

If bees can survive winter in the wild, why do so many beekeepers have trouble wintering their bees?

When considered together with the mess and additional work it produces, the cost of rearing or buying replacement bees, and loss of crop income, winter loss can easily be the largest expense of the year for a beekeeper.

If you never lose over 10% of your colonies over winter, and your surviving hives are always strong every spring, you can skip this article. It is not for you. If you don't experience any winter in your region, with snow, cold weather, absence of honey flows and long confinement periods for the bees, this might not interest you either. For the rest of us, improving wintering success offers the largest, and possibly easiest, opportunity for significantly increasing our profit and enjoyment from beekeeping.

Almost everywhere in North America -- from the Mexican border on the south, to the Arctic Circle in the north, honey bees have demonstrated that -- barring serious mite problems -- they can winter on their own with good success.

Before tracheal and varroa mites became a problem, bees commonly survived for many years in trees, in walls, under floors, and in the many other cavities they choose to occupy when they escape from managed apiaries and go wild. Even now -- in spite of mites -- managed bees often escape and make on their own it through a winter or more in many parts of the country.

In managed hives, however, beekeepers often have bad luck when keeping bees over winter. Many suffer heavy losses, even when they devote time, money and effort to the task, and even when they follow the advice of experts. Anywhere bees can be kept profitably, bee wintering successes approaching one hundred percent, and nearly total failures can often be found within a few miles of one another.

If bees can survive winter in the wild, and some beekeepers in nearly any region consistently winter their bees without much fuss or loss, why do so many other beekeepers have trouble wintering bees? What explains the successes? What causes the failures?

There is seldom one simple answer to these questions. Many unrelated things must go right for wintering bees to live and thrive, but if only one vital factor goes wrong -- *even for a short while* -- a colony or an entire apiary may be killed -- or permanently damaged. If this happens at *any* point during the winter, hives will be discovered dead or seriously weakened in the spring inspections. Such losses may occur quickly, in a matter of minutes or hours, or slowly over weeks and months, depending on the nature of the stress.

Bees can be wintered either indoors or outdoors, and either method can work very well, or fail miserably. In either approach, the basic preparations are similar. The main differences are that when bees are stored indoors the environment is the responsibility of the beekeeper, and that the bees must be kept in complete darkness until they are taken out and set down in spring. Thus, indoors, they normally have no flight opportunities all winter. Otherwise, there is not a lot of difference.

An interesting compromise, one that provides the best features of both indoor and outdoor wintering, is the use of an European-style bee house. Bee houses can be either quite large and elaborate, or small and simple, but they can combine a controlled temperature environment -- the major advantage of indoor wintering -- with flight holes

that can be opened on nice days to allow bees to fly for cleansing or to exploit early spring pollen and nectar sources.

For every hive death, whether in summer or winter, there is always a reason, or a combination of reasons. However, identifying *all* the causes of abnormal hive losses over winter, or weak hives in spring is not always simple or easy. Often, by the time that the beekeeper arrives to do a post mortem, weeks or months have passed. As often as not, multiple factors are involved. Conditions in a beehive range drastically during fall, winter and early spring. Many inter-related factors come into play over a long winter, and many lethal transient and one-time conditions or events may not leave obvious clues behind.

Finding the real causes behind weak or dead colonies is the key to preventing similar losses in the future. Human nature being what it is, there is always a currently accepted scapegoat at the ready to explain away abnormally high colony deaths. Many of us are happy to accept any convenient answer, but accepting the handiest explanation may delay learning the real causes, and lead to more failures. Careful study and perhaps some experimentation, or a visit to a successful neighbour may be necessary to break out of a losing pattern.

These days, mites are the first to be blamed whenever things go wrong. To be sure, mites can cause big problems with wintering; bees that are heavily parasitized, either by varroa externally and in the brood, or tracheal mites internally, are not going to be in prime condition to winter well, no matter how many other things we get right.

If bees are also suffering from the virus conditions that often accompany mite infestations, they are even less likely to winter well, but mite management – like disease control, nutrition, breeding, and population management -- is a separate topic, and mite management problems are only a small -- albeit important -- part of the wintering puzzle. For the most part – assuming mites are well controlled, and that the treatments are correctly applied so that the bees are not damaged or poisoned by the 'cure' -- mites should not be a very large factor, one way or the other.

Optimal wintering requires strong hives with lots of young, healthy, well-managed, well-fed bees. That doesn't mean that less ideal hives aren't worth a try, but it means that colony losses will be greater – possibly much greater. Where bees go into winter in bad shape, any survivors can be expected to come out in bad shape too. Garbage in, garbage out.

If the hives to be wintered are heavily mite infested, riddled with AFB, malnourished, have been crowded or starved recently, are recovering from a pesticide kill or badly administered mite treatments, have a queen that is failing or inferior, have small populations of old or worn-out bees, been allowed to plug up with honey before fall, or are otherwise in less than great shape, the odds are already stacked against them for their winter ordeal. If several of these factors apply, the odds are even worse.

