

Wild and Hatchery Seed Survey - France

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by

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Tiles Stacked in Arcachon



Coupelles in Arcachon



On the 9 October 2003 Brian O' Loan (BIM) conducted with the assistance of Nicolas Ranninger (BIM, Paris) and Mr Tommy Hickey (Hook Head Shellfish Ltd) a survey of *gigas* wild and hatchery seed production in France. This is part of BIM's plan to report from France twice a year (Autumn and Spring) on the status of *gigas* seed production.

As predicted by many seed producers after the seed shortage last summer, there has been a bumper settlement this season in France. The Bay of Arcachon experienced seven settlements as opposed to the usual three. Marennes on the other hand experienced three settlements. This will have an effect on the quantity and quality of seed available in these areas as discussed below. But the end result from an Irish perspective is that there should be, barring any extreme levels of mortality over winter or other adverse impacts, a surplus of wild seed which will be reflected in lower prices. The demand for hatchery seed and in particular triploid seed in France however is still strong and thus the surplus of wild seed will not ensure readily available hatchery seed to Irish producers. It is evident that hatchery prices have remained stagnant or have gone up in line with inflation.

Background

Natural reproduction of *gigas* oysters is concentrated in two regions of France; Arcachon and Charente Maritime. Both regions are located on the southwest coast of France and have physical attributes that are conducive to natural spat falls each year:

- Sites exposed to the open sea (Atlantic).
- Warm temperatures during summer months, facilitating maturation of broodstock and larval development.
- Proximity of an estuary.
- Presence of intensive oyster cultivation



Wild seed on couppelles (not as dense as on tiles but very variable shape)

The critical factor in determining a successful settlement of seed is the relationship between temperature and salinity. In general the temperature should stay above 20°C from spawning until settlement. Arcachon and Charente Maritime represent about 95% of natural spatfall in France with small amounts appearing in the Vendée and Mediterranean coastal regions. Hatchery production of seed represents about 5% of the total available seed in France. The total production for France is estimated to be 110,000t of Pacific oyster per annum.



Typical tile from Arcachon displaying high density of settlement.

Settlement in Arcachon

The Bay of Arcachon has approximately 4-4.5 million tiles in place for settlements (usually 3) that will occur during the summer. The tiles consist of a clay core covered in a layer of lime (approximately 100grams of lime per tile). The seed is removed by scraping the tiles with purpose-built machines or quite often by hand tools. The ideal number of oysters that the producers want on a tile is 1,000. At this density a uniform monolayer of seed oyster develops with plenty of growth away from or perpendicular to the surface of the tile. Thus the seed develops a good cupped shape early on.



**Bag dipped for 3 seconds at 85°C ↑
Cooling down oysters after their hot dip treatment ↓**



To obtain 1,000 live oysters per tile a settlement of around 3,000-4,000 is required on each tile.

On examination of tiles from many of the farms in Arcachon this year it was evident that the tiles were completely smooth



Couppelle seed with criss-cross mark evident.

ered with seed. Many of the fast growers or early settlers were covered in up to five smaller seed or as the French call them 'cavaliers' as they ride on the back of the larger seed. In essence the fact that settlement has been so good has been something of a curse to the seed producers in Arcachon as they are now having to discard vast quantities of seed in the first grades due to the cavalier effect. On top of this they have had to tend to bags of mature stock for the Christmas market, which have settlement not only on the bags themselves but on the mature oysters. This, if not dealt with immediately will lead to a reduction in quality and price for full-grown product. As a consequence many producers were observed dipping bags of full-grown oysters into vats of water heated to 85°C for three seconds. This is sufficient to kill off the fresh settlement. However not all producers will go to such lengths and some will sell their product at reduced prices. Diligent seed producers have been grading their seed from the end of August onwards this year to ensure the removal of multiples (doubles, triples etc.) to get singles bagged and in position for overwintering. Although this is a drastic measure given the sensitivity of the seed, producers are confident that due to the level of over settlement there will be plenty of seed for sale.



Seed mechanically harvested off tiles ↑
Mechanical Coupelle Harvester ↓



Coupelle seed was being harvested also during the visit. Coupelles displayed a high level of settlement and great variation in seed shape was evident. Again the 'cavalier' effect was noticeable upon close inspection. Vast quantities of coupelle seed will also have to be discarded in the first grades so that they do not interfere with the growth potential of singles. Coupelle seed displays the cross mark on the shell made from the pattern of the plastic coupelle disc.

