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# The "Mixed Wheat" Grade

## What It Means and How To Avoid It

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By definition, "mixed wheat" is any mixture of wheat that consists of less than 90 percent of one class and more than 10 percent of another or a combination of classes. This grade inevitably leads to sizeable discounts against the seller at the point in the marketing channel where the mixture is first discovered. For that reason, an analysis of causes and effects of mixtures should be useful to all segments of the wheat industry.

### Classes of Wheat in Idaho

Idaho is inclined to have "mixed wheat" because four different classes of wheat are grown in a limited geographic area: (1) hard red winter, (2) hard red spring, (3) white and (4) durum. Mixtures may occur because of cultural practices, improper identification and/or handling of the grain by the producer or at the local elevator. The potential for accidental mixtures also exists between inland and Pacific Coast marketing channels.

Northern Idaho primarily produces white wheat. As a result, few mixed loads originate from this area. The problem in northern Idaho occurs with loads shipped to Lewiston from areas such as Montana.

Durum acreage is located mainly in southeastern Idaho and is very restricted. As it is generally produced under contract, it is not often implicated in "mixed wheat" shipments.

Most "mixed wheat" shipments from Idaho originate in southeastern Idaho. There hard red winter (HRW), hard red spring (HRS) and soft white wheat (SWW) all are grown in a limited geographic area.

### Causes of Mixing

On the basis of color alone, white wheat is easily segregated from the other classes. Mixture of red and white classes is, therefore, most commonly caused by negligence.

On the other hand, mixtures of the two red classes in the area (HRW/HRS) occur as a result of several factors:

1. Lack of knowledge of the difference in classification.
2. Economic pressure to "sweeten" (or reseed) winter stands with spring wheat.
3. Improper handling on the farm, at local elevators or in marketing channels.

The latter two reasons account for most of the mixtures in southern Idaho.

"Sweetening" of a poor winter stand is a deliberate mixture. Its effect on the marketplace can be minimized by keeping it apart from an unmixed crop and selling it as mixed wheat. Of course, the discount that will be levied upon it must be taken into consideration when making the decision whether HRS should be seeded into a poor HRW stand. Your local grain merchant can furnish you with the mixed wheat discount figures of previous years. Mixtures resulting from this practice should be of minimal impact to the market if producers and marketers will handle them in good faith.

Improper handling of wheat between farm gate and mill represent an equally large part of the "mixed wheat" problem. Generally, mixtures of this type are accidental and stem from lack of knowledge of wheat classification or failure to identify the



material being handled. Wheat classing is becoming more difficult, even for the experts, because of continued crossbreeding. Such breeding practices are necessary to build better wheat varieties, though they do confuse the kernel characters by which grain is classed. True mixtures confuse the grading picture even more for the grain inspectors at the port. Because of this, it is in Idaho's best interest to minimize the amount of mixed grain leaving the state. A clean, unmixed shipment gets a straightforward, accurate grade.

Having reviewed the general problem, let's examine specifically the damaging aspects of mixed wheat. Then this publication deals with specific strategies for avoiding the problem.

## Impact of Mixed Wheat On Commercial Quality

The value of wheat in the commercial world is based on its milling quality and baking quality. The miller looks for a good yield of flour from clean wheat. The baker expects the flour to produce a product with suitable taste, texture and appearance.

Mixture of two different wheat classes can damage functional performance in either of these areas. The amount of damage depends on (1) the type of mixture (SWW/HRW or HRS as opposed to HRW/HRS) and (2) the level of mixing. Mixtures of soft and hard wheats represent the greatest loss of performance in both milling and baking quality. Hard red spring and winter mixtures do lower milling quality but have negligible effects on baking quality.

Performance in these areas is dictated by the physical and chemical structure of the wheat kernels. Each class has specific strengths and optimal processing conditions.

Before milling, wheat is conditioned or tempered by the addition of water. This practice makes the kernels easier to crush while allowing greater separation of outer bran layers from the flour-filled endosperm. Fig. 1 shows the relative conditioning rates of HRS, HRW and SWW. Each of these will produce the most flour after a given conditioning time exclusive to its class. Furthermore, even with optimum conditioning, these classes differ in their potential to yield flour. An unwitting mixture of classes will lead to milling difficulties.

Flour performance in baked goods also varies by class. Both hard red classes go into bread manufacture. Many buyers, here and abroad, have been led to believe that HRS makes better bread than HRW. Research at the Wheat Quality Laboratory in Aberdeen has not demonstrated this superiority in regional varieties when they are compared at identical protein levels. Much of this perception probably stems from the fact that HRS usually achieves higher protein levels. Fig. 2 graphically represents this property. Also demonstrated in this figure is the fact that soft white wheats have low potential for bread production, at any protein level, when compared to hard wheats.

