

2018-19 Lane County Winter Loss Report by Dewey M. Caron

Oregon and LCBA beekeepers were directed to a web-based survey document as a continuing effort to define overwintering successes/losses. This was the 11th year of such survey activity. I received 416 responses from OR backyarders and 98 from Washington beekeepers keeping anywhere from 1 to 38 (WA 40) colonies. Lane County members sent in 44 surveys, 10 more than last year.

A report of the OR beekeeper survey responses, including losses and, eventually when prepared, responses to management questions in the survey, with easy to understand graphs, will be posted at www.pnwhoneybeesurvey.com.

Overwintering losses were determined by asking number of fall (October) colonies by hive type and subsequently how many were still alive in the spring (April). LCBA response included 222 fall colonies, 176 Langstroth 10 frame hives in the fall + 20 Langstroth 8 frame hives, 12 nucs , 2 top bar, 9 Warré and 3 other hive types. Numbers shown below Figure 1 below includes comparison of Lane Co to statewide. **Total LCBA loss = 31%**. Movable frame loss was slightly higher 33%. This loss rate was the lowest of the 16 Oregon associations and was ½ the rate of highest loss level, 62% Lane members.

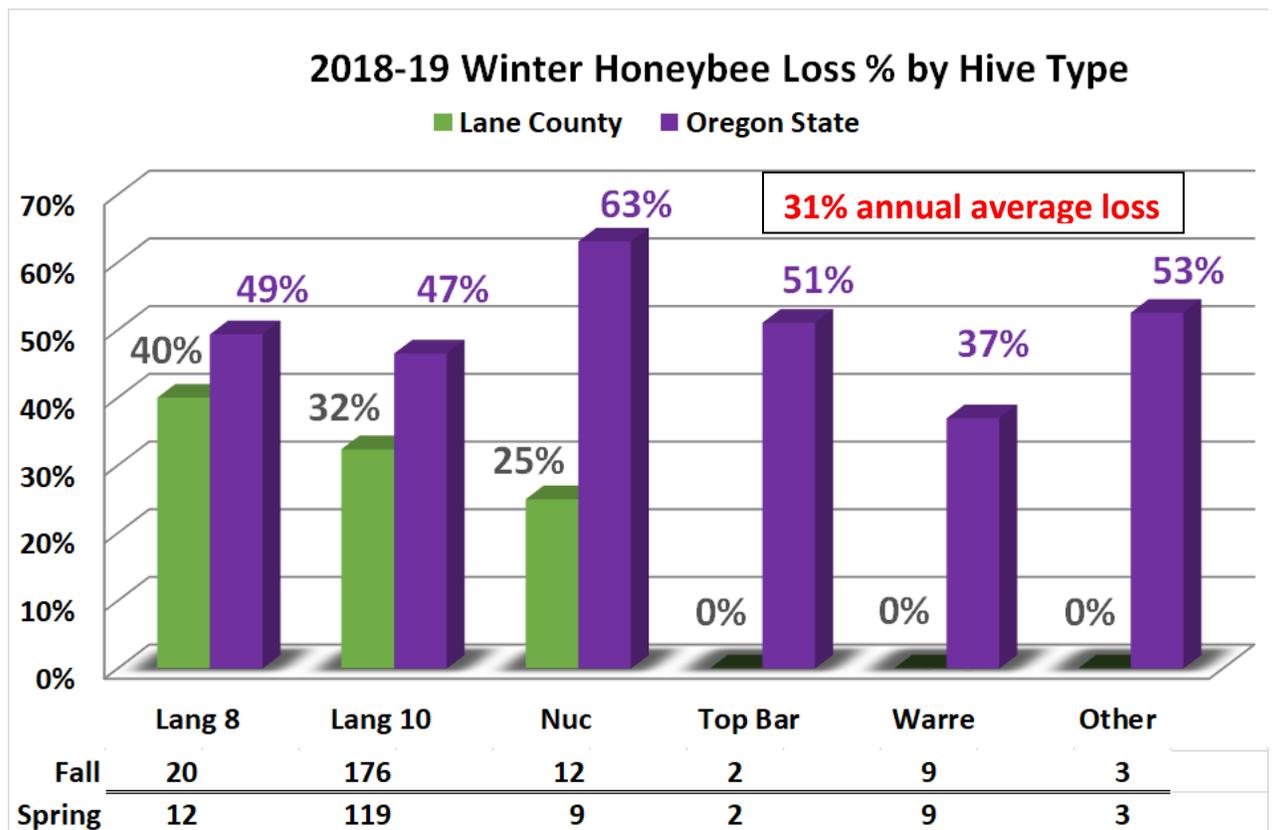


Figure 1

Survey also asked about colony losses by hive origination. Overwintered hives had a 31% loss rate and packages, swarms and splits exhibited good survivorship, all better than statewide. Only nucs did poorly (45% loss). LCBA results compared with statewide in Figure 2.

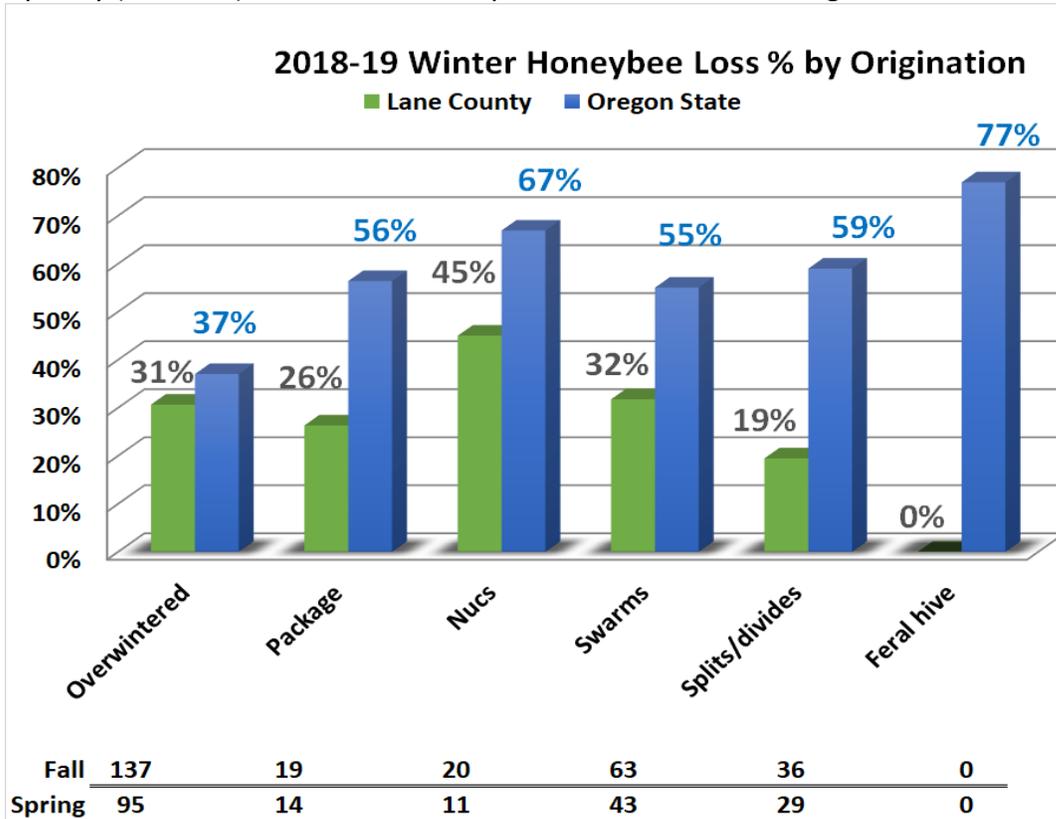
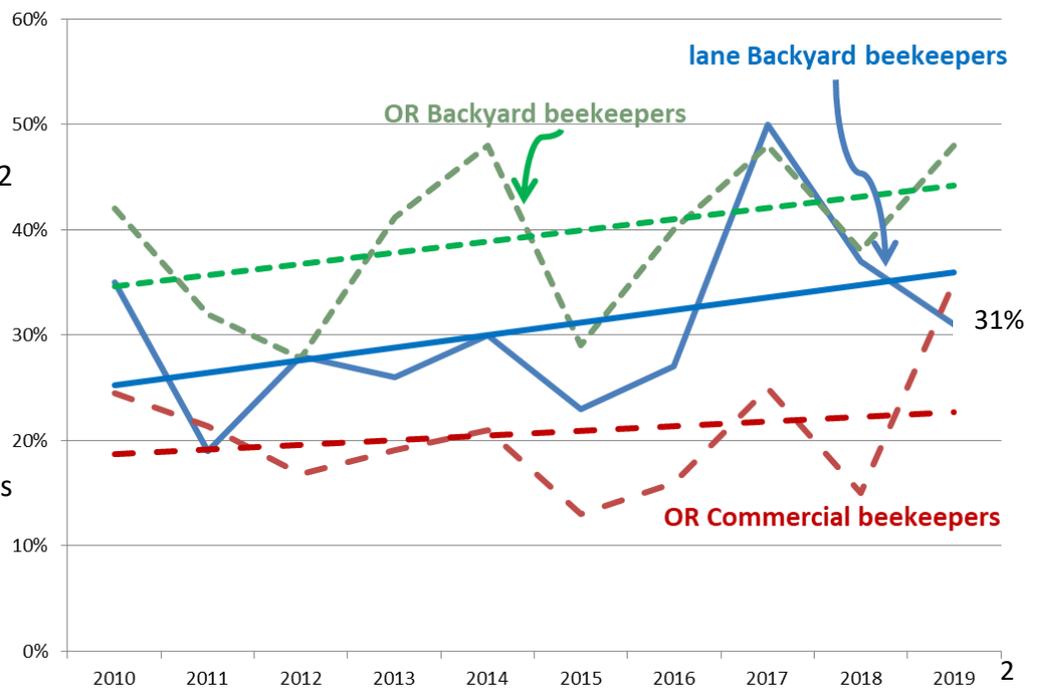


