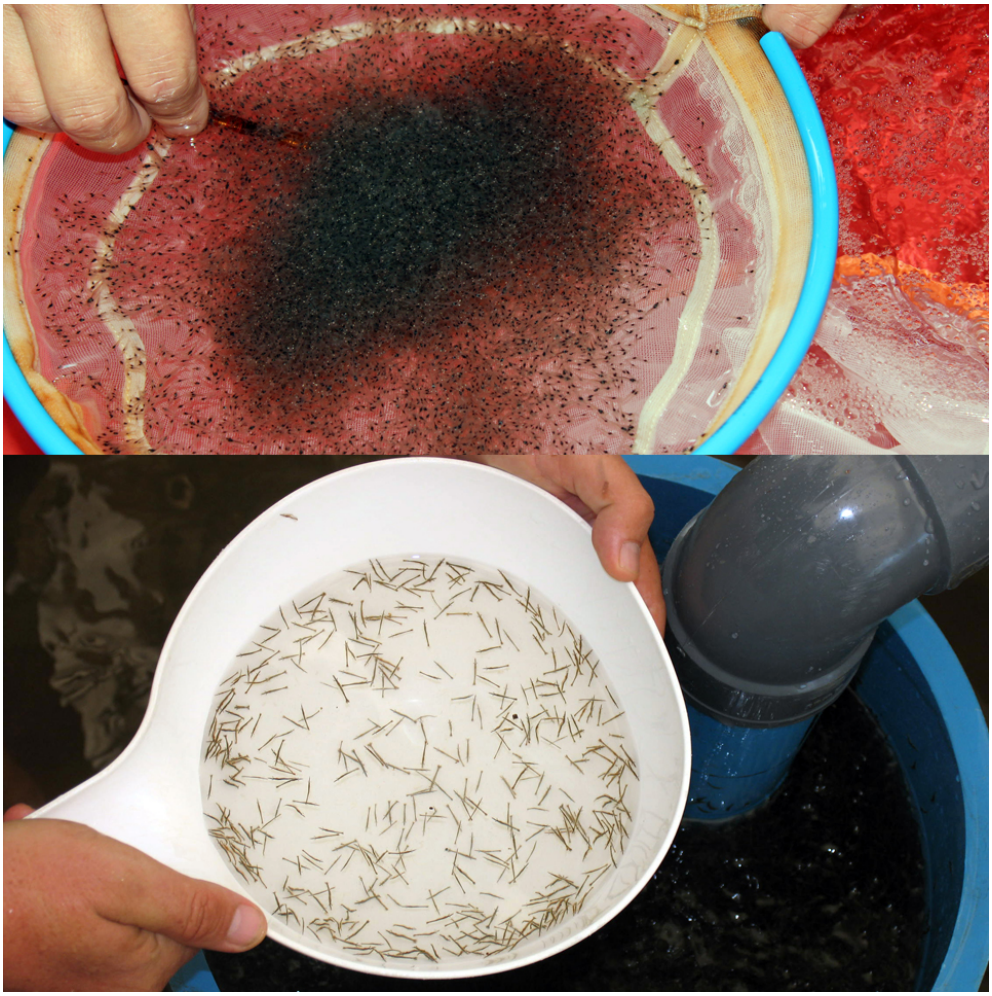
Form working groups to standardize methodology for deriving and reporting important metrics



Standardized reporting on a range of postlarvae attributes could help advance the production of both white and black tiger shrimp.

All agricultural "crop" production systems start with an initial step: the seeding, planting or stocking of the "seedstock" for the crop to be produced. Whether for plants or animals, this starting point establishes the basic potential and limitations of the future harvest. Knowing more concerning the seedstock's genetic, performance and management characteristics can lead to the greater probability of a successful outcome.

Corn, animal production

Consider corn as an example. There are many descriptors used to define the many different strains that are available for planting. There is a clear product code, which defines the genetic makeup of each strain. Other important strain characteristics include recommended planting densities, days to harvest, expected yield, number of kernels per bushel, drought and temperature tolerance, resistance to various insects and plant pathogens, and even recommended fertilizer application rates are available.

Similarly, extensive information is available for animal production systems, such as swine, broilers, turkeys and egg layers. As for corn, genetic makeup is clearly identified by a product name and code. Additional information for these animals includes stocking densities, growth rates, eggs per hen per year, feedconversion ratios, expected survivals and, quite frequently, the recommended nutrient profiles of the diets to be fed.

The information available for seedstocks has evolved and increased significantly over the past 40 years because it was absolutely necessary to improve crop productivity to feed the growing populations of the world at profit levels necessary to sustain viable industries.