Soft wheat flours give their best performance in pastry products. Hard wheats are generally unsuitable in such formulations. Pastry quality is adversely affected by increased protein levels (Fig. 3).

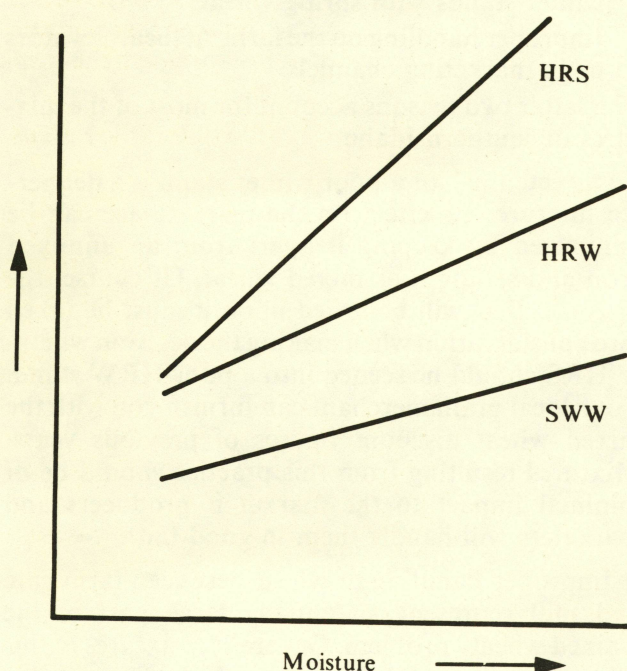


Fig. 1. Optimum conditioning time.

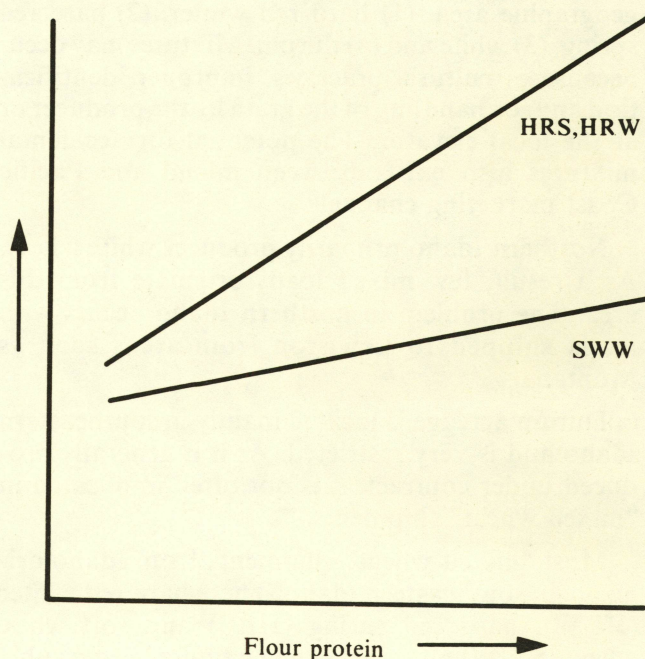


Fig. 2. Breadmaking potential.



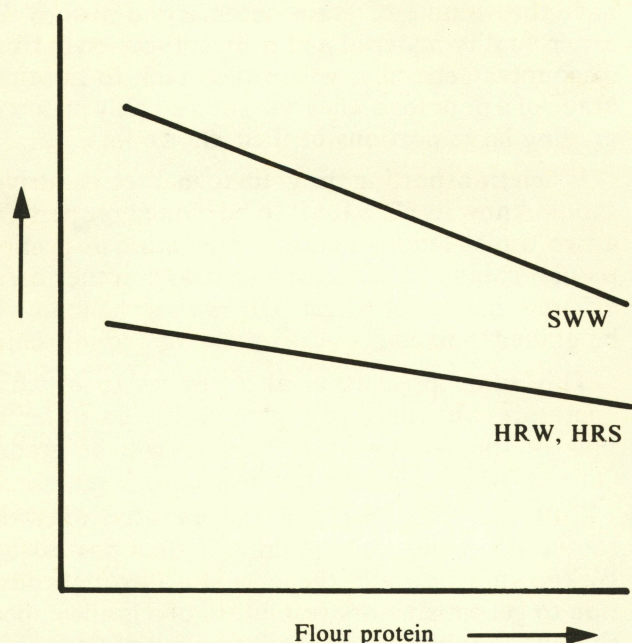


Fig. 3. Pastry quality.

Obviously, the miller and baker want to buy wheat and flour which are proper for their processing goals. Mixed wheat will be discounted. Wheat producers and marketers need to meet the customer's needs. Mixtures incur discounts to allow for the recovery of additional handling costs. These discounts reduce the producer's income and profits.

