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A NEW ARTIFICIAL DIET FOR THE EARLY WEANING OF SEABASS (*DICENTRARCHUS LABRAX*) LARVAE

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Introduction

The weaning of marine fish larvae is a critical step in larval rearing. The successful transition from live food to an artificial feed depends among others on the quality of the dry feed used (*e.g.* freshness of ingredients, digestibility, quality of the formulation) and the larvae themselves (*e.g.* age, behaviour towards artificial diets, development of the digestive tract, efficiency of certain metabolic pathways). The present study shows the results obtained with a new artificial diet formulated for the weaning phase of marine fish larvae in commercial hatcheries.

Materials and methods

Two experiments were carried out in two commercial hatcheries using their rearing procedure of current practice. Main specifications were as follows for the two hatcheries respectively: tanks of 3 000 and 1 200 l, fish density 15 and 10 larvae/l, temperature 21±1°C, semi-closed recirculation system and flow-through system. Average fish weight at the start of the experiment was approximately 30mg and the larval age was 30 to 35 days. The following feeding regime (Table I) has been used but has been adapted in function of the feed consumption and the physical properties of the dry feed in the water column. The *Artemia* (Great Salt Lake, UT-USA origin) fed to the larvae during weaning were enriched with Selco emulsion (Artemia Systems SA, Gent, Belgium). The new artificial diets (Artemia Systems SA, Gent, Belgium), namely Lansy A2 (150-300µm) and Lansy W3 (300-500µm) were tested in duplicate against one or two competitive products of comparable characteristics and sizes, commonly used in European hatcheries.

Table I. Feeding regime used as a guideline during the experiment for the Lansy A2 and Lansy W3 diet. The same feeding regime was used for the competitive diets.

Age (in days)	*Artemia* $10^6/m^3/day$	Amount of dry food given		
		$g.m^{-3}.day^{-1}$	Proportion (in %)	
			Lansy A2	Lansy W3
35-37	20	20 - 30	100	-
38-41	20	30 - 40	100	-
42-45	20 -> 15	40 - 50	100	-
46-49	15 -> 10	60 - 80	70	30
50-55	10 -> 0	90 - 110	50	50
56-60	0	110 - 120	30	70
61-66	0	120 - 150	-	100
67-75	0	150 - 180	-	100
75-90	0	5-10% of biomass	-	100

Results

Experiment 1

Fish were graded on day 12 and divided in batches of large and small fishes. On day 26 the batch of large fishes was harvested and transferred to the nursery. On day 33 the batch of small fishes fed Lansy A2 and Lansy W3 diet reached an appropriate size and were harvested and transferred. The rest of the batch of small fishes fed the competitive diets needed another 5 days prior to harvesting. For both batches (small and large fishes separated after grading) the final weight obtained was higher with the diet Lansy A2 and Lansy W3 (Fig. 1), even for the batch of small fishes where the harvesting occurred five days earlier. The higher growth rate obtained with Lansy diet is also reflected after the grading as a higher proportion of large fishes. Fig. 2 shows the food efficiency for the three treatments. Using the Lansy A2/W3, 30 to 50% more fish biomass can be harvested with the same amount of food (both live and dry food).

Experiment 2

Fish were graded on day 17 and divided in batches of large and small fishes. On day 27 the batch of small fishes was graded again into batches of big (s/big) and small (s/sml) fishes. Growth results are shown in Fig. 3. The first competitive diet was tested against the product Lansy A2/W3. A higher growth rate is achieved with Lansy A2/W3 with both the batch of small and large fishes. At the end of the experiment a stress test was carried out (Fig. 4), in which fish were transferred into 65ppt seawater and their mortality recorded every 3 min. A better resistance was noted with the fishes fed Lansy A2/W3 diet where the onset of the mortality is noted 15min later and significant differences in survival were recorded at the end of the stress test.

