



AMARANTH (*Amaranthus cruentus*) Amaranth was a staple of Aztec culture, until Cortez decreed that anyone growing the crop would be put to death. Seeds were smuggled to Asia, where local dialects referred to amaranth as “seed sent by God” as a tribute to its taste and sustenance. Amaranth kernels are tiny and resemble brown caviar when cooked. Today amaranth is making its way back, thanks to a lively, peppery taste and a higher level of protein (13.56%) than most other grains. In South America, it is often sold on the streets, popped like corn. Amaranth has no gluten, so it must be mixed with wheat to make leavened breads. It is popular in cereals, breads, muffins, crackers and pancakes. Health bonus: Amaranth is a source of complete protein; its protein contains lysine, an amino acid missing or negligible in many grains.



BARLEY (*Hordum vulgare*) Barley is one of the oldest cultivated grains. Egyptians buried mummies with necklaces of barley, and centuries later Edward I of England standardized the inch as equal to “three barley seeds.” It is a highly-adaptable crop, growing north of the Arctic Circle and as far south as Ethiopia. Barley has a very tough hull, difficult to remove without losing some bran. Pearled barley is not a whole grain (but is still high in fiber). Look for hulled barley or one of the new varieties of hull-less barley starting to be available. Lightly pearled barley is not technically a whole grain (as small amounts of the bran are missing)—but it’s full of fiber and much healthier than a fully-refined grain. Health bonus: Barley foods can reduce the risk of coronary heart disease, in part because of the soluble beta-glucan fiber in barley.



BUCKWHEAT (*Fagopyrum esculentum*) Buckwheat goes way beyond the pancake mixes we associate it with. Japan’s soba noodles, Brittany’s crêpes and Russia’s kasha are all made with buckwheat. Botanically, buckwheat is a cousin of rhubarb, not technically a grain at all—and certainly not a kind of wheat. But its nutrients, nutty flavor and appearance have led to its ready adoption into the family of grains. Buckwheat tolerates poor soil, grows well on rocky hillsides and thrives without chemical pesticides. Health bonus: Buckwheat is the only grain known to have high levels of an antioxidant called rutin, and studies show that it may improve circulation and prevents LDL cholesterol from blocking blood vessels.



BULGUR (*Triticum ssp.*) When wheat kernels are cleaned, boiled, dried, ground by a mill, then sorted by size, the result is bulgur. It’s often referred to as “Middle Eastern pasta” for its versatility as a base for all sorts of dishes. Bulgur is nearly always made from wheat, but in fact almost any similar grain can be made into bulgur. Because bulgur has been precooked and dried, it needs to be boiled for only about 10 minutes to be ready to eat—about the same time as dry pasta. It is sold in four different particle sizes, and the smaller grinds can be “cooked” in seven minutes by the addition of hot water. This makes bulgur an extremely nutritious fast food for quick side dishes, pilafs or salads. Perhaps bulgur’s best known traditional use is in the minty grain and vegetable salad known as tabbouleh. Health bonus: Bulgur has more fiber than quinoa, oats, millet, buckwheat or corn. Its quick cooking time and mild flavor make it ideal for those new to whole grains.



CORN (*Zea mays mays*) Popcorn. Corn cakes. Polenta. Tortillas. Corn muffins. Though sometimes dismissed as a nutrient-poor starch—both a second-rate vegetable and a second-rate grain—whole grain corn is lately being reassessed and viewed as a healthy food. Traditional Latin American cultures learned how to treat corn with alkali, creating masa harina. This treatment liberates the niacin in corn, so those who depend on it for sustenance will avoid pellagra. Eating corn with beans creates a complementary mix of amino acids that raises the protein value to humans. Avoid labels that say “degerminated” when you’re looking for whole-grain corn. Health bonus: Research at Cornell shows corn has among the highest levels of antioxidants of any grain or vegetable—almost twice the antioxidant activity of apples!



EINKORN (*Triticum monococcum* L) Generally thought to be the most ancient of wheat varieties available today, einkorn is a diploid wheat with just two sets of chromosomes. While einkorn, with its hard-to-thresh hull, was abandoned as a mainstream crop, it's still grown in Austria, southern France (where it's called *petit épeautre* or "little spelt"), Italy (where it's called *farro piccolo* or "little farro"), Germany, and some eastern European countries, in marginally fertile areas. More recently, farmers in Washington state and elsewhere are bringing drought-tolerant einkorn back into production in the U.S.



FARRO / EMMER (*Triticum turgidum dicoccum*) Emmer, an ancient strain of wheat, was one of the first cereals ever domesticated in the Fertile Crescent, and centuries later, it served as the standard daily ration of the Roman legions. But over the centuries, emmer was gradually abandoned in favor of durum wheat, which is easier to hull. By the beginning of the 20th century, higher-yielding wheat strains had replaced emmer almost everywhere, except in Ethiopia, where emmer still constitutes about 7% of the wheat grown. In Italy—and increasingly around the world—emmer is known as farro or grano farro and is staging a comeback as a gourmet specialty. Semolina flour made from emmer is still used today for special soups and other dishes in Tuscany and Umbria, and farro is thought by some aficionados to make the best pasta.