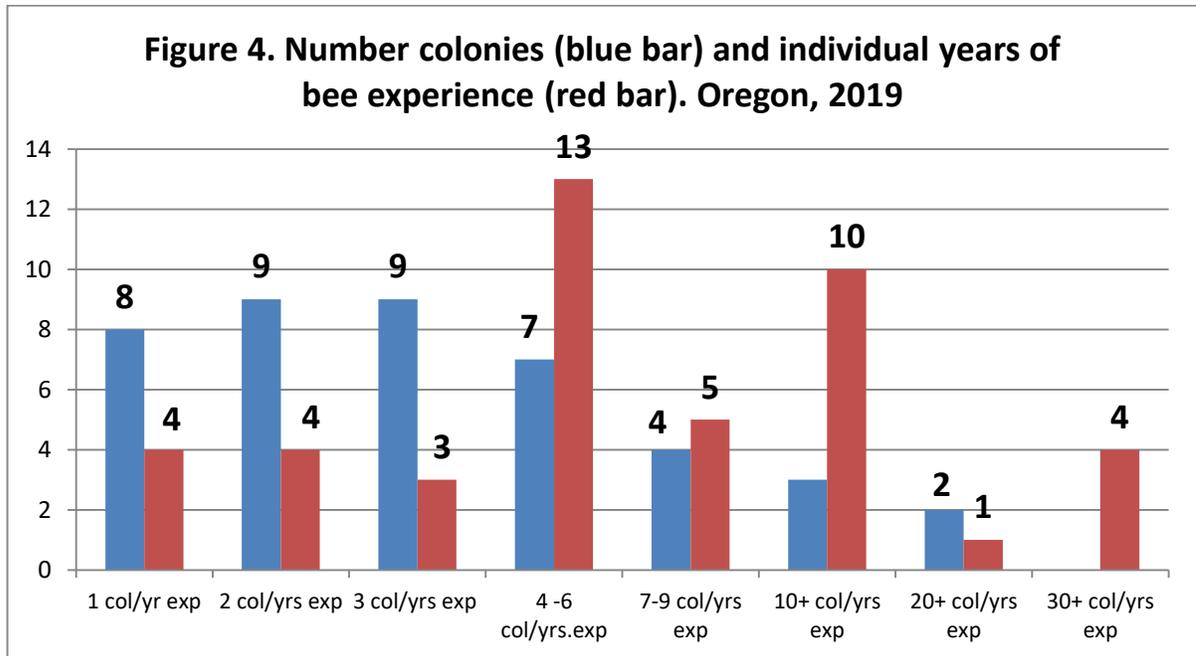
Figure 2

Losses this past overwinter were reduced from the heavier losses the past 2 winters and were lower than OR Commercial losses. Losses of Lane County beekeepers (31%) were at the average of colony losses for past 9 seasons (30.5%). Figure 3 (solid blue line is trend line for LCBA).

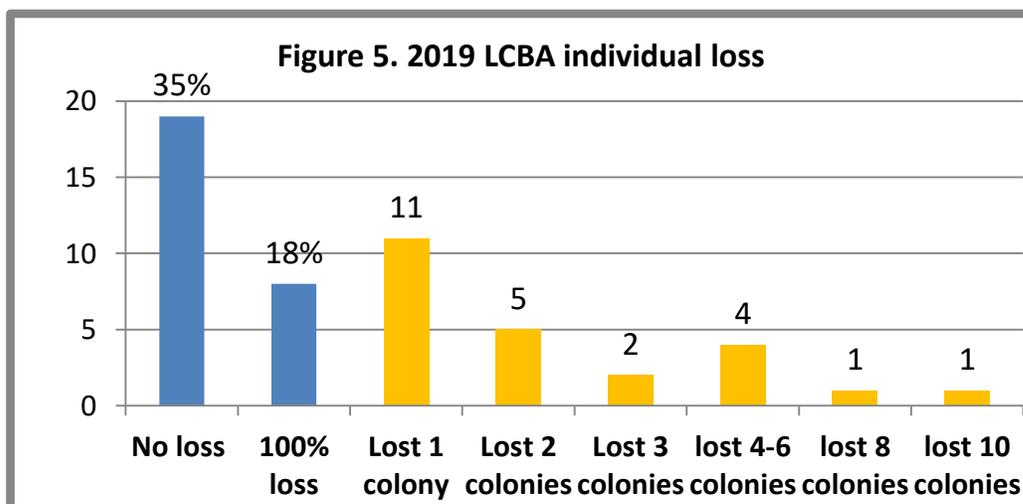


The LCBA association respondents can be characterized, as are the state respondents, by small numbers of colonies and a wide range of years of experience. Eight individuals had 1 fall colony, 9 had two and 3 each (59% had 1, 2 or 3 colonies), 7 individuals had 4-6 colonies, and 4 individuals had 7-9 colonies. Five individuals (11%) had 10+ colonies (highest numbers were 22 and 25 colonies).

Years experience shows a broad spread. There were 11 individuals with 1, 2 or 3 years experience (25%), 13 with 4, 5, or 6 years, 5 individual listed 7 or 8 years and 15 individuals indicated 10+ years experience (34%); 3 individuals had over 40 years and highest was 50 years experience. Twenty one individuals (64%) said they had a mentor available when they were learning beekeeping.



Not all LCBA individuals had losses. Nineteen individuals (35%) had NO LOSS while 8 respondents (18%) lost all their fall colonies. Eleven individuals lost one colony, 5 lost two colonies; heaviest losses were 8 and 10 colonies. Figure 5.



Five individual respondents (11%) kept their bees in 2 apiaries and one in 4 apiaries. Those six individuals had slightly lower losses in out apiaries (27.5%) compared to 31% average Lane losses. Two individual moved colonies during the year, both for pollination purposes.

Reasons for Colony Loss/Acceptable loss

We asked individuals that had colony loss to estimate what the reason might have been for their loss (multiple responses were permitted). There were 72 total listings for LC, 2.5/individual, nearly same as 2.3/individuals statewide. Thirteen LC individuals listed queen failure (45% of respondent choices), followed by varroa (34.5%), weak (24%) and poor wintering (20.5%); 8 individuals (17%) checked Don't know Both Nosema and pesticides checked by 2 individuals each are included in other. Table compares LC with % statewide selections.

	Varroa mites	Poor wintering conditions	Weak in fall	Queen failure	Starvation	CCD	Yellow jackets	Other
Lane (#)	10	6	7	13	2	2	6	5
CBA (%)	(34.5%)	(20.5%)	(24%)	(45%)	(7%)	(7%)	(20.5%)	(17%)
Statewide %	40%	23%	29%	27%	18%	4%	14.5%	15%

Survey individuals are asked to indicate what might be an acceptable loss level. The median (middle) selection was 20%. 13 Lane individuals selected 15% or less =36%, 19.5% checked 20%, 25% chose 33% loss level as acceptable and 3 individuals listed 50%.

Why colonies die? There is no easy way to verify reason(s) for colony loss. Colonies in the same apiary may die for different reasons. Examination of dead colonies is, at best confusing, and, although some options may be ruled out, we are often left with two or more possible reasons for losses. I am working on a book chapter on necropsy of dead bees and will post it as report on the www.pnwhoneybeesurvey.com website.

