



EWOS LUMPUS

Feeding manual for lumpfish

LUMPFISH

The lumpfish is a common species along the entire Norwegian coast. As juvenile the lumpfish lives in the kelp forest and uses a suction disk to attach themselves on the kelp. When they are about one to two years old, they swim out into the open sea. Here they feed on plankton before they wander back to the coast to spawn in the period from January to September. The lumpfish has many unique features, where the special body shape is most evident. In addition, it lacks a swim bladder, and has great variation colors: on the fish, the roe and the blood serum. The lumpfish is carnivore and has a very varied diet, including salmon louse.

Using lumpfish as cleaner fish was discovered by accident as early as 2001. However, it took ten years before farming of lumpfish as cleaner fish started. Since then, the commercial production has escalated rapidly, to 40 million lumpfish farmed in 2018. This makes lumpfish our second largest farmed species measured in number. There are many ongoing initiatives to improve the knowledge on lumpfish as cleaner fish. A lumpfish breeding program has recently been started, and there are projects on developing better vaccines and mapping nutritional needs.



FEEDING RECOMMENDATIONS

When the lumpfish is released into the pen, the goal is to ensure good health and welfare. Growth should preferably be kept moderate, since large lumpfish are less effective lice eaters. Good feeding routines are important. We recommend to feed at least 3% of biomass daily for the first 30 days after release. During this period, the lumpfish needs good access to feed to adapt to their new surroundings and routines. During summer when temperatures are above 7°C, we recommend 2% increased feeding distributed over 2-3 daily feedings.

In winter, feeding can be reduced to 1.5%, distributed over 1-2 daily feedings. In case of high lice numbers, stop feeding may be considered for 2-3 days. If the breaks are repeated too often, the probability increases that the lumpfish will get used to eating salmon feed. The breaks should not last too long. The lumpfish needs proper nutrition in order to perform as an effective lice eater over time. Several different measures can be taken to ensure that the lumpfish have access to the feed and thrive.

The lumpfish should have access to plenty of hiding places, placed where the salmon easily swims close by or through. At the same time, the hiding places should not be too close to where the salmon feed drops. Lumpfish should be fed through a few (1-2 per cage) fixed feeding points, centrally located in the hiding places.

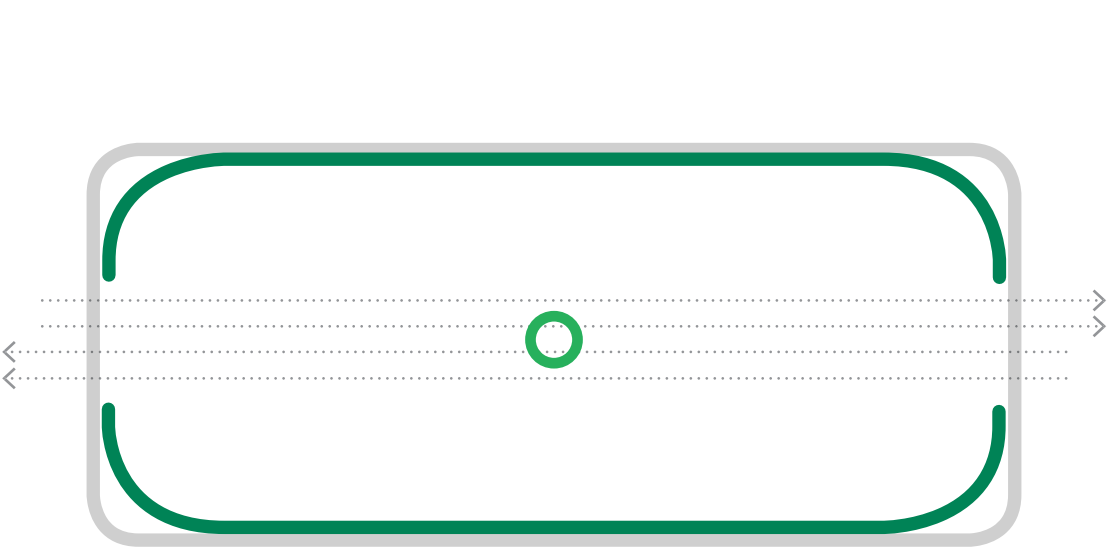
Feeding close to the new wall is not recommended, alternatively should hand-feeding be the option.

It may be advantageous to feed the lumpfish at the same time as the salmon, to reduce the probability of the lumpfish eating salmon feed. Clean cage nets help the lumpfish be a more efficient lice eater. To release lumpfish into the cages at the same time as smolt should be avoided if possible, since the lumpfish can get used to eating salmon feed.

NUTRITION

- » Salmon lice alone do not provide adequate nutrition
- » In the wild, lumpfish eat jellyfish, crustaceans, shells, and small fish
- » Proper nutrition provides good health and welfare
- » Good welfare provides a surplus of energy – to eat lice!

FEEDING



— Feed barge

○ Feeding point

— Kelp hiding place

…> Salmon swims through the hiding place

Time	Feeding recommendation
First 30 days after release	>3%
Summer	2% 2-3 feedings per day
Vinter (under 7°C)	1,5% 1-2 feedings per day

- » 1-2 fixed feeding points per cage
- » Place feeding point at center of hiding place
- » The hiding pace should have opening in both end so the salmon swims through easily
- » Feed the lumpfish at the same time as the salmon

EWOS LUMPUS

Good raw materials are essential for making a good feed. EWOS LUMPUS contains high levels of marine raw materials, with fishmeal being the most important component. Fishmeal is a raw material with great variation in composition and quality, depending on where it is produced, the type of fish used as a raw material, season and production process. Through decades of research, Cargill Innovation Center has acquired extensive knowledge on how we can identify fishmeal with the very best quality for fish feed. EWOS LUMPUS also contains extra minerals and vitamins, as well as EWOS BOOST to support health and well-being.

- » High-quality raw materials
- » High level of fish meal
- » Specially adapted to the lumpfish nutritional needs
- » Strengthens extensive bone structure
- » Provides better health and well-being
- » Contains EWOS BOOST
 - supports health and welfare

Feed	Feed size	Fish size
EWOS LUMPUS 15	2,2 x 2,2mm	> 15 gram
EWOS LUMPUS 40	3 x 3mm	> 40 gram
EWOS LUMPUS 80	4 x 4mm	> 80 gram



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THE BROCHURE IS DESIGNED IN COLLABORATION WITH AQUA KOMPETANSE AS



Fredrik Staven
Marine Biologist, Aquacompetence.
Researcher on evolutionary biology in cleaner fish..

The Ph.D focuses on the use of lumpfish, learning capacity and adapting to life in the cage in interactions with farmed salmon.

Contact our sales office for placing order or more information about EWOS LUMPUS.

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