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# Common problems with aquafeeds and feeding in marine farms in Greece

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**SUMMARY** – Different problems are faced in everyday production in a fish farm, related to aquafeeds and feeding. Feed quality may be reduced due to the presence of floating pellets, high levels of dust or oil, differences in the size of pellets and occurrence of mould. Faulty packaging and transport to remote places shortens the useful life of feeds. Feeding levels and recommended composition of pellets are also questions that are not adequately addressed by feed suppliers. Modern feeding systems can lead to undesired complications due to inadequate training and skills of personnel as well as lack of proper translation of manuals. Fish feed prices are also a considerable problem, which threatens the sustainability of the sector. Feed producers should intensify their efforts to solve practical problems related to fish feeds, in collaboration with fish farmers so that new ideas can be immediately implemented.

**Keywords:** Fish feeds, aquaculture, feeding, feed quality.

**RESUME** – "Problèmes d'ordre général concernant les aliments pour aquaculture et la nourriture en fermes marines en Grèce". Il y a différents problèmes à affronter dans la production au quotidien d'une ferme aquacole concernant l'aliment pour aquaculture et la nutrition. La qualité de l'aliment peut être réduite dû aux granulés flottants, à une grande quantité de poussière et d'huile, aux différences de taille des granulés et à la présence de moisissures. Un emballage défectueux et un transport à des lieux éloignés raccourcissent la période pendant laquelle l'aliment peut être utilisé. Les niveaux d'alimentation et la composition recommandée des granulés sont également des questions auxquelles les fournisseurs d'aliment ne répondent pas de façon adéquate. Les systèmes modernes d'alimentation peuvent mener à des complications indésirables dû au manque de formation ou de compétence du personnel ainsi qu'à l'absence d'une traduction appropriée des manuels. Le prix de l'aliment poisson est également un problème considérable, qui menace la durabilité du secteur. Les producteurs d'aliments aquacoles devraient intensifier leurs efforts pour résoudre les problèmes pratiques liés à l'aliment poisson, en collaboration avec les aquaculteurs, pour que de nouvelles idées puissent être appliquées immédiatement.

**Mots-clés :** Aliment poisson, aquaculture, nutrition, qualité de l'aliment.

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## Introduction

Modern production of fish in intensive aquaculture relies on the use of artificial feeds, which constitute the single largest cost of the production process. Therefore natural problems related to aquafeeds and feeding are the main concern for fish farmers. Research undertaken on nutritional requirements and diet formulation as well as technological improvements in feed production has improved considerably the quality and physical characteristics of fish feeds. However, different problems of minor or major importance might still be faced by farmers in connection with the use of feeds. These are presented below based on the author's experience during day-to-day practice on a Greek aquaculture farm.

## Problems related to aquafeeds and feeding

The main categories of the problems presented concern: (i) problems with the fish feeds themselves; (ii) problems related to the fish feeding techniques that the farmers employ; and (iii) the (crucial and eventually decisive) problem of the fish feed prices.

## Different problems related to the fish feeds (quality, transport, storage)

Different types of problem are connected with the use of fish feeds. These concern the quality of the feed as it is received from the producers and problems of packaging, transport and storage in the units.

### *Quality of feed*

#### Floating feed pellets

Floating feed pellets are produced when manufacturing conditions are not optimal and can occur when feed is produced by extrusion. Floating feed pellets give rise to feed losses due to lower consumption by the fish and drifting of the pellets by currents.

#### High levels of dust

This problem may be due to many reasons, including problems during the manufacturing process as well as physical breakage of a portion of the feed pellets as a consequence of poor transporting and unloading methods. In certain occasions the percentage of the observed (and later weighted) dust inside the bags of certain batches exceeded 20% of the total weight. When such a problem exists the negative effects can be various. Serious problems will occur when feed batches with this specific problem are sent to the fish farm in big bags in order to be placed inside the feeding system silos. Other problems that may occur are water pollution, surface clogging of the nets and the clogging of the fish feeding system pipes.

#### Big differences in the size of the pellets

In some occasions grain sizes supplied to the farmers are completely out of the specifications concerning the dimensions of the pellets. This is particularly problematic when the fish are relevantly uniform in size due to recent grading. This phenomenon can be observed both in the pelleted and in the extruded feeds (though in much lesser frequency and extent in the latter case). This may be caused again by mistakes at some stage of the feed production procedure in a fish feed plant.

#### High percentage of mouldy feeds

In occasions mouldy feed embodiments inside the feed bags have been found in certain feed batches. This problem can occur as a result of a variety of reasons such as:

(i) Bad quality or defective feed bags that allow water and moisture to penetrate easily inside them. This tends however to become a problem of the past.

(ii) Mistakes during the manufacturing process that results in the incorporation of abnormally high percentages of water (moisture) inside the fish feed pellets, parameter that is directly connected to the development of mould.