Shrimp information

In contrast, the shrimp industry is not able to make the same claims as others because the information concerning the postlarvae (P.L.) being stocked into today's production units is limited. To increase the amount of available information, the industry could adapt the following data for inclusion in product literature, purchase orders and invoices used in the commerce of shrimp postlarvae.

Genetic identity

Since the genetic makeup of stocked animals fundamentally determines future performance, it is very important that an identifying code or product number is provided. In this way, animal performance can be tracked and compared over time, which allows managers to select those strains that perform best in a given production system. For example, PA-17- WSR might refer to a strain that originated in Panama, is in its 17th generation since domestication and is resistant to white spot syndrome virus.

Animal quantity

Knowing the number of animals stocked into a tank or pond is critical. Without accurate stocking numbers, the evaluation of the production metrics at harvest will likely lead to inaccurate conclusions concerning pond productivity and profitability.

By stocking fewer animals than planned, the productivity of the pond will be decreased, and overfeeding can easily occur. Conversely, unknowingly stocking higher numbers of animals than planned can result in underfeeding and more rapid consumption of the natural productivity, which can result in stunted or slower-growing animals. In both cases, profitability would decline.

Hatcheries frequently provide undisclosed numbers of extra animals in shipments of postlarvae. This usually results in higher, although inaccurate, survival percentages reported at harvest. This erroneous data makes the hatchery look good because it appears it provided animals with superior survival. At the same time, the pond manager may receive undeserved credit for a high-surviving crop.

P.L. stage, weight

Postlarvae are normally sold based on their stage, which is defined as the number of days that passed since the animals metamorphosed from mysis to postlarvae.

Although this is an important metric, it is far more important to know the average weight of the animals stocked.

The weight of the postlarvae is correlated with crop survival. Stocking larger animals usually results in higher survival at harvest. A reasonable average weight for a P.L.12 is 4 mg, but it is frequently observed that animals at this stage weigh as little as 2 mg.

The size or weight of animals at stocking significantly affects the formula and particle size of the feed that is initially fed. Providing feed particles that are too large prevents feed intake by the animals, causing them to get off to a poor start.

Variation

Variation is normally expressed as a coefficient of variation (C.V.) percentage calculated by dividing the population mean by the standard deviation and multiplying this number by 100. It is recommended that coefficients of variation be provided for all P.L. shipments and include the individual genetic strains determined at market size.

Low variation is considered very desirable in animal production populations, as it relates to higher crop value. A high C.V. for shipments of postlarvae suggests concern and indicates special attention should be given to the feed formula and particle size for the first week or two of feeding.

Growth rate

Since growth rate is perhaps the primary driver of profitability in shrimp production systems, data on the maximum growth rate should be available for all commercially available strains of shrimp. Maximum growth rate is defined as the average weekly weight gain during the linear growth phase of the shrimp (from 3 to approximately 25 g for *L. vannamei*) when grown in an ideal environment and fed a nutritious, well-balanced, high-quality feed.

Feed

Knowing the feed given to postlarvae during the last three days in the hatchery allows the purchaser the option of transitioning the animals into the nursery or production ponds using the same feed product. This assumes that changing as few environmental parameters as possible during the stocking phase is less stressful to the shrimp.

Other traits

Where possible, the different strains of shrimp available to the industry should be defined in terms of other attributes important to industry profitability. These include resistance to specific diseases, tolerance of limiting environmental factors, suitability for specific types of production systems, vaccinations, etc. All such claims should be supported by credible scientific evidence.

Perspectives

Providing more information describing the attributes of the various strains and sources of shrimp seedstock used today can help raise the bar in the shrimp industry. Of course, what has been suggested is only a beginning, and the industry has a long way to go to reach the level of sophistication of existing grain and animal production systems. But the model exists, and the goal is clear.

The industry would be well served by forming working groups to standardize methodology for deriving and reporting important metrics for this beginning phase of the crop. In the future, leading postlarvae suppliers will provide the above information and more, while at the same time, the purchasers of P.L. will require this same information and more.

Bottom Line: Starting point determines profits.

(Editor's Note: This article was originally published in the July/August 2012 print edition of the Global Aquaculture Advocate*.)*

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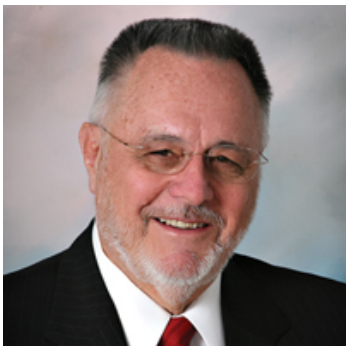

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