Honey bees, hives need TLC to help them survive Wyoming winter, early spring

Winter is a hazardous time for most insects. Most species in Wyoming use the "freeze tolerance" strategy to survive freezing temperatures – fluids in their tissues change chemically to prevent ice crystals from forming in vital organs.

Freeze-tolerant insect bodies can reach temperatures well below 32 degrees Fahrenheit (F) and may appear dead if you can find them; however, these dormant insects can revive and will resume activity when temperatures eventually warm to above freezing.

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Honey bee hive wrapped with insulation.

The developmental growth stage of insects that this "winterizing" occurs at depends on species. Some insect species produce freeze-tolerant eggs, such as floodwater mosquitoes. Other species like the mountain pine beetle spend the winter as larvae in cold but protected places. Some species spend the winter as adults, like mourning cloak butterflies that appear like magic during warm spells in March.

Winter survival

Honey bees spend the winter season as part of a colony, in contrast to most insects living in temperate climate zones. Acting together, honey bees survive the winter more like a warm blooded animal than a typical insect. A honey bee colony's survival depends on having a large population of the winter worker bee caste, which are members of the

Winter care

For more information on caring for bees during winter, please see https://bit.ly/winter-bee-care.

Helping honey bees survive winter adversity

If you are a beekeeper, you probably were aware of how honey bees survive winter and prepared your bee colonies by:

1. Ensuring your colonies had adequate honey stores or supplementing them with food.
2. Ensuring all colonies are populous enough to form a large cluster to be better able to survive severe cold spells; this can require combining weak colonies.
3. Monitoring for bee diseases and parasites and treating them, if warranted.
4. Locating your hive(s) for the winter in a quiet and wind protected area.
5. Wrapping the hives to prevent cold air drafts and reducing the lower hive entrance to exclude mice.
6. Providing a hive top entrance to allow ventilation of excess moisture vapor and carbon dioxide generated by the bees.

colony that perform all the work, along with enough honey to sustain them, the queen, and the new spring generation of worker bees all through the cold months.

The winter worker caste is produced at the end of summer and differs from the summer worker bees by having significantly more "fat body" tissue in their abdomens. The enlarged fat body provides winter worker bees with energy and vital nutrient reserves. These stored nutrients enable the winter workers to provide the spring generation brood with the correct nutrition they need before flowers are available to the colony. By eating stored honey, the winter bee caste can provide enough body heat collectively to maintain the queen bee and eventually the new brood at a temperature well above freezing.

Winter worker bees will cluster around the queen when the ambient air temperature cools in the fall. As the air temperature continues to drop, winter bees tighten the cluster with the outermost bees packing together to act as insulation and conserving their body heat. Although insects are "cold-blooded," honey bees generate heat when they work their muscles, just like humans. Honey bees can survive a wider range of body temperatures than humans.

The temperature of the outermost bees of a winter cluster may go down to 50 F. Any colder than that and they go into a "chill coma" and cannot restart working their muscles to get warm again without an application of heat. Conversely, when needed, some winter bees inside the cluster can act as "heater bees" and shiver all of the muscles in their body to raise its temperature to 115 F. These "heater bees" will occupy an empty brood cell and heat up the surrounding cells containing the brood.

In late fall and early winter, when no brood is present, the queen and the core of the cluster are kept in the low 80s F range. In late winter, when the queen starts producing eggs again, the temperature of the interior of the cluster is increased to 94 to 95 F for her and the new brood. This resource is an excellent read for more information on this fascinating subject, https://bit.ly/honeybee-heat.

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Honey bees are searching for all food sources in the early spring. These workers are checking out the coffee grounds tossed on a tulip patch. Honey bees will also visit bird feeders and farm animal mangers where they will gather the small particles of cracked grain and seeds.

Spring beekeeping

As calendar spring approaches, beekeepers need to decide when to do the spring inspection of hives based on weather conditions. Wyoming's March and April weather can be balmy one day and a raging blizzard the next. The first check should be done on a warm March day. This inspection is often referred to as the alive/dead check. It is recommended to not open the hive at this time if the honey bees are alive. If the air temperature is above 55 F on the day you check, some bees will be flying to eliminate accumulated body waste away from the hive. Other bees will be clustered around the hive entrances. You can open the hive and do a full inspection later in the spring when the weather is consistently warmer.

The weight of hive(s) should be gauged at this first check. The bees may have used up their stored food if the winter has been very cold. If the hives are light, you will need to feed the bees until plant nectar flows get going in the spring.

The "light" hives can be fed a 1:1 sugar syrup solution to keep them from starving. Use an in-hive method to feed a starving colony in the spring. Low air temperatures can prevent the worker bees from flying even a short distance to a barrel feeder. The major bloom of dandelions is a good plant indicator that supplemental feed is no longer needed for your bees.

Dandelions may be the bane of groundskeepers, but they are a favorite early-season source of pollen and nectar for honey bees. This is a long-term relationship as both of the species are European in origin. Willow trees and shrub catkins are another good and early appearing source of pollen for honey bees.

If there are no sounds or signs of life at this first check, the hive can be opened to try and determine the cause of the loss. Starvation, accumulations of moisture, outbreaks of dysentery, and varroa mite infestation are common causes of winter colony loss.

Leave winter wraps on your hive(s) until the overnight lows are consistently above freezing and the extended weather forecast is good. Removing winter wraps too early will have the bees expend a lot more energy and eat more food to keep the brood and the queen the required temperature to produce the spring generation of worker bees.

As mentioned earlier, do not open the hive while the colony is still clustering around the queen. Wait until daytime temperatures are consistently above 59 F and early floral resources are abundant for the bees. The honey bees will be able to provide for themselves once nectar and pollen sources are abundant in the spring. You can give your hive(s) a spring cleaning as there will be fewer worker bees in the hives and it is a good time to cull frames.

If you think University of Wyoming Extension entomologist **Scott Schell** has some fascinating insights into bees, wait until you read more intriguing insect information in his stories this year. He can be reached at (307) 766-2508 or at sschell@uwyo.edu.