



Farm Application of Wrasse

The rearing of farmed Ballan wrasse is a technical task described in leaflets 1-6 of this series. However, care has to be taken in managing the use of wrasse on salmon farms to ensure maximum survival of the wrasse and to give effective control of lice burdens on salmon. This requires attention to detail in the care and welfare of wrasse described here.

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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

Transport of Wrasse to Farms

Wrasse should be transported in dark covered containers. The oxygen levels should be monitored and the tanks should be aerated if necessary. It is important that the temperature in holding tanks does not increase by more than 2°C during transport, and temperature levels should be monitored and the fish shaded from full sunlight. Temperatures should never exceed 25°C. Ice should not be included in transport tanks as ice presents a risk of reducing salinities to levels that stress the fish. Similarly, water should not be supersaturated with air or oxygen above 110% due to the risk of stress.

Where possible, acclimatise wrasse to the net cage environment before stocking with salmon. This delay will be offset by the wrasse commencing cleaning behaviour more quickly once they have been transferred to the salmon pens. Wrasse should be carefully released into the pens by placing the transport bin underwater and allowing the fish to swim out against the pen net. Sudden introduction to the pen or dropping wrasse into it may provoke an aggressive response from the salmon. Wrasse should be stocked either as soon as possible after putting smolts in sea-pens, or before the smolts are introduced.

Stocking Density of Wrasse to Salmon

A range of stocking densities are currently used in the industry. A common stocking density to effectively and safely control sea lice numbers on farmed salmon using Ballan wrasse (*Labrus bergylta*) in salmon cages is 2% (1:50). Many companies in Norway and Scotland are using a stocking density of 4% with a range of other wrasse species but more work is required to establish if this density is optimal for Ballan wrasse. The 2% stocking density allows effective control of the parasites while avoiding intra-specific aggression between Ballan wrasse. Although salmon have been successfully treated at a variety of wrasse densities with other species, there seems to be a variety of other influencing factors. For example, ratios up to 1:150 (0.7%) have been found effective with salmon smolts, but higher ratios than 2% (up to 10%) may be appropriate with *Caligus elongatus* infestation and large salmon.

Wrasse should be introduced to the salmon pens when they are a minimum of 14cm in length for Ballan wrasse and 10cm for Goldsinny, suitable for 15mm mesh, although this may be higher dependent on mesh size.

The size of the salmon may also have to be considered when determining the size of wrasse to be used. For this reason the use of larger Ballan wrasse is suggested for the second year.



Recovery/removal of wrasse from a salmon pen using a lobster pot

Recovering Wrasse from Pens and Transfer of Wrasse Between Pens

Once de-lousing has taken place, wrasse may be recovered from salmon pens. They can be re-captured using lobster pots or creels which may be set with suitable bait. Ballan wrasse have shown a preference for crushed mussels (*Mytilus edulis*) but other molluscs or crustaceans can be used. A precautionary step would be to remove wrasse from the pens before size-grading of salmon and when fasting salmon prior to harvest. While conditions may not always make it possible, wrasse can be removed from the pens and stored elsewhere when temperatures are less than 5°C or if salinity at 4–12m depth is less than 20ppt.

Feeding Wrasse when Sea Lice Numbers are Low

Various wrasse species have been shown to require feed intake comprising at least 4% as wet weight of their body weight at summer temperatures (14–16°C). If this amount is not available from sea lice, supplementary feed should be provided as small or crushed molluscs or crustaceans held in small bags in the net pens. If lice numbers are very low in some pens wrasse should be transferred to other nearby pens to avoid possible aggressive nipping by wrasse on salmon.

