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A visit to the Grand Isle Oyster Hatchery

In June of 2002 I traveled to Grand Isle Louisiana directly south of New Orleans, in the Gulf of Mexico to visit with John Supan of the Louisiana Sea Grant College Program's shellfish hatchery and aquaculture facility.

I first met John at the Aquaculture America conference in Orlando Florida a number of years back and we have stayed in touch though many conferences since.

John is probably most well known for his work in oyster triploid production, however, he is also an out-spoken individual on the direction the industry should take as well as promoting and supporting the commercialization of the oyster industry.

Even though we come from different backgrounds we share many similar views on oysters and as John once stated "our passion and excitement for what we do has probably left us with oyster juice flowing through our veins rather than blood".

As well as doing research in the hatchery, there has been a lot of work done with the local people and their port commission on developing an industry in the area.

With Louisiana being the top oyster producing state in North America one might wonder why the effort on shellfish aquaculture, which is a valid question. It really comes down to economics in that oysters in that area are among the most inexpensive in the world, trading locally for 8 to 11 cents a piece. This low price also brings a reputation of lesser quality which with bottom-grown dredged oysters is in many cases true, in comparison to mid-water cultured product which in some areas trade for as high as 75 cents a piece.

To help change this reputation one has to focus on quality, which is one of the benefits that the triploid technology that they have been working with at the hatchery can deliver. When this is combined with grow-out technology such as the Australian long line technology (ALS) that we offer, a lot can be done because now you can have an animal that looks completely different inside and out, has controlled taste and meat yield and will grow in half the time as the local oyster.

A number of columns ago I discussed triploid technology, however in case you missed it I will quickly review the process. Normal oysters are classified as diploids having one set of chromosomes from each parent. Instead, triploid oysters have

two maternal sets and one paternal set. Both are naturally occurring animals in the wild, however there are far more diploids then there are triploids which are very rare.

Triploids are unique in that they are functionally sterile and do not spawn. The benefit to the aquaculture industry with triploids are that since they do not spawn their meat yield stays relatively consistent year round, as well they are generally a healthier animal and more resistant to disease and parasites. They also reach maturity quicker.

I asked Jamie Dockstader, who is a grad student working with John, to explain it from her perspective and this is what she had to say;

Most animals have two sets of chromosomes, and therefore are known as diploid organisms. In nature, varying numbers of chromosomes and of sets of chromosomes have been discovered within animals of a single species, particularly with shellfish. This trait is rare, but does occur. Triploid shellfish, such as oysters, are beneficial to the oyster industry for a number of reasons. For one thing, they are unable to reproduce. While most oysters spawn out in warmer months and become watery with little meat yield, triploid oysters retain their meat in the form of glycogen all summer long. Triploids also do not expend energy on reproduction, and as a result, grow faster and larger than normal diploid oysters. This benefits oyster growers as they can earn more money for the oysters they produce. Scientists have discovered that triploidy can be easily induced in a laboratory setting by shocking the embryos. During normal meiosis, each embryo releases two polar bodies, the first contains two sets and the second one set of chromosomes.

By shocking the embryo, the release of the second polar body is inhibited and an additional set of chromosomes is retained. Heat shock, pressure shock, and chemical shocks have been used to successfully produce triploid shellfish.

Through work done by different researchers, it has been identified that the triploids are a very rare oyster occurring in nature. In the laboratory they can be produced by a tetraploid that has two sets of maternal and two sets of paternal chromosomes that when they fertilize with diploids, the spawn will produce triploids. Just to make it clear and to avoid alarmist comments none of this has anything to do with GMO's that some individuals hare very concerned about but rather is controlled natural genetic selection.

The LSU hatchery is now able to make induced triploids as well

as normal diploid larvae and seed production on a seasonal basis. Supan and his colleagues are also developing tetraploid eastern oyster brood stock for the gulf region.

The hatchery itself is very efficient and economical, a testament to the tight budgets that John had to work with and cost far less than the million dollar research facilities that I have visited over the years. The location allows for natural heat availability for operation, although seasonal, as well as a source of clean high nutrient water availability.

John states that he should be able to produce close to 100,000,000 larvae a week at present and under his mandate with LSU can sell excess capacity into the public domain at market value.

The work that has been done with the local fishermen and others on educating them as to the benefits of the project was a pleasure to observe in that the positive attitude and support to move forward to create a new industry. In the discussion I had with directors of the port commission, it was obvious that they were treating this as a business growth opportunity with talks of a new processing plant and specific branding strategies.

The approach to creating an Aquaculture Park of approximately a 100 acres that would have all the regulatory red tape done in blanket form so as to allow individuals to sublease or become a tenant allows for a specific controlled growth of an area was very cleaver. It was modeled after the common sense approach used in cities where you have specific zoning for commercial, industrial and residential so that new residents do not have to do the permitting process over and over again.

Overall, John Supan does not fit the mould of many of the PhD's that I have met and observed in that he thinks way outside the box and beside his biology research hat, he understands the social and economic aspects of the business and its benefits to the region.

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