Wheat and Wheat Products

INTRODUCTION

Cereals are the dried seeds of the cultivated grasses, which belong to the family Gramineae. They include wheat, rye, barley, corn, oats, grain sorghum, and millet. Buckwheat, although not a true cereal, is usually included with them.

The cultivation and use of cereals antedates the recorded history of man. Excavations in early centers of civilization have indicated that one or another of the above cereals were known and used by the people of these cultures. The civilizations of Babylonia, Egypt, Greece, and Rome were founded on the production of wheat, barley, and the millets. The cultures of India, China, and Japan were dependent on the rice crop. The Inca, Maya, and Aztec cultures were based on the growing of corn (maize), which is apparently the only cereal indigenous to the Americas.

The cereals are, in general, the cheapest sources of food energy and can be grown almost anywhere in the world. They give high yields per acre, can be stored for relatively long periods of time, and can be transported cheaply.
In addition to being good sources of energy, the cereals are good sources of protein, the B vitamins, iron, and phosphorus. The protein of cereals is incomplete because it is low in lysine and tryptophan (see Proteins and Nutrition in Chapter 6). This deficiency is easily corrected by the addition of other foods to the diet such as meat, milk, eggs, or vegetable proteins. Cereals are poor sources of vitamins A and C, but these can be obtained from fruits and vegetables.

To a large extent climate determines the cereal species that can be grown in a region. Rice, the principal food of more than half of the world's population, is the basic cereal in the densely populated areas of Asia from India to Japan and the adjacent islands. Rye can be grown in colder climates and is used for breadmaking in the northern European countries. Corn, oats, and barley, which are grown in countries with a temperate climate, are used extensively as animal feeds and to a more limited extent as human food. Sorghum grain is grown in India and Africa. Millets are used as food primarily in eastern and southern Asia, parts of Africa, and parts of the Soviet Union. Wheat is grown in all countries lying in the temperate zone. In the United States, wheat is the most widely used cereal, hence it will be the only cereal discussed in detail in this volume.

CLASSIFICATION OF WHEATS

Wheat belongs to the grass family, Gramineae, and the genus Triticum. The known species and varieties of the genus Triticum are said to number over 30,000. They can be assembled into three groups (races), which are traced from separate original ancestors and which differ in their number of chromosomes, as shown in Table 11.1.

The classification shown in Table 11.1 suggests a possible explanation for differences in the flour from the three wheat groups. Einkorn is used only as an animal feed. Emmer wheats are used for macaroni, spaghetti, and other pasta products, and not for breadmaking. Wheat from the spelt group is used in baked goods and other cereal products. The principal wheats of commerce are T. aestivum and T. compactum, both in the spelt group, and T. durum, in the emmer group.

In addition to their classification into groups based on chromosome number, wheats are classified as hard or soft (referring to milling character) and strong or weak (referring to baking character).

The terms hard and soft wheat relate to the way the endosperm breaks during milling. In hard wheats, the endosperm tends to fracture along the lines of the cell boundaries, whereas in soft wheats the en-