

# Durum

This article is about the cultivar of wheat. For the bread and sandwich wrap, see *dürüm*.

**Durum wheat** or **macaroni wheat** (*Triticum durum* or *Triticum turgidum* subsp. *durum*)<sup>[2]</sup> is the only tetraploid species of wheat of commercial importance that is widely cultivated today.<sup>[3]</sup> It was developed by artificial selection of the domesticated emmer wheat strains formerly grown in Central Europe and the Near East around 7000 BC, which developed a naked, free-threshing form.<sup>[4]</sup> Like emmer, durum wheat is awned.

*Durum* in Latin means “hard”, and the species is the hardest of all wheats. Its high protein content, as well as its strength, make durum good for special uses, the most well-known being pasta. Durum wheat is used extensively in breadmaking. However, it is unusual in that, despite very high protein content, it is low in desirable gluten needed to form a glutinous web necessary for bread to rise.

As a result, although 100 percent durum wheat breads do exist (such as pagnotte di Enna or “rimacinato” bread from Sicily, as well as Altamura bread from Apulia and Matera bread from Basilicata) in most instances bread doughs contain only a portion of durum wheat and are supplemented substantially with commercial white flours, often those higher in gluten necessary to offset the poor gluten contribution of durum flour. When durum flour is used as the sole flour in bread, substantial additions of isolated wheat gluten are necessary for rising to occur. Without it, 100 percent durum wheat breads are often heavy, with very close grain, and will split easily when risen for baking.

## 1 Genealogy

Durum wheat is a tetraploid wheat, having 28 chromosomes, unlike hard red winter and hard red spring wheats, which are hexaploid and have 42 chromosomes each.<sup>[5]</sup>

Durum wheat originated through intergeneric hybridization and polyploidization involving two diploid grass species: *T. urartu* ( $2n = 2x = 14$ , AA genome) and a B-genome diploid related to *Aegilops speltoides* ( $2n = 2x = 14$ , SS genome)<sup>[6]</sup> and is thus an allotetraploid species.

## 2 Uses

Commercially produced dry pasta, or pasta secca, is made almost exclusively from durum semolina. Most home made fresh pastas (pasta fresca), such as orecchiette, cavatelli, and malloreddus, also use durum wheat or a combination of soft and hard wheats.

Husked but unground, or coarsely ground, it is used to produce the semolina in the couscous of North Africa and the Levant. It is also used for Levantine dishes such as *tabbula*, *kishk*, *kibba*, *bitfun* and the *bulghur* for pilafs. In North African cuisine and Levantine cuisine, it forms the basis of many soups, gruels, stuffings, puddings and pastries.<sup>[7]</sup> When ground as fine as flour, it is used for making bread. In the Middle East, it is used for flat round breads, and in Europe and elsewhere, it can be used for pizza, *torte*, etc. It is not, however, good for cakes, which are made from soft wheat to ensure softness.<sup>[7]</sup>

The use of wheat to produce pasta was described as early as the 10th century by Ibn Wahshīya of Cairo. The North Africans called the product *itrīya*, from which Italian sources derived the term *tria* (or *aletria* in the case of Spanish sources) during the 15th century.<sup>[7]</sup>

Another type of pasta, *al-fidawsh* (called “dry pasta”), was popular in al-Andalus. From there it was transmitted to Christian Spain, and it frequently appears in Hispano-Muslim cookbooks. From *al-fidawsh* was derived the Spanish word for noodles, *fideos*, and the Italian *fidelli* or *fidellini*.<sup>[7]</sup>

In the American Great Plains, durum wheat is used almost exclusively for making pasta products such as spaghetti and macaroni.<sup>[5]</sup>

## 3 Production

Most of the durum grown today is amber durum, the grains of which are amber-colored and larger than those of other types of wheat. Durum has a yellow endosperm, which gives pasta its color. When durum is milled, the endosperm is ground into a granular product called semolina. Semolina made from durum is used for premium pastas and breads. There is also a red durum, used mostly for livestock feed.

The cultivation of durum generates greater yield than other wheats in areas of low precipitation (3–5 dm). Good yields can be obtained by irrigation, but this is

rarely done. In the first half of the 20th century, the crop was widely grown in Russia.<sup>[8]</sup> Durum is one of the most important food crops in West Asia. Although the variety of the wheat there is diverse, it is not extensively grown there, and thus must be imported.<sup>[9]</sup> West amber durum produced in Canada is used mostly as semolina/pasta, but some is also exported to Italy for bread production.<sup>[10]</sup>

In the Middle East and North Africa, local bread-making accounts for half the consumption of durum. Some flour is even imported. On the other hand, many countries in Europe produce durum in commercially significant quantities.<sup>[11]</sup>

### 3.1 Processing

Durum wheat is subject to four processes: cleaning, tempering, milling and purifying. First, durum wheat is cleaned to remove foreign material and shrunken and broken kernels. Then it is tempered to a moisture content, toughening the seed coat for efficient separation of bran and endosperm. Durum milling is a complex procedure involving repetitive grinding and sieving. Proper purifying results in maximum semolina yield and the least amount of bran powder.<sup>[13]</sup>

To produce bread, durum wheat is ground into flour. The flour is mixed with water to produce dough. The quantities mixed vary, depending on the acidity of the mixture. The dough is mixed with yeast and lukewarm water, and then fermented for hours. The quality of the bread produced depends on the viscoelastic properties of gluten, the protein content and protein composition.<sup>[11]</sup>

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