There is a good deal of variance in opinion as to what might be an acceptable loss level. We are dealing with living animals which are constantly exposed to many different challenges, both in the natural environment and the beekeeper's apiary. Lane individual choices varied from zero to 50%, with medium of 20%. This acceptable loss level has crept upwards over time.

Major factors in colony loss are thought to be mites and their enhancement of viruses especially DWV (deformed wing virus) and declining nutritional adequacy/forage and diseases. Pesticide in the agricultural environment weakens colonies. Yellow jacket predation is a constant danger to weaker fall colonies, Management, especially learning proper bee care in the first years of beekeeping, remains a factor in losses. What effects our changing environment such as global warming, contrails, electromagnetic forces, including human disruption of it, human alteration to the bee's natural environment and other factors, play in colony losses are not at all clear.

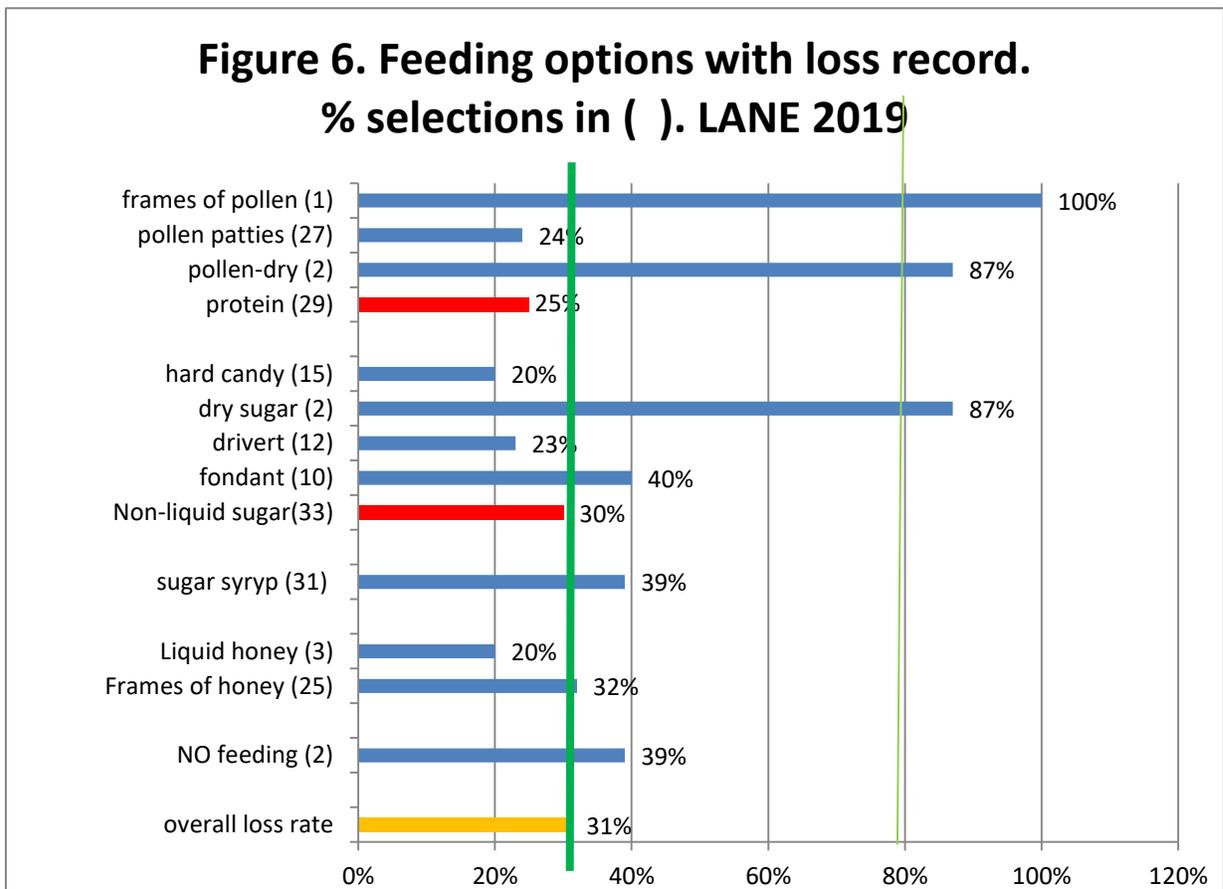
There is no simple answer to explain the levels of current losses nor is it possible to demonstrate that they are necessarily excessive for all the issues facing honey bees in the current environment. Varroa mites and the viruses they transmit are considered a major factor, but by no means the only reason, colonies are not as healthy as they should be.

Managements and losses

The survey inquired about feeding practices, wintering preparations, sanitation measures utilized, screen bottom board usage, queens, mite monitoring and both mite control techniques (such as screen bottom board use, drone brood removal efforts, etc.) and chemical mite controls used. Individuals could check none or more than one response; most LCBA and OR beekeepers most often do not do just one thing/management to their colony (ies) to control mites toward improving overwintering success.

Most Oregon beekeepers do not perform just one management to their colony (ies) toward improving colony health and overwintering success. This analysis however is mainly of a single factor equated with loss level. Such analysis is correlative and doing a similar management as fellow beekeepers do does not necessarily mean you too will improve success.

FEEDING: Lane survey respondents checked 139 feeding options = 3.2/individual (statewide it was 2.8/individual). Five individuals selected a single choice (they had a 39% loss), 6 chose 2, 15 (greatest number) chose 3 and 13 chose 4. The three individuals selecting 5 had lost of 17%.

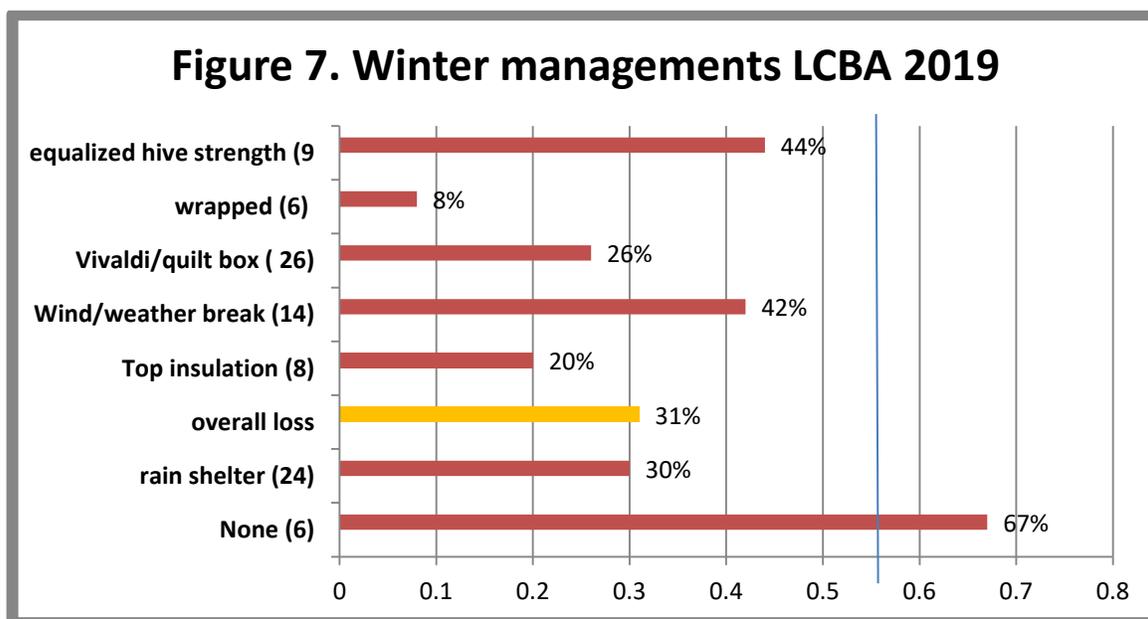


Percent colony losses are presented for feeding options with numbers of Lane members indicating doing the management in (). Bar lengths of left of green vertical bar indicate better than average survival while those to right had heavier than average losses. Individuals feeding Pollen patties, protein in general had better survival and those feeding non-liquid sugar likewise especially the 15 feeding hard candy (20% winter loss) and drivert (23% loss). Statewide fondant feeders also had below average losses (but not drivert feeders) so that was opposite for Lane members; the 10 fondant feeders had higher than average loss (40%).

