Release

- The ideal release areas resemble an underwater scree slope, being composed of a jumble of a wide variety of rock sizes, from cobble to boulder. It is the gaps between the rocks, which offer the habitat for the lobsters.
- Allow the juveniles time to acclimatise to ambient seawater conditions before they are liberated from the release containers.
- The density of release depends upon the suitability of the ground, but in general it is between 1 – 2 animals per square metre.
- Juveniles can be released by a variety of methods. Diver controlled releases can be most effective although experimentation suggests that alternative remote release systems show promise. The merits of the various systems are discussed in the Seafish lobster manual.

Divers releasing juvenile lobsters

- Juveniles released directly on to the seabed seek shelter rapidly in cracks and crevices or below stones.
- Do not release juveniles at the surface and allow them to sink through the water column. Predators are attracted rapidly and many juveniles will be consumed.

Harvest

- Depending upon the size of juvenile released, it can take from 4 – 7 years before the first animals above the minimum landing size are recovered.
- The animals can be recaptured in conventional fishing gear (pots or creels) set in the normal way.
- It has been estimated that, depending upon the size of juvenile released, up to 40% of the stock may be surviving to marketable size.
- It has been observed that animals of hatchery origin can contribute between 5 – 10% of the gross fishery landings of an area.
  The contribution to individual hauls or fishing locations can be even greater.
- There appears to be little emigration of stocks away from suitable grounds.
- Recoveries peak around 1 – 2 years after a year-class (cohort) recruit to the fishery.
- The animals mature sexually and reproduce naturally.
- It has been hypothesised that, depending on its size and duration, the effects of a stocking programme may be measurable for many generations after its cessation.
- In general, the animals recovered are identical in appearance to the wild stocks in the area.
- The flavour and texture of the meat from animals has not been affected by their hatchery origin.

LOBSTER HATCHERIES

General

- Lobster hatcheries operate at elevated seawater temperatures and consequently tend to make use of recirculation technologies.
- Lobster hatcheries do not tend to be fully commercial enterprises. In general, they are operated to provide juvenile lobsters for release in to the wild as a stocking or fishery management measure.
- Hatcheries can operate on any scale and each is designed to meet the needs of its area.
- In addition to normal planning procedures, there may be additional legislation affecting lobster hatcheries or the associated release programmes. Consult the Centre for Environment, Fisheries and Aquaculture Sciences (CEFAS), Scottish Executive Environment and Rural Affairs Department (SEERAD) or Department for Agriculture and Rural Development (DARD) in Northern Ireland for the current position.

Further advice

- For further advice on any aspect of lobster hatcheries please contact the aquaculture advisor for your area.

They are:

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Alternatively, please visit our website at www.seafish.org/sea for more information. The website also contains details of the CD-ROM based resources produced by Seafish. There is a specific Hyperbook, which combines in-depth information regarding the culture of this species together with an economic modelling tool for business planning purposes. In addition, there is a more general Guide to commercial bivalve molluscs with information on aspects of cultivation, harvesting, the fishery, depuration and distribution for all species.

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LOBSTER HATCHERIES

This leaflet is intended to offer a summary of the methods used to rear lobsters in UK hatcheries. More detailed information about specific aspects of the process may be found in other Seafish publications, technical publications from otheragencies and books. Prospective hatchery operators are advised to consult these in addition to this sheet.

Hatchery reared juvenile lobster

LOBSTER HATCHERIES

Broodstock

- Obtain broodstock from the intended release area.
- Purchase broodstock in the spring, when the eggs are closer to hatching naturally. (Unless year-round production is intended, in which case consult the Seafish lobster hatchery manual for advice about out-of-season production methods).
- Choose females with black or better still blue-brown eggs, as they are closer to hatching.
- Avoid females that have been exposed to the air for long periods or those with red-brown or orange eggs amongst the clutch of eggs – these indicate a damaged brood and they have the potential for large-scale egg loss.
- Ideally, house the females in individual tanks with an automatic larval collection system. For instance, lead the outflow from the tank in to a separate screened container.
- Females can be housed communally providing they have individual hides and they are disturbed as little as possible.

Female lobster with eggs under her tail

- Broodstocks can be maintained at elevated temperatures (16 – 20ºC) to speed-up egg development.

