STORAGE GUIDELINES

BAGGED FEED

1. Store feed in a cool, dry, well ventilated area.
2. Rotate stock to use old feed first. “First in, first out” principle.
3. Keep bags stacked neatly on pallets to prevent feed from being in direct contact with damp floors.
4. Bags should be stacked to allow at least 18 inches between walls and upright supports. This allows for cleaning and placement of traps/bait boxes. This also prevents condensation on walls from damaging feed and permits necessary air flow around the bags.
5. Keep different types of feed separate and clearly marked. Be particularly careful not to mix bags of medicated and nonmedicated feed together.
6. If receiving skids of feed in plastic wrap, remove wrap before storing feed in warehouse. This allows better air flow around the product and helps prevent mold problems.
7. Rodent/insect control:
   - Keep exterior doors closed when not in use.
   - Position bait boxes/traps around interior and exterior walls. Glueboards or automatic traps on either side of warehouse doors are effective for preventing entry of rodents.
   - Clean up spilled feed immediately and remove torn bags as soon as possible. A continuous good housekeeping policy is the basis of any pest control program.
   - Regularly fog warehouse area with approved insecticide during warm months.
   - Regularly spray problem areas with good residual crack and crevice type insecticide.
   - Periodic fumigation of entire storage area may be required for severe problems, but is expensive and requires a qualified applicator.
   - Keep weeds and brush away from exterior of storage area.
   - Eliminate poor drainage areas which serve as breeding grounds for most insects.
8. Do not handle bags more than necessary and handle with care. Pelleted diets are designed to be durable, but they are not indestructible. Abusive handling will increase the dust level in the feed which results in poor water quality and loss to the farmer.

BULK FEED

1. Bin design: bins should be designed to empty out completely and maintain air flow through the bin, preventing condensation.
2. Inspect bins regularly for leaks and repair immediately.
3. Allow bins to empty out completely between loads. Many bins have “dead” areas where old feed and dust can accumulate and spoil if new feed is continually put in on top of old.
4. Clean inside of bins regularly, removing encrusted material which acts as mold and insect growth areas.
5. Bins can be sealed and fumigated to kill insects, but be sure to use a qualified fumigant applicator.
INTRODUCTION

Animal feed is a semi-perishable item. Like the bread we buy from the local grocery store or the cheese we keep in our refrigerator, it will spoil given a long enough period of time. We can go to the store every week for new groceries, but this is not practical or economically feasible when purchasing large quantities of animal feed. The question therefore, is how can we extend the shelf life of the animal feed over a several month period.

When we talk about shelf life, it is important to understand what happens to feed under long term storage. The problems encountered with storage or feed fall into four major categories.

NUTRIENT LOSSES

As feed ages, essential vitamins, especially Vitamin C, begin to degrade and eventually become deficient. High temperatures and humidity further speed this deterioration. As manufacturers we deal with this problem two ways:

1. Add excessive levels of vitamins to allow for losses incurred during manufacturing and storage.
2. Utilize stabilized forms of vitamins which resist breakdown in the feed. Zeigler was instrumental in the development of a stabilized form of Vitamin C, L-Ascorbyl-2-Polyphosphate, (STAY C) which has 80 times more stability than standard Vitamin C in pelleted feeds at room temperature (77° F).

This now allows us to maintain adequate vitamin levels six months or more in dry pelleted feed. Studies have shown feed made with Stay C to have adequate levels of Vitamin C even after one year of storage.

As a consumer, you can minimize the nutrient losses of your feed by storing it in a cool, dry, well ventilated location and following the storage guidelines outlined in this pamphlet.

RANCIDITY

Rancidity is the spoilage of the fats and oils present at relatively high levels in most aquaculture diets. Over time, oxygen breaks the fat down chemically, creating undesirable by-products. These compounds can cause several problems, including:

Feed rejection
Off-flavoring of flesh
Vitamin E deficiency
Overall poor growth and health

Rancidity is prevented by adding antioxidants to the fat source, and by using only the highest quality fish oils. At Zeigler Bros. all fish oils are tested for rancidity and contaminants before being purchased. Storage according to the suggested guidelines will also minimize the possibility of rancidity.

MICROORGANISMS

Unfortunately, most animal feeds provide a very good growth media for molds and bacteria when sufficient moisture and warmth are present. Molds produce poisons called mycotoxins, which can cause symptoms ranging from poor growth to mortality in most aquaculture species. Maintaining low moisture levels (<10%) and using fresh, high quality ingredients make our feed less likely to mold, but the real key to mold prevention is good storage conditions.

INFESTATIONS: RODENTS/INSECTS

Any time feed is stored for a long period of time there is a chance of infestation occurring. Rodents and insects create problems by acting as vectors - agents which carry disease and mold from one area to another. Left unchecked, they can do major damage to any stored feed supply. The following storage guidelines include suggestions to help prevent infestation.