KAMUT® KHORASAN WHEAT (*triticum turgidum turanicum*) Kamut® (a common brand name for khorasan wheat) is another heirloom grain, once pushed aside by an agricultural monoculture but now returning to add variety to the food supply. Said to be discovered in an Egyptian tomb, this wheat variety was peddled without much success at the Montana State Fair in 1960 as "King Tut's Wheat." Years of selecting, testing and propagating eventually brought the grain—now called Kamut, an ancient Egyptian word for wheat—to prominence. Today, millions of pounds of this rich, buttery-tasting wheat are grown on organic farms and made into whole-grain products around the world. Health bonus: Kamut® grain has higher levels of protein than common wheat, and more Vitamin E.



MILLET (*Panicum miliaceum* and others) Millet is rarely served to humans in the United States—here, it's the grain most often found in bird feeders. Yet it's one of the leading staple grain in India, and is commonly eaten in China, South America, Russia and the Himalayas. Millet has a mild flavor and is often mixed with other grains or toasted before cooking, to bring out the full extent of its delicate flavor. Its tiny grain can be white, gray, yellow or red.



OATS (*Avena sativa*) Oats have a sweet flavor that makes them a favorite for breakfast cereals. Unique among everyday grains, oats almost never have their bran and germ removed in processing. So if you see oats or oat flour on the label, relax: you're virtually guaranteed to be getting whole grain. In the US, most oats are steamed and flattened to produce "old-fashioned" or regular oats, quick oats, and instant oats. The more oats are flattened and steamed, the quicker they cook—and the softer they become. If you prefer a chewier, nuttier texture, consider steel-cut oats, also sometimes called Irish or Scottish oats. Steel-cut oats consist of the entire oat kernel (similar in look to a grain of rice), sliced once or twice into smaller pieces to help water penetrate and cook the grain. Cooked for 20-30 minutes, steel-cut oats create a breakfast porridge that delights many people who didn't realize they love oatmeal! Health bonus: Studies show that oats, like barley, contain a special kind of fiber called beta-glucan especially effective in lowering cholesterol. Recent research reports indicate that oats also have a unique antioxidant, avenanthramides, that helps protect blood vessels from the damaging effects of LDL cholesterol.



QUINOA (*Chenopodium quinoa*) Quinoa (keen-wah) comes to us from the Incas in the Andes. Botanically a relative of swiss chard and beets rather than a "true" grain, quinoa cooks in about 10-12 minutes, creating a light, fluffy side dish. It can also be incorporated into soups, salads and baked goods, and processed foods like cereal flakes. Quinoa is a tiny, round grain, often light-colored but also available in red, purple and black varieties. Most quinoa must be rinsed before cooking, to remove the bitter residue of saponins, a plant-defense that wards off insects. New saponin-free



strains eliminate this minor annoyance to the enjoyment of quinoa. Health bonus: The protein in quinoa is complete protein, containing all the essential amino acids our bodies can't make on their own.



RICE (*Oryza sativa*) White rice has been refined, with the germ and bran removed. Whole-grain rice is usually brown—but, unknown to many, can also be black, purple, red or any of a variety of exotic hues. Around the world, rice thrives in warm, humid climates; almost all of the US rice crop is grown in Arkansas, California, Louisiana, Mississippi, Missouri and Texas. Converted rice is parboiled before refining, a process which drives some of the B vitamins into the endosperm so that they are not lost when the bran is removed. As a result, converted rice is healthier than regular white rice, but still is lacking many nutrients found in brown rice. Brown rice is lower in fiber than most other whole grains, but is full of other important nutrients. Health bonus: Rice is one of the most easily-digested grains—one reason rice cereal is often recommended as a baby's first solid. This makes rice ideal for those on a restricted diet or who are gluten-intolerant.



RYE (*Secale cereale*) Long seen as a weed in more desirable wheat crops, rye eventually gained respect for its ability to grow in areas too wet or cold for other grains. For this reason it is a traditional part of cuisine in Northern Europe and Russia. Rye was also widely grown in colonial America; some historians believe a fungus, rye ergot, triggered hallucinations leading to the Salem witch trials. Like barley, rye is unusual among grains for the high level of fiber in its endosperm—not just in its bran. Because of this, rye products generally have a lower glycemic index than products made from wheat and most other grains, making them especially healthy for diabetics. Health bonus: The type of fiber in rye promotes a rapid feeling of fullness, making rye foods a good choice for people trying to lose weight.



