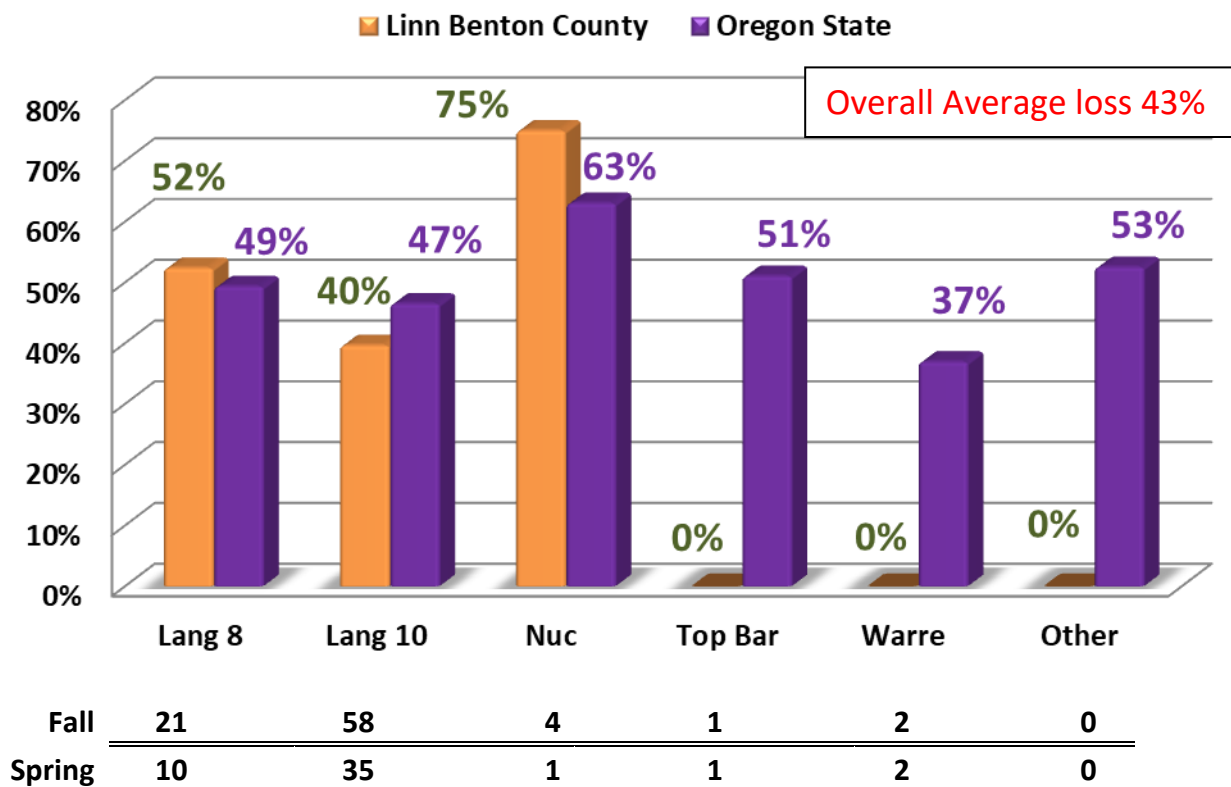


## 2018-19 LBBA Winter Loss Report PART 1 by Dewey M. Caron

Oregon beekeepers were directed to a web-based survey document in a continuing effort to define overwintering losses/successes. This was the 10<sup>th</sup> year of such survey activity and the fourth to include a 10+ beekeeper response from Linn Benton Beekeepers. I received 416 responses from Oregon backyarders and 98 from Washington beekeepers keeping anywhere from 1 to 38 OR/40 WA colonies. Twenty two LBBA Association members completed a survey (double last year and 1 less than previous year LBBA response rate).

Overwintering losses of LBBA respondents, as for total OR beekeepers, was determined for number of fall colonies minus number of spring survivors by 5 hive types. Data are shown in Figure 1 with LB compared to statewide loss numbers. **LBBA Overall average loss rate 43%**, 5 percentage points lower than statewide, largely due to the better survivorship of Langstroth 10 frame colonies (40%). No top bar or Warré or other hives were lost but they totaled only 3 colonies (see number of fall and spring numbers below graph).