Many millers and bakers blend wheats for milling and flours for particular bakers' needs. This does not excuse producers and marketers from segregating different classes. Unlike accidental mixtures, these blends are precisely formulated for optimum processing performance.

## Avoiding the Problem — On the Farm

Producers often think that grain marketing begins when their trucks head to town fully loaded. This is a misconception. Marketing decisions actually started months earlier with the selection and purchase of seed. Cultural practices and growing conditions, as well as harvest and storage conditions, all affect crop quality and value. The following steps should maximize returns to the producer and minimize problems in the marketing and processing of wheat.

**Seed Selection** — The farmer's choice of variety and the quality of seed used play important roles in producing a quality crop. Variety selection also determines the marketing channels that will be available. As noted earlier, the class to which a variety belongs decides its end use. Factors that a producer must consider are:

**Seed Purity** — Is the seedlot a pure variety or is it a mixture? If it is a mixture, do all the varieties belong to the same class? Is the lot contaminated with seeds or even other crops?

**Disease Resistance** — Some diseases affect both quality and yield. The variety selected should provide protection against current diseases. Some diseases may be seedborne. If these are a problem in your area, try to secure seed that was produced in a clean area.

**Growth Characteristic** — Use varieties that best meet your needs for straw strength, maturity date, sprout and drought resistance, etc.

**Suitability for Area** — A variety will produce better when grown where it is fully adapted. If trying a new variety from another area, first test it on small plots. Also, check its marketing background in the region where it is popular.

**Hardiness** — If you grow hard red winter wheat and have trouble with winterkill, get the hardiest variety available. This will help you avoid the necessity of seeding spring wheat into a winter stand.

**Treated Seed** — Treated grain should be kept apart from market grain. Equipment used to handle the seed (trucks, augers) should be scrupulously cleaned before use with market grain.

## Planting Practices

When planting different classes of wheat, always clean out equipment when switching classes. The practice of spring planting or "sweetening" hard red winter stands must be carefully evaluated. Mixtures more than 3 percent lower otherwise No. 1 grade wheat to No. 2. Likewise, mixtures over 5 percent automatically result in, at best, No. 3 designations. More than 10 percent yields a "mixed wheat" grade. Decide on whether the discounts are worth the gamble before you "sweeten" a field.

You may be wise to clean till winterkilled areas. Then you can replant.

## Cultural Practices

Fertilization rates can affect quality and protein levels. They can also indirectly affect quality by causing grain to lodge.

Irrigation practices can affect color, grain filling and kernel plumpness. Overwatering, even in mild cases, increases occurrence of black point. Not serious in red wheats, it can lead to steep discounts for infested white wheat. An excess of water into the ripened stage will lead to sprout damage, especially if cool and damp weather conditions prevail.

## Harvest Practices

- Thorough cleaning of bins and surrounding area, augers and trucks will reduce both contamination and pests.



- Store grain by class. Loads of grain that are of mixed classes or quality should be kept separate.
- Get a clear picture of the quality of grain you are binning.

Procure a 1 pound sample from each truck delivering to the bin. This sample is best obtained by either probing the lot or "cutting" it from the grain flowing into the auger. A sample pulled from the top or side of a lot will generally not be representative of the load. These samples may be visually inspected for uniformity. This gives the producer the opportunity to segregate distinctly lower quality lots from his top value lots.

Using these samples, bulk each of three consecutive samples representative of loads delivered to the bin. This would work out to about one sample for each 1,000 to 1,500 bushels. Get the grade on each bulk sample. The fewer number of samples drawn, the less reliable will be the official grade on a submitted sample.

## **Avoiding the Problem — Farmgate and Beyond**

The procedures outlined in the previous section are all oriented toward the same goal — providing the producer with an unmixed crop and the information on its quality necessary to market it for maximum return. Some cautions are in order at this point.

You should not plan to blend problem lots with good quality grain. Even most large producers do not have equipment of the sophistication needed to do the job well. More importantly, they will not

have the volume of grain necessary to absorb the lower quality material and protect themselves from discounts. Generally, where they seek to raise the grade of a poor load, they will succeed only in downgrading large portions of their choice lots.

When transporting the grain to market, the driver should know its class for it to be binned properly. If a two trailer load is sent out, a separate inspection request should be made on each trailer if they carry different classes of wheat. Otherwise, the load will be graded "mixed."

This same precaution also applies to elevator operators who may segregate classes in different bins of the same railcar. The car will be graded "mixed" unless separate bin inspection is requested.

Both the producer and the elevator operator should know the grade of grain in their possession. By knowing the grade, the seller is in a stronger position to get satisfactory resolution of a grade appeal should the export inspectors levy a lower grade. The grower or elevator operator who knows exactly what he holds retains the greatest latitude in marketing options. He will minimize the losses associated with the "mixed wheat" grade and often will be able to secure a better price by marketing his grain based upon its strengths.

## **The Authors**

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