Biosecurity 101 Washing and disinfecting eggs and nauplii

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Shrimp farms are plagued by many different diseases some of which could have been easily prevented simply by following a few well established protocols. These are aimed at killing surface borne pathogens including viruses, bacteria, fungi and even protozoa. They will not impact anything that is **in** the egg to start.

Eggs and recently hatched Nauplii

The false vertical transmission of many potential pathogens is the primary route by eggs and subsequently nauplii become carriers of pathogens that are moved with these PLs onto farms. There are a few pathogens that are in the egg (such as IHHNV) but even with these pathogens false vertical transmission can occur. Screening of broodstock for the presence of these pathogens is not enough to ensure that they are not present. Histories must be considered in conjunction with repeat testing of animals by PCR. Population screening misses animals.

Ideally both eggs and nauplii should be washed. These points in the production process are critical areas where proper biosecurity protocols can reduce and even eliminate the carryover of pathogens into production systems. Mass spawning is the most common method of producing eggs which can make it difficult, although not impossible, to collect the eggs. The eggs typically sink to the bottom of the spawning tanks where they are bathed in feces and miscellaneous other materials from spawning fluids. Individual spawning is more labor intensive although it does offer several advantages that including being able to eliminate those animals that produce poor spawns and facilitates easier collection of eggs.

Simple modifications to spawning tanks will allow eggs to be removed for washing. Since they settle on the bottom of the tanks they can be gently siphoned or collected through a dual standpipe system or any number of other methods if the tanks are designed to facilitate ready collection. Where possible, eggs should be collected and washed in a device that ensures that they are properly surface disinfected. This step is repeated with nauplii before stocking. There is no one right way to do this. The figure to the right shows one such flow through system that can facilitate the washing of eggs and nauplii. The principle is simple. The eggs or nauplii are placed into the pail and clean water runs through the pail. The mesh in the center drain is small enough to allow everything to pass through except the eggs and the nauplii.

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After the eggs hatch it is a standard practice to collect the hatched nauplii by their attraction to light. They can then be scooped up using a 100 micron dip net and dipped into 200-300 ppm of formalin for 30 seconds followed by 50-100 ppm of Iodine for 30 to 60 seconds. Nauplii are rinsed thoroughly in-between each step with clean water. The water should be the high quality water that you use to stock your production tanks. High flow rates (although this should be gentle) are important to dislodge weakened pathogens. The levels of disinfectants suggested are somewhat arbitrary although there is data to support the specific levels and times of exposure. Strong healthy animals are not adversely affected by these handling and washing protocols. Weak animals will have problems.

When using the formalin solution be careful to make sure that there is no milky appearing material in the container that you use. This is very toxic polymerized paraformaldehyde and the solution should not be used if there is any of this material in it. The iodophor solution is a standard PVP iodine solution that is diluted to the required concentration. Both solutions can be used a few times before discarding. The critical element in all of this is to ensure that the nauplii (and eggs where possible) are surface disinfected and then washed copiously before, between and after the disinfection exposures.

Never implement or modify long standing procedures in your facility with testing them out on small batches of animals to verify that there are no problems. Track the preparation of the solutions used to make sure that they are being prepared properly and train staff appropriately.

Aquaintech provides a range of products and consulting services many of which are geared towards improving animal health by reducing stress and improving biosecurity. Among our tools for improving water quality we have a unique tableted blend (PRO 4000x) of Bacillus species that does not require any activation prior to use. Tablets are added directly to hatchery tanks or to ponds. An additional source of carbon can be added if there are indications that carbon may be limiting in some way. Field trials in many countries have shown that the product works well. Data at this link (www.bioremediationaquaculture.com) shows results of the use of PRO4000x in reducing vibrio loads (by competition for nutrients not by the production of antibiotics), reducing the levels of accumulated organic matter, improving water quality by reducing ammonia levels and impactingthe algal composition. Bear in mind that these are tools. Tools must be used properly to function properly. The proper tools can form the basis of a solution to a problem.