(iii) Prolonged storage of the fish feed batches under sub-optimal environmental conditions. This is common especially in remote areas where access is problematic. Here the fish feed manufacturers can indirectly magnify the problem by delivering batches of ordered fish feeds out of the scheduled time, situation that in Greece is not a rare phenomenon.

#### High percentage of oil

When batches of fish feed are delivered to the fish farmers some of them have excessive oil, much more than the normal level, which covers the feed pellets. Again, the obvious causative agent is some kind of mistake that was made during the manufacturing process in the fish mill. A special negative effect that will occur in case this feed or a part of it, for a number of reasons, is fed to the fish will be the visible extra-pollution of the water around the cages.

The biggest problem, in case any of the previously described problems occur, is that the farmer

cannot do anything on-site to prevent them. In some cases things can get worse because farmers may be forced to use all or part of the bad quality feed while waiting for the replacement of the defective batch.

### *Packaging*

Poor quality packaging may be because the bags are not completely waterproof, difficult to open with the side threads, easily cut, etc.

### *Transport*

Production and delivery dates are a problem that occurs especially when the feed is manufactured outside Greece and has to travel and pass through ports, borders, etc. in order to reach the farmer. It might occur that there is a difference of six months between the production and the expiring dates, but a difference of two months between the delivery and the expiring dates. Again the elimination of this problem lies upon the sensitivity and professionalism of the feed producers.

### *Storage*

Prolonged storage in the feeding silos is a problem. Problems with the feeds that remain packed in the feeding silos of the feeding systems for prolonged periods, longer than programmed, for a number of reasons. This problem becomes worse during the summer months, which are characterized by high temperatures and is aggravated by the presence of oily fish feeds and also by the feeds that contain large percentages of dust in their composition.

## Problems related to the fish feeding techniques that the farmers employ

### *Big differences in feeding instructions*

There are big differences in the instructions given to the fish farmers (via the feeding tables) by the different fish feed manufacturers concerning the quantity of feed to feed. This is causing confusion to the fish farmers who, in most occasions, leave feeding practice in the hands and experience of their workers. The biggest negative effect of this kind of problems is the confusion brought on producers.

### *Obscurity concerning the "style-pattern" that the farmers have to employ concerning their daily and seasonal feeding tactics*

This again is a problem that can cause annoying confusion among fish farmers, especially among those who, for a number of different reasons, happen to use feeds from different manufacturing companies in the same period in a production year. There is a number of critical points of the day-to-day feeding practice that have to be followed by the cage manager and the workers, and which cannot be explicitly answered by the salesmen from different feed companies, such as: (i) how many feedings per day?; (ii) amount of total daily feed that has to be fed per feeding (from the total amount that has to be fed) during the day; (iii) feed according to the fish appetite (especially in the summer months) or relying on the feeding tables; (iv) low lipid, high lipid, extruded, pellet?; and (v) correlation of all the above with seasonally affected physicochemical parameters.

### *Inefficiency in operating the modern feeding systems*

This is not a rare phenomenon. Most of the feeding system manufacturing companies come from countries such as Norway and Scotland, countries, which are technologically advanced, compared to Greece. After the installation of the device and the checking of its proper function, the Greek fish farmer is left to operate a fairly easy to command device. However personnel are in many instances not specialized, mainly because most fish farmers do not want to pay high wages to hire educated, experienced personnel. Instead they prefer to operate their farms at low costs, with low skilled workers. The reason for this trend is the present unstable market for their products, which in turn results in low prices. So, when a problem occurs the personnel in charge cannot cope and s/he ends up having long conversations on the phone with some technician far away in order to find out the

solution and feed the fish. A definite step forward (a breakthrough, rather) would be that the installation manuals of the systems that are sent to Greece are written in Greek, apart from all the other languages into which they are already translated.

### The (crucial and eventually decisive) problem of the fish feed prices

The fish feed price and the grim future prospect concerning this specific issue. The rising trend in fish feed prices is expected to become the main problem of the future, and will certainly define the economic sustainability of most fish farms. The main reason for this situation, which is worsening, is the reduction of the low quality fish by-catches, which constitutes the main substance of the fish feeds.

### Conclusions

There are different types of day-to-day problems connected with fish feeding. These are related either to feed quality or to inappropriate instructions given by feed companies concerning the use of feeds. Untrained personnel also in certain cases exaggerate the problem. It is within the capacity of the fish feed companies to deal and solve these problems and provide fish farmers with the necessary support for improving their production.

Specific suggestions concerning this aspect are the following: (i) try to find solutions following new ideas; (ii) deal with some real problems and give solutions, easy to be followed by the group who will address them, that is, the practical-empirical (the vast majority) fish farmers; and (iii) find a way to pass these solutions to the fish farmers.