THE IMPORTANCE OF BEES

(1) Do you like apples, strawberries, oranges, tomatoes and cucumbers? We don't often think about where our food comes from because most of us first see our food when it is in a supermarket or when it is placed in front of us at a meal. However, before it arrives at a supermarket, your food was first grown on a farm. Besides thanking the farmer for this feast, you also need to thank the beekeepers and the honeybees that make global food production possible.

(2) You might have heard that bees are pollinators, but do you know what this really means and how essential pollination is for producing food? To truly understand how pollination leads to the production of food, we first have to examine the flower, which is the reproductive structure of a plant.

(3) Most plants are like us, they contain male and female reproductive organs. In a flower, the male reproductive organ is called a stamen and it produces the yellow powdery pollen that is the sperm of the plant. The female reproductive organ is at the base of the flower and is called the pistil. The pistil contains an ovary that surrounds the eggs of the plant. The pistil has a structure at the top called a stigma and which is covered in a sticky liquid. This liquid captures any pollen that lands on top of it. When the pollen lands, the pollen proceeds to tunnel downwards through the stigma until it reaches the ovary where the pollen finds and fertilizes the eggs. When this happens, the fertilized eggs turn into the seeds of the fruit and the tissues of the ovary begin to transform, grow and develop into the flesh of the fruit. The petals of the flower shrivel and fall off and at the end of this process you have a fruit instead of a flower!

(4) The transfer of pollen to the stigma is called pollination, and without pollination, a fruit will never be created. Some plants depend on the wind to blow the pollen onto the stigma, but over 90% of plants require an animal to transfer the pollen for it. The flower provides a reward for this service in the form of sweet energy packed nectar and protein rich pollen. When insects and birds try to collect the nectar and pollen, the pollen ends up coating their bodies. This pollen is transported and

transferred to the stigmas of many flowers as the animal goes from flower to flower collecting the nectar and pollen for food. We call animals that do this pollinators.

(5) Of all the pollinators, the honeybee is the most efficient and effective at pollination. Its body has evolved over millions of years to become a pollen collecting machine. It has tiny hairs all over its body to trap the pollen. It also has specialized flaps on its hind legs which act as baskets to collect pollen and carry it back to the hive to feed the growing bee larvae. There are other bees, like the carpenter bee and bumblebee, that can provide natural pollination, but for many reasons, they aren't as easy for beekeepers to raise and manage. Honeybees, unlike wasps, are rarely aggressive and only sting if their hive is in danger. Bee keepers care for and maintain hundreds of millions of honeybees so that they can be used as pollinators for crops. Without beekeepers and honeybees, there wouldn't be enough pollinators to pollinate the amount of crops needed for global food production.

(6) An excellent example of the importance of honeybees is provided by apple orchards. In nature, most bees die in the winter but the queen bee survives and hibernates. In early spring, the queen bee emerges from hibernation and begins to make offspring to populate her hive. When summer reaches its peak, so will the bee population in each hive, around 80 000 bees, but by then it will be too late to pollinate the apple flowers. Apple flowers bloom in spring when honeybee numbers are just beginning to grow. At this

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point there aren't enough bees to pollinate the early blooming crops that flower in spring. Beekeepers are vital because they care for bees, so that when the spring blossom season comes, there are enough honeybees to pollinate all of the crops that need them.

(7) Besides helping us create crops for human food consumption, honeybees are also needed to pollinate crops that we feed to our livestock. Most livestock are herbivores so they must eat plants. Many of these plants could not be grown in large enough quantities without honeybees. Pollination is an example of an ecosystem service. An ecosystem service is any direct or indirect service provided by nature that contributes to human well-being and survival. For example, micro-organisms provide decomposition services, and geological processes provide soil formation and nutrient cycling services. We don't fully appreciate the value and necessity of these ecological services to our existence, and this lack of appreciation often leads us to damage these services.

(8) Beyond aiding humans, bees are also essential for natural ecosystems. Plants depend on bees to help them reproduce, and the fruit produced through pollination is consumed by a large number of animals other than humans.

Article Questions

1) What is a flower?

2) The male reproductive organ of a flower is called the _____ and the female reproductive organ of a flower is called the _____. Another term for plant sperm is _____ and it attaches to the sticky liquid on the _____ of the pistil to achieve pollination. _____% of plants require animals to transfer pollen for them.

3) Describe three things that happen when the sperm fertilizes the eggs in the flower, to turn the flower into a fruit.

4) How do flowers attract pollinators?

5) What characteristics of the honeybee make it such a great pollinator of our crops?

6) Why are natural bee populations inadequate at pollinating our crops?

7) What is an ecosystem service? Provide three examples.