Thirty one Lane individuals (70% of respondents) said they used sugar syrup. They had a 39% loss rate, slightly higher than the overall Lane loss level of 31%; individuals feeding liquid honey had losses below the overall Lane average. That too is opposite the statewide results though both were close to average. There were three other selections, 2 grease patties and 1 candy cane; these 3 individuals had 14% loss

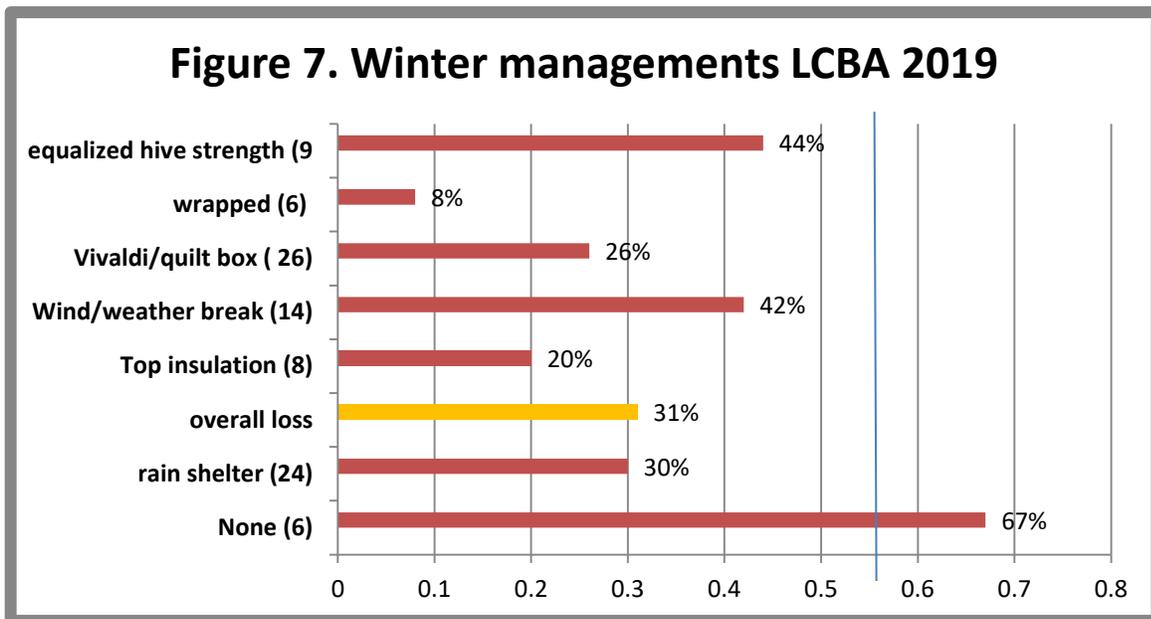
WINTERING PRACTICES: Six LCBA individuals (14%) reported doing no winterizing; they had loss level of 67%; statewide these 6 were among 51 individuals (12% of overall statewide respondents) that indicated none of the several listed wintering practices; statewide losses were 63% for those doing no winterizing managements, 15 percentage points higher loss than overall loss of 48%. Multiple selections were possible and in fact the 44 LCBA members averaged 2.3/individual. Eight individuals chose a single management and had a 29% loss level while the nine individuals checking 4 or 5 of the options had a 39% level. Twelve individuals chose 2 selections and 9 selected 3 options

The two most common wintering managements selected were use of a quilt box (Vivaldi board) at colony top (242 individuals statewide (58%) and 26 LCBA (59%) and use of a rain shelter (159 individuals statewide (38%), 24 LCBA (54%) respondents. Figure 7 shows number of individual

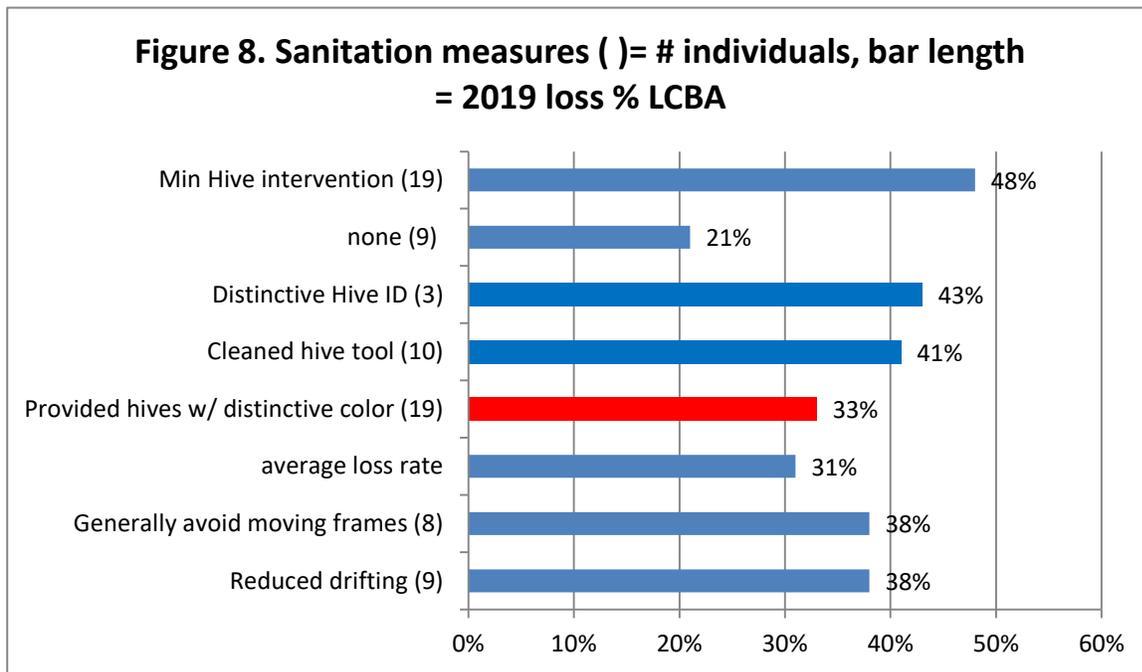


choices for Lane members in () and percent loss of each selection. Use of rain shelter loss was only one percentage point less but Vivaldi board difference was 5 percentage points. The six LCBA individuals who wrapped their hives had the best survival (8% loss) as did those using top insulation (20% loss).

Over the past three years no single winterizing management statewide improved survival each survey year. However 6 managements improved survival in 2 of the 3 years. Those managements are Equalizing colonies in the fall, Use of the quilt box/Vivaldi board/moisture trap at top of colony, an upper entrance (most Vivaldi boards have an upper entrance built into the equipment), Wrapping colonies, Wind/weather protection and other (the other items are a large mixture from reduced bottom entrance, reducing number of boxes and some means of reducing moisture). In all 3 years those statewide, including Lane, doing no winterizing had heavier losses than overall.



SANITATION PRACTICES: It is critical that we practice some basic sanitation (some prefer use of term bee biosecurity) in our bee care. We can do more basic sanitary practices to help insure healthy bees. Lane beekeepers had 68 responses 1.9/individual. Sixteen percent statewide and 9 Lane individuals (20%) said they did not practice any of the 6 offered alternatives. Loss rate statewide was 52%, four percentage points higher than the overall loss rate of 48%; for Lane the 9 individuals had a 21% loss rate, 10 percentage points better than overall Lane average loss of 31%. Seventeen Lane members had 1 selection (loss rate 15%), 10 made 2 choices, 3 each made 3 and 4 choices and 2 had 5; individuals with 4 and 5 choices had a 47% lose rate. These lower loss numbers are not what one would expect.

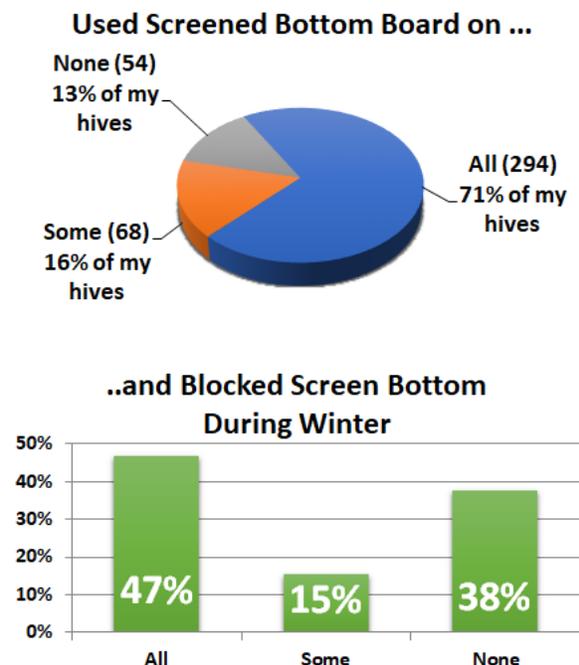


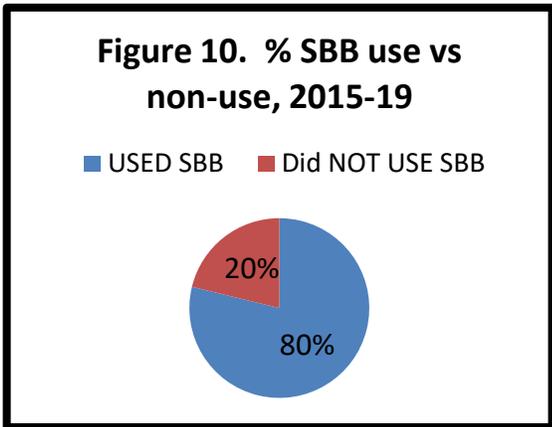
Minimal hive intervention (209 individuals, 19 of them Lane beekeepers) was the most common option selected along with Distinctive hive colors by Lane members. Minimal hive intervention nor distinctive colors showed better improvement for Lane members, although distinctive colors did show better survival statewide. The two sanitation choices that did seem to improve survival statewide was reduce drifting by spreading colonies out and providing hives with distinctive ID /doing other hive ID measures but these did not do so for Lane members.