Unfortunately for Irish oyster farmers seeking to purchase wild seed, no French seed producers keep records of their seed husbandry. *Irish producers must be careful of buying seed too soon after harvesting and grading as there will be mortalities after such treatment.*

Many of the farms where on-growing of oysters occur are located around Ile aux Oiseaux. The majority of the tiles, however, are placed further into the bay away from the entrance channel to the sea where the hydrographical conditions and temperatures are conducive to settlement. Plots are marked out with poles and are small and densely packed. The number of poles is quite overwhelming yet there is no conflict with pleasure boat operators who can have up to 3,000 boats in the bay during the summer months. The Irish oyster industry is noticeably of very low visual intrusiveness by comparison. Oysters were observed to have quite good quality in this part of the bay.

Charente Maritime

Charente Maritime produces 25,000t of oysters with an average stocking density

of 10kg/m². Compared to Arcachon this region focuses on the on-growing stage of oyster production with approximately only 500 million seed produced from this region in a normal year. There are about 1,500 producers of full-grown oysters as opposed to about 600 seed producers. The average size of farm is 2 Ha of which for many 10-15% is for seed, 30-40% half-grown and 45-60% for full-grown oysters. In Marennes 50% of sites are dedicated to wild oysters and have no licence. Everyone has a right by law to collect up to 5kg/day for individual consumption.

Having discussed settlement and proposed harvest with farmers from Charente Maritime it is believed that the settlement in this region is optimal for the maximum production of good seed. As mentioned there were three settlements, which is somewhat more manageable than the seven in Arcachon. Marennes producers were able to move their coupelles into other parts of the bay after first settlement and thus avoid spoiling through successive settlements. As a result it should be a good harvest of seed. The use of plastic tubes which were favoured in this region in the past has been reduced as this method of seed collection is very labour intensive and can lead to poor oyster shape as they grow around the circumference of the tube, which is only 2.5cm in diameter. Coupelles are favoured now.

Satmar Marennes

This is a nursery facility, which mainly produces clams (60 million) with oyster production at 30 million per annum. The facility uses underground water to culture 220m³ of *Heteroskeletonema sp.* (diatom) per day to feed juveniles. Algae are cultured for 5 days in winter or 3 days in summer to reach a cell concentration of 1-2 million cells per ml. At this point the culture is in exponential phase and production of toxins is avoided which can be a feature of the stationary phase of culture. The algae is then mixed with seawater which is then pumped around the



Example of small seed from Satmar Marennes

facility. The facility spawns every two weeks except for two months in winter and the month of August when in the latter case diurnal temperature variations are too large for oysters to tolerate. Seed

is graded every day and had very good shape when examined. 75% of seed produced by Satmar is triploid and is produced via mating between diploids and tetraploids. An official comes to the hatchery with tetraploids and oversees



Wild oyster stocks on rocks in Marennes

the spawning returning the tetraploids afterwards or else killing them. Feedback from oyster growers would indicate that 80% of them regard the triploid oyster to be superior in terms of growth. Signs of expansion at this nursery were evident. Again it should be stated that although Satmar have many orders pre-booked Irish producers, if they are interested, should enquire in case they can be accommodated.

Grainocéan

This hatchery, based on Ile de Re, is dedicated to the production of *gigas* seed exclusively. It has been run by Eric



Shell from previously used broodstock in Grainocéan

Marrissel for the last 22 years and employs ten people. At the centre of the hatchery are two 25,000 litre containers, which hold 200 million larvae per tank. The first tank is used for larvae up until one week before metamorphosis whereupon they are moved to the second tank for settlement onto crushed oyster shell 350 microns in size. The larvae



