INVE AQUACULTURE

shapingaquaculturetogether

TECHNICAL CARD

fish hatchery diet

o.range

The finest marine fish hatchery dry diet line

The different diets in the "o.range" perfectly meet the nutritional needs of the fish larvae throughout the different hatchery stages. Formulated with the best marine ingredients available in todays market to maximize fry performance and improve their resistance to stress.

- ✓ One diet range for the entire hatchery cycle
- ✓ Optimal Σω3 HUFA and DHA/EPA profiles
- ✓ Excellent stability and floatability in the water

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CHARACTERISTICS

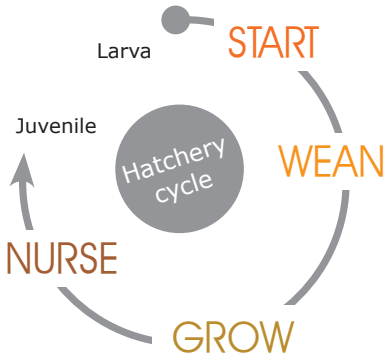
START
- Formulated to initiate fish larvae to artificial feeds
- Highly digestible and attractive to the larvae
- Optimal DHA/EPA profile to fit the needs of the fish

WEAN
- Excellent stability and floatability in the water
- Perfectly in balance as a partial *Artemia* substitute
- Contains free nucleotides to improve cell growth

GROW
- Contains high levels of lipids and proteins
- Formulated to maximize a growth explosion
- For easy transitioning from weaning to post-weaning

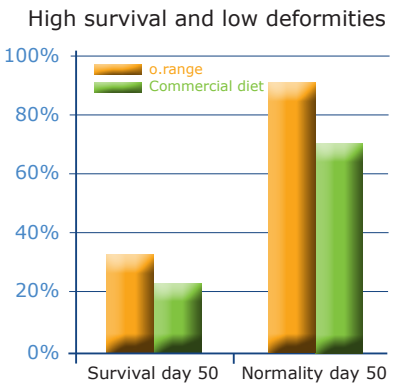
NURSE
- Easily digestible: includes highly nutritional raw materials
- For an easy transition from hatchery to juveniles
- Formulated using the best quality marine proteins

The diets in the o.range line are specifically formulated to fit the complex nutritional needs of fish larvae during each of the hatchery stages. High quality ingredients, vitamins and oligoelements make for superior quality, while the 4 different products each with different available particle sizes guarantee a seamless nutritional transition from one hatchery stage to the other.



PERFORMANCE

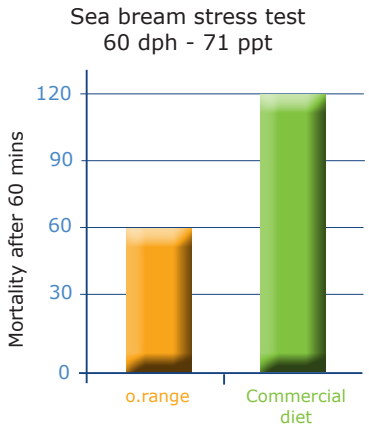
High survival rates



At 50dph*, significantly higher survival rates (32%) are obtained with o.range compared to other diets (23%). Additionally the percentage of fish without deformities is higher when fed o.range as compared to other diets.

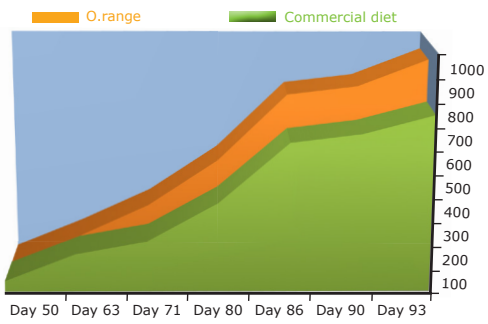
*days post hatching

Better resistance to stress



Stress test performed on 60 days old seabream postlarvae (3 replicates). After one hour, o.range shows a better resistance to stress, as illustrated by 50% less mortality, compared to an alternative commercial diet.