SCREEN BOTTOM BOARDS (SBB): Although many beekeepers use SBB to control varroa, BIP and PNW surveys clearly point out they are not a very effective varroa mite control tool. In this recent survey, 54 individuals statewide (16%) said they did not use screen bottom boards. This is a decrease of 11 individuals and 4% from previous year. Figure 9. Only 2 of 44 LCBA did not use screen bottom boards (5%).

This past overwintering season, the 54 non-SBB users had 233 fall colonies of which they lost 122 for 48% loss. Those beekeepers using SBB on all of their colonies had 49% loss.

Figure 9





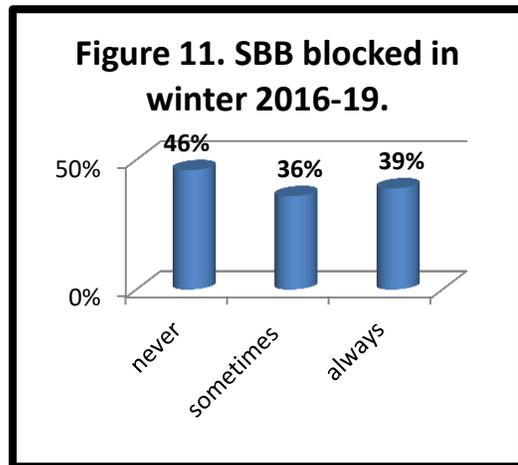
In 5 survey years 20% said they did not use SBB and 80% did use SBB on some or all of their colonies. See Figure 10 to left.

Examining the four year average of SBB use, loss level of those using SBB on all or some of their colonies had a 42.8% loss level whereas for those not using SBB had loss rate of 44.2% (a 3% positive survival gain for those using SBB versus those not using them). They are very minor in improving overwinter survival.

We asked if the SBB was left open (always response) or blocked during winter (bottom Figure 12). This past season 47% of individuals said they always blocked SBB during winter. They had 884 colonies in the fall and lost 503 for a 43% loss rate. One hundred forty seven individuals (38%) never blocked them during winter (never response). They had 724 colonies in the fall and lost 303 colonies =58% loss rate, 16 percentage points higher than the average of three previous years. Sixty individuals (16%) blocked them on some of their colonies. Their loss rate was 52%. Among LCBA respondents 43% said they never block the SBB (20% loss) vs 34 who block (33% loss).

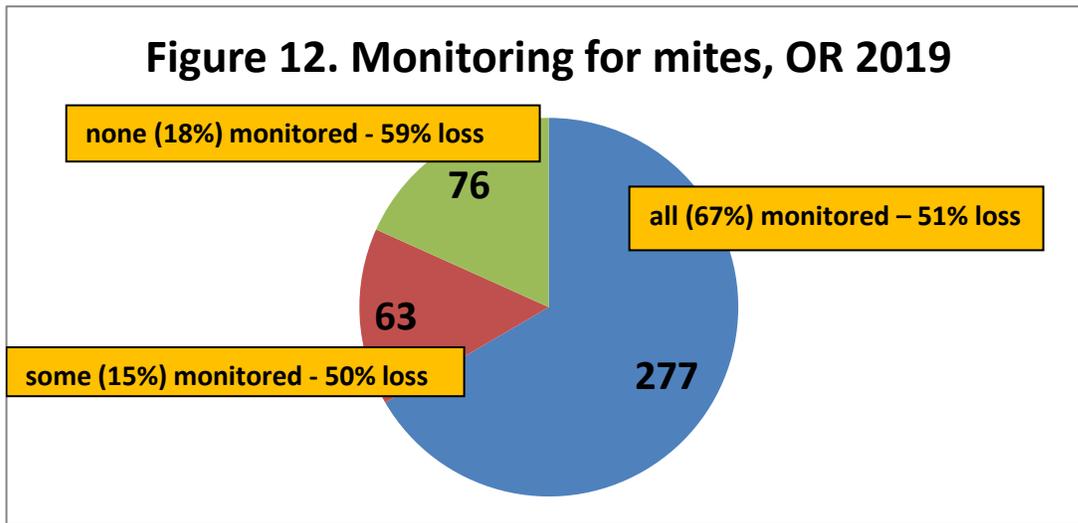
Comparing the always and sometimes left open with the closed in winter response reveals a 9 percentage point difference in favor of closing the SBB over the winter period. See Figure 11.

There is no good science on whether open or closed bottoms make a difference overwinter but some beekeepers “feel” bees do better with it closed overwinter. Four years of comparison shows those closing the screen during winter did have a 9 percentage point improvement in colony survival. An open bottom, at least during the active brood rearing season, can assist the bees in keeping their hive cleaner and promote good hive ventilation.



Mite monitoring/sampling and control management

We asked percentage of LCBA hives monitored for mites during the 2018 year and/or overwinter 2018-19, whether sampling was pre- or post-treatment or both and, of the 5 possible mite sampling methods, what method was used and when it was employed. Statewide 67% respondents said they monitored all their hives; seventy seven percent (77%) of Lane respondents said they monitored all. Losses of those individuals monitoring was 33%. Statewide, 18% reported no monitoring; they had a higher loss rate of 59% loss. Five Lane respondents did no monitoring; they had loss rate of 20%. Figure 12 shows statewide relationship.

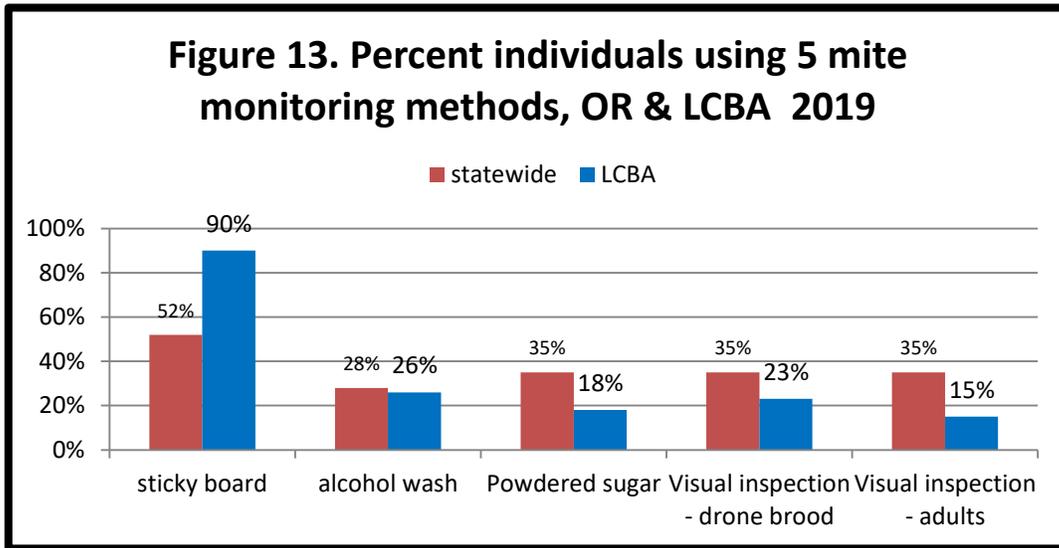


At least statewide, monitoring alone is a means towards improved winter survival. The table below compares % individuals and % winter loss for individuals who monitored all colonies compared with those who monitored none over last 3 survey years. Monitoring provided a 17% improvement in survival. The 14-15% who monitored some colonies was variable but 3 year average mirrors those who monitored all colonies.

