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## Part II -- The Techniques of Food Storage

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#### Selecting and Buying Grains and Legumes

One of the most important decisions in planning your long term food storage are the kinds of grains you are going to store. Too many people do not give this adequate thought, and just buy however much wheat they think is necessary to meet their needs and leave it at that. Others rely upon pre-packaged plans made for them by the storage food retailer who put together the food package they've

purchased. For many, either decision could be a major mistake.

There are any number of food storage plans to be found by those who take the time to look. Many of them are based on the so-called "Mormon Four" of wheat, milk, honey and salt, with as many additional foods as the planner finds to be desirable. Back in the thirties, when I believe this plan first got its start, this may have been OK, but we've learned a great deal since then. An unfortunate number of people in our society have developed allergies to one kind of food or another. One of the more common food allergens is wheat. Even more unfortunate is the fact that of those with an allergy to this most common of grains, many of them are not even aware of it. They won't become aware of it until they try to live with wheat as a large part of their diet. This is the reason you should store what you eat and eat what you store: So that ugly surprises such as this don't come up when it's too late to easily avoid them.

A second reason to think about providing a variety of grains in your food storage is appetite fatigue. There are many people who think providing variety in the diet is relatively unimportant and that if and when the time comes they'll eat what they've got and that will be that. For healthy, well-adjusted adults under ordinary circumstances this might be possible without too much difficulty. However, the entire reason for having a *long term* food storage program is for when circumstances *aren't* ordinary. Times of crisis produce stress -- possibly physical, but always mental. If you are suddenly forced to eat a diet that is both alien and monotonous, it is going to add just that much more stress on top of what you are already dealing with. If your planning includes the elderly, young children and infants they might just quit eating or refuse to eat sufficient amounts and become unable to survive. This is not a trivial problem and should be given serious consideration. Consider the positive aspects of adding some "comfort foods".

In his book, *Making the Best of Basics*, James Stevens mentions a post WWII study by Dr. Norman Wright, of the British Food Ministry, which found that people in England and Europe were more likely to reject unfamiliar or distasteful foods during times of stress than under normal conditions. When it's wheat, day in and day out, then wheat's going to start becoming distasteful pretty fast. Far better to have a variety of foods on hand to forestall appetite fatigue and, more importantly, to use those storable foods in your everyday diet so that you'll be accustomed to them.

[If anyone knows where I may find an actual copy of the study by Dr. Wright, I'd appreciate it if you'd point me to it. Thanks-ed.]

Below is a list of some common and uncommon grains presently available in the

marketplace. Because wheat is by far the most common directly consumed grain in the United States I've put it at the head of the list.

## Wheat

Wheat comes in a number of different varieties. Each variety is more or less suitable for a given purpose based on its characteristics. The most common classifications for wheat varieties are spring or winter, hard or soft, red or white.

The hard wheats have kernels that tend to be small, very hard and have a high gluten content. Gluten is the protein in grains that enables the dough made from them to trap the gasses produced by yeast fermentation and raise the bread. Low gluten wheat does not produce as good a loaf as high gluten wheat, though they can still be used for yeast breads if necessary. As a general rule, hard varieties have more protein than soft varieties.

The soft varieties have kernels tending to be larger, plumper and softer in texture than hard wheats. Their gluten content is less and these are used in pastries, quick breads, pastas, and breakfast cereals.



Winter wheats are planted in the fall, over winter in the field and are harvested the next summer. Spring wheats are planted in the early spring and are harvested in the fall. Red wheats comprise most of the hard varieties while white wheats comprise most of the soft. Recently, hard white wheats have been developed that are suitable for raised bread making. Some feel the hard white varieties make a better tasting whole wheat bread than the hard red.

The most commonly stored are the hard red varieties, either spring or winter, because of their high protein. They should have a protein content of no less than 12%, with higher the better. The hard white spring wheats are still relatively new and are not yet widespread. They have the same excellent storage characteristics as the hard red wheats.

## Amaranth

Amaranth is not a true cereal grain at all, but is a relative of the pigweeds and

the ornamental flowers we know as cockscomb. It's grown not only for its seeds, but for its leaves that can be cooked and eaten as greens. The grain is high in protein, particularly the amino acid lysine which is limited in the true cereal grains. The grains can be milled as-is, or the seeds can be toasted to provide more flavor. The flour lacks gluten, so it's not suited for raised breads, but can be made into any of a number of flat breads. Some varieties can be popped much like popcorn, or can be boiled and eaten as a cereal, used in soups, granolas, and the like. Toasted or untoasted, it blends well with other grain flours.

