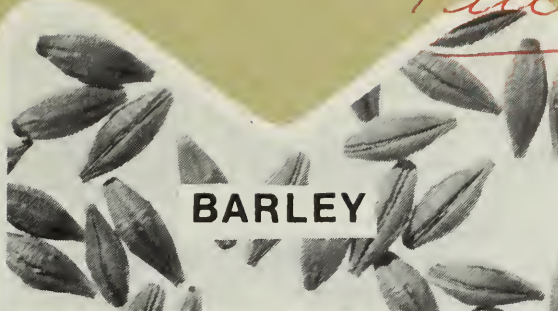


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BARLEY



RYE



OATS

what you should know about

COARSE GRAINS

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Canadian coarse grain bushel weights

Barley	48 lb
Oats	34 lb
Rye	56 lb

Metric conversions

1 metric tonne barley	=	45.93 bushels
1 metric tonne oats	=	64.84 bushels
1 metric tonne rye	=	39.36 bushels
1 metric tonne	=	2 204.62 lb

What You Should Know About Coarse Grains (Barley, Oats and Rye)

Coarse grains (barley, oats and rye) are grown under a wide range of temperature, soil and moisture conditions. They may be found north of the Arctic Circle or deep in the tropics; at sea level or up to 4500 m; on heavy, poorly drained clay soils or on light, well-drained, sandy soils; and in areas of high or low rainfall. Their social and economic importance, however, lies between these extremes. The wide adaptability of coarse grains to different geographical regions has contributed significantly to the development of farming, means of transportation, customs and habits of the people.

In the past, coarse grains were grown largely for human consumption, but increased livestock production has changed their use. In Canada, coarse grains have always played a major role in the feeding of poultry, hogs, cattle and horses. On this continent, barley, oats and rye are so important in livestock production that they are often called "feed grains" to distinguish them from a "food grain" such as wheat.

Barley came into cultivation in Asia Minor (5000-2000 B.C.). Rye and oats are of more recent origin. We are told that rye was grown about 1000 B.C. in southeastern Europe between the Austrian Alps and the Caspian Sea. The history of oats is more difficult to trace, but it is believed that oats were cultivated on the Hungarian Plains of eastern Europe around 900-500 B.C.

Centuries later, when settlers came to the New World, they brought barley, oats and rye seed with them. Survival of the colonies depended largely on the cultivation of coarse grains as food for humans and animals. In 1721, French settlers in Canada produced 987 t of oats and 100 t of barley. There are no figures readily available for rye. It can be assumed from the records that oats were the most adaptable of the coarse grains, although not the most important crop grown. Production of wheat in the same year totaled nearly 7486 t.

Export trade in coarse grains developed early in Canadian history. Substantial quantities of oats were exported to the United States in the 1860's. The demand arose from food and feed shortages during the Civil War. When the war ended, Canadian trade in oats was reduced but barley exports continued until the 1890's. Ontario barley, it was said, produced better beer than that grown in the United States. But tariffs were imposed on barley entering the United States for this purpose and trading activities subsided. Rye was not exported to any extent during that period.

Through the years, the Canadian coarse grain market has expanded. Now, Canada exports to the United States, Great Britain, Holland, the United Arab

Republic, Japan and Norway. In 1977-78, Canada exported 3 590 000 tonnes of barley, 90 000 tonnes of oats and 271 000 tonnes of rye.

BARLEY

Barley Plants

Barley stalks are hollow and range in length from about 20 to 150 cm, terminating with a spike shaped head. The long, slender leaves are usually shiny and smooth.

There are two types of barley spikes. One kind has two rows of grain, the other six rows.

Barley is self-pollinating, that is, the pollen from the pistil of a flower fertilizes the stigma of the same flower. This yields seed that will continue to produce uniform crops of the same variety.

Barley Uses

Over half of the Canadian barley crop is used for livestock feed. About 10% is used by breweries for making beer. The rest is exported, saved for re-planting or used for human consumption.

Farmers may prefer barley for some types of livestock feed because it is easily digested and contains a high proportion of carbohydrate (feed energy). A significant portion of barley in Canada is fed on the farm on which it was grown.