	ALL Colonies Monitored % individuals	% loss	SOME Colonies Monitored % individuals	% loss	No colonies Monitored % individuals	% loss
2019	67%	51%	15%	50%	18%	59%
2018	63%	38%	14%	26%	26%	49%
2017	63%	43%	15%	60%	22%	48%
3 year loss average		44%		45%		53%

In order of popularity of use statewide, sticky boards were used by 174 individuals, 52% total of 340 individuals who did some or all monitoring of colonies followed by 120 individuals (35% of individuals) using powdered sugar monitoring and visual inspection of drones; visual inspection of

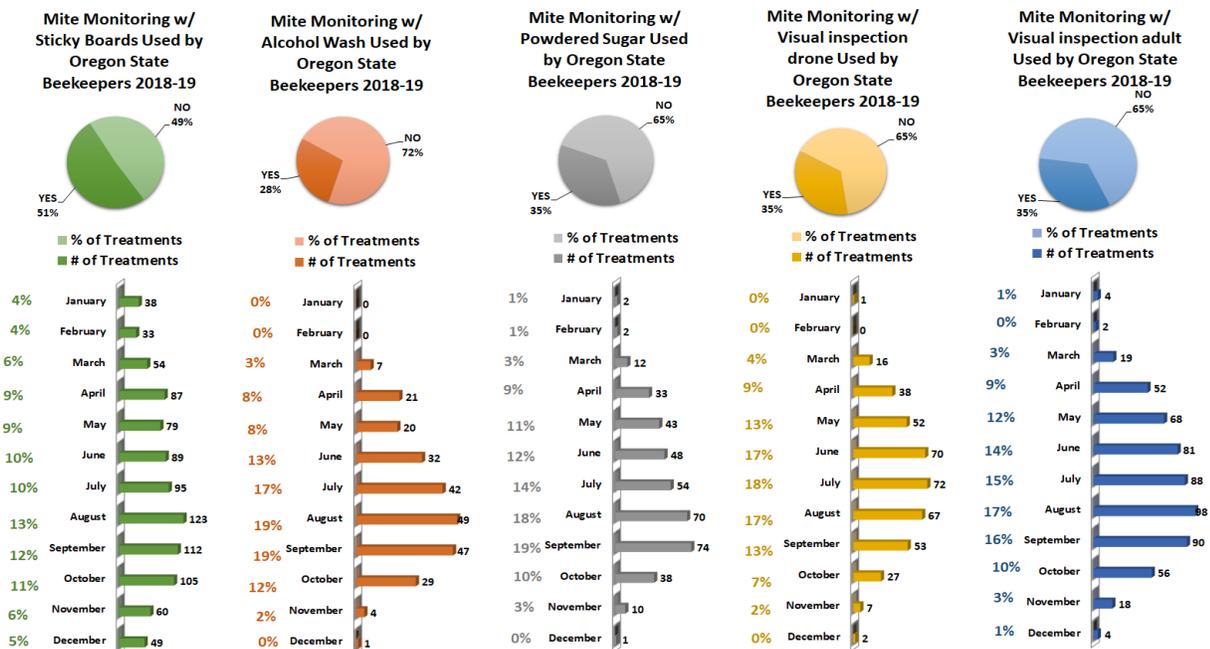
adults was 3 less individuals (117) but same 35%. Alcohol wash was used by 96 individuals, 28% of the respondents. LCBA members use sticky boards more (90% did so) and are less likely to use visual inspection. Figure 13 show LCBA and statewide results.



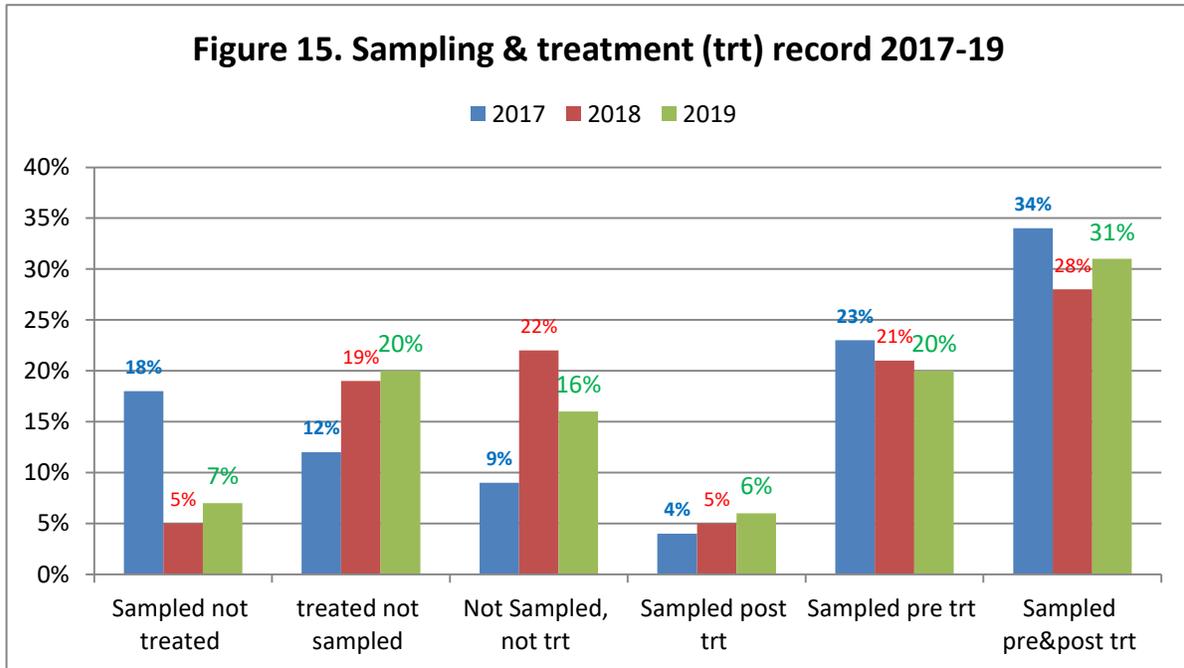
Individuals use more than one monitoring technique (1.7/individual by Lane and 1.8/individual statewide). In past 5 years, the use of sticky boards has decreased in use and both alcohol wash and powdered sugar shake have increased in use statewide.

Most sampling to monitor mites was done in July – September, as might be expected since mite numbers change most quickly during these months and results of sampling can most readily be used for control decisions. See Figure 18 below for number of months each of the 5 sampling methods were used.

Figure 14



The most common sampling of respondents in 2017-18 was both pre and post-treatment (31%), as was the case the previous 2 years. Sampling just pre-treatment was similar each year; sampling just post treatment has been increasing, but is less commonly practiced (20% pre vs 6% post in 2019). Treatment without sampling has increased in last 3 years. Data for statewide beekeepers last three years in Figure 15.



It is important to KNOW mite numbers. Less effective mite monitoring methods include sticky (detritus) boards below the colony (often so much detritus drops onto a sticky board that picking out the mites can be hard, especially for new beekeepers) but sticky boards used for a day can help confirm the usefulness of a treatment when inserted post treatment. Visual sampling is not accurate: most mites are not on the adult bees, but in the brood. Unfortunately looking for mites on drone brood is also not effective as a predictive number but can be used as an early warning that mites are present; if done, look at what percentage of drone cells had mites.

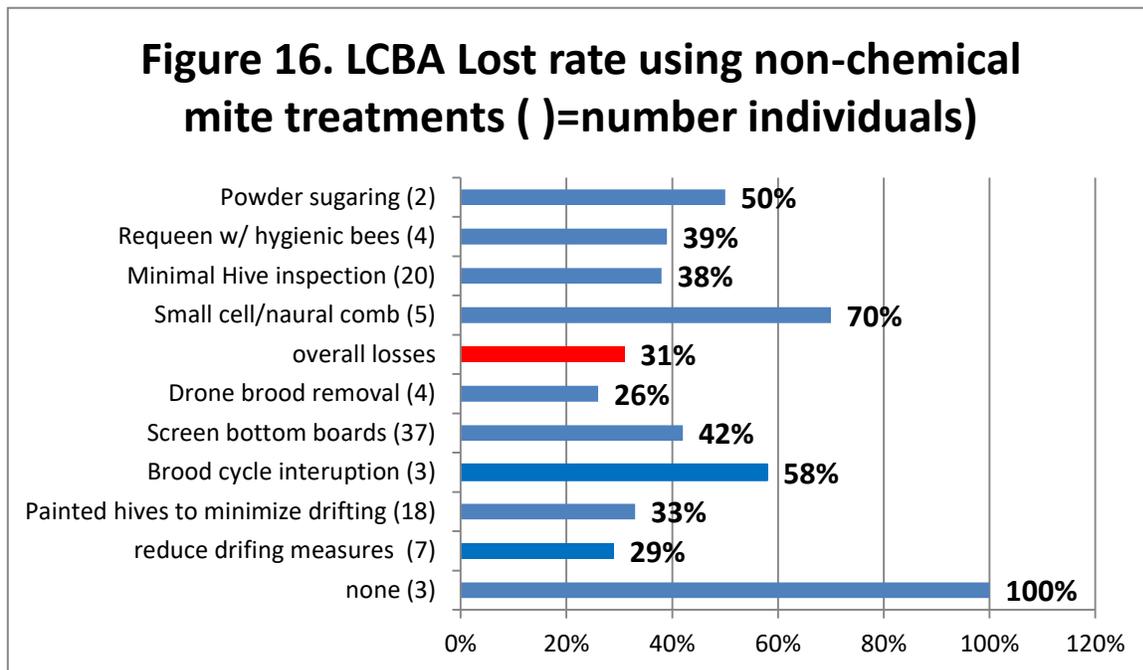
See ***Tools for Varroa Monitoring Guide*** www.honeybeehealthcoalition.org/varroa on the Honey Bee Health Coalition website for a description of and to view videos demonstrating how best to do sugar shake or alcohol wash sampling. The Tools guide also includes suggested mite level to use to base control decisions based on the adult bee sampling. A colony is holding its own against mites if the mite sample is below 2%. It is critical to not allow mite levels to exceed 2% during the fall months when bees are rearing the fat fall bees that will overwinter. It is also the most difficult time to select a control method (if one is deemed needed) as potential treatment harm may negatively impact the colony. We are seeing more colonies suddenly disappear (abscond?) during the fall, which may be related to the treatment itself.

