



Ethnobotanical Leaflets



Barley: The Versatile Crop

By Brian Young

Barley is a very important grain in the world today. It is very versatile in every way. It has been well adapted through its evolution. It has a very mysterious and much debated beginning. Now however, barely has become well known and so have its many uses. Barley, which is of the genus *Hordeum*, is a cereal that belongs to the grass family Poaceae. Barley has many different varieties. The most common is *Hordeum vulgare*, which is a six-rowed type of barley that has a spike notched on opposite sides with three spikelets on each notch. At each notch there is a flower or floret that later develops into a kernel. *Hordeum distichum* is a two-rowed type of barley that has central florets producing kernels and it has lateral florets that are sterile. Lastly there is *Hordeum irregulare* which has fertile central florets and different arrangements of sterile and fertile lateral florets. This is the least cultivated species of the three main forms (2).

Barley is very adaptable to various environments. In fact, it is the most adaptable of the cereals. Barley is an annual grass that has two growing seasons, winter and spring. It does best in the spring in a temperate zone with a 90 day growing season, it can also be found growing in sub-arctic regions, like in Alaska or in Norway, with very short growing seasons (1). Barley also has a very good resistance to dry heat compared to other small grains. This feature allows it to grow near desert areas such as North Africa (2).

Barley has a very debatable origin. There are two different thoughts as to where barley was originally cultivated. J.R Hardin says that barley cultivation originated in Egypt. There is evidence of barley grains found in pits and pyramids of Egypt over 5000 years ago. There has also been ancient glyphs or pictorials showing barley dating back to 3000 BC. There have also been references to barley and beer making in ancient Egyptian and Sumerian writings. (4). The other thought is that barley was originally cultivated in China around 1500-2000 BC. This is evident by ancient pottery found depicting the end of the famine by having barley fall out of the sky (2). Barley cultivation also seems to have been evident in other parts of the world at later times. For example northwestern Europe is estimated to have civilizations cultivating barley around 3000 BC. Later, around 3500 BC it would be used in Mesopotamia and then it would be traded even further around the world. During the 16th century, barely was the main bread plant of the Hebrews, Greeks, Romans and many European communities (2). Some

ethno-botanists believe that this may be a case of convergent evolution. This means that barley cultivation arose in both regions simultaneously (5). This however is the least accepted of the three ideas as to barley's origin. No matter which origin is thought to be correct, the real answer will probably never be known because barley is so old and records of trade were non-existent back then so the path of barley trade across the world is unknown.

The earliest known, and most probable ancestor of barley was probably of the two-rowed variety. More than likely it was of the sub-species *spontaneum*. It had a weak rachis which caused the seeds to fall easily (5). This was not advantageous for harvesting. This was later selected out either in cultivation and domestication, or in the wild through mutations in the weed like form, which gave rise to the four- and six-rowed varieties. Which leads researchers to believe that one of the first selections made were those mutants with a tough rachis. Six-rowed barley which is more common today did not come about until after 6000 BC (5).

Barley is the fourth most important grain crop in the United States. Barley has many economic uses in the United States and the rest of the world today. Barley is produced primarily as animal feed. It is also used in the production of beer and some wines. A small amount of the produced barley is used for human food in the form of pearl barley. Finally, in some areas barley is used to make hay (6).

Over half of the barley grown in the United States is used for livestock feed. Barley as feed has the same nutritive value as corn. Barley is high in carbohydrates, with moderate amounts of protein, calcium and phosphorus. It also has small amounts of the B vitamins (2). Barley is the most valuable for hog feed and is increasingly being used as cattle feed. Because of its nutritional value it produces good portions of firm fat and lean meat. The entire barley kernel is used as feed after it has been steam rolled or gone through a grinding process. By products from the brewing process and malt sprouts are also used in livestock feed (4). It is found that two-rowed barley is most often used for animal feed because it produces higher weight and superior kernel production (1).

About 25% of the cultivated barley in the United States is used for malting. Of that amount, about 80% is used in beer production, 14% is used in distilled alcohol production, and finally the last 6% is used for malt syrup, malted milk, and breakfast foods (4). The malting process involves the modification of barley into green malt, which is made up of barley root sprouts, which are then preserved by drying. At this point malt is made and it is either sent to be used in the food industry or it is sent to be fermented into beer. If it is to be used in beer production the malt is mixed with warm water which then produces two main enzymes, alpha-amylase and beta-amylase. These two enzymes hydrolyze starch to dextrins and fermentable sugars. This is then boiled with hops, for flavor, and then filtered out. Yeast is then added to ferment the sugars into alcohol and carbon dioxide. The hop residue is and proteins are then removed for the resulting product, beer (3). When it comes to malting for alcoholic beverages, six-rowed varieties are used because of the superior enzyme production, which is essential to the production of beer both quality and quantity (1).

Barley is also used in many different types of food that we eat. Before it is suitable for human

consumption, it must be processed in pearl barley. Pearl barley is created by grinding the barley kernels with very abrasive disks many times over. Each time that the kernel is ground is called a "pearling". Before it is considered suitable pearl barley it must go through 3-4 pearlings. Once it is pearled it can be used in soups or dressings, or turned into flour. If it is turned into flour it can be used in baby foods, breakfast cereals, or combined with wheat flour for baking (4). Barley is also used in the production of vinegar (2).

Finally, barley is sometimes grown as a hay crop in some areas. Only the smooth varieties or awnless varieties are used in hay production. Winter barley also can be used if pasteurized before the stems start to elongate (4).

The debate is still going on over barley's origin. Some resources and ethno-botanists feel that barley was first cultivated in China (2), while others claim that the Egyptians were the first to see its' potential and cultivate it (4). It seems that both side agree that barley was first found as a two-rowed type which was later mutated or selected in four- and six-rowed varieties. Regardless of its history and beginning, today it is a very valuable economic plant. Whether it is used as feed for the livestock that we depend on or if it is making our favorite type of beer; it is easy to see why barley is the fourth most important grain crop in the United States (1).

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