To make beer, malt is obtained from germinating barley seeds. Barley varieties differ in their malting characteristics and only those meeting the standard of quality are called malting barleys.

Pearled barley (hulls removed by mechanical process) is used to make soup. Barley flour is sometimes used in small quantities in baby food and breakfast cereals. In Japan and China, processed barley is a popular food on the menu.

Brewer's grain (a byproduct of barley from the brewing industry) is used as cattle feed.

Soil

Of the three coarse grains, barley responds best to soil fertility. It has a comparatively shallow root system and it absorbs large quantities of water in its early growing stages. Because of these characteristics, barley does best in light-textured soils. It can do well in heavier soils but added fertility is required for good results.

Along with small roots, barley has a short growing period. It is important, therefore, that plant nutrients are readily available in the soil for rapid growth.



Typical heads of barley: a six-row awned variety (left) and a two-row awnless variety (right).

Moisture

Of the three coarse grains, barley uses the smallest amount of moisture to produce a crop. It may suffer from excess moisture because water-logged soils are cool and lack enough air for best growth.

Barley is the first of the coarse grains to be affected by excess moisture. During a wet season, if barley and oats are grown side by side, oats may do well but barley may show signs of 'drowning'. Certain diseases are also more prevalent under wet, humid conditions.

Temperature

Temperature range is very important in barley production. Temperature of soil at germination, heat requirements, length of growing season, and plant tolerance to heat are all critical factors in the growth of a crop.

Barley can be grown farther north than any other grain because it has the shortest growing period. It is superior to oats and rye in resistance to heat.

Diseases

Diseases attack barley and other coarse grains in varying degree from one year to the next. Infectious germs (fungus or bacterial organisms) may live over winter in the soil, seed, or on an alternate plant (host), such as barberry or buckthorn.

Barley diseases are avoided by using resistant varieties. Plant breeders search for disease-resistant species, and introduce the resistant characteristics into a desirable variety. Treating seeds and spraying crops with chemicals are other ways of control.

Rust can be a serious barley disease in both Western and Eastern Canada. It is carried over winter on barberry and transmitted through the air to the growing crop. An important control measure is the destruction of barberry bushes. Most modern varieties of barley have some rust resistance. Mildew, another serious disease of barley, is avoided largely by resistant varieties.

Insects

Like most crops, barley is damaged by insects from time to time.

The number and kind of insects vary according to the climate. For instance, the grasshopper may cause more damage in Western Canada than in the Maritimes.

OATS

Oat Plants

An oat plant grows 60 to 150 cm high, depending on growing conditions and variety. The stem is hollow and terminates with a head, or panicle. The leaf blades are about 25 cm long and 16 mm wide. The numerous small roots, through which the plant feeds, are covered with fine hairs.

Like barley, oats are self-pollinating.

Oat seeds have protective coverings known as hulls surrounding the kernels. The oat kernel, often called the 'groat', is spindle-shaped when the hull is removed. Plant breeders have developed oat varieties that have loose hulls, which separate easily from the kernel. Such varieties are known as hull-less or free-threshing.

Oat Uses

About 90% of the oats grown in Canada are fed to livestock. The remaining 10% are used for human consumption and for planting new crops.

Oats are very nutritious. They are a well-balanced source of proteins, carbohydrates, fats and fiber. The proportion of fiber, which influences digestion, is a little higher in oats than in other coarse grains. For that reason, oats are highly regarded for horses. Usually, livestock feeders may mix oats with two or more



A head of oats ready to be harvested.

grains to get the proper balance of ingredients for a specific type of livestock product (veal, beef, pork, eggs, milk, etc.).

Small acreages of oats are used for pasture, hay or silage.

Soil

Oats do well on many different kinds of soil, including acid soils and poorly drained soils. They have a large deep root system and this makes them strong feeders—they find nutrients in poor soils.

Oats also respond to high fertility. When grown on soils in good condition, they can be very productive.

Moisture and Temperature

Oats are popular in the Maritimes because they can grow under heavier moisture conditions than other coarse grains. They also do very well in the Prairie Provinces.

Diseases

Rust fungi, feeding on oats, can damage a crop. Loose smut and speckled leaf blotch are other diseases that may attack oats.