Mite control treatments

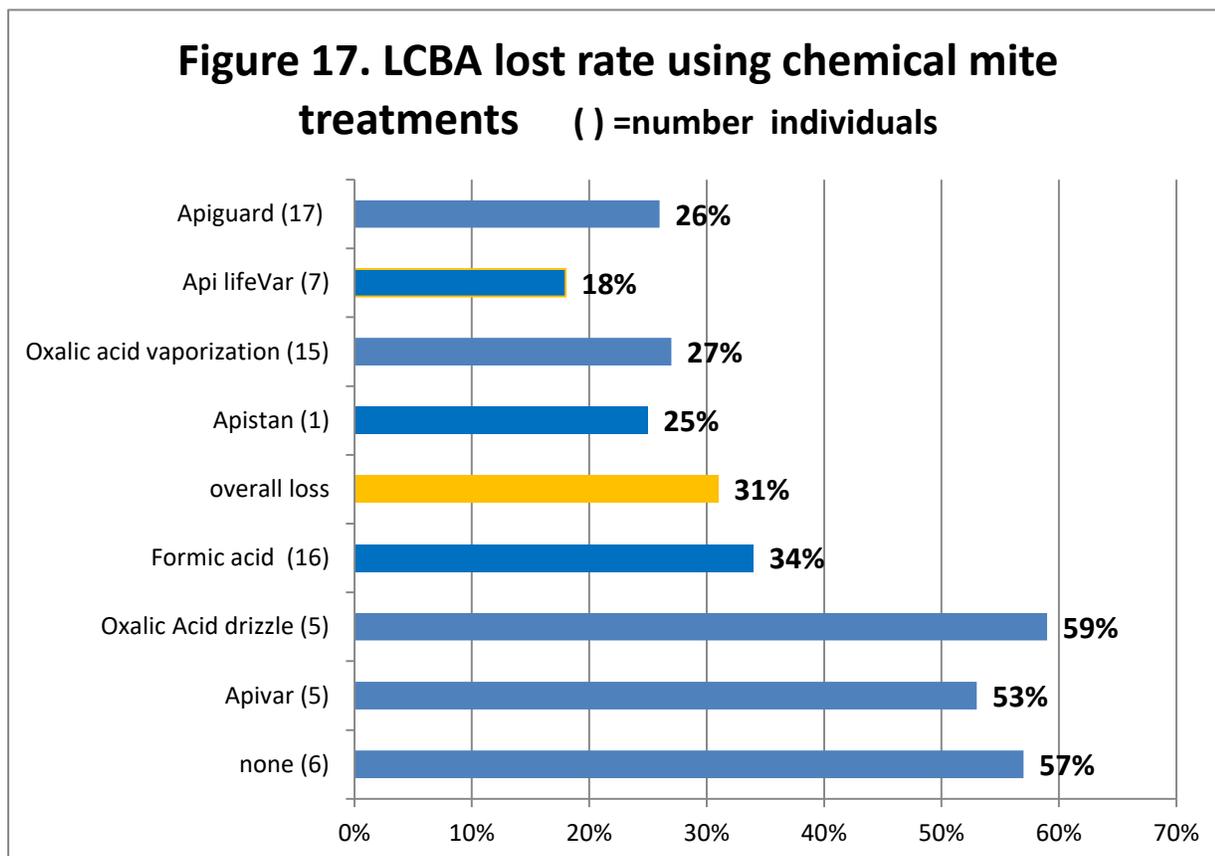
The survey asked about non-chemical mite treatments and also about use of chemicals for mite control. Fifty one individuals (12%), statewide said they did not employ a non-chemical mite control and 99 individuals (24%) did not use a chemical control. Three LCBA individuals said they used no non-chemical treatment last year and had a 10% loss. Six LCBA members did not use a chemical control; they had a 57% loss level.

Non-Chemical Mite Control: Of nine non-chemical alternatives offered on the survey (+ other category,) 10 individuals used one method, 9 used two, 15 used three, 6 used 4 and 1 used 5 managements. Those using one had 20% loss while the 7 using 4 and 5 had a 38% loss level. Use of screened bottom board was listed by 37 individuals. The next most common selection was minimal hive inspection (20 individuals. Neither had loss levels below the overall LCBA average. The use of the remaining 7 selections are shown in Figure 16; number of individuals in (), bar length represents average loss level of those individuals using each method.

The only two treatments that had losses below the overall loss rate was reduced drifting measures and drone brood removal. Statewide three of the non-chemical alternatives have demonstrated reduced losses over past 4 year. Reducing drifting such as spreading colonies, different colony colors in apiary has demonstrated a 13% better survival, Brood cycle interruption an 11% better survival and drone brood removal a minor 2% advantage. Some control alternatives demonstrate an advantage on one or two years but overall no improvement.



Chemical Control: For mite chemical control, 6 LCBA individuals (14% of total respondents) used NO chemical treatment. Those using chemicals used at rate of 1.7/individual. Sixteen individuals (42%) used one chemical, 14 used two (medium) eight used 3. Seventeen LCBA Beekeepers (45% of total chemical users) indicated they most commonly utilized Apiguard followed by sixteen who indicated used of Formic acid; only 2 said they used Formic Pro and one said they made their own formic treatment using shop towels and 15 individuals who used oxalic acid vaporization. Figure 17 illustrates number of uses () and bar length indicates the loss rate for those using that chemical.



Consistently the last 3-4 years five different chemicals have helped beekeepers improve better survival. The essential oils Apiguard and ApiLifeVar have consistently demonstrated the lowest loss level. Apiguard has a 31% better survival and ApiLifeVar has a 30% better survival record over past 4 years. Apivar use, the synthetic (amitraz), has demonstrated a 29% better survival over past 4 years (2016-19). Oxalic acid vaporization over past 3 years has a 13% better survival (the survey did not differentiate Oxalic vaporization from drizzle in 2016). Formic acid demonstrated a 14% better survival but this product has changed and how we use it is changing so this information is more difficult to tease out of the data. This past season for LCBA Apivar users had a 53% loss.

The monthly use of Apivar (blue line), essential oil (red line) or an acid (green line) is shown in Figure 23 for 2016-17 season. Further review is needed to determine if the timing of treatments was more effective than at other times for the various chemicals.

