We need bees!

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Looked at on a world wide basis, bees are having a hard time. Normally bees do not all survive the winter, but recently over 60% of hives have suddenly become empty except for the queen and a few drones (male bees) and the bees have not returned. No one knows why this is happening.

About a third of all the food we eat is pollinated by bees as well as some animal food such as alfalfa and beans. Put bluntly, the survival of many humans is dependent on the survival of bees.

Why are the bees dying?

There are plenty of possibilities. Rachel Carson's book *Silent Spring* (published in 1962) was written in response to the death toll in birds and insects due to excessive use of DDT and other chemicals before DDT was banned. In this book, she described a series of events that might be called a circuit of death. Farmers may use pesticides, herbicides or insecticides to improve their crops. The sale of these chemicals enables the makers to fund research fellowships for people to research and develop a new form of chemical so that when a pest has become resistant to one form of chemical, there is another to follow on. This began after the First World War when arsenic was used as a pesticide and almost wiped out beekeeping. It is quite possible that two pesticides may operate together and can potentiate one another rather as the HIV virus in humans can potentiate other infections.

Bees may be attacked by fungi, particularly if there is a late spring and the bees are densely held together in the hive for longer than usual. In these circumstances, a breed of bees that originated in Northern Europe is likely to winter better than bees that originated in Italy. At least three different sorts of mites can attack bees. The best known is varroa but there are also mites that attack the bee's wind pipe and others that cause diarrhoea. With the history of insecticides, many keepers have tried to kill the mites, but some keepers took a different view. They put varroa infected bees on an island and waited to see what would happen. In the first few years there was a considerable loss of hives but gradually-the bees followed Darwin's idea of "Survival of the fittest" and within six years there was no excessive mortality.

When the genetic structure of bees is studied, it is clear that bees have fewer genes devoted to the healing of infections than other insects. However, bees can adapt to the presence of some infection just as we tolerate bacteria in our intestines.

Ace navigators.

Bees are fantastic navigators. Normally they can fly two miles from their hive and return safely. If there are two hives placed close together, the bees return to their own hive. Even in the dark conditions of a hive, a bee can inform her colleagues of the time it takes to fly to a good source of nectar and the direction in which to fly, relative to the position of the sun. If the hive is moved a few miles overnight (bees have an inbuilt twenty four hour clock just as we do), then the bees will re-draw their mental map of the surroundings and learn to forage and return to their hive in its new position.

However if the temperature in the hive falls below the ideal of 35 degrees, centigrade, while the eggs laid by the queen are changing into larvae and then into immature bees, the navigation system of the developing bees may go adrift. The bees that are most likely to keep the hive warm are young bees with a good genetic diversity. In the normal state of affairs, a young queen will fly high and emit pheromones that attract drones from maybe a mile away. She will mate with

maybe ten or more drones and mix their sperm so this should yield genetic diversity.
Commercial beekeepers work in a different manner. They replace their queens every year or two to maintain good egg production. They buy their new queens from breeders who derive these queens from relatively few specialised breeder queens. In 1993, a DNA study in America revealed that a mere 308 of the initial breeding queens produced half a million new queens for sale. This creates the possibility for a massive reduction in genetic diversity.

Some breeders may try to produce relatively docile bees that are good at gathering honey. The trouble with this selective breeding is that attempting to produce one particular characteristic may accidentally breed out another, such as resistance to disease.

Solutions.

Those are some of the problems that bees face, and the solutions are scarcely on the drawing board. First, we need to remember our attitude to insects in general. As children we remember seeing fly paper covered with house flies. Nowadays house flies are a rarity. Twenty years ago we would walk in woodlands in the spring and see trees dripping with caterpillars. Now we may see three or four hanging on their silken threads. When we drove to Scotland, the windscreen and headlamps would be covered with dead insects when we arrived. Not now. When we walked in the heather, a cloud of crane flies would rise up and we would see dozens of meadow pipits. Not now. This is probably due to the organo-phosphorus sheep dip that sheep carry on to the heather when they lie down after dipping.

If we want bees we shall probably need to re-consider our attitude to insects. We shall need to live with them rather than simply spraying insecticides. The Government is giving some money for research into insect pollinators-not just bees. Many flies, wasps and moths play a part in pollinating our plants and trees. The populations of these insects have fallen in recent years and this is reflected in falling bird populations for the youngsters need caterpillars and grubs to feed on and in many parts of the country there isn't enough food. In farming areas, chemicals are often used except for the headlands that enlightened farmers leave unsprayed. In gardens, many people spray with chemicals against greenfly. This is not really necessary as there will soon be plenty of wasps and hoverflies about and they gobble up greenfly.

We have not used sprays for 41 years and this spring we have seen hundreds of bumble bees before the queens have hatched more than their first brood. The queen is the only one who overwinters and she finds her nest site, builds the cells, lays her first eggs, forages, broods on the eggs to keep them warm and feeds the larvae all on her own. When the larvae develop into bumble bees they will help her. A successful colony could number 100 bees. That is not many compared to a colony of honey bees, but bumble bees can tolerate lower temperatures. Many are out earlier in the spring than honey bees and are at work earlier in the morning and later in the evening. Also known as humble bees, they rarely sting!

Our present minister of farming, Lord Rooker foresees an absence of honey bees within the U.K. within a decade unless we find a solution to the dying colonies. Possibly part of the solution may lie in places like our garden or churchyards where suitable flowers have been planted.

Sources: Roy Cropley, beekeeper.
Silent Spring by Rachel Carson and *A world without bees* by Alison Benjamin and Brian MC.Callum. They are amateur beekeepers who have a hive in Battersea. They have travelled widely and talked to many professional beekeepers. Alison is a journalist and together they have written a very thoughtful book.