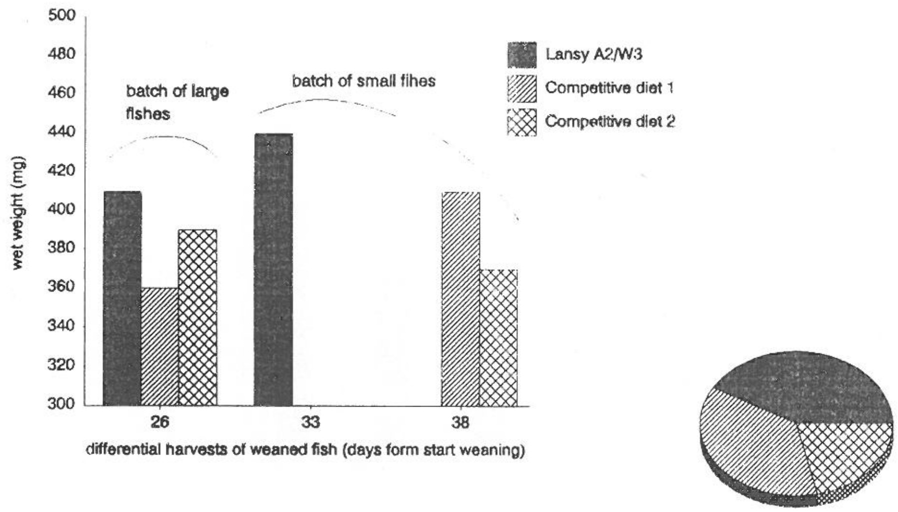

Fig. 1. Final wet weight (mg) of seabass larvae after completion of weaning for both small and large fishes. The porportion of large fishes collected after grading is also mentioned.

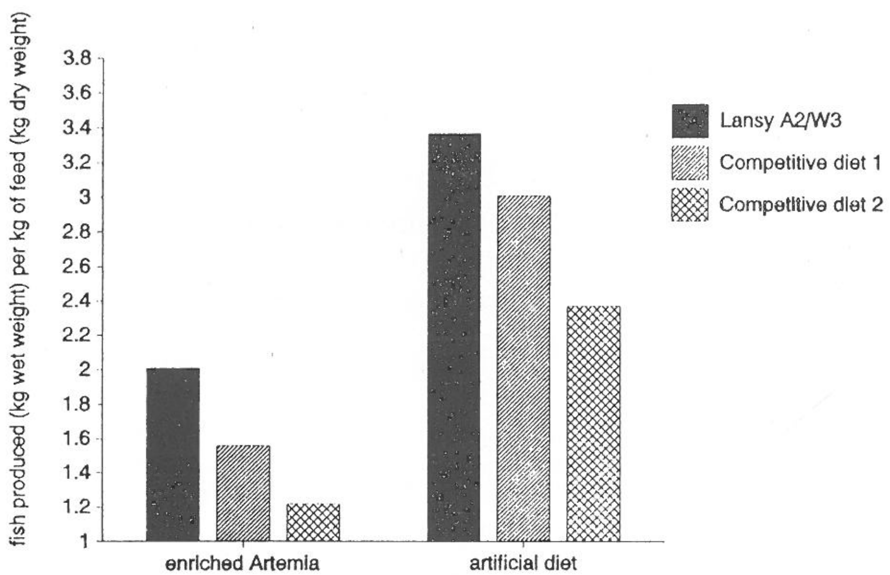

Fig. 2. Food efficiency in seabass larvae fed three different artificial diets.

