SUCCESSFUL BEEKEEPING

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Necessity is the mother of all inventions, and people learn from their experiences:
How to winter 72 – 8 frames colonies in one circle of 6 towers each housing 12 colonies in insulated boxes.
Winter packing and ventilation: Truths, myths, and laws of physics.

In the August issue you read how we prepare our hives for winter. Today we will discuss a series of many changes that brought me to the successful wintering I'm doing today. But remember, without the August preparation and FORMIC ACID MITEGONE mite treatment, winter packaging cannot do miracles. It is the entire process that saves your bees.

In 1980 the 100 hive outfit I bought had 22 live hives. My mentor wintered his hives in groups of 4 wrapped and covered with paper backed 3 ½" fibreglass insulation. On top was a ¼" tar coated plywood bent over 4 feeder pails under insulation and tied with ropes in a dome. In the snow it looked like heaps of hay forgotten in a field.

As a young buck who knows better, I did the same thing but I put all 22 hives in two rows back to back, side by side. I put the feeders on top. Not having enough money for plywood, I found an old tarp and covered whole thing and tied it down using old tires like the guys use on hay.

The first lesson I learned was about drifting. At the end of each row I had 4 extremely strong colonies, then some weaker and some extremely week in middle. I also learned that the insulation would be unusable in the following year.

I also learned that carrying single hives in pollination is a very hard work which I did not want to do again. Therefore, I had to come up with another system. Fortunately at the time, my workplace (Western Star Trucks) had a lot of scrap pallets, odd sizes of plywood, short 2x4s, and much more. My graduate paper had been written on the use of Aircraft scrap material in other sectors of the national industry, Simply Sanford and Son if you remember that show.

I also bought 100 packages and decided to go commercial. I brought in a D8 and carved up a big flat bee yard from my property and started to utilize the scraps from Western Star. All pieces were smaller and odd to use in construction, they were low quality or eastern hard wood, but well suited for beekeeping as you can see on pictures:

Transmission pallets were best for hive supports, as they were a foot high to accommodate shafts and being of eastern hardwood many are in use still now.

I promised myself I was never again going to carry hives one by one into orchards. I converted my old 61 GM into ¾ tone rear axle, installed a hydraulic system with electric command and set up the "4 pack" system.

The plywood from plant and other wood scrap made the bottom boards and migratory covers for 2 and 4 hives packs.

EXPERIENCE: 4 packs weight 800 lbs and cannot be stolen and cannot be moved without a crane. Doubles can be lifted by two men and used in pairs as 4 packs, but 2 men can carry double and only one got stolen in those years. The plywood from

the plant was also great to make my winter boxes. As you can see in the next picture they were reworked many times.

The first version was for the double high with the feeder pail on top:
EXPERIENCE: Temperature and air pressure changes pushed and spilled the feed out drowning weak colonies.

I also started to experiment with wintering nukes but decided to do so with all standard deep frames. On lower picture you see how I made 3 color 3 frames units in one box with ¼" slots for divider boards and dry top feeders. I fed the main hives early and put the nukes on top of main hives. This required enlarging the wintering boxes to accommodate the insulation blanket on top and provide entrances for 6 nukes in row in front.

This one was finally reworked into insulation blanket storage, but shows the 4 sides and the insulation.

EXPERIENCE: **Not too great. Try something else.**

Since I was dissatisfied with feeder pails and needed nukes, I created a wooden inner feeder replacing 2 STD frames. When put on standard bottom board with strip of carpet in middle I had 2 – 4 frame mating nukes. Please note that the feeder has two compartments joined by ½" gap under centre divider and that the top half is open to the right and the closer one to the left. The higher sides form the letter "S" so when carpet is put on the top the two nukes are sealed separately. We would have 550 of these, providing 1100 mating units to ensure our new generation as all old queens were sold with SWARMS (I will write about that in May issue).

If one did not mate, we just moved the feeder to the side and had 8 frame colonies if both mated we caught and sold one and then made an 8 framer.

Here you see it in the current use. The feeder can be moved to any position creating from 3 frame mating nuke to 6 frame wintering unit and 2 frame space behind the feeder through which I could feed the lower hive through 1 ½" hole plugged by screen. Please note the screened entrance 2" x 3/8" high.

We wintered our 560 hives in 2 deep and 6 frames on top, in our winter boxes for many years. We fed both colonies in late February and early March by moving the feeder back and adding 2 frames to the 6 frame unit to have 10 frame pollination unit in early April.

