Figure 6.27 Pollen grains enlarged approximately 1900×

Pollination

In most plants, internal fertilization is achieved through a process called pollination. **Pollination** is the transfer of male gametes in structures called **pollen** (Figure 6.27) from the male reproductive part of a plant to the female reproductive part of a plant. Pollen grains carry the sperm cells in a protective case to the **ovules**, which are the female plant structures that contain the egg cells. Figure 6.28 shows the main reproductive structures of a flowering plant. The reproductive organ of the male is the stamen. The reproductive organ of the female is the pistil.

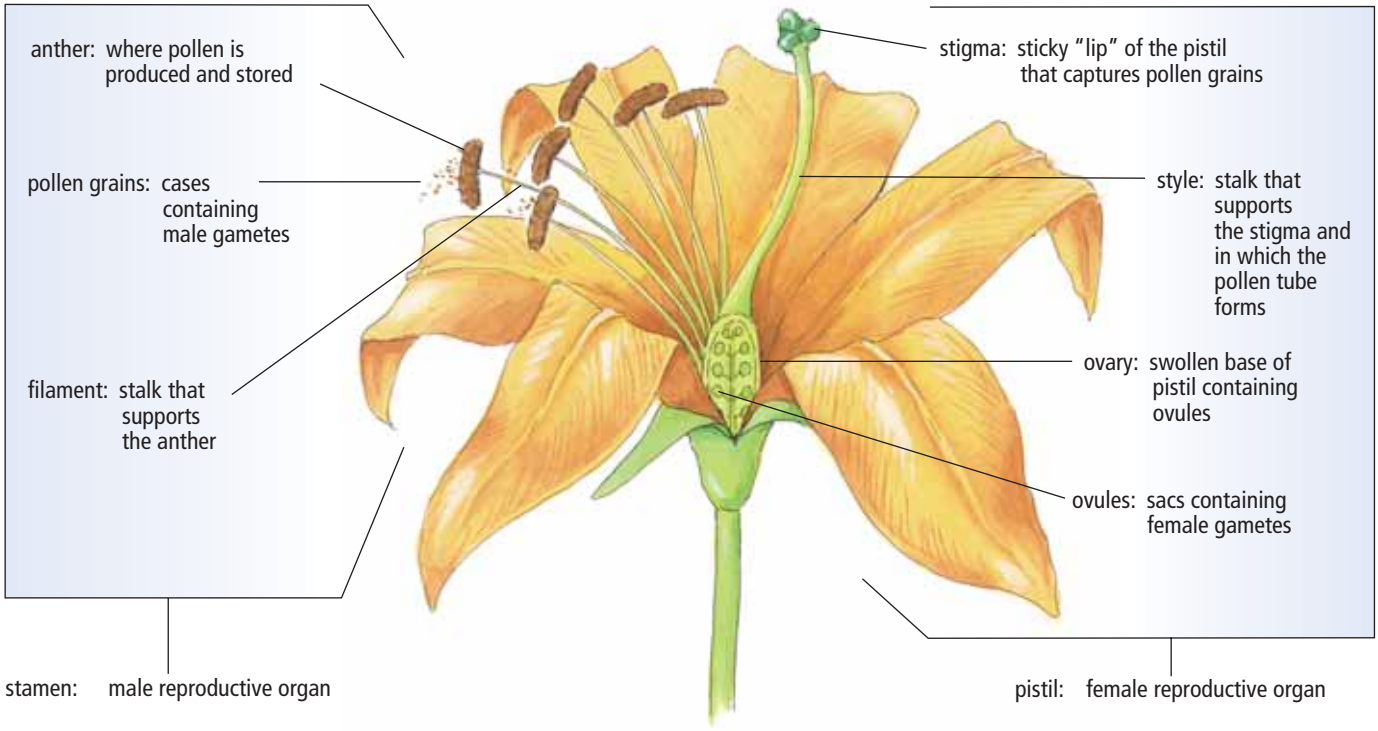

Figure 6.28 The reproductive structures of a flowering plant

After the pollen lands on the female part of the plant, a **pollen tube** forms, which is a structure that delivers the sperm cells to the egg cells (Figure 6.29 on the next page). Following fertilization, a zygote grows into an embryo and is nourished by food stored within the seed in which the embryo grows. The seed's tough outer coating protects the developing embryo.

Figure 6.29 The pollen tube of a winter jasmine flower

Colourful flowers can attract bees and other insects that feed on plant sugars (nectar) and pollen. Bees collect pollen and nectar to feed themselves and their young. Special hairs on their hind legs and abdomen allow them to collect large amounts of pollen in pollen baskets. Since bees visit many flowers before returning to their hives or nests, they often transfer pollen between flowers of the same species (Figure 6.30). This is why bees are called pollinators. Other animals, such as fruit bats, can also pollinate flowers when they drink the nectar and eat the pollen of particular flowers. Bats are less attracted by the colour of the flowers, since they visit plants at night. Some researchers think that certain flowers visited by nectar-sipping bats may offer extra calcium, which would be helpful to female bats who are still feeding their young.

Figure 6.30 A honeybee gathers pollen from a blanket flower.

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Bees are attracted to flowers not only for their pollen and nectar. Bees can increase their body temperature by seeking out certain flowers that generate heat energy. To find out more about this relationship, go to **www.bcscience9.ca.**

Pollen transport

Some flowering plants such as willow, hazelnut, and aspens have flowers that do not have petals. Plants like these release their pollen into the air so that the wind can carry the pollen to the female reproductive parts of other flowers (Figure 6.31).

Genetic variation in flowering plants is maintained because seeds are often enclosed in a fruit that can be transported away from the parent plant by animals who eat the fruit. Since many seeds have a tough outer coat, they are often not digested by animals. As a result, the embryo may survive, grow, and reproduce away from the parent.

Figure 6.31 A willow tree releases pollen into the air.

Figure 6.32 The female cones of a Douglas fir tree. Pollen is released from the male cones.

Plants such as Douglas fir trees do not have flowers. Instead, sperm and egg cells are produced in male and female cones (Figure 6.32). Such cone-bearing plants are called conifers. Pollen is released from the male cones and is carried by the wind to the female cones. The embryo is protected within seeds in the female cone and completes its development there. The winged seeds that are eventually released are often transported by birds and small animals to new locations.

Since genes are reshuffled in meiosis during the production of egg and sperm cells, new Douglas fir trees may be resistant to disease or insect infestation. As a result, trees that survive with these favourable characteristics can pass them on to their offspring.