## Barley

Barley is thought by some to be the first grain ever grown by man. It has short, stubby kernels with a hull that is difficult to remove. Excluding barley intended for malting or animal feed, most of this grain is consumed by humans in two forms. The most common is the white, highly processed "pearl" barley that has had most of its bran and germ milled off along with its hull. It is the least nutritious form of barley. The second form it's found in is called "pot" or "hulled" barley and it has been subjected to the same milling process as pearled, but with fewer trips through the polisher. Because of this, it retains more of the nutritious germ and bran. Unless you are prepared to try to get the hulls off I don't recommend buying barley still in the hull. Barley can be milled into flour, but its low gluten content will not make a good loaf of raised bread. It can be combined with other flours that have sufficient gluten to make good raised bread or used in flat breads. Barley flour and flakes have a light nutty flavor that is enhanced by toasting. Whole barley is commonly used to add thickness to soups and stews.

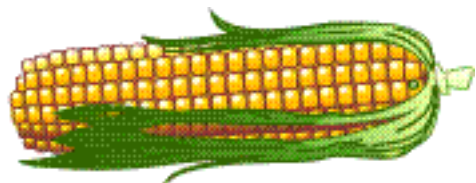
Recently, a hull-less form of barley has become available on the market through a few suppliers. This is whole grain barley with all of its bran and germ intact and should have the most nutrients of any form of this grain available. I have not been able to discover yet how suitable it is for long term storage.

## Buckwheat

Buckwheat is another of those seeds commonly considered to be a grain, but which is not a true cereal. It is a close relative to the docks and sorrels. The grain itself is a dark, three cornered seed resembling a tiny beechnut. It has a hard, fibrous hull that requires a special buckwheat huller to remove it. Here in the U. S., it is most often used in pancakes, biscuits and muffins. In eastern Europe and Russia it is known in its toasted form as kasha. In the Far East, it's often made into soba or noodles. It's also a good bee plant, producing a dark, strongly flavored honey. The flour is light or dark depending on how much of the hull has been removed before grinding. Dark flour is far superior nutritionally as you

might expect, but it also much more strongly flavored. Buckwheat is one of those foods with no middle ground in peoples opinions -- they either love it or they hate it. Like amaranth, it's high in lysine, an amino acid commonly lacking in the true cereal grains.

## Corn



Corn is the most common grain crop in the U.S., but it is mostly consumed indirectly as animal feed or even industrial feedstock rather than directly as food. Nevertheless, it comes in an amazing variety of forms and, like wheat, some of them are better suited for a particular purpose than others. The varieties intended to be eaten as fresh, green corn are very high in sugar content and do not dry or store well. The other varieties are the flint, dent, and popcorns. All of them keep well when they have been properly dried. To a certain extent, they're all interchangeable for purposes of grinding into meal (sometimes known as polenta meal) or flour (very finely ground corn, not cornstarch), but some make better meal than flour and vice versa. As a general rule of thumb, the flint varieties make better meal as they have a grittier texture than the dent corns which make better flour. If meal, hominy and hominy grits (commonly called just "grits") are what you are most interested in, use the flint type. If you intend to make corn masa for tortillas and tamales, then the dent type is what you want. Popcorn is what you need if you want to pop it for snacks and it can also be ground into meal or flour. It seems to me it makes a very good meal, but it's just a bit gritty for flour. Your mileage may vary. Yellow dent corn seems to be the most commonly available variety among storage food dealers.

Popcorn is one form of a whole grain available to nearly everyone in the U.S. if they know where to look. Since it's so popular as a snack food, particularly in movie theaters and events like fairs and ball games, even the smallest of towns will generally have at least one business selling it in twenty five or fifty pound bags. Since it's meant to be eaten it's safe for food. To be at its most poppable, this corn needs to have a moisture content between 13.5%-15.5% which makes it just a little too moist for ideal storage. A small amount of drying will need to be done before it's packed away. If wanted for popping later, it can always be re-hydrated by sprinkling a small amount of water on the kernels, shaking vigorously and allowing it to be absorbed.