Lagoon system with baskets in Grainocéan

measure approximately 250 microns at this stage, thus promoting a one seed per shell piece scenario. Normally all seed produced are triploid but in this year the



last hatching was diploid as tetraploids were not available from IFREMER when required. The hatchery operates a programme of broodstock selection, which is now at the 8th generation stage. From the first wild generation 50 million descendants were produced with only 1,000 being kept on the basis of shape, shell quality and growth traits. This equates to a selective pressure of 1 per 50,000 which would be equivalent to selecting on height basis alone humans above 2.05 m! Spawns usually take place from January to July and the overall current production capacity is 320 million. The limiting factor in production is the area of ponds dedicated to nursing new seed. The nursery uses a lagoon system covering 9 Ha. Algae cultivated in ponds are pumped using a spiral screw pump into the ponds to promote algal blooms to feed the seed. The screw pump itself has several advantages in that it can pump 600 litres per hour using a 7 KW pump and importantly with minimal turbulence (thus causing no damage to phytoplankton) and minimal maintenance. A new 3,600-litre/hr pump is being brought in to cope with the imminent expansion of the nursery. The owner can get G10 product up to market size in three months on long lines! Due to the selection of fast growing broodstock the owner believes his oysters to be suitable in slow growing environments also. The expansion of the facility will see a doubling of capacity within the next two years. The company at present supplies mainly the French industry but is hoping to expand into other European markets in the next few years. Irish producers can enquire about seed availability but like other hatcheries in France there is strong demand from French producers for seed.

Trends

At present the French industry needs 6 billion seed to produce approximately 110,000 tonnes (this final tonnage figure can vary even though the seed requirement can remain static). It is the opinion of some of the hatchery seed producers that 3 billion hatchery seed would produce the same finished product as 6 billion wild seed due to reduced mortalities and would do all this in a shorter growth cycle and giving better quality. Therefore

given the current total hatchery seed production of 500 million and the change of mind set among French oyster producers towards hatchery and triploid seed, there is obviously great scope for development of hatchery production. Hatchery producers can see a potential of 80% of farmers using their seed in the future. This has not been lost on the banks that are now keen to support the hatcheries. The Irish oyster industry should note this trend away from wild seed as a move towards hatchery triploid seed may lead to less mortalities, better quality product, shorter production cycles and more flexibility when selling to the market place as theoretically the oysters will not be milky. From the point of view of the consumer in France, even a small amount of milk in the oyster will lead to a rejection of those oysters in the restaurant. Having stated that, it all depends on the numbers of pieces that the Irish farmer is producing and how comfortable he/she is with relying on one source of seed. Maybe sourcing seed from several providers is the low risk approach. There has also been a shortening of the range of sizes of hatchery seed available this year as can be seen in Table 1.

General Considerations when purchasing wild seed

In determining the quality of a given batch of wild seed there are many factors for consideration. It is considered that the region of harvest should be visited on at least two occasions; following settlements and during harvest.

The following characteristics may be applied in assessing the quality of wild seed:

- **Age:** it must be less than one year old if it fits into 4 or 6mm bags. If the lime from tile seed is still whitish then the seed is still young. The lime will become progressively darker with age. Older seed will have a harder and thicker shell and new growth will be very visible on older seed. In addition the lime becomes harder with age and will not fragment as easily upon grading. Thus older seed will have larger pieces of lime mixed within bags than younger seed.
- **Percentage of singles vs. doubles:** percentage of doubles should be less than 10%.
- **Average weight:** (normally sold in piece per kilo). This varies if the seed is tile seed or Coupelle seed (lime present).
- **Survival rate:** level of dead shells must not be above 10%.
- **Time of purchase:** never during May/June (risks of mortality).
- **Counting:** an accurate assessment of numbers should be made.
- **Level of grading and whether**

seed is from top or lower grades:

In general the proportion of doubles will be higher in the top grade and the best quality seed will be in the next grade, with a reduction in quality increasing at the lower grades. Also the top of the batch with its higher growth performance will limit the number of other species mixed with it.

