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# Feed handling in aquaculture

Aquaculture Department, Southeast Asian Fisheries Development Center

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Type A<sub>2</sub> or not-so-good eggs – development of embryo either delayed or abnormal in comparison to A<sub>1</sub> eggs of the same batch; mean HR, 32%; newly hatched nauplii may be weak.

Type B – bad eggs showing irregular cytoplasmic formations; 0% HR.

Type C – bad eggs with cytoplasm remaining a single undifferentiated mass; 0% HR.

Type D – bad eggs with very little remaining cytoplasm because of bacterial invasion; 0% HR.

There is a highly significant linear relationship between the proportion of A<sub>1</sub> eggs and hatch rates of ablated pond and wild stock.

Source: Lecture Notes of J. Honculada-Primavera, Scientist, SEAFDEC Aquaculture Department, Tigbauan, Iloilo, Philippines. 1988.



## FEED HANDLING IN AQUACULTURE

### Feed Storage

The quality of feedstuffs during storage will deteriorate with time. Many problems can occur during storage and some adverse effects are inevitable. To ensure that the fish and shrimp which depend on aquaculture feeds receive the best nutrients available, ingredients should be stored for as short a period as possible and compounded feeds used quickly, especially in tropical conditions.

Environmental factors such as moisture, temperature, light, chemical changes, and oxygen influence deteriorative changes and weight losses in feed ingredients and prepared feeds either directly by chemical reactions or indirectly through proliferation of insects, fungi, bacteria, and other pests.

The major factors that cause losses in quality and weight of feedstuffs during storage are rain, condensation and high temperatures, theft, fire, scavenging animals such as rats and birds, presence and breeding of insects, growth of fungi, enzymatic actions, and the development of oxidative rancidity. Larger fish farms often have a central or primary feed store with individual secondary stores and often, silos at the pond sites.

### Storage Principles

In order to ensure maximum benefit from feeds, several points are worth noting and implementing wherever possible:

– Provide a proper, well-insulated and -secured building for storage. Ensure that the roof will protect the feed from rain and that surface water cannot enter the store. Provide it with ventilation entry points (windows are not necessary nor recommended). The ventilation points should be low on the side facing the prevailing winds and high on the opposite side. Orient the buildings so that one of the long sides faces the prevailing winds. Ensure that all entry points are meshed to prevent entry of birds, rats, etc. The drier and cooler the store, the better the feed quality will be.

– Plan ingredient purchases carefully and do not accept deliveries which are obviously infested with insects or are visibly damp. Do not keep large quantities – one should not be tempted to buy a year's supply of seasonally cheap or scarce materials. It may prove very expensive indeed if half of them have to be thrown away. The recommended maximum storage periods for several feedstuffs are outlined below:

**Storage guidelines for feed materials**

	Condition	
	Tropical	Temperate
Ground ingredients	1–2 months	3 months
Whole grains and oil cakes	3–4 "	5–6 "
Compounded dry feeds	1–2 "	3–4 "
Vitamin mixes (kept dry and cool)	6 "	6 "
Wet ingredients	2–3 hours	2–3 hours
Frozen materials	2–3 months	2–3 months

– Always keep the store clean. Floors and walks should be regularly swept. Spilled materials must be removed and contents of broken bags or containers have to be used first. Cleared areas of the store must always be cleaned before new materials are placed there.

– The “first in, first out” principle must be applied – that is, the oldest stocks should be used first.

– Make high stacks. High stacks of sacks lessen chances of insect damage which occurs mainly at the surface. Stacking sacks on wooden pallets and leaving spaces between them and the walls of the store enhance circulation of air.

– Do not allow personnel to sleep, eat, or smoke in the store, and apply strict stock control system.

Source: Gerald Roessink. *Infofish International*, January-February 1989.



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The Philippines is now Asia's largest exporter of dried seaweeds and their natural extracts, carrageenins, which are used as thickening and gelling agents in many modern products.

About 4,000 hectares of coral fields in central and southern Philippines have been planted with *Eucheuma* and other red algae. Farming and production are covered by hundreds of contract-farming agreements.

The Department of Agriculture, under its Livelihood Enhancement for Agriculture Development Program (LEAD), is going to invest more than US\$15,000 on a 20-hectare farm owned by 20 members of the Seaweed Plants Association in Guisok, Tabu-Manuk, Panamao, Sulu.