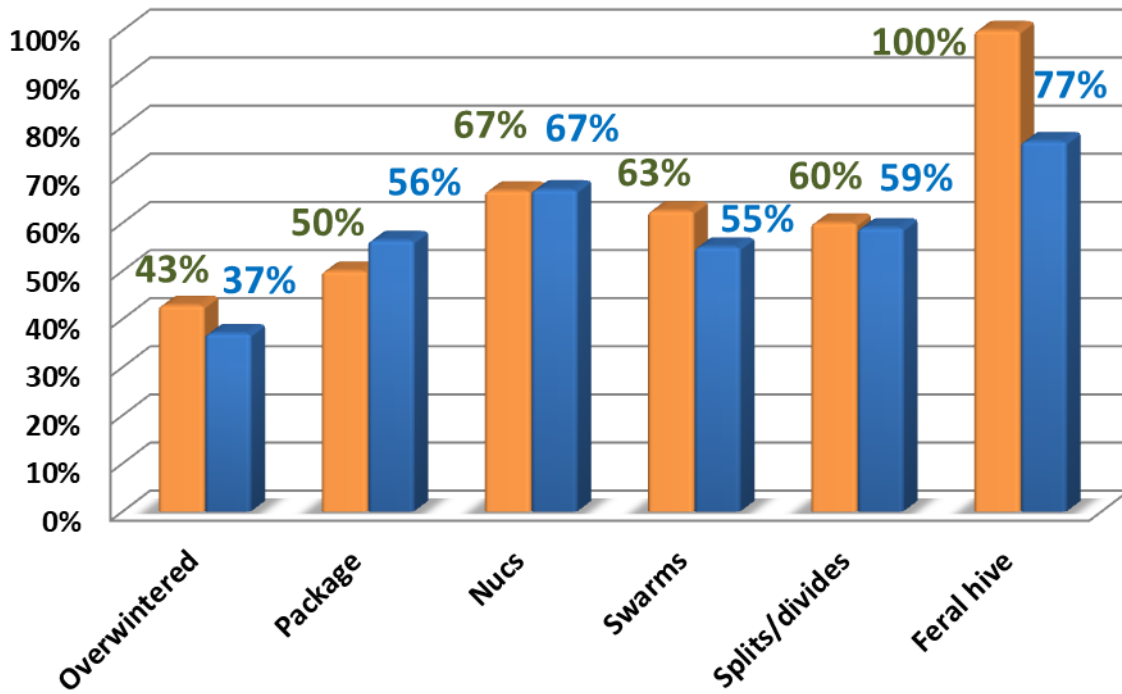
**Figure 1 2018-19 Winter Honeybee Loss % by Hive Type**



The survey also asked for hive loss by hive origination. Overwintered colonies, for both LB and statewide beekeepers, did better. Data comparing LB with statewide shown in Figure 2.

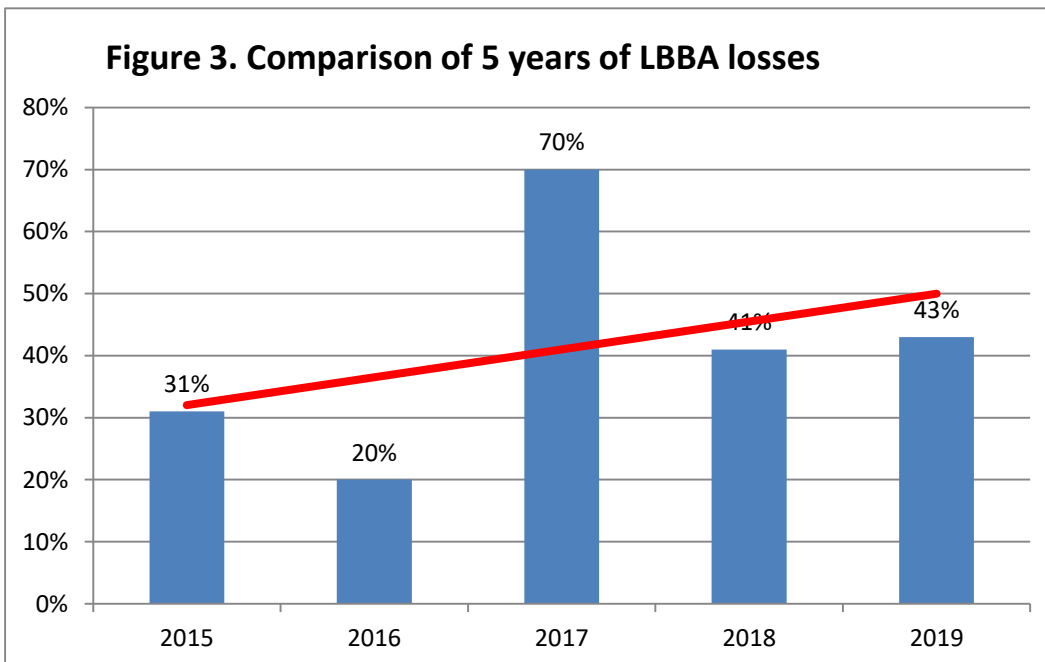
**Figure 2 2018-19 Winter Honeybee Loss % by Origination**