This lasted till 1996 when the disaster struck. A beekeeper from the Peace River region had a Kelowna beekeeper winter and use for pollination 500 of his hives and he left his partner infected with AFB. The guy in Kelowna obviously was not too careful and by midsummer his 100 hives were fully infected and committed to be burned by local inspector. He wanted to save them so he went to get a burning permit which he knew will be denied. Our provincial "wizard" came up with the solution to bury the infected comb in the garbage dump. They dug a hole for the first load and buried it. There was no hole for the second load and the 3rd load so the guy just dumped it into the garbage. Unfortunately, I had a yard with 40 honey producing and 40 6 framer just on east side of dump ¼ mile from dump site. My main breeding yard with 40 honey producing colonies and 100- 6 framers ½ mile to the west and Gorge yard and home yard mile to west and north. At 4pm I received call from the dump foreman asking "Bill, please come! All my employees are being stung by bees". When I arrived at the site, there was a huge black cloud of bees over the dumped equipment robbing it. Having just a veil with me I got on the D-8, smashed all of the bee equipment and bees and buried it under other garbage. I went home and mixed a barrel of light feed with oxytet and started to drench all of my hives in all 4 yards each week. I checked hives constantly and burned a few I suspected of having AFB.

OXYTET WILL NOT CURE AFB BUT IT WILL PREVENT IT FROM INFECTING 4-7 DAY OLD LARVA and prevent the forming of scales as long as it is present. Once you stop and, if there are scales, the spread of AFB will be fast. We decided to feed OXITET until late fall but withdrew it after and do not feed any in the February feed. The February – March feed was mainly done to feed the drugs. I could not feed the bees the drugs as I wanted to be able to check all my hives later in the spring to find any scales and dispose of infected colonies to have whole outfit clean.
Therefore, I decided not to feed. I increased the wintering weight of a 2 high colony and give the top units 8 frames. In late March I had our provincial "wizard" summon all BC inspectors and we went through all of my colonies comb by comb. Fortunately, we were clean.

EXPERIENCE: All bad things sometimes produce a good result: I NEVER FEED IN FEBRUARY - MARCH AGAIN. I just feed to my wintering weight and winter on top 8 framers.

WINTER PACKING AND VENTILATION: TRUTHS, MYTHS, AND LAWS OF PHYSICS.
When I was taking apart the winter packs in spring, I noticed that the top 8 framers were in many times much stronger than the double colonies below. They did not have any moisture problems, even though the screened holes, which should have provided warm air from lower colonies, were plugged and sealed.
The only difference was the lower colonies had winter entrances and wood top covers. These top covers acted also as nukes bottoms the nukes did have carpets on top and 3 1/2" fibreglass insulation pillow on top for all 4 units. They were all in a winter pack covered by asphalt painted plywood.
It was the time to put my thinking cap on, remember the meteorology lessons of my flying days, and the adiabatic functions of gases of my university years.

I ASKED MYSELF THESE QUESTIONS:
<u>Why do we have winter entrances?</u> The only reason I could see, was that in lands of winter blizzards the lower entrance can get plugged, and the bees can use upper entrance to go for cleansing flights.
In years of early feeding I also practiced cleaning of lower entrances. There was some debris but the entrances were never plugged by snow. Therefore that reason did not apply here.

<u>Will you, in your house, open the front door and an upper window and leave it open whole winter?</u> I would not! It would cost me a fortune in heating. So why do we do it to the bees? The winter entrance and winter cover with its space above tops of frames creates a stove and chimney out of the hive. The colony and cluster is the heater, the fuel is honey, and the heated air is going out "the winter entrance" the chimney.

THE MYTH…SOMEONE TOLD US THAT THIS TAKES THE MOISTURE OUT OF THE HIVES.
THE TRUTH: In my early years of needing money, I offered the removal of feral colonies in trees and walls. I helped to cut down two. All had a lot of bees and honey but only one entrance, usually at the

bottom. On one occasion, in the wall of old cold storage house, where the double wall was 2 feet apart and filled with saw dust that had settled down, there were two knot holes but the upper one was plugged with propolis. I also saw colonies hanging under rock overhangs in deserts of Arizona. It gets quite cold in Arizona and the combs are attached directly to the rock, there is no space above frames so each space between combs has its own heat control. Fresh air enters at bottom and gets heated to brood temperature of 34-35 °C.
I do not know if the bees know the laws of physics but they still apply. **As many times as they heat the air up, that many times they lower the relative humidity of air.** Bees get in nice dry fresh air, and a lot of times they have to bring in water to maintain 55% humidity required by the brood, otherwise the larva will dry and die.

I confirmed this in designing Mitegone. I measured the temperature between the frames and wall of a hive adjacent to next hive. I did the measurements in April when outside temperatures were as low as below freezing in morning and humidity at entrance 100% and as high as 25°C and 40% humidity in late mid day. The temperature and humidity inside was constant of 26 - 28 °C and 55% humidity on strong hives covering most of upper box combs.