At some point any beekeeper who plans to winter – or produce honey -- must get the bees into top condition and thereafter make it a priority to keep them in that state at all times. The best time to start is right now. It takes months – sometimes many months -- for bees to get into good condition after being run-down, and bees don't usually recover well late in the year, nor do they improve over winter. If getting them into shape means medicating, treating, feeding or giving pollen supplement, re-queening, combining, moving to a better location, giving up a pollination job – or whatever, do it now.

When beekeepers estimate winter loss, the number of hives that are completely dead by certain date, are usually counted up and declared as the loss. Sometimes the weakest colonies -- those with only a handful of bees -- are included in the dead count. This loss is undeniably the most obvious part of the problem, but loss of entire colonies is usually only half the picture. We must also consider the condition of the bees in the surviving colonies. In these survivors are the bees that must carry on to produce more bees to fill the empty hives, make the crop, and go into winter the next year. Will they be up to the task?

After a heavy loss of colonies, surviving hives are often weak and vulnerable to nosema and frustrating 'dwindling' problems arising from stress, poor nutrition, viruses or environmental factors. The bees that make it through winter in such colonies may be living on dirty comb, under continual stress, and subject to heavy workloads with little support in foraging or rearing young, due to small populations. They are also lacking assistance in regulating temperature and humidity, managing on poor quality food, malnourished due to colony conditions, damaged by their wintering experience, subject to disease, possibly affected by accumulated toxins -- and old. That's a major reason why colonies that look reasonably good in early spring often don't stay good-looking until summer without some help from the beekeeper.

Surviving colony condition is every bit as important as the number of hives that remain alive after winter. Just as the percentage of hives surviving in each apiary can vary, the number and condition of the bees surviving winter in each remaining hive can vary widely too. Some wintering and early spring stresses are cumulative; the adverse effects will last the entire life of each remaining bee, reducing its lifespan and ability to forage and to feed brood. Some of these effects will continue to afflict even the next generation of young bees, since the young will be raised under less than ideal conditions, and tended by bees that may be unhealthy and functioning poorly.

When considered together, colony survival and colony condition in spring will determine to a very large measure the success of the following beekeeping year and ultimately, over the course of years, the profitability of any bee enterprise. Success leads to more success. Failure leads to more failure. Every little thing that tips the balance towards better survival rates and healthier bees will accrue in our favour and thus contribute to success upon success.

Good wintering is the cornerstone of most successful beekeeping, and good wintering is affected by *everything* a beekeeper does all year. Building and maintaining good bees at all times is the most fundamental goal of any master beekeeper, and the key to wintering success. It is a circle. Good bees lead to good wintering. Good wintering leads to good bees.

There are many more reasons than simply money to strive to achieve a high level of wintering success. Recovering from bad winter losses can use up all a beekeeper's time and resources, slow down the bees, and cost the honey crop as well. Besides, cleaning up after a bad winter is hard work.

Cleaning out dead equipment is a nasty and unhealthy chore for the beekeeper and the bees alike. Combs from dead-outs can be full of dead bees, covered with moulds and bee feces, and harbour nosema spores. Such combs are valuable and can be re-used, but they require work by the bees to make them habitable again. For the beekeeper, combs from dead-outs are unpleasant to handle, and the dust and moulds from them can cause respiratory problems and discomfort if they are handled carelessly in an unventilated space. Such combs can be reclaimed in summer by strong colonies

without apparent harm to the bees, but if all colonies are weak, as they are in a spring after a heavy winter loss, the combs must be stored until there are enough suitably strong colonies to work on them.

Things are much better all around for all concerned – bees and beekeeper -- if the bees winter well and come out of winter strong and healthy. It is well worth the extra effort and expense to make sure as many hives as possible survive winter in top condition.

Few beekeepers manage to achieve one hundred percent success every year. Most beekeepers with more than a few hives *never* hit one hundred percent success or even try to do so. Some loss is natural, and anything under ten percent dead is considered very good in most regions, especially if survivors are strong and especially if some weaker colonies have been given a chance to try and make it through.

When only a small percentage of hives are lost over winter and the remaining hives are strong and healthy, the normal spring splitting and equalizing necessary to prevent swarming will provide enough brood and bees to make up the loss at no cost or extra effort, and even provide extra bees for sale or expansion, but when winter losses approach 30%, the story rapidly becomes very different. When losses reach that level, surviving hives are often found to be poor, and if this is the case, the amount of splitting necessary to make up the loss is certain to seriously reduce the honey crop, since neither the parent hives or the splits will be up to strength for the early flows.

Whether made up by splitting, or by buying package bees, winter loss can be a real and crippling expense. On the other hand, where wintering is successful, surplus bees and hives can be used for increase or sold, hives can be at full strength for all flows, and most of the hard work is lifting full supers, extracting, filling jars, pails or drums, and rushing empties back to the yards. Bees are healthy and feed their young well. Well-fed bees winter well. The beekeeper is content, and the cycle continues...