■ Linn Benton County ■ Oregon State



Fall	56	4	6	32	20	1
Spring	32	2	2	12	8	0

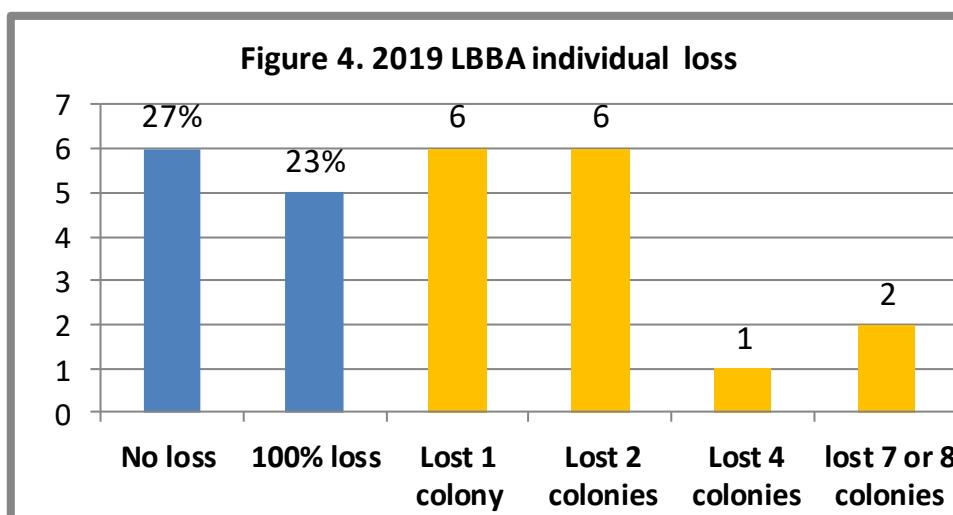
**Figure 3. Comparison of 5 years of LBBA losses**



In the 2016-2017 overwintering period LBBA members had the highest loss rate of any of the OR associations and the year earlier (2015-2016) LBBA had the lowest rate of state bee groups. The remaining 3 of past 5 years have been closer to the statewide numbers. Losses this year were just above the 5 year average (40.5%). More worrisome, trend line shown in red shows increasing losses over the 5 year period. Data shown in Figure 3.

The 22 LBBA survey respondents were all single digit beekeepers. Twelve individuals (55%) had 1, 2 or 3 fall colonies, 6 individuals had 4 to 6 colonies and 4 individuals (18%) had 7, 8 or 9 colonies. Six respondents had 1 to 3 years of beekeeping experience (27%), 9 individuals had 4 to 6 year experience (41% - Median was 5 years), 5 had 7 or 8 years experience and 2 individuals (9%) had 10+ years experience, with 15 the highest. Thirteen individuals (59%) had a mentor available as they were learning beekeeping.

Six individuals had no loss and 5 experienced 100% loss. Six individuals lost either one or two colonies, 1 each lost 4, 7 and 8 colonies, the highest loss for any individual. Two individual respondents kept bees in more than a single apiary.