Once you've decided between flint, dent or popcorn, you now have to decide upon it's color: There are yellow, white, blue, & red dried varieties. The yellow and white types are the most common by far with the blues and reds mostly being relegated to curiosities, though blue corn has been gaining in popularity

these last few years. It should be kept in mind that white corn does not have the carotene (converts into vitamin A) content of yellow corn. Since vitamin A is one of the major limiting vitamins in long term food storage, any possible source of it should be utilized so for this reason I suggest storing yellow rather than white corn. Additionally, much of the niacin content of corn is chemically bound up in a form not available for human nutrition unless it has been treated with an alkali. If grits, hominy or corn masa (for torillas and tamales) are not a part of your diet and you're storing corn, it is a very good idea to begin to develop a taste for some or all of these alkali treated forms of corn foods.

## Millet

Millet is an important staple grain in North China, and India, but is little known as a food in the U.S, mostly being used as bird feed. The grain kernels are very small, round, and usually ivory colored or yellow, though some varieties are darker. The lack of gluten and a rather bland flavor may account for the anonymity of this grain here, but it's alkaline content is higher than other grains and makes it very easy to digest. It also has a higher iron content than any other grain but amaranth. It swells a great deal when cooked and supplies more servings per pound than any other grains. When cooked like rice it makes an excellent breakfast cereal. Though it has little gluten of its own, it mixes well with other flours.



## Oats

Though the Scots and the Irish have made an entire cuisine from oats, they are still mostly thought of in the U.S. as a bland breakfast food. It is seldom found as a whole grain, usually being sold processed in one form or another. Much like barley, oats are a difficult grain to separate from their hulls. Besides their longtime role as a breakfast food, where they can be made very flavorful with a little creative thought, oats make an excellent thickener of soups and stews and a filler in meat loafs and casseroles. Probably the second most common use for oats in America is in cookies and granolas.

Listed below in order of desirability for storage are the forms of oats most often found in this country. Rolled and cut oats retain both their bran and their germ.

### Oat Groats

These are whole oats with the hulls removed. They are not often found in this form, but can sometimes be had from natural food stores and some

storage food dealers. Oats are not the easiest thing to get a consistent grind from so producing your own oat flour takes a bit of experience.

### **Steel Cut Oats**

Also known as Irish or pinhead or porridge (but so are rolled) oats. These are oat groats which have been cut into chunks with steel blades. They're not rolled and look like coarse bits of grain. This form can be found in both natural food stores (sometimes *much* cheaper) and many supermarkets.

### **Rolled Oats**

These are also commonly called "old fashioned", "thick cut" or "porridge" oats. To produce them, oat groats are steamed and then rolled to flatten. They can generally be found wherever oats are sold. They take longer to cook than do the quick cooking oats, but they retain more flavor and nutrition. This is what most people will call to mind when they think of oatmeal.

### **Quick Cooking Rolled Oats**

These are just steamed oat groats rolled thinner than the old fashioned kind above so that they will cook faster. They can usually be found right next to the thicker rolled oats.

### **Instant Rolled Oats**

These are the "just add hot water" or microwave type of oat cereals and are not at all suited for a long term food storage program. They do, however, have uses in "bug out" and 72 hour food kits for short term crises.

### **Whole Oats**

This is with the hulls still on. They are sold in seed stores and sometimes straight from the farmer who grew them. Unless you have some means of getting the hulls off, I don't recommend buying oats in this form. If you do buy from a seed supplier, make certain that they have not been treated with any chemicals that are toxic to humans.

## **Quinoa**

Quinoa is yet another of the grains that is not a true cereal. It's botanical name is *Chenopodium quinoa* (pronounced "keen-wah"), and is a relative of the common weed Lambsquarter. The individual kernels are about 1.5-2 mm in size and are shaped rather like small flattened spheres, yellow in color. When quinoa is cooked, the germ of the grain coils into a small "tail" that lends a pleasant crunch. This exotic grain should be thoroughly washed before cooking in order to

prevent the cooked product from tasting bitter. There are several varieties of quinoa that have color ranging from near white to a dark brown. The larger white varieties are considered superior and are the most common found.

*[Captain Dave's Editorial Note: Quinoa is available in many health stores, as are pasta and other products made from it. Quinoa is becoming an increasingly popular alternative for those allergic to wheat.]*

## Rices

Rice is the most commonly consumed food grain in the world. The U.S. is the leading exporter of it, though we actually only produce about 1% of the global supply. It is my favorite grain and in the form of brown rice, we eat a great deal of it here at the House.

Much like wheat and corn, rice comes in a number of varieties, each with different characteristics. They are typically divided into classes by the length of their kernel grains; short, medium and long.