Lodging

Oats are particularly subject to lodging—a condition where the crop is flattened by wind or rain. This makes the crop difficult to harvest and results in reduced yields and quality of the grain.

RYE

Rye Plants

Rye usually stands stronger and taller than oats and barley. On fertile soils it can grow 150 cm tall or more. The stem terminates with a head or spike. Its roots branch in many directions and can go as deep as 185 cm. Unlike oats and barley, rye is cross-pollinated. Pollen is carried from plant to plant largely by the wind. For this reason, it is difficult to grow pure varieties of rye unless the seed producer isolates seed plots from other rye varieties.

Rye Uses

Rye was the most important bread crop in Europe until the nineteenth century. Since then it has been largely replaced by wheat. Rye contains a protein called "gliadin" which enables its dough to retain gases, a critical factor in bread making. Because of its hardiness and ability to grow almost anywhere, and because it is adaptable to baking techniques, rye holds a very important historical position as a reliable food.

About one quarter of the Canadian rye crop is used in making bread. Frequently, wheat and rye flour are mixed together to make a bread that has the taste of both grains. About one third is used to make rye whisky. The remainder is fed to livestock either as a by-product of flour mills or as grain. Rye is somewhat sour and difficult for animals to chew. As a result, it is often necessary to feed it in a mixture with other grains.

Rye lends itself favorably as a pasture grass in the fall or early spring.

Soil

Rye can be grown on poorer soils than any other grain crop. Soils too poor for rye are generally not used for crop production.

Temperature

Rye is a cool-weather plant, not as well adapted to either dry or moist heat as oats and barley.

Diseases

Ergot attacks rye grown in most areas. The disease replaces the rye seed by forming spurlike purplish-black bodies. The ergot bodies present in rye are



Rye ready to be harvested.

poisonous to livestock and human beings. During the Middle Ages, ergot carried in rye bread caused illness and death. Ergot can be controlled by using disease-free seed and proper cultural practices.

GROWING SEASON

In Canada, barley and oats are usually grown as annuals; they are seeded in April or May and harvested in late summer.

Some varieties of rye are grown as winter annuals, they are seeded in early fall and seedlings emerge soon afterwards to produce grain the following summer.

HARVESTING

Dry weather is very important, so that the crop can be harvested at the peak of condition. There must be as little moisture as possible in the grain; otherwise, it will spoil in storage. Swathers and combines have largely replaced binders in



A farmer swathing oats. After drying out on the field for several days, the crop is combined.

grain harvesting. Grain combines, as the name implies, combine two operations, picking up the grain from the field and threshing it at the same time.

Engineers have designed large time- and labor-saving combines suitable for Western Canada. Tremendous increases in land and equipment costs since 1972 have pushed the value of a medium-sized grain farm to levels in excess of a half million dollars. This trend has led to gradually fewer and larger-sized farms.

CANADIAN COARSE GRAIN PRODUCTION AND MARKETING

The following table shows the number of acres, the yield in kilograms (bushels) per acre and total production in tonnes (bushels) for the 1972 and 1977 barley, oat and rye crops. Production in Western Canada accounts for nearly 90% of the total Canadian harvest of these crops. Well over half the western crop is fed directly to livestock on the Prairies, the remainder moves into export and Eastern Canadian markets.

Expansion of the Ontario corn crop has sharply reduced that province's dependence on Prairie feed grains, but Quebec and the Maritimes are still heavy users of Prairie feed grains.

Export sales of Prairie barley and oats are the sole responsibility of the Canadian Wheat Board. Sales to the domestic market are largely handled by the private trade. Western producers usually receive slightly higher returns on their export sales, particularly during periods when world demand for feed grains is strong.

Canadian production of barley, oats, rye

		Crop year	
		1972-73	1977-78
Area '000 ac	barley	12 510	11 330
	oats	6 104	4 220
	rye	634	566
Yield kg/ac (bu/ac)	barley	902 (41)	1 004 (46)
	oats	759 (49)	848 (55)
	rye	541 (21)	650 (26)
Total production '000 t ('000 bu)	barley	10 812 (496 270)	11 380 (522 342)
	oats	3 717 (241 017)	3 580 (232 134)
	rye	304 (11 967)	368 (14 487)