### 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 30 total listing for LB, 1.9/individual, slightly less than statewide. Seven LB individuals listed varroa (40% of respondent choices), followed by queen failure (34%) and weak in fall (25% each); 6 individuals chose Don't know (27%). Choices were very similar to last year. Table compares LB with % statewide selections.

	Varroa mites	Poor wintering conditions	Weak in fall	Queen failure	Starvation	CCD	Yellow jackets	Other
LBBA (#)	7	2	4	4	3	1	2	3
(%)	(44%)	(12.5%)	(25%)	(25%)	(19%)	(6%)	(12.5%)	(19%)
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 25%. Nine LB responses (41%) were 15% or less, 18% of respondents selected 25% and 14% said 33%; 2 individuals said 50% and 1 said 100% acceptable.

**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](http://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. LBBA individual choices varied from zero to 100%, 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 colonies are not as healthy as they should be. LBBA members also considered queen failure and weak in fall as reasons for high losses.**

## **Management selections and losses**

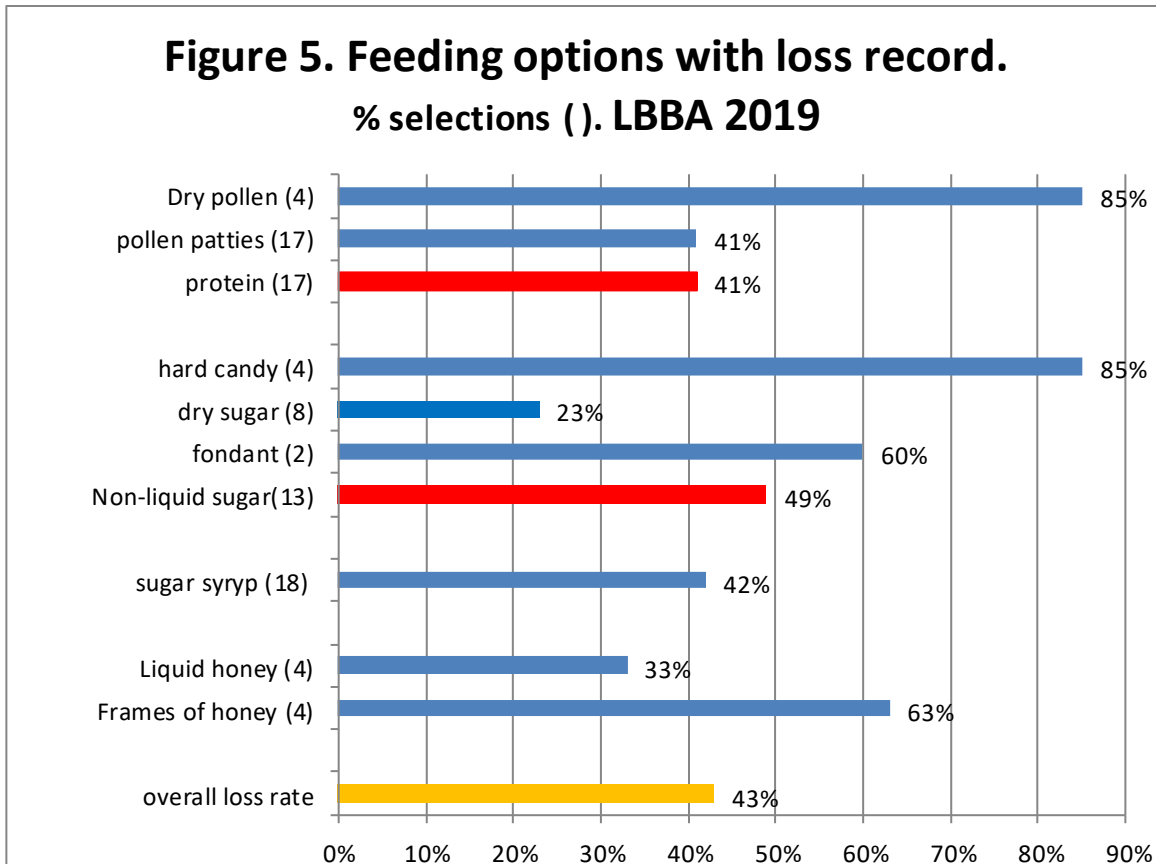
We asked in the survey for information about some managements practiced by respondents. Multiple responses were accepted. The survey inquired about feeding practices, wintering preparations, sanitation measures utilized, screen bottom board usage, mite monitoring, both non-chemical and chemical mite control techniques and queens. Respondents could select options and there was always a none and other selection possible. This analysis seeks to compare responses of this past season to previous survey years.