### Short Grain Rice

Short grain rice is a little softer and bit moister when it cooks and tends to stick together more than the longer rices. It has a sweeter, somewhat stronger flavor than long grain rice.

### Medium Grain Rice

Medium grain rice is not very common in the States. It has flavor like short grain rice, but with a texture more like long grain rice.

### Long Grain Rice

Long grain rice cooks up into a dryer, flakier dish than the shorter grains and the flavor tends to be blander. It is the most commonly found size of rice on the grocery shelves.

Each of these may be processed into brown, white, parboiled or converted and instant rices. Below is a short discussion of the differences between the various types of rices.

### Brown Rice

This is whole grain rice with only the hull removed. It retains all of the nutrition to be found in rice and has a pleasant nutty flavor when boiled. From a nutrition standpoint it is by far the best of the rices to put into storage, but it has one flaw: The essential oil in the germ of the rice is very



susceptible to oxidation and soon goes rancid. As a result, brown rice has a shelf life of only about six months from the date of purchase unless given special packaging or storage processing. Freezing or refrigeration will greatly extend its storage life. It's also possible to purchase brown rice from long term food suppliers specially packaged in air tight containers with an inert nitrogen atmosphere. In this kind of packaging, (if properly done), the storage life of brown rice can be extended for years.

### **Converted Rice**

Converted rice starts as brown rice which undergoes a process of soaking and steaming until it is partially cooked. It is dried and then polished to remove the bran and germ. The steaming process drives some of the vitamins and minerals from the outer layers into the white inner layers. This makes it more nutritious than polished white rice, but also makes it more expensive.

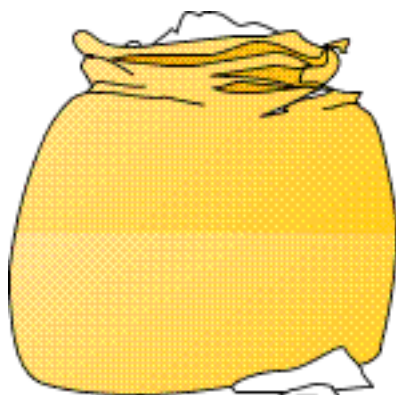
### **White Rice**

This is raw rice that has had its outer layers milled off, taking with it about 10% of its protein, 85% of its fat and 70% of its mineral content. Because so much of the nutrition of the rice is lost, white rice sold in this country has to be enriched with vitamins that only partially replaces what was removed.

### **Rye**

Rye is a well known bread grain in the U.S., though not as popular as wheat. It has dark brown kernels longer and thinner than wheat, but less gluten. Bread made from this grain tends to be somewhat dense unless gluten is added (often in the form of a lot of wheat flour) with color that ranges from pale to dark brown. German pumpernickel, made with unrefined rye flour and molasses, is the blackest, densest form. Rye makes for excellent variety in the diet.

### **Sorghum**



Sorghum is probably more widely known here in the States for the syrup made from the juice squeezed from the canes of one of its many varieties. Also widely called "milo", it is one of the principle cereal grains grown in Africa. Its seeds are somewhat round, a little smaller than peppercorns, with an overall brown color with a bit of red and yellow mixed in. The varieties called "yellow endosperm sorghum" have a better taste. Sorghum is a



major feed grain in the Southwestern part of the U.S. and is where the vast majority of the national milo production goes to. Like most of the other grains, sorghum is low in gluten, but the seeds can be milled into flour and mixed with higher gluten flours or made into flat breads, pancakes or cookies. In the Far East, it is cooked and eaten like rice, while in Africa it is ground in meal for porridge. It's also commonly brewed into alcoholic beverages.

## Triticale

Triticale is not a creation sprung whole from the foreheads of Star Trek script writers. It is, in fact, a cross or hybrid between wheat and rye. This youngest grain combines the productivity of wheat with the ruggedness of rye and has a high nutrition value. Triticale kernels are gray-brown, oval shaped larger-than-wheat kernels and plumper than rye. It will make a raised bread like wheat flour will, but the gluten is a bit weak so wheat flour is frequently added to strengthen it. Because of the delicate nature of its gluten, excessive kneading must be avoided. This grain can be used in much the same way wheat or rye is. Although it is the youngest of the grains, it's been around for some years now. For reasons I've never understood, triticale has never achieved much popularity. Whether this is for reasons of agricultural production or public acceptance I don't know.

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