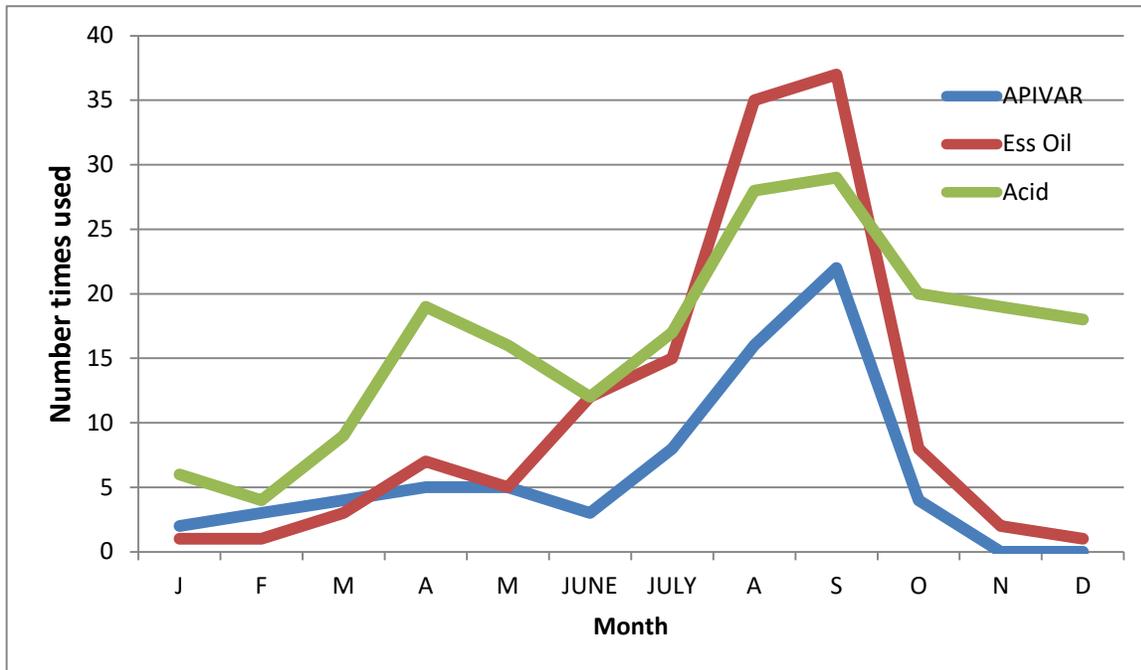


Figure 18

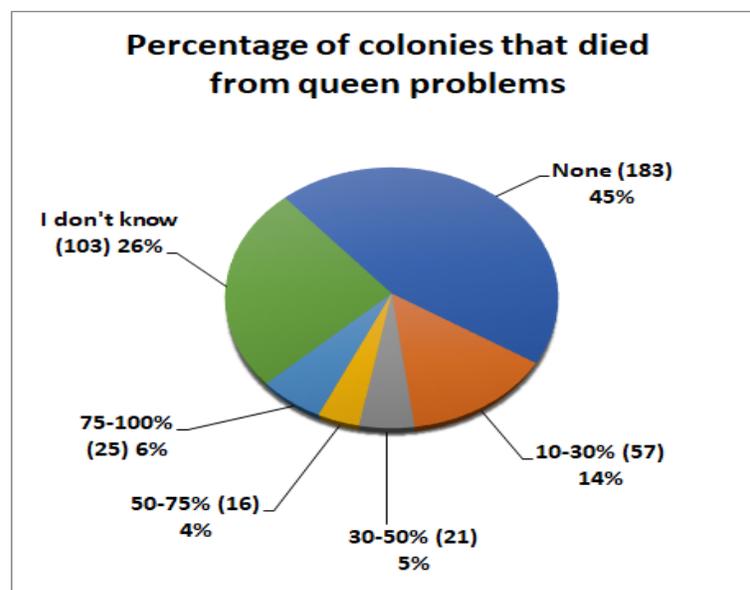
Antibiotic use

Eighteen individuals (4%) statewide used Fumigillan (for Nosema control) of which 4 were LCBA members; their loss rate was 33%. One LCBA individual indicated use of terramycin.

Queens

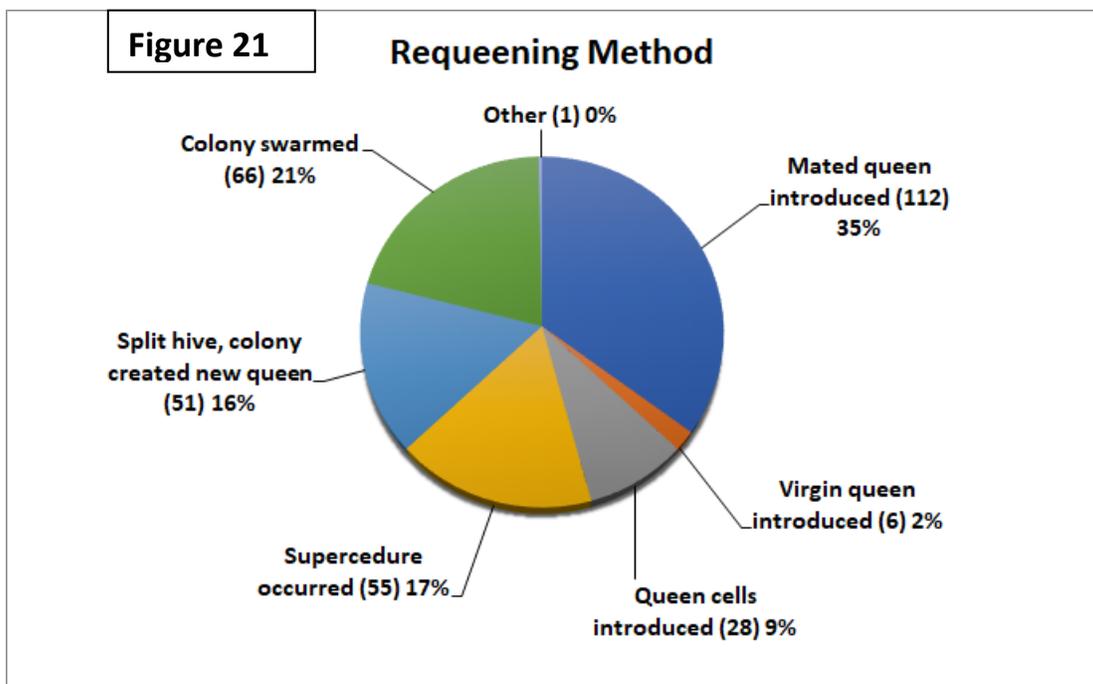
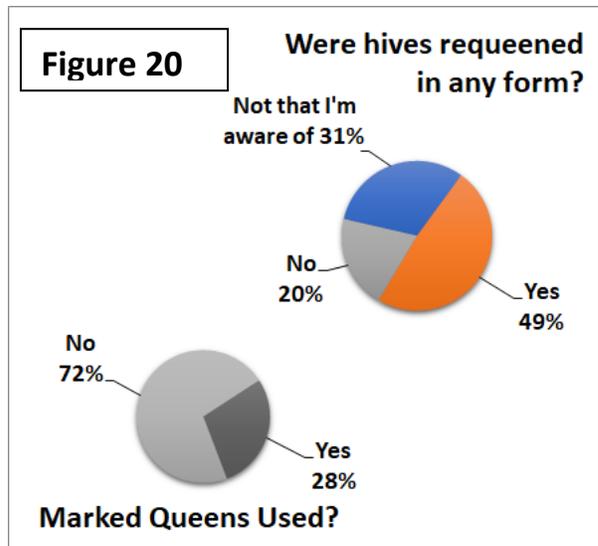
We hear lots of issues related to queen “problems”. One hundred twenty nine individuals statewide subdivided queen related issues from 10 to 100% of their hives. One hundred eighty three (44) said none; an additional 103 individuals (24.5%) said they didn’t know. The number and percent statewide is expressed in pie chart Figure 19. Fir LCBA 15 individuals (34%) said none and 11 said don’t know (25%).

Figure 19



Queen events can be a significant factor contributing to a colony not performing as expected. We asked if you had marked queens in your hives. Twenty eight percent statewide said yes while in Lane it was 39%. The related question then was did you or your bees replace their colony queen? Forty-Forty nine percent statewide said yes, 31% said no. and the remainder 'not that that I am aware of.' For LCBA 57% said yes and 23% said no. Figure 20 shows statewide.

One technique to reduce mite buildup in a colony is to requeen/break the brood cycle. The question "How did bees/you requeen" received 318 responses (more than one option could be checked) as illustrated in Figure 21 for statewide. LCBA responses were 34% (15 individuals) said they introduced with a mated queen, 1 used virgin queens and 2 used queen cells. Fifteen individuals said their hives were requeened by bees (4 splits, 4 supersedure and 7 via swarming). That means too few were seeking to use this valuable tool for mite control.



Closing comments

This survey is designed to 'ground truth' the larger, national Bee Informed loss survey. Some similar information is additionally available on the BeeInformed website www.beeinformed.org and individuals are encouraged to examine that data base as well. The BeeInformed survey is measuring the larger scale OR beekeepers not the backyarders (See Figure 6 of Oregon state report.) Reports for individual bee groups are customized and posted to the PNW website.

We intend to continue to refine this instrument each season and hope you will join in response next April. If you would like a reminder when survey is open please email us at info@pnwhoneybeesurvey.com with “REMINDER” in the subject line. We have a blog on the pnwhoneybeesurvey.com and will respond to any questions or concerns you might have.

Thank You to all who participated. If you find any of this information of value please consider adding your voice to the survey in a subsequent season. Dewey Caron June 2019

