

GRASS

Carl S. Hoveland

Crop & Soil Sciences Dept., Univ. of Georgia, Athens, GA

He causeth the grass to grow for the cattle, and herbs for the service of man, that he may bring forth food out of the earth. Psalms 104:14.

Grasses are the most important plants to human beings. The grass family includes not only pasture grasses for grazing animals but also the most important food crops consumed by man. The most important food crops in the world, either eaten directly or as meat produced from grain, are wheat, corn, rice, and barley. All of these crops are grasses. In addition, there are other grasses of great importance for food production such as sorghum, oats, rye, and millets. It is estimated that cereal grasses make up 72% of worldwide food production for human and animal consumption. Some of these grasses are also used for grazing by livestock as well as for grain production.

What is a grass?

If such different-looking plants as corn, rice, wheat, bermudagrass, and tall fescue are all grasses, what is it that characterizes a grass? The structure of all these plants is similar and differs greatly from cotton, soybean, alfalfa, clover, and peanut. All grasses have stems with solid joints and two-ranked leaves, one at each joint. The leaves consist of two parts, the sheath, which fits around the stem like a tube, and the blade which is long and narrow. Leaf blades have veins that are parallel and not branched as in most other plants. No other plant family has just this structure.

The seed heads of grasses are distinctive. The tiny flowers are borne on small branches, often crowded together, always two-ranked like the leaves. Being wind-pollinated, grass flowers have no bright colors, no fragrance, no honey to attract insects. Flowers are simple, having only the necessary parts needed for reproduction and seed development. Seed size varies greatly from the large kernels of corn to tiny crabgrass seed. Grasses may be annuals such as rye, crabgrass, rice, and wheat, or perennials such as bahiagrass, bamboo, and orchardgrass. Some grasses such as crabgrass and bermudagrass have stolons (above ground runners), while rhizomes (underground creeping stems) are found on bermudagrass and Kentucky bluegrass.

Origin and use of cereal grasses

All of our cereal grasses originate from wild plants that have been selected over the centuries as they were domesticated by man. Wild ancestors of grasses such as wheat and barley were adapted to strongly seasonal climates with long dry seasons. Unfortunately, they had uneven ripening so that repeated hand harvests would be needed to collect the seed. In addition, seed shattering was a problem. Harvesters of seed from wild plants likely selected seed from individual plants which matured more uniformly, had less shattering, and were larger, thus when the seed were planted by primitive farmers there was continued improvement for these characteristics. Over time, these grasses produced more grain and were more easily harvested, but

were less able to survive and reproduce without the aid of man. Thus, one might say that these early farmers were our first plant breeders.

Wheat and barley were domesticated in the eastern Mediterranean region, rice in southeast Asia, corn in southern Mexico, sorghum and millet in sub-Saharan Africa. Today, wheat is more widely utilized than any other cereal but probably more people consume rice as their primary food crop, mainly in China and southeast Asia. Corn is a major part of people's diet only in certain areas of Central America, South America, and southern Africa. Corn is mainly used for animal feed in much of the world.

Forage grasses

Grasses have a wider range than any other plant family, enduring both cold and torrid desert conditions. They tolerate greater extremes in temperature and rainfall than trees. With the wide range of grass species, they have adapted to all sorts of environments. Mostly low in stature and relatively inconspicuous, grasses attract but little attention - but they are the meek that inherit the earth.

Common forage grasses of the southeastern USA such as bermudagrass, bahiagrass, and tall fescue survive under conditions of acid soils and low fertility, overgrazing, trampling, drought, excess water, and pests. They provide forage for cattle, protection from soil erosion, watershed collection areas, and landscape beautification. They often must tolerate severe mismanagement but have the potential to be highly productive with better management.

Grasses are truly the staff of life, whether it is from direct consumption of cereal grains or animal products produced from cereal grains or forage grasses. Successful feeding of growing human populations in the future will be dependent on how well we manage our cereal and forage grass crops.