

Roll'Bag System

The Roll'Bag System was designed and patented and is supplied by GrainOcean International. It is based on the same principle as all inter-tidal floating bag systems in that oysters in these bags experience a systematic agitation twice a day based solely on the tidal cycle and regardless of wind and wave action. This should replace the need for shaking and turning bags on the tide and still enhance the shape and meat content of the oysters.



Figure 1: Trial site in Brittany



Figure 2: Trial site in Ireland

Materials & Structural Specification

All components of the roll'bag are supplied by GrainOcean International, including the trestles. If a producer wishes to build their own trestles they should be aware that the dimensions are specific to the system and can be provided by the manufacturer. The use of 20mm hot galvanised steel throughout is recommended.

Table 1: Materials required for trestle and hanging bag systems:

Materials	Cost € Guideline only
Trestle <ul style="list-style-type: none">• 20mm hot galvanised steel• 3.4m long, 2.1m wide, 800mm high	
Bag and accessories * <ul style="list-style-type: none">• Hard plastic, reinforced mesh bag supplied in 2 halves with 2 floats and 8 plastic closure pins• 2 plastic clamps, each one supplied in 2 parts• 2 diabolos, also supplied in 2 parts• Spacer templates to ensure exact positioning of the diabolos on the trestle cross bar• Sealant to secure the diabolos onto the trestle bar• A tool for securing closure pins on both the bag and the clamps	
Trestle plus 4 bags with accessories Excludes delivery	360.00
Cost per 1kg of 30g oysters stocked	€7.50

The roll'bag itself is 115cm long, 70cm wide and 14,5cm deep with a fixed internal volume of 40 litres, approximately one quarter of which is taken up with the flotation which is capable of providing lift to up to 20kg of oysters.

The minimum quantity supplied is usually 24 Roll'bags with 6 trestles (optional), referred to as a roll'bag set.

Whereas the system was originally designed for bringing half grown oysters to market size it has also been trialled for growing seed at high densities in 4mm box bags inside the roll'bag. This means it is suitable for all areas of the farm: nursery, growout and fattening or hardening sites.

The system offers some variation in that the bags can be hung from single 4m long bars used in some parts of France and has also been deployed sub-tidally on the seabed in a purpose-built frame. Information can be found on these on YouTube



Figure 3: Roll'bag components

Recommended Method of Deployment

The purpose-built trestles should be deployed in line with the tide, similar to traditional bag and trestle systems. Each leg of the trestle should be secured in the ground with a length of rebar driven in at an angle and tied tightly to the trestle leg (Figure 4). This is to ensure the trestle will not lift in strong winds.

It is recommended by the manufacturer that the diabolos, the 2 piece clamps secured to the trestle, are installed on the trestles after transport to the site to avoid them being damaged while stacked on the trailer. A template is provided for fixing the diabolos because their positioning must be exact to ensure the bags can swing freely. There must be 22cm from the trestle edge to the diablo, 29.5cm between the 2 diabolos and a further 22cm from the second diablo to the opposite edge of the trestle. Two plastic spacers, cut to these specific lengths are provided for the farmer to use during the initial setup.

The roll'bags themselves are assembled, filled with oysters to the recommended stocking densities and closed with plastic pins, using the tool supplied, at the farm shed. Importantly, the floats provided are secured inside the bag. They are made to measure, can only be fitted one way and cannot move once the bag is closed.



Figure 4: Trestle secured in seabed with rebar driven in at an angle and tied tightly using a rubber band to the trestle leg.

There are numerous videos on You Tube in both French and English on assembly and deployment of the system https://youtu.be/hpkn-UY24hM?si=iteeCVvEPqgC4E_p.

Site Specifications

In France the system has been trialled at bouchot mussel sites which tend to be more exposed with exceptionally high tidal ranges, some of the highest in Europe. However, as it relies on the tidal cycle as opposed to wind and wave action to work the oysters, the site does not need to be exposed. Because the bags hang from the trestle at low water a firm, stable seabed where trestles are not prone to sinking is essential.

Reported lifespan

The manufacturer recommends the use of hot galvanized steel trestles made to his own specification, which, he states should last for 30 – 40 years if properly installed even on the most exposed inter-tidal sites.

The diabolos are secured onto the trestle using chemical sealant. There is a raised strip running the length of the cross bar which must fit into a groove on the inside of the diablo so there is only one way to fix them in place correctly. They will not move and will not therefore be subject to wear.

