

Buzz Pollination

by Sue Rosenthal on June 11, 2008

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Bumblebees and other native bees were long ignored by farmers because they produce little or no honey and don't form large, portable colonies like honeybees do.

But the true importance of bees is their ability to pollinate plants, that is, to perform the essential task of transferring pollen from plants' male to female reproductive organs, starting the process of fruit and seed formation. Bumblebees are now being heralded as important crop pollinators, especially in these times of declining honeybee populations. And bumblebees are especially effective pollinators because they, as well as some other native bees, can employ a method not practiced by honeybees, called "sonication" or "buzz pollination."

Buzz pollination can be useful for releasing or collecting pollen from many types of flowers, but it is essential for some, including tomatoes, blueberries, and our native manzanitas. The anthers (male reproductive organs) of these flowers have only small pores through which pollen is released, like the holes in a pepper shaker. Sometimes wind or visits from insects can inadvertently shake out some pollen, but the amounts are small. Also, many of these flowers do not produce nectar, so honeybees ignore them anyway.

Bumblebees, by contrast, actively collect and eat not just nectar but also protein-rich pollen. And a bumblebee can cause a flower to discharge a visible cloud of pollen through buzz pollination. The bumblebee grasps the flower with its legs or mouthparts and vibrates its flight muscles very rapidly without moving its wings. This vibration shakes electrostatically charged pollen out of the anthers, and the pollen is attracted to the bumblebee's oppositely charged body hairs. The bumblebee later grooms the pollen from its body into pollen-carrying structures on its back legs for transport to its nest.

Sometimes bumblebees employ buzz pollination on flowers that don't require it, for example, California poppies. This may release the already accessible pollen more quickly and efficiently. They also use the energy of buzz pollination for other purposes, for example, compacting soil in their underground burrows (bumblebees don't build hives like honeybees) or moving a pebble or other obstacle.

Honeybees cannot perform buzz pollination (so far, only a few kinds of bees are known to do it), and therefore they cannot pollinate some important crops and wild plants. In fact, commercially-grown greenhouse tomatoes were traditionally pollinated by handheld electric vibrators with names like "Electric Bee" or "Pollinator II."

Although discovered relatively recently, buzz pollination is no secret. Buzz-pollinating bumblebees make a distinctive, middle-C buzz, which is noticeably higher pitched than the buzz of flight. No special equipment is needed to hear the sound of buzz pollination, just listen for a distinctive middle-C "raspberry" next time you find a plant buzzing with bumblebees.