Exponential growth



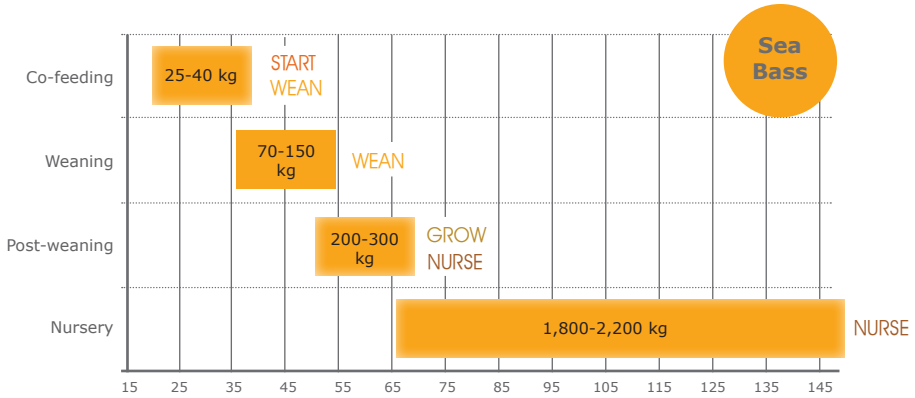
Following successful weaning, the larvae show an exponential growth. The graph above clearly illustrates that when compared to a control diet, o.range performs better and keeps a more constant growth tendency without interruptions during the post-weaning phase.

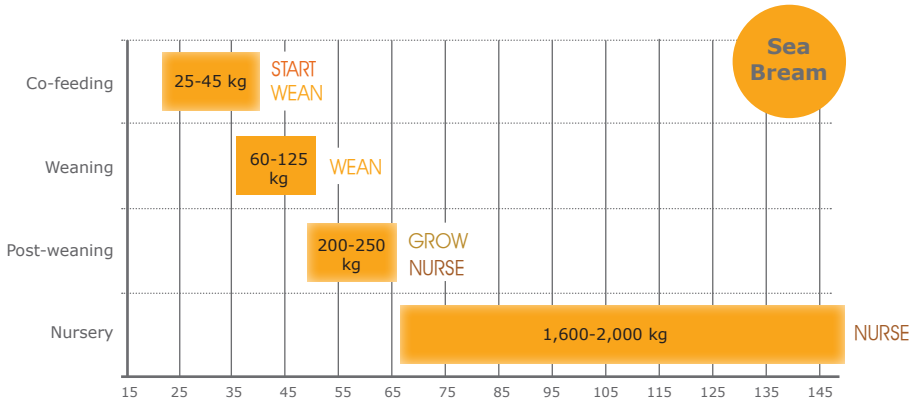
USE

Diet	Diet size	Particle size	Use
START	S	(100-200 µm)	For co-feeding during the rotifer feeding phase.
	L	(200-300 µm)	Early dry diet during the last rotifer phase and the start of *Artemia* feeding.
WEAN	S	(200-400 µm)	A first dry diet during the last rotifer and early *Artemia* phases.
	L	(300-500 µm)	A nutritionally rich diet for early weaning during the enriched *Artemia* phase.
GROW	S	(300-500 µm)	A well balanced diet at the end of the weaning and post-weaning phases.
	L	(500-800 µm)	
NURSE	S	(500-800 µm)	From the post-weaning phase and during all the nursery phases. This diet will allow for a smooth transition between the different phases.
	L	(800-1200 µm)	
	XL	(1200-2000 µm)	

FEEDING REGIME

Marine fish larvae generally have a high growth rate and therefore require high levels of proteins and essential amino acids. Additionally, the o.range diets, especially the ones for larval and post-larval feeding are easily digestible, aiming to improve the assimilation of the essential nutrients in the early stages.





Tentative feeding regimes for o.range in Sea Bass and Sea Bream rearing - from hatching to juveniles.

Initial 2 days old larvae density is 80 up to 120 larvae per litre. Temperature 16°C at day 6 rising up to max 16 to 18°C, and 20°C after day 50. Salinity 35-37 ppt. Photoperiod 14-16 hours daylight.

