



Broodstock

This leaflet covers issues surrounding the capture, transportation and quarantining of ballan wrasse. It also addresses the physical and environmental conditions necessary for the maintenance of broodstock as well as feeding and rearing issues.

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PROJECT SUMMARY

EcoFish is a three-year transnational project financed by the European Regional Development Fund/Northern Periphery Program and national private and governmental grants. The project focuses on developing methods for culture and use of Ballan wrasse as cleaner fish.

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EcoFish has produced this series of summary technical leaflets on all the relevant practices covering the entire life cycle for the rearing and the production of Ballan wrasse. Readers can access and download more detailed, full-text, pdf versions of these technical leaflets at www.eco-fish.org

Ballan Wrasse



Ballan wrasse

Ballan wrasse are inquisitive and require a diverse and varied environment. The rearing environment for wrasse can be enhanced by supplying tank furniture to give cover, shelter and to allow wrasse to identify a territory. The broodstock should not be handled too frequently through the year, and especially not during the spawning season and immediately prior to spawning commencing. Extraneous noise should be kept to a minimum. The observation of broodstock with camera and video systems is desirable.

Design of Broodstock Holding Units



Broodstock holding units

Tank Size

The project discovered that larger tanks ranging in size from 4m diameter x 2m deep, 3m diameter x 1m deep and square tanks of 2m² by 40cm deep facilitated successful spawning. Smaller tanks proved to be unsuitable.

Tank depth

Water depth in the tanks can vary from 40cm to 2m, but shallower tanks permit ease of access.

Lighting systems

The illumination in the tanks was usually reduced (dimmed), ranging from 300–600 lux, but some facilities used brighter lights up to 1200 lux.

Tank furniture

Plastic pipes and bags should be shredded to simulate seaweed in each tank. Astroturf can act as substrate for natural release of the eggs.

Environmental Conditions for Holding and Rearing Broodstock Wrasse

Temperature

The broodstocks in summer and autumn production should be supplied with chilled water during spawning and for several weeks in the lead up to spawning.

Water quality

The temperature of broodstock tanks should range from 6°C to 17°C maximum. The salinity wrasse should be stable, from 30ppt to 34ppt.

Photoperiod regimes for broodstock and other environmental parameters

The spawning time of wrasse can be altered by advancing or retarding the photoperiod but the use of hormone induction should be avoided.

**BROODSTOCK
WRASSE COLLECTION**

**QUARANTINE
ARRANGEMENTS**

**ESTABLISHING SPAWNING
STOCKS OF FISH IN TANKS**

**SORTING OF WILD CAUGHT
FISH INTO BROODSTOCK
POPULATIONS**

**INITIATION OF FEEDING
AND BROODSTOCK DIETS**

Broodstock Ballan Wrasse Collection

The fishing and capture of Ballan wrasse should be conducted in a way that is as stress-free as possible for the fish. Capture of juvenile fish is frequently easier as the smaller fish can be handled more readily, can be captured by trap, and are more likely to adapt rapidly to feeding on a dry diet. Ballan wrasse should be handled with care following capture and on transfer to the hatchery. Some guidelines include:

- Soft mesh hand nets should be used to prevent damage of the skin, fins, and body
- Control of tank temperature with a maximum rise in temperature of no more than 2 degrees
- Oxygen levels should be checked regularly and maintained in the range 7–10mg l⁻¹ oxygen.
- Wrasse should be offered feed if they are held in storage for more than 48 hours
- Wrasse should be checked for signs of physical damage or signs of disease

The fish selected from the broodstock should have:

- The normal body shape and colour typical to the species
- No skeletal abnormalities
- No obvious health conditions such as physical damage or parasite loading

Quarantine Arrangements

Fish should be quarantined on receipt in a biosecure area for a prolonged period (six months is suggested) before transfer to the main broodstock tanks. A prophylactic treatment should be carried out shortly after receipt at the hatchery to remove any ectoparasites that could cause health problems. Mortalities during this quarantine period should be sampled for clinical pathological signs and tissue samples taken to establish bacteriological, virological and histological. This quarantining procedure contributes toward building a health history for the stock.

Additional screening can be applied to samples to ensure there are no carriers of diseases such as Infectious Pancreatic Necrosis (IPN) and Viral Nervous Necrosis (VNN). A fish movement record book should be completed to record fish brought in and discharged from the hatchery. Quarantine facilities should be in a separate area with a separate flow through water supply and there should be no use of shared equipment, to prevent the spread of disease.

Establishing Spawning Stocks of Fish in Tanks

Ballan wrasse can reach sexual maturity from a length of 28cm. Natural spawning takes place from April to July depending on latitude. Individual females are repeat spawners. Ultrasound techniques can be used to identify the sex of Ballan wrasse and the stage of maturation. Ovaries can be identified as a pair of distinct lobes. If they cannot be seen, then the fish will likely be male or sexually immature.

A more straightforward technique to establish the sex is to gently squeeze each fish along the flanks to see whether milt or eggs come out. However, this will only be effective immediately before or during spawning.



Process for wrasse broodstock

Fish caught in the wild may be held in a communal tank at relatively high density during quarantine and in storage prior to stocking in the final broodstock tanks. A few weeks before spawning the fish can be sorted into separate broodstocks with a suitable ratio of male to females.

Anaesthesia

At some stage the fish will have to be measured, have their sex determined and perhaps be fitted with a PIT (Passive Intergrated Transponder) tag (NW Technology). These procedures should be carried out under anaesthesia to avoid damage and stress to the broodstock. Sufficient water exchange should be provided as well as a supply of oxygen. An oxygen meter should be used continuously. The PIT tag can be inserted on the dorsal “shoulder” of the fish slightly anterior to the first dorsal fin. Antibiotic powder can be applied to the site of the lesion to sterilise the wound. The fish should be monitored for recovery and checked in the following days for infection in the wound.



ECOFISH BALLAN WRASSE PROJECT

Identification of the sex

Establishing appropriate breeding populations was difficult to achieve due to absence of dimorphic characteristics or nuptial features in ballan. The populations in this project were established based on including one or two spermiating males when they were sexually mature in each tank and observing the behaviour of the other fish.

Sex determination in Ballan wrasse is most accurate in the period prior to sexual maturation. The sex can be determined from two months prior to spawning using ultrasound techniques. Once identified, the spawning ratio in tanks can be adjusted and each tank should have one confirmed male present.

Initiation of Feeding and Broodstock Diets

On arrival at the hatchery the Ballan wrasse selected as broodstock may initially be reluctant to feed for several days. At first a variety of fresh feeds such as crab, mussels, prawns and fish such as herring can be offered. Later, wild caught Ballan wrasse can be weaned to marine finfish pellets or paste.

In Norway, after capture and initial weaning to artificial feed the fish were fed three times per week. To reduce waste feed and faeces during spawning, feeding was reduced during the spawning season: fish were only fed until apparent saturation in order to leave a minimum of uneaten feed in the tank.

Feeding should be to satiation to reduce waste, although waste is inevitable if fresh mussel or shellfish are provided. Tanks should be cleaned on a regular basis. Feeding frequency varies between hatcheries, and can be done daily, every second day and three times each week.

SEX RATIO IN BROODSTOCK TANKS

The optimum stocking density of Ballan wrasse has to be determined but is likely to be near 1:10, with greater number of females per males, depending on tank size.

The objectives of the EcoFish partnership project are:-

- To establish wrasse hatcheries with captive broodstocks in Ireland, Scotland and Norway
- To develop techniques for rearing wrasse at all life stages
- To produce eggs and larval wrasse
- To develop methods for culture and use of Ballan wrasse as cleaner fish

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