Tech Talk: To Pit or Not to Pit?

The threat of ice damage has forced intertidal oyster farmers to devise strategies to reduce potential losses. Here in southeastern Massachusetts, some oyster farmers move their oysters from the farm location to a storage area, or ‘seed pit’, that is typically cold (30-40°F) and damp (over 90% relative humidity) for approximately three months. Local farmers have reported typical survival rates of over 90% using this method for first year seed— but it’s a lot of work and time.

What other options are there? Here farmers either leave the oysters on the intertidal farm site or move them to deeper water, below any ice that might form. This past year we did an experiment to see how these methods stacked up. Specifically, we asked:

**What are the typical physical characteristics and average survival of oysters kept in seed pits?** We put temperature/humidity sensors in 9 pits around the region and found that oysters were typically stored in cold (38°F), humid (100.1% relative humidity) conditions, for periods ranging from 45 to 124 days (with an average of 90 days). Survival was over 80% in all the pits and only pit duration seemed to affect survival, with survival decreasing as the number of days stored in the pit went up.

**Does storage time in a pit affect survival or average revival time of oysters?** After the third week of pitting and every two weeks thereafter, we removed batches of oysters from a seed pit, placed them in aerated seawater and checked to see how many showed signs of life over 28 days. In the 15th week, batches started to show a significant decrease in survival. Also, the oysters in the first batch (3rd week) revived faster than any of the batches after that.

**How do the three methods (pitting, sinking or leaving on the flats) compare in terms of oyster mortality and growth – and do any effects have a carry-over effect through the following growing season?** Not surprisingly, winter mortality was significantly highest among the oysters on the flats (which were crushed under ice), compared to the other two methods. Over the rest of year (from March to December), the oysters from each of the overwintering methods survived equally well.

Also not surprisingly, the oysters sunk in deep water showed an increase shell length over the winter (although small) while the other two methods did not grow. Surprisingly though, the oysters overwintered sunken in deep water ended the year with the smallest increase in shell length!

To summarize, overwintering oysters in a seed pit avoids the risk of ice damage, which can inflict significant mortality. To our surprise, pitted oysters did not lose any growth in the following year. In fact, unexpectedly, the oysters kept in the water over the winter had the smallest growth. This was perhaps due to the metabolic costs of remaining active through the food-poor winter.

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*2004 - 2005 Oyster Overwintering Study*
Additionally, the first year oyster seed survived well under a variety of pit conditions, suggesting they are relatively resilient. Importantly, survival tended to decrease with storage time and oyster farmers report a sharp increase in overwintering mortality with increasing age of stored oysters.

In addition to the presented data, oyster farmers reported that placing oysters in seed pits reduced fouling both through direct mortality of any fouling organisms stored with the oysters (e.g., blue mussels) and the avoidance of any late winter/early spring sets of fouling organisms.

Therefore, of the tested methods, pitting oysters seems to provide the best combination of survival and growth. Despite the perceived risks and the considerable labor involved in seed pitting, this method is recommended as an excellent method of overwintering oyster seed.