Females in individual shelters

- Feed the broodstock a variety of non-oily fish and shellfish every day. Chopped crabs or shrimps can be used as an occasional supplement. Remove uneaten food and detritus each day to prevent water quality and disease problems.
- Under-fed animals will consume their eggs or the eggs of others.
- In general, the broodstock are kept on a dim lighting regime.
- In a hatchery, larval hatching can be expected between April/May through to September, depending on location. Production at other times is 'out-of-season'.
- When the larvae hatch, they can be attracted to the collection area using a low-powered light.
- The average female lobster can be expected to yield between 5 000 – 10 000 larvae, depending on how it is housed and treated.

Larvae

- Collect the larvae that hatch regularly during the day. As a minimum in the morning, mid-day and last thing at night.
- Transfer larvae from the collection area to the transport container or larval rearing bins using rigid plastic mesh strainers.
- The standard larval rearing bins are 100 litre conical plastic tubs, used commercially as feed hoppers. Other systems have been used.
- The tubs are filled to 80 litres and fitted with a water injection system at the base. The outflows are screened with 2 mm mesh to prevent larval loss. Various designs have been used by different operators.
- Larvae are stocked at between 12 – 25 larvae per litre or the entire hatch over 3 days, whichever is the lesser.

Lobster larvae in a rearing bin

The lower the stocking density the lower the losses through cannibalism.

- The larvae can be most easily fed on freeze-dried krill (sold for the aquarist trade). Feed twice per day. This may be supplemented once per week (or more often) with chopped mysid shrimps, mussels or live brine shrimp nauplii.
- The food ration should be tailored to produce an excess of food particles over larvae. This reduces larva-larva encounters and aims to reduce losses.
- Generally, larval rearing takes place at elevated temperatures (17 – 20ºC).
- The development time to metamorphosis is generally between 12 – 18 days. Larvae that have not metamorphosed within this period should be discarded. At ambient seawater temperatures, development is slower, in the order of 30 days to metamorphosis.
- Metamorphosed larvae have the appearance of the adult lobster and swim against the current in the tub with their claws extended in front of them.

Post-larval (stage IV) lobster juvenile

- Remove metamorphosed larvae (called post-larvae or stage 4) as soon as they are apparent otherwise they will be eaten or damaged by other larvae.
- Approximately 20% of the larvae initially stocked in to a larval rearing tub at 25 larvae per litre will survive to metamorphosis. Higher percentage survivals have been reported at lower stocking densities or with alternative management regimes. These are discussed in the Seafish lobster manual.

Post-larvae

- Transfer the post-larvae (stage 4) from the larval tubs to individual on-growing containers using rigid mesh strainers.

Stage IV post-larvae in individual on-growing containers

- Ideal on-growing containers are approximately 50 mm square by 100 mm deep, with a 2 mm mesh base. Alternative designs have been used.
- The on-growing containers can be housed in on-growing tanks of different designs. The most common is a shallow trough.
- Post-larvae can be on-grown for varying lengths of time, depending on the intended size for release.
- Feed each post-larva every day and remove uneaten food and detritus from the cell.
- They can be fed freeze-dried krill as their standard ration. However, they benefit from occasional supplementation with mysid shrimps, chopped mussels, live brine shrimp or periwinkles.
- Post-larvae or juvenile lobsters are usually reared at temperatures between 16 – 18ºC.
- Post-larvae have been on-grown for up to 12 weeks before release during the scientific trials. The semi-commercial hatcheries are tending to rear for at least 1 or 2 moults (stage 5 or 6) before release. This can be achieved in 4 weeks or less.

Lobster juveniles ready for release

- In general, approximately 80% or greater of the juveniles can be expected to survive to release size.
- Juveniles should be acclimated to the ambient seawater temperature of the intended release site in the hatchery, before they are sent to the release area. This necessitates a system for individually manipulating the temperature in each on-growing tank.
- If required, juvenile lobsters can be marked prior to release using sophisticated tagging systems such as coded wire micro-tags. However, this is expensive and time consuming and is probably un-necessary in the majority of situations.

Juvenile lobster being micro-tagged prior to release

- Acclimatised juveniles can be transported to the release areas using either wet (in-water) or dry (in air) transport systems. The relative merits of each regime are discussed in greater detail in the Seafish lobster manual.