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:** Linn Benton beekeeper survey respondents checked 58 feeding options = 2.8/individual and every respondent had at least one option indicated. Four individual (19%) selected a

single choice and had 55% loss, 5 individuals had 2 choices and the best survival (31%), the 10 that indicated 3 selections also had improved survival (36% loss) but the 4 that had 3 and the one with 6 choice did not show improved survival (65% loss). Clearly doing more than one thing of feeding choices helped improve survival but within limits.

Percent colony losses are presented in Figure 5 for feeding options with numbers of LBBA member numbers in ( ). Thirteen individuals (72% of respondents) said they used sugar syrup. They had a 49% loss rate, similar to the overall LBBA average of 48% which was also the case for statewide beekeepers.



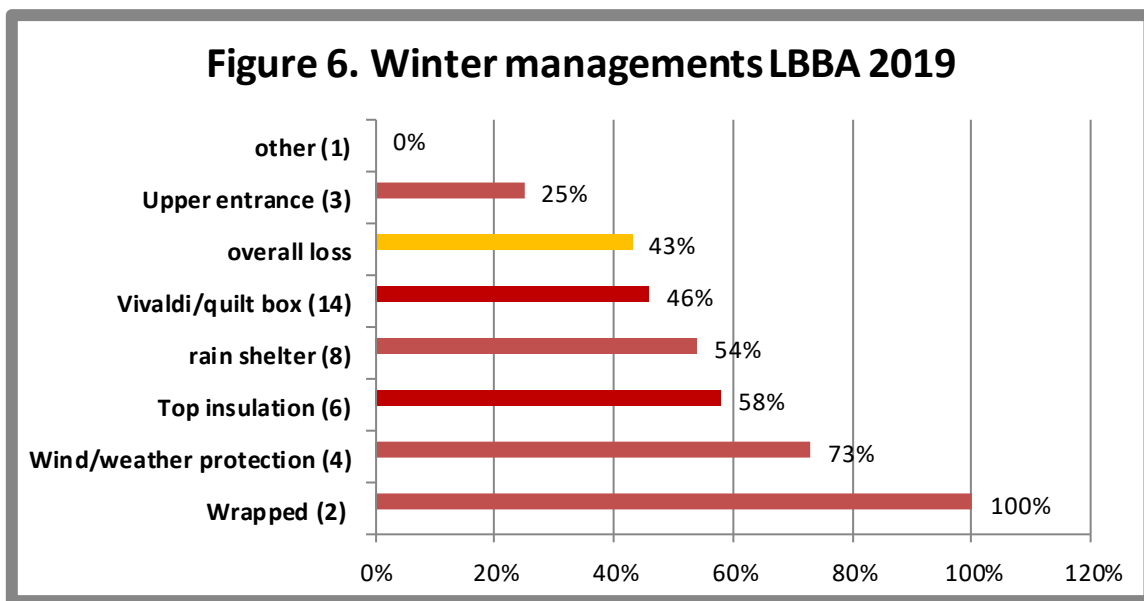
The 17 LBBA individuals (50% of respondents) that fed protein had only a two percentage point lower loss, 41%, compared to overall loss of 43%. Those using non-liquid sugars (13 LBBA individuals) had a higher loss level (49%) compared to overall LBBA average; statewide beekeepers had a 5 point improved survival especially those feeding fondant or using hard candy. The 8 dry sugar feeders within LBBA did have improved survival. Statewide fondant feeders had improved survival.

Feeding of protein improved survival marginally both statewide and for Central Oregon beekeepers. Feeding honey did not improve survival for statewide beekeepers but the 4 individuals feeding liquid honey had a 25% improvement in survival.

