

## Nature Notes, November 2022

### How do honey bees survive our Saskatchewan Winters?

By Heather Brenneman

As an urban beekeeper, I am often asked this question at this time of year. Honey bees (*Apis mellifera*) are not native to the Americas but originated in Africa and were eventually brought here by European settlers. They do not hibernate. So how do they survive our cold winters with temperatures reaching the  $-40^{\circ}\text{C}$ ? The short answer: the bees' own strategies are augmented by a little help from their beekeeper friends.

Bees make honey from flower nectar and store it in honey comb in the hive. These stores are meant to ensure the survival of the queen bee and the hive throughout the year. As days shorten and cool, flowers wither and nectar is no longer available. Bees respond to this by reducing their numbers so there are fewer to feed.

Most of the bees in a hive are worker bees, all females. There are a smaller number of drones, male bees, whose reproductive services will not be needed during winter. Drones are forced out of the hive by worker bees. When beekeepers see this happening, they know that fall is just around the corner.

The size of the hive is also reduced when forager bees, who repeatedly fly up to five kilometers from the hive to retrieve nectar, pollen and water, die of exhaustion and are not replaced. This is because the queen bee stops laying eggs in response to the drop in temperatures. The six-week life span of summer bees is extended to five months or more for bees who winter over because they do not do the exhausting work of foraging.

When beekeepers harvest honey in mid to late summer, they are careful to leave enough honey for the bees to eat during the fall. They also feed the bees a thick sugar syrup which the bees use to fill up and replenish their stores throughout the fall to ensure they have enough food for winter. The syrup is delivered through special pails or trays placed on top of the hives. It is easier for bees to digest "honey" made from sugar syrup than from nectar in cold temperatures.



**Two honey bee hives wrapped for winter. Both the bottom and top entrances are open to allow bees outdoor access on warm winter days and to promote ventilation.** Photo by Heather Brenneman

Beekeepers also administer treatments to each hive to reduce the chance of disease (e.g., foul brood) and pests (e.g., mites) from weakening or killing the hive.

The main job of the bees during winter is to keep the queen bee alive by making sure she is safe and warm. As nighttime temperatures drop towards freezing, the bees form a cluster around the queen. They huddle together and shiver and flutter their wings. This motion keeps the temperature inside the cluster near  $+30^{\circ}\text{C}$ . The cluster moves around the hive to feed.

However, in very cold temperatures this would not be enough to keep the hive alive. To help the cluster stay warm, beekeepers wrap their hives with insulation. We use five-centimetre rigid foam encased in painted particle board and place a pillow in an empty hive box on top.

On sunny, warm winter days, small numbers of bees leave the hive in cleansing flights (to defecate). You may see them flying or, if they are overcome with cold, lying dead on top of the snow. They also remove dead bees from the hive. These are usually the old foragers who die naturally. When the snow melts, a small pile of dead bees can be found outside the hive entrance.

When spring temperatures warm to about  $+10^{\circ}\text{C}$ , the hives are unwrapped, and another beekeeping season begins.

*Heather Brenneman, a member of the Saskatoon Nature Society, manages two hives in her Saskatoon back yard with her neighbour Ken Glover.*