- **The seed must preferably come from an early harvest.**
- **The proportion of lime mixed in with the seed should be reasonable.**
- **No mussel seed should be mixed in with the seed.**
- **A small frill should be present on the seed.**
- **Guarantees:** In the initial assessment of a wild seed supplier (producer, broker or dealer) the guarantees offered by the company are critical in assessing the quality. In particular, guarantees should be sought regarding the mortality/survival rates, settlements of mussels, the percentage of doubles and the presence or absence of dog whelks. It may not be possible to secure guarantees regarding the absence of flat oysters, *Crepidula* or *Polydora*. The policy of the company in assessing actual numbers per batch should also be investigated. All guarantees should be reflected in pricing and payment structure.
- **Irish oyster farmers wishing to buy wild seed should make an assessment of the status of settlement in France and negotiate a price for seed based on the likely availability and quality of seed during harvest the following year. A visit to the supplier during harvest should be made to get a first-hand look at the seed and the methodologies employed pre-sale by the supplier bearing in mind the points made above.**
- **Irish oyster farmers should always establish the status of *Martelia* and *Bonamia* in the areas that they are purchasing seed. Certification from IFREMER should indicate the probability of the presence of these two pathogens in the consignment. EC Directive 91/67, states that shellfish should only be moved from approved coastal zones and the presence of flat oysters (*ostrea edulis*) in any consignment is in contravention of the Directive.**
- **Finally: the shape of the seed should be of the highest quality.**

Table 1: Selection of prices for triploid and diploid *gigas* from all hatcheries/nurseries in France, Ireland and Britain 2003/2004.

Grade	G2	G3	G4	G5	G6	G7	G8	G10	G12	G13	G14	G15/20
Triploids	-	-	9.00	-	11.00	-	15.00	18.00	21.00	-	-	-
Price/1000	5.40	-	-	-	13.70	-	15.30	-	-	-	-	-
	-	-	-	-	-	6.50	-	8.00	-	-	-	-
	5.00	6.00	7.00	8.50	10.00	-	-	15.00	17.00	-	20.00	-
Diploids	-	-	8.00	-	10.00	-	13.00	16.00	20.00	-	-	-
Price/1000	4.40	-	8.00	-	12.00	-	13.50	16.00	-	-	-	-
	-	-	-	-	11.43	12.70	-	19.05	-	-	-	-
	5.00	6.00	7.00	8.50	10.00	-	-	15.00	17.00	-	20.00	-
S*	4.57	7.14	8.57	10.86	-	14.28	-	20.00	-	27.14	-	30.85
A*	-	6.35	7.62	9.65	-	12.70	-	17.78	-	24.13	-	27.43
	-	-	8.25	9.50	12.00	13.25	16.50	19.50	21.50	-	23.50	-
	-	-	-	-	-	-	12.00	14.50	-	-	-	-

S* = Spring price quoted per 1000 including full discount of 20% if purchase is over 5,882 Euro (£4,000) and payment made in advance.

A* = Autumn price quoted per 1000 including full discount of 20% if purchase is over 5,882 Euro and payment made in advance.

Other seed sources and prices

Charles Kelly (Atlantic Clams Ireland Ltd.) - 3 million G8-10 available in April 2004

Jim Lyons (Sea Lyons Seafoods) - All pre-booked until May 04. However 20t of 40-60g at 1.70 Euro/kg between Christmas 2003 and March 2004.

Seasalter (Walney) Limited - In addition to the popular seed sizes, between now and Spring 04 they are selling 10g and 15+g oysters at 2.54 and 1.90 Euro/kg and sold by the 1,000kg.

Jean Le Dorven (Boet Mor Seafoods) - will have 500,000 18 month old oysters available in spring 04. In October 04 he will have 5 million 10mm oysters for sale. Prices not confirmed as of yet.

Jim Harty (Dungarvan Shellfish) - 3 million 20g oysters and 8 million 30-40g oysters available from mid January –End of May 04 at a price of around 2,000 Euro/tonne delivered.



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Irish Sea Fisheries Board

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BIM's objectives for aquaculture development are to:

- ☐ Build a critical mass in the production of those species with higher added value potential
- ☐ Create additional peripheral coastal income and jobs in species with relatively lower capital costs and potential for added volume.
- ☐ Promote the diversification of the aquaculture industry by encouraging new species development
- ☐ Promote the introduction of new technology and improve infrastructural support for the sector
- ☐ Promote initiatives to improve the sustainability, efficiency, safety and competitiveness of the industry.

To achieve these goals BIM provides a range of financial, environmental and quality support services to the aquaculture industry.

BIM also support site and technology feasibility studies and promotes environmental awareness in the areas of good husbandry practice and waste management.

If you think we can help why not give us a ring when one of our Technical Advisors will be willing to help and advise you.



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