CORN TALK NEWS
PENNSYLVANIA MASTER CORN GROWERS ASSOC., INC.

Understanding Grain Shrink

J. Allan Shoener
Schuylkill County
Extension Agent

The selling of grains requires several considerations, and one of the least understood seems to be the elusive and mysterious loss of weight as adjustments are made from harvest to market moisture levels.

If grain is dried using heated air, the cloud of steam rising can be seen, and it is easy to recognized that this is moisture or water being removed from the grain. There is also a visible settling or reduction of volume of the grain as a result of the moisture removal.

This reduction of volume also occurs and is noticeable when grain is dried by ambient air. A good example is the settling that takes place in a crib of ear corn over a period of time. The weight lost during drying is shrink and is expressed as a percentage of the original quantity before drying.

The loss of moisture can be seen and recognized that it does occur. So where does the confusion and misunderstanding occur? Probably in the somewhat complicated mathematical calculations that are used to determine the amount of shrink and maybe in the way these calculations are applied.

Often these calculations are referred to as pencil shrink — a procedure used by grain buyers to calculate how much grain they will actually have after the grain they buy is dried.

There is no standard method of pencil shrink. That is to say that not all grain dealers use the same system for calculating grain shrink. In fact, several valid methods are in popular use. This makes it important to compare the potential net return of the sale of a quantity of grain and not just the price per bushel offered. Grain growers can maximize the net sale of their products by understanding pencil shrink and evaluating sale alternatives.

There are two components to consider when calculating shrink. The first is water shrink, which is the weight of the water removed in drying. Total water shrink is equal to the pounds of water removed during drying, divided by the original weight. This number is then multiplied by 100 to express the shrink factor as a percentage.

The calculation would be easy to do if the wet grain delivered to the dealer was weighed, dried as a batch by itself, and then weighed again when dry. But then the percent shrink would not need to be known because the dry grain weight would already be known. The problem is that grain is not handled by the delivered load or batch but is mixed with other deliveries and generally dried on a continuous basis. Therefore, it is necessary to have a method to calculate the water shrink when the wet grain is delivered.

A series of mathematical calculations can be used to accurately determine the water shrink for each load of grain. Another system often employed is to use water shrink factors which are calculated values representing the percent shrink for each point of moisture removal to a given dry grain level.

Using shrink factors gives accurate results by relying on predetermined values while eliminating the need for more complex calculations. Using this method, the total water shrink is equal to the number of percentage points of moisture removed multiplied by the water shrink factor.

The second component of shrink is handling loss. In addition to the water weight lost from drying, a small amount of dry matter is also lost. This is called "invisible shrink" or handling loss and consists of loss of volatile compounds, mechanical loss of broken kernels and foreign materials and seed respiration. The amount of handling loss is determined by initial physical quality of corn, method of drying, and the handling process during drying. The higher the initial quality of the grain, the lower the loss.

High heat drying will generally result in higher losses. And gentler and lesser amounts of handling will result in lower losses. According to a Midwest study, on-farm handling losses ranged from 0.22 percent to 1.71 percent with a three-year average of 0.82 percent, while handling losses of commercial systems ranged from 0.64 percent to 1.33 percent with a three-year average of 0.88 percent.

In addition to recognizing the two components of grain shrink, it is also important to understand that there are different methods of calculating total shrink. The first is the use of drying tables where total shrink is equal to the water shrink plus the handling loss. The second is the constant shrink factor method where total shrink is equal to a constant shrink factor multiplied by the number of points of moisture removed from the grain.

The Penn State Agronomy Guide contains two tables that are useful in estimating shrink. The first can be used to determine the equivalent bushel weight for either ear or shelled corn at moisture levels from 11.0 percent to 33.0 percent. The second chart contains shrink factors for grains ranging in moisture from 13.0 percent to 30.5 percent and dried to six levels ranging from 13.0 percent to 15.5 percent by .5 percent increments. These shrink factors include a .5 percent dry matter loss.

With the different methods of calculating shrink and the variables within the methods, it becomes apparent why a price per bushel quote alone does not necessarily tell you where you will receive the best price for your grain. To further complicate the issue, there can be variations in deductions for foreign materials, bushel weights, and drying charges. And because in many cases these charges may be lumped together and expressed as a single deduction percentage, it is difficult to compare the individual charges.

Perhaps the best way of evaluating wet grain sale alternatives is to compare the net price you will receive for a load of grain where the net price is equal to the price per bushel multiplied by the number of bushels after adjustments in quantity and/or price have been made. To do this, instead of calling the grain dealer and asking the price being paid for a bushel of grain, ask what will be paid for your load of grain weighing a specified number of pounds and at the wet moisture. You may not know the exact weight or moisture level, but by using the same numbers with several dealers you will be able to more accurately compare the prices being quoted.

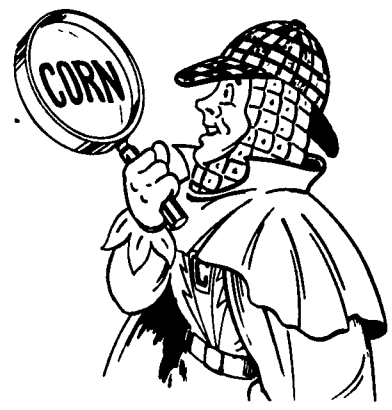
RESEARCH UPDATE

(Continued from Page 25)

number of broadleaf weeds including lambsquarters, pigweed, ragweed, and velvetleaf.

Permit 75DG (MON12000) is a sister product of Battalion. Permit is also being developed by Monsanto for use in corn, but will be applied postemergence. Permit is effective on pigweed, velvetleaf, and nutsedge, but tends to lose some of it's activity on lambsquarters and ragweed when applied post.

Exceed 75WG (CGA-152005) is an experimental product from Ciba being tested for its broadleaf activity in corn. Exceed is a sulfonylurea and will probably be applied postemergence because of crop safety concerns with soil applications. Foliar applications of Exceed show good crop safety and are effective on a number of broadleaf weeds including lambsquarters, pigweed, velvetleaf, ragweed, and burcucumber.



Resource 0.86 EC (flumiclorac-pentyl/V-23031) is an experimental product from Valent. Resource belongs to a new herbicide family and is a cell membrane disrupter (contact-type). Resource will be applied postemergence for broadleaf weed control in corn and soybeans. The product is rather narrow in spectrum and will probably be tank-mixed with other products to broaden the spectrum. Velvetleaf will be a main target of Resource.

Editor's Note: The author and Penn State University do not imply endorsement of any product mentioned in this paper.