Both illustrations show typical feed quantities for each hatchery stage. These quantities might change depending on local conditions.

For further information regarding our protocols and their implementation, please contact your local INVE Aquaculture representative.

Notes:
Gradually switch to another nutritional block from larvae to juvenile according to the larval development, mouth opening & fish size. The feeding regime should be adapted to your local conditions (rearing system, temperature, fish density, etc...).

The initial fish density is 100 larvae per liter and 15-30 larvae per liter during weaning. Temperature: 18-20°C. Salinity: 35-37 ppt. Photoperiod: 16 hours of daylight. Quantities expressed in kg per million juveniles for each phase per day.

PACKAGING

START	S	(100-200 µm)	10 x 1 kg alufoil bags
	L	(200-300 µm)	5 x 3 kg alufoil bags
WEAN	S	(200-400 µm)	5 x 3 kg alufoil bags
	L	(300-500 µm)	5 x 3 kg alufoil bags
GROW	S	(300-500 µm)	2 x 10 kg alufoil bags
	L	(500-800 µm)	2 x 10 kg alufoil bags
NURSE	S	(500-800 µm)	20 kg bag
	L	(800-1200 µm)	20 kg bag
	XL	(1200-2000 µm)	20 kg bag

Store in a dry place (max. 25°C). For prolonged storage, refrigeration (4°C) is advised. Once opened, the product should be used within 1 month, kept well closed and stored in a refrigerator.

TYPICAL COMPOSITION

	START	WEAN	GROW	NURSE
Crude protein (%)	56	56	55	55
Crude oils and fats (%)	13	13	13	13
Crude ash (%)	10	10	10	13.5
Ash insoluble in hydrochloric acid (%)	2.4	2.4	2.4	3
Phosphorus (%)	1.2	1.2	1.3	1.8
Crude fibre (%)	1	1	1	1
Σω3 HUFA (mg/g dwt)	40	40	35	30
DHA/EPA ratio	2	2	2	2
Vitamin A (IU/kg)	20,000	20,000	20,000	15,000
Vitamin D3 (IU/kg)	2,500	2,500	2,500	2,500
Vitamin E (mg/kg)	700	700	700	150
Vitamin C (mg/kg)	2,000	2,000	2,000	1,000

WHAT MAKES A GOOD QUALITY LARVAL FISH DIET?

Both *biotic* and *abiotic* factors greatly influence the critical stages of larval rearing. The development of the fish larvae and their gastrointestinal tract, their digestive physiology and metabolic processes should be taken into account to understand their specific nutritional requirements.

How to judge the quality?

To compare the quality of the microdiet components, one needs to look at how successful the larvae ingest, digest and absorb the nutrients the diets are formulated with. This is especially of great importance in the early stages, less so for ongrowing larvae. Not only a good quality diet, but also an adjusted feeding protocol is crucial to produce healthy larvae/juveniles.

Digestibility is crucial

Digestibility of the feed is of great importance, especially at the initial stages of larval development when no functional stomach is present and the digestive tract is still immature initially in a presence of cytosolic enzymes, later on switching to brush border enzymes and pepsin production leading to adult mode of digestion.

Therefore, a careful selection is made when using protein sources for the specific stages of the fish larvae. Not only proteins of sustainable marine origin are used, but also adequate protein sources in hydrolised form to obtain most optimal uptake of amino acids and peptides in the initial stages of larval development. Dietary n-3 highly unsaturated fatty acids are not only fundamental to provide through broodstock feed and live feed, but in microdiets as well, further promoting development, growth and survival.

Finally - one of the fundamental steps in microdiet production is to reach the optimal balance between its physical characteristics and the nutritional characteristics of the different ingredients. For the initial stages of larval development, floating or slowly sinking feed is provided to obtain satisfactory feed acquisition and feed uptake.

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For more information, please contact your local INVE Aquaculture Service Center or take a minute to visit our website: www.inveaquaculture.com

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