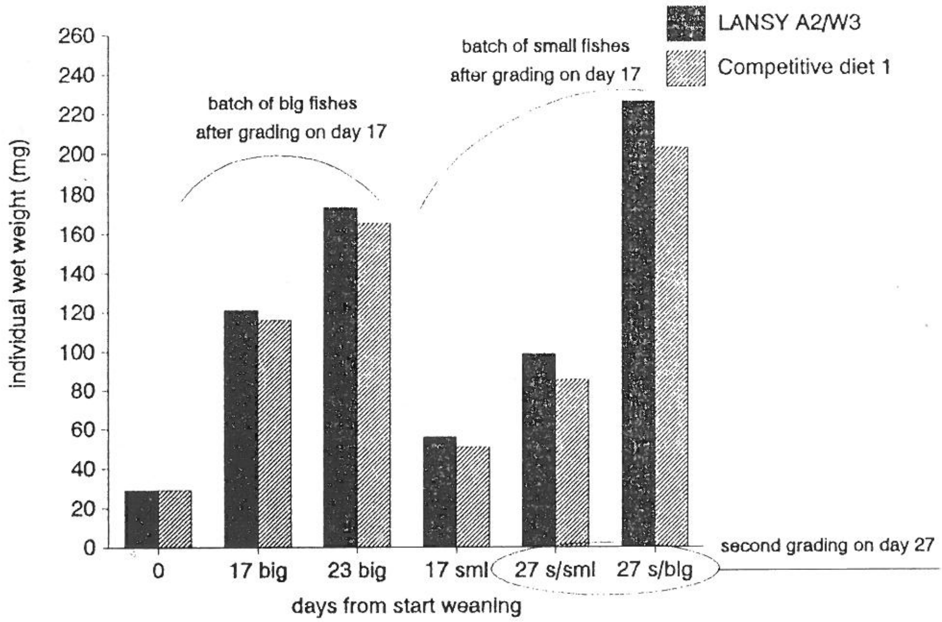

Fig. 3. Growth of seabass larvae separated in small and large larvae after the first grading on day 17, fed two different artificial diets.

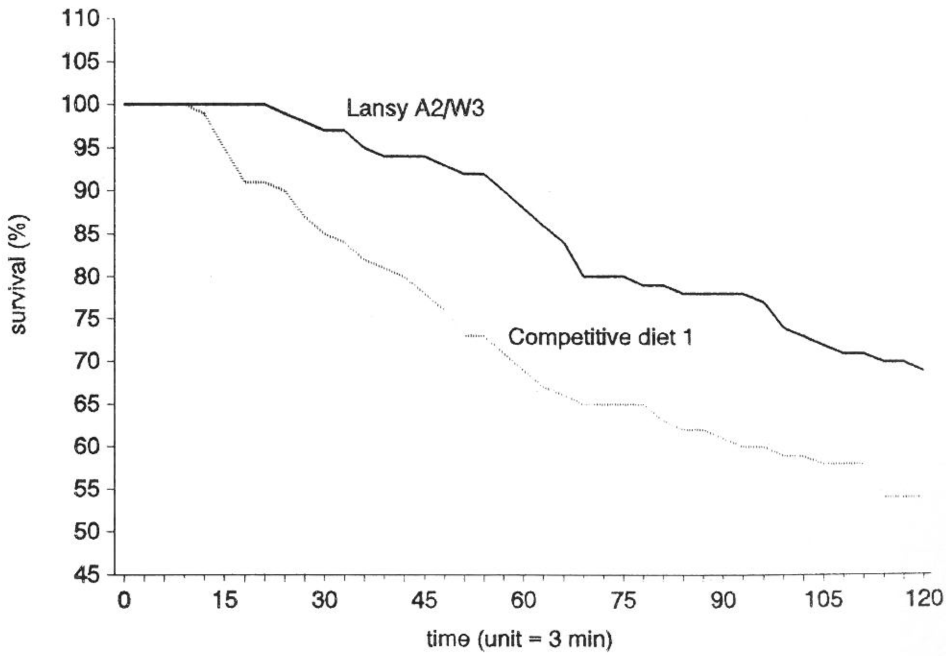

Fig. 4. Survival of weaned seabass larvae during a stress test. Mortality of the larvae is recorded each 3 min for 2h.

Conclusions

The new artificial diet Lansy A2/W3 gave superior results when applied at commercial scale conditions in all parameters investigated, *i.e.* growth rate, food efficiency, resistance to stress, uniformity of size.
A higher palatability of the diet Lansy A2/W3 and a slow sinking speed in the rearing tanks are thought to be important characteristics of the new diet. These points are important for a rational use of the diet, giving higher fish biomass with the same amount of food. The pollution within the tanks is reduced and hence the risks of possible bacterial contamination. A higher growth rate and a better resistance to stress reflect a good assimilation and utilization of the essential compounds available in the diet. The good results obtained with this product makes the culture of seabass larvae easier and more productive for the fish farmer both in terms of culture yields and economical outputs.

Acknowledgement

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