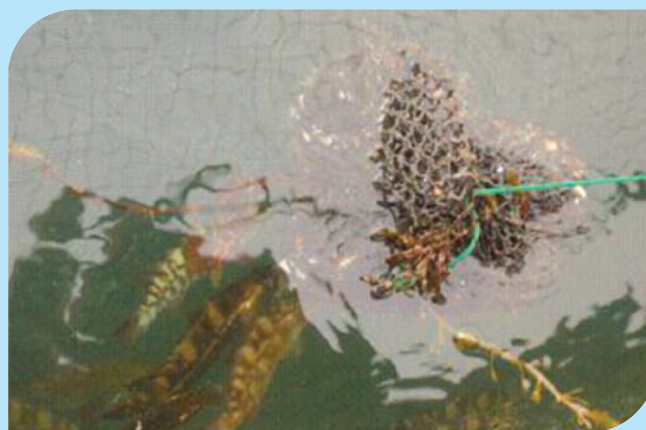
The main diet of Ballan wrasse in the wild consists of molluscs and crustaceans and, as mentioned previously, crushed mussels are a common food item, but any crustaceans or molluscs may be used. Feeding rates will vary according to a variety of environmental conditions and should be monitored closely on a regular basis. As a guideline figure, the feed intake of Ballan wrasse held in tanks during winter is approximately 20–30% of summer levels. The feeding regime can therefore be reduced to 1.5% of body weight during the winter. Pellet feed should be avoided where possible as this may effectively train the fish to compete for salmon feed when they are used again in treating salmon.

Survival of Wrasse in the Pens

The lice cleaning action can only be maintained if the stocking numbers of Ballan wrasse are sufficiently high and if the stocking ratio to salmon is not reduced. It's important to ensure the maximum survival and retention of wrasse in the pens and to record and identify causes of losses. Wrasse may be less effective in cleaning lice and may be stressed on farms with occurrences of low salinity below two metre depth and/or where current speeds are high. While wrasse have been shown to survive short-term at salinities as low as 14ppt and for longer periods (5–7 days) in salinity down to 21ppt, low salinities can induce stress that may result in mortalities. In particular, the combination of reduced salinities and high currents may be detrimental to their welfare.

Use of Wrasse at end of the Production Cycle

Wrasse show less cleaning activity when stocked later in the production cycle and through the winter. It has generally been shown that for wrasse to be an effective treatment for sea lice they need to be introduced to the salmon cages from the beginning of the production cycle



Ballan wrasse in a salmon pen being fed crushed mussels held in a mesh bag



Ballan wrasse by flow-through downpipe

Provision of Hides/Refuges for Wrasse

Wrasse require some form of shelter in net pens. They “sleep” at night and are inactive. As such, they can be a target for bird predation as they can rest on the side of the net. In addition, some respite from wave action, adverse weather conditions, low temperature and reduced salinity is required. Ballan wrasse have a natural affinity for areas of refuge/shelter as their natural habitat is along steep rock faces and boulder slopes. The provision of hides has been shown to improve survival. It is therefore important to incorporate cover in tanks and also in net pens.

Wrasse Husbandry in Tanks

Wrasse may be stored in tanks prior to transfer to farms or after being removed from the net pens and returned to tanks on land for storage. In these tank situations certain environmental conditions need to be maintained for effective husbandry. All wrasse recovered from salmon pens should be checked for signs of disease or morbidity. Fish that are identified as diseased or moribund should be culled. If disease was recorded in any salmon in the pens where the wrasse were deployed, the wrasse should also be culled to prevent transmission of disease between year classes. In the event of fish being stocked with a subsequent salmon year class, a sample of wrasse should be taken for bacterial and viral testing to ensure biosecurity.

A stocking density of less than 5kg of wrasse per m³ water is recommended. Tanks can be maintained in a flow to waste system or recirculation unit under conditions which approximate ambient environmental conditions around the normal range for Ballan wrasse in that geographical locality. Ballan naturally occur in temperate areas (63°N–20°N, 32°W–30°E). Tank water should be maintained as close to marine salinity as possible (≈34ppt). This species has been shown to safely tolerate ambient temperatures in tanks in the range that occur in Britain and Ireland. Optimal acceptable temperatures are between 8 and 20°C. Fish should be acclimated to any temperature changes over a period of time.

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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