At the same time I was conducting a test for "WINTER ENTRANCE FUNCTION". To be scientifically and statistically correct, all 260 lower hives in all yards were divided into 2 groups A & B. Group A was wintered with a WINTER ENTRANCE with the existing wood Inner cover also acting as upper colony bottom board without any screen connection and 1"upper entrance holes in the winter box were open. Group B was wintered without WINTER ENTRANCE given carpet on top of hive with upper colony on it the winter entrance hole in winter pack were permanently plugged and insulated. To eliminate location position and yard differences. In each yard one circle of 20 hives had group A on inside circle and the other on outside.

THE RESULTS: While none of the strong hives in either group had any problems with moisture, in the hives with winter entrances, they consumed 90-95% of their stores while Group B without winter entrances consumed only 65-70%. This is the equivalent of 2-3 Frames. Our winter loses were 5-7% and on weak and dead colonies other problems like mildew and rot was occasionally found.

EXPERIENCE: winter entrances in our area do not provide any help with moisture control and cause large consumption of stores. Please note that bottom of Okanagan Valley is prone to valley cloud being miserable ugly fogy wet below cloud and sunny cold up above it saves our orchards from freezing.
I have not used winter entrance since then.

WHERE IS THE MOISTURE PROBLEM COMING FROM? ANSWER is in the CONDENSATION.
In feral colonies and in my hives, the air enters by the bottom entrance. As it is heated it becomes nice dry and is humidified to 55%. Warm used air is heavier than fresh air coming in and falls down and is exhausted by the bottom entrance. Just last week, I spoke to people on Vancouver Island who were asking: How their insulated hives without winter entrances but fully open screened bottoms will affect the MiteGone acid treatment? It will lower the efficacy of the treatment but the use of monitoring trays will increase it. I asked if they have a moisture problem and they said no and I agree. In their and my hives, the walls and tops are insulated and kept warm so condensation cannot occur and wet heavy air flows out the bottom.
What happens in a non insulated WINTER ENTRANCE HIVE? The air enters the bottom, gets heated and absorbs moisture. When this air gets into contact with cold outside walls or the inner or top cover, the moisture in the air condenses on these surfaces and drips back into the hives causing problems you all know.

How to winter 72 – 8 frames colonies in one circle of 6 towers each housing 12 colonies in insulated boxes:

At the end of September at 9 am, all hives are uncovered, the summer covers are loaded to go home. They were all treated and fed to wintering weight and are ready to be packed.

First, the front circle is on a standard board being cleaned and levelled so the towers are straight and solid.

All other hives are on nukes bottoms housing 8 frame colonies and a feeder so we can feed the last missing feed to proper wintering weight. As the hives are brought in the towers are growing up.

The winter packs are brought in and assembled around them. The narrow fronts are screwed onto sides with 4 screws and 3 ½" insulation battens are put on top.

Here you have it finished. A yard with top covers and mounted on bear fence activated by 27000 volts.

For those who have just 2 hives, we made a winter Styrofoam insulated box with a 3 ½' fibreglass top blanket in a garbage bag. All insulation is rated as R-12

NOW YOU KNOW EVERYTHING THAT I HAVE TRIED. WHAT I RECOMMEND YOU DO IS THE RESULT OF WHAT HAPPENED IN THE 2017 - 2018 BEEKEEPING SEASON.

While the wintering of a hive in a standard box with eight frames of bees and brood plus a feed started in 2009 and has worked very well for many years, in 2017 this system did not work. We had an extremely hot summer with no rain for several months. On August 25th we prepared, treated and weighed the hives as usual. We bought our sugar and started to feed the hives so they would reach the desired wintering weight. Unfortunately for me, on the last two days of August and the first two days of September of that year, we received a deluge of rain. We got so much rain that all of the sweet clover and knapweed had a second bloom and the bees began bringing in nectar.

I observed that only 20-30% of the bees were bringing in pollen while in other dry years it would be 80-90%. And that brings me to the importance of having a HIVE ON SCALE and DAILY MONITORING of your hives' weight. I will write about it in the spring. Had I been monitoring the weight of my hives, I would have been warned that there was a honey flow on and I could have reduced the amount I fed each hive. Unfortunately, about three years ago, a bear destroyed a hive and my scale and I have not replaced it since.

The unfortunate result was that these small colonies became honey bound. The queen did not have space to lay eggs for winter bees. When the summer bees died off in mid October there were no winter bees to sustain the hive over the winter. We lost 50% of our colonies but these colonies were full of honey when we opened them up in April.

LESSON LERNED:
If you want to keep hives in single boxes you should have a scale on one of your hives and monitor them closely**. For the average Hobby Beekeeper I recommend wintering your hives in two standard boxes.**