Modified Stems

Although most stems grow erect, there are some modifications that serve special purposes, including that of natural vegetative propagation. In fact, the widespread artificial vegetative propagation of plants, both commercial and private, frequently involves the cutting of modified stems into segments, which are then planted and produce new plants. As you become acquainted with the following modified stems, keep in mind that stems have leaves at nodes, with internodes between the nodes, and buds in the axils of the leaves, while roots have no leaves, nodes, or axillary buds.

**Bulbs.** Onions, lilies, and tulips have swollen underground stems that are really large buds with adventitious roots at the base (figure 38.28a). Most of a bulb consists of fleshy leaves attached to a small, knoblike stem. In onions, the fleshy leaves are surrounded by papery, scalelike leaf bases of the long, green aboveground leaves.

**Corms.** Crocuses, gladioluses, and other popular garden plants produce corms that superficially resemble bulbs. Cutting a corm in half, however, reveals no fleshy leaves. Instead, almost all of a corm consists of stem, with a few papery, brown nonfunctional leaves on the outside, and adventitious roots below.

**Rhizomes.** Perennial grasses, ferns, irises, and many other plants produce rhizomes, which typically are horizontal stems that grow underground, often close to the surface (figure 38.28b). Each node has an inconspicuous scalelike leaf with an axillary bud; much larger photosynthetic leaves may be produced at the rhizome tip. Adventitious roots are produced throughout the length of the rhizome, mainly on the lower surface.

**Runners and stolons.** Strawberry plants produce horizontal stems with long internodes, which, unlike rhizomes, usually grow along the surface of the ground. Several runners may radiate out from a single plant (figure 38.28c). Some botanists use the term stolon synonymously with runner; others reserve the term stolon for a stem with long internodes that grows underground, as seen in Irish (white) potato plants. An Irish potato itself, however, is another type of modified stem—a tuber.

**Tubers.** In Irish potato plants, carbohydrates may accumulate at the tips of stolons, which swell, becoming tubers; the stolons die after the tubers mature (figure 38.28d). The “eyes” of a potato are axillary buds formed in the axils of scalelike leaves. The scalelike leaves, which are present when the potato is starting to form, soon drop off; the tiny ridge adjacent to each “eye” of a mature potato is a leaf scar.

**Tendrils.** Many climbing plants, such as grapes and Boston ivy, produce modified stems known as tendrils, which twine around supports and aid in climbing (figure 38.28e). Some tendrils, such as those of peas and pumpkins, are actually modified leaves or leaflets.

**Cladophylls.** Cacti and several other plants produce flattened, photosynthetic stems called cladophylls that resemble leaves (figure 38.28f). In cacti, the real leaves are modified as spines.

Some plants possess modified stems that serve special purposes including food storage, support, or vegetative propagation.