**WINTERING PRACTICES:** Three LBBA individuals reported doing no winterizing; statewide losses were 63% for those doing no winterizing managements, 15 percentage points higher loss than overall loss of 48% but the loss level for these 3 individuals was a mere 17%. Multiple selections were possible and in fact the 19 LBBA members who did winterize averaged 2.3/managements per individual. Nine individuals chose a single management and had a 34% loss level, 6 individuals checking 2 had a 65% loss level. Doing more did not improve survival; the 3 individuals who did 3 and the 3 indicating 4 and 5 had 60 and 50% loss levels respectively.

The most common wintering management selected was using a Vivaldi board/quilt box - 14 individuals, 74% of respondent members. Figure 6 shows number of individual choices for LBBA members in ( ) and percent loss of each selection.

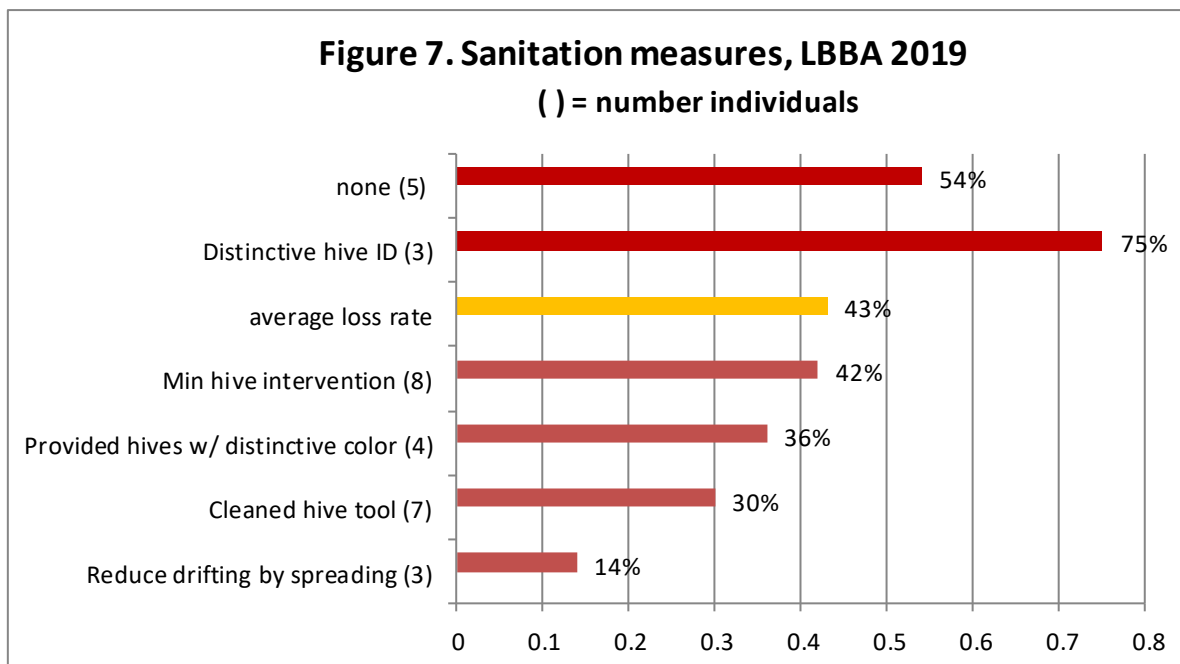
Over the past three years no single winterizing management improved survival each survey year. However 5 managements improved survival in 2 of the 3 years. Those managements were equalizing colonies in the fall, use of the quilt box/Vivaldi board/moisture trap at top of colony, an upper entrance (most Vivaldi boards have an upper entrance built into the equipment), wrapping colonies, and wind/weather protection. Only two managements, upper entrance (3 individuals) and other (1 individual) improved Linn Benton beekeeper overwintering. The other was use of a light bulb in the single colony; this single colony also had a rain shelter, was wrapped had Vivaldi Board and wind/weather protection (i.e. 5 managements).



**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. We received 826 responses for this survey question statewide, 39 were LBBA member responses. Sixty eight individuals statewide (16%) and 5 among LBBA (23%) said they did not practice any of the offered alternatives. Loss rate statewide (52%) was 4 percentage points higher than the overall loss rate of 48%; for the five Linn Benton respondents, loss rate was 64%