JWM Leafcutters Inc.

Sampling Methods

Sample methods :

FOR LOOSE CELLS

1. The most critical part achieving and accurate Bee count is gathering a representative sample. This is done by pouring the bags or boxes of bees from one container to another and while they are flowing, gathering a sample from the stream of bees.

This sample will most likely still be too large, so, to get a representative sample we use a device called a rifle splitter, Google it. Our rifle splitter has 12, 1 inch chutes, 6 going to one side and 6 going to the other side. So regardless of the sample size every time the bees are poured through, it divides the sample in half keeping the integrity of the sample. This allows us to reduce the sample to a cuttable size (20-40 grams) without losing the accuracy of the sample. When we've poured the bees through enough times to reduce it, we end up with two comparable samples. This is nice as we like to do both cuts to compare and they usually end up being very close. Then we take the average of both cuts to arrive at the count we will use to apply to the net weight of the loose cells to determine how many bees are in that lot.

If a rifle splitter is not available, make sure you pour the sample and take another smaller sample by gathering bees from the beginning of the pour to the end. This will give you an idea where the count is for interest sake.

WE DO NOT take a set weight, like 10, 20 or 30 grams, because as you try to arrive at a specific weight it is very difficult to add or take away and keep the sample representative, this is the reason why we use the rifle splitter. Weigh the entire sample. It is usually between 20 and 40 grams. Some producers and even testing facilities like to do a series of 10 gram samples, we prefer to cut a couple of larger samples just to help remove some of the margin of error which can occur during sampling and weighing.

2. Once you have your sample, cut all the cocoons and count the live larvae, parasites, pollen, and whatever else you want to keep track of Ex. dead, damaged, 2nd generation, etc.

3. We measure all of our samples in grams. The following is an example of the calculations to use:

Ex. Sample size 31.8 grams and from cutting this sample, we obtained,

296 live larvae
1 parasites

$$\frac{\text{Live larvae} \times 1000}{\text{Grams}} = \text{Bees/Kg}$$

$$\frac{296 \times 1000}{31.8} = 9308.176 \text{ Bees/Kg}$$

To convert this to Bees/pound:

$$\frac{9308.176}{2.2045} = 4222.35 \text{ Bees/lb}$$

Or:

$$\frac{\text{Live larvae X Metric Conversion}}{\text{Grams}} = \text{Bees/pound}$$

$$\frac{296 \text{ X } 453.6176}{31.8} = 4222.35 \text{ Bees/ Pound}$$

Parasite percentage:

$$\frac{\text{Parasites}}{\text{Parasites + live larvae}} \text{ X } 100 = \% \text{ Parasites}$$

$$\frac{1}{1 + 296} \text{ X } 100 = .3367\% \text{ Parasites}$$

4. Now add up the total weight of bees and subtract the weight of the containers they are in to get the net bee weight. Then multiply by the number of bees per kilogram, or the number of bees per pound whichever measurement you used to weigh them.

We most often talk in terms of "gallons of bees" in sales. One gallon simply refers to 10,000 live larvae.

To get the number of gallons of bees, just divide the total number of bees by 10,000.

Formula for the number of gallons of bees...

No. of gallons = net weight in lbs. x no. of bees/lb ÷ 10,000

or metric no. of gallons = net weight in kgs. x no. of bees/kg ÷ 10,000

For our example, say we have 428 lbs or 194.1 kgs of bees net weight-
No. of gallons = 428 lbs.(total bee net weight) x 4222.4(no. of bees /lb.) ÷ 10,000 = 180.7 gallons

Or using metric measurement of kgs.
no. of gallons = 194.1kgs.(Total bee net weight) x 9308.2(no. of bees/kg.) ÷ 10,000 = 180.7 gallons

FOR FULL STYRO BLOCKS

1. The most critical part is obtaining a representative sample and cutting the sample immediately before the cells that may have been crushed become too dry to separate and count accurately.

2. Obtain a 20-40 gram sample, in order to get this we punch one random full tunnel from each block and typically need to sample between 30 and 40 block to acquire an adequate size sample. These block are acquired randomly from the lot as they are being stacked for transport. It's important to keep track of how many tunnels are sampled so the average bees per tunnel can be determined.

3. To determine how full the block are we count the amount of non full tunnels down one random row the length of each block in the sample lot. We then subtract the average amount of non full tunnels from the total amount in the length of the block. A typical nesting block is 118 tunnels long by 30 tunnels wide but this can vary if the producer has trimmed the length to fit surrounds etc.

4. Then cut the sample taking care to count everything, including the cells that were crushed. They are easy to separate and count accurately while they are still damp. Count them as good live larvae because they would have been fine had they not gotten crushed during sampling.

5. Once the sample is cut we now have the number of bees from the number of full tunnels punched. Then we divide the number of live larvae by the number of tunnels sampled to get the average number of bees per full tunnel.
Being that the non full tunnels are neither full nor empty we assume each one contains 30% of the average amount we find in the full tunnels.
We should now have all the data needed to determine how many gallons of bees are in this lot.

Formulas:

Non full tunnels = average non full tunnels/ row
Tunnels probed

118 - average non full tunnels= average full tunnels/ row

Live larvae = Average larvae/ full tunnel
Tunnels probed

Average larvae/ full tunnel X .33 = average larvae/ non full tunnels

Mennie Bee Farms Inc.
Block Data Sheet

Name: Sample_____ Date: _____ # of Block: 274
Gallons: 519.23
Parasites: 0%

Chart of Non-Full Tunnels Per Row:

1	8	11	11	21	10	31	12
2	3	12	5	22	3	32	2
3	1	13	3	23	1	33	4
4	0	14	9	24	4	34	9
5	4	15	7	25	6	35	6
6	15	16	11	26	11	36	
7	7	17	3	27	7	37	
8	2	18	2	28	4	38	
9	8	19	6	29	9	39	
10	4	20	8	30	3	40	
Sub-total	52	Sub-total	65	Sub-total	58	Sub-total	33

Total Non-Full Tunnels: 208

Average Non-Full Tunnels/Row: 5.9 (total non-full tunnels/rows counted)

Average Full Tunnels/Row: 112.1 (118 – average non-full tunnels/row)

Bees Found in Cut: 194

Tunnels Probed: 35

Bees /Tunnel: 5.54 (Bees Found/Tunnels Probed)

Bees in Full Tunnels: 621.03 (Bees/tunnel X Full Tunnels) X 30 /10,000 = 1.863 Gal. Bees /Block in Full tunnels

Bees in Non-full Tunnels: 10.786 (% of bees/tunnel x non-full tunnels) X 30 /10,000 = .032 Gal Bees/block in Non-full tunnels

Total: 1.895 gallon per block