The roll'bag is made from heavily re-enforced plastic mesh. The weakest point on the system is the point of contact between the clamp and the bag. The clamps themselves are designed to withstand a pulling force of up to 1.2 tonnes. The bags are symmetrical which means that once signs of wear are apparent the bag can simply be hung from the other end. The manufacturer reports an expected lifespan of at least 20 years for the bag and clamps.

Recommended Stocking Densities

The roll'bag is designed to take higher stocking densities than other bags on the market. When used for finishing oysters of approximately 30g the bag should be stocked with at least 12kg or 400 per bag. Because the bag is rigid and therefore fixed in terms of its volume it is quite slim to avoid the oysters overcrowding when the bag is hanging.

- Seed at 4,000 G8's per 4mm box bag insert
- Half grown at 400 per bag
- Market size at 200 per bag



Figure 5: oysters stocked at 400 per bag

Potential yield per hectare

The assumptions made when estimating the potential yield per hectare from the Roll'Bag system are as follows:

- The area is 100m x 100m
- Trestles are laid out in 10 sets of double rows, 29 per row
- There is a 5m tractor corridor between each double row
- An acceptable mortality rate of 20% over one growing season may occur

Table 2: Potential return per hectare

Growth	# Bags/Ha	Stocking Density/bag	Normal mortality rate for one growing season	Potential Return after one season
35g up to 50g	2,320	400	20%	37 tonnes
50g up to 85g	2,320	200	20%	31 tonnes

By comparison, in the case of a typical inter-tidal 6 bag trestle farm, one hectare laid out in double rows with 5m tractor corridors between them will potentially return 28 tonnes of 50g oysters or 31 tonnes of 85g oysters because of the lower stocking densities required.

Environmental considerations

There are no rubber bands, hooks or cable ties required, the risk of losing bags is greatly reduced and the float is internal so also highly unlikely to be lost.

The bags will be visible for a slightly longer period on each tide but the overall height of the trestle and roll'bag is no greater than that of systems already licensed around the country and the visual impact would not be considered significant in the majority of sites.

There will be considerably less human activity on the shore because turning and shaking bags will no longer be required so there is less risk of disturbance of potentially sensitive species.

Finally, it is generally accepted that the replacement of physical shaking of bags to promote optimal shell shape and meat content with a gentler constant tumbling effect is less stressful on oysters and makes them more resilient against the *Vibrio* outbreaks linked with oyster mortality events. However, there has been no evidence to support this in the Irish trials done to date.

<p>STRENGTHS</p> <ul style="list-style-type: none"> • Optimises the shape and meat content potential from a given site • High volume bag allows for higher stocking densities per square metre • Eliminates turning & shaking requirements and therefore labour requirements • Reduced labour requirements means less time spent on the shore and less disturbance in environmentally sensitive areas. • Re-enforced plastic components and hot galvanised steel trestles have been designed for exposed inter-tidal sites • Floats are integrated inside the bag reducing the risk of marine litter • Eliminates the use of rubber bands which are a major source of marine litter • Once harvested the various components are easily stored • You tube videos of each stage of husbandry are provided 	<p>WEAKNESSES</p> <ul style="list-style-type: none"> • High capital investment required • Limited evidence of success because not widely used in France as yet. • Assembly and disassembly at harvest time of finished oysters is slow because of the plastic pins and clamps which need to be secured in place and then removed and stored safely at harvest. • The ergonomics of farmers grading and production lines will have to be modified to ensure these processes are not slowed down. • Hot galvanised steel trestles are not widely available • The floats are polystyrene which may break down over time becoming a source of marine litter
<p>OPPORTUNITIES</p> <ul style="list-style-type: none"> • This system is designed from the start with exposed inter-tidal sites in mind • The manufacturers have shown how the system might be used for seed by inserting 4mm box bags into the roll'bag. • It may be possible to raise the grade of oysters from speciale to "super-speciale" and therefore open up markets for the producer • The supplier, GrainOcean can deliver the system in their own truck 	<p>THREATS</p> <ul style="list-style-type: none"> • The system is not yet proven for Irish conditions although numerous trials are now underway • The potential impact of fouling on the flow of water and nutrients through the bags is not yet known. This will be site specific. • The trestles are higher than traditional trestles and the floating end of the bag is visible for longer which may raise concerns over visual impact