SORGHUM / MILO (*Sorghum spp.*) Farmers on the Great Plains from South Dakota to Texas appreciate that sorghum thrives where other crops would wither and die; in drought periods, in fact, it becomes partially dormant. Worldwide, about 50% of sorghum goes to human consumption, but in the US, most of the crop is fed to animals, made into wallboard or used for biodegradable packing materials. That's a shame, because sorghum, also called milo, believed to have originated in Africa, can be eaten like popcorn, cooked into porridge, ground into flour for baked goods, or even brewed into beer. Health bonus: A gluten-free grain, sorghum is especially popular among those with celiac disease.



SPELT (*Triticum aestivum spelta*) Spelt is a variety of wheat widely cultivated until the spread of fertilizers and mechanical harvesting left it by the wayside in favor of wheats more compatible with industrialization. Spelt can be used in place of common wheat in most recipes. Twelfth-century mystic St. Hildegard is said to have written, "The spelt is the best of grains. It is rich and nourishing and milder than other grain. It produces a strong body and healthy blood to those who eat it and it makes the spirit of man light and cheerful. If someone is ill boil some spelt, mix it with egg and this will heal him like a fine ointment." Today, the German abbey she founded still sells spelt products and even spelt liqueur. Health bonus: Spelt is higher in protein than common wheat. There are anecdotal reports that some people sensitive to wheat can tolerate spelt, but no reliable medical studies have confirmed that issue.



TEFF (*Eragrostis tef*) It is estimated that teff is the principal source of nutrition for over two-thirds of Ethiopians, who make it into the ubiquitous spongy injera flatbread. Teff grains are minute—just 1/150 the size of wheat kernels—giving rise to the grain's name, which comes from teffa, meaning "lost" in Amharic. This nutritious and easy-to-grow type of millet is largely unknown outside of Ethiopia, India and Australia. Today it is getting more attention for its sweet, molasses-like flavor and its versatility; it can be cooked as porridge, added to baked goods, or even made into "teff polenta." Teff grows in three colors: red, brown and white. All are whole-grain, because the kernel is simply too small to mill easily. Health bonus: Teff has over twice the iron of other grains, and three times the calcium.



TRITICALE (*x triticosecale rimpaui*) Triticale (trit-i-kay-lee) is the new kid on the block, a hybrid of durum wheat and rye that's been grown commercially only since about 1970. Rye and wheat have long cross-bred in nature, but the resulting offspring were sterile, until a French scientist, in 1937 discovered how to induce fertility. Triticale was over-hyped as a miracle crop in the 1970s, but initial interest faded when crops were inconsistent and acceptance was slow. Today about 80% of the world's triticale is grown in Europe. It grows easily without commercial fertilizers and pesticides, making it ideal for organic and sustainable farming.



WHEAT (*Triticum aestivum; Triticum turgidum*) Wheat has come to dominate the grains we eat because it contains large amounts of gluten, a stretchy protein that enables bakers to create satisfying risen breads. It's very difficult to make an acceptable risen loaf without at least some wheat mixed in. Two main varieties of wheat are widely eaten. Durum wheat (*Triticum turgidum durum*) is made into pasta, while bread wheat (*Triticum aestivum vulgare*) is used for most other wheat foods. Bread wheat is described as "hard" or "soft" according to its protein content; as "winter" or "spring" according to when its sown; and as "red" or "white" according to color of the kernels. Hard wheat has more protein, including more gluten, and is used for bread, while soft wheat creates "cake flour" with lower protein. Winter and spring wheat differ largely in their growing areas, with northern areas supporting spring wheat and more southerly climates able to plant winter wheat, which is actually planted in the fall and harvested in the spring. Red wheat has more strong-flavored tannins than milder white wheat; in this case the word "white" does not mean that the grain has been refined.

Like the other grains above, wheat can be enjoyed in many different forms other than baked goods and pasta. Bulgur makes excellent side dishes. Wheat berries—whole wheat kernels—can also be cooked as a side dish or breakfast cereal, but must be boiled for about an hour, preferably after soaking overnight. Cracked wheat cooks faster, as the wheat berries have been split open, allowing water to penetrate more quickly. Some stores also sell wheat flakes, with an appearance similar to rolled oats.



WILD RICE (*Zizania spp.*) Wild rice is not technically rice at all, but the seed of an aquatic grass originally grown by indigenous tribes around the Great Lakes. Today some commercial cultivation takes place in California and the Midwest, but much of the crop is still harvested by Native Americans, largely in Minnesota. The strong flavor and high price of wild rice mean that it is most often consumed in a blend with other rices or other grains. Wild rice has twice the protein and fiber of brown rice, but less iron and calcium.

If this overview of the world of whole grains has whetted your appetite, visit our website at www.WholeGrainsCouncil.org where you will find:

- scores of recipes, so you can try cooking with different grains
- sources to buy different grains
- lists of ready-made products made with different grains

Enjoy delicious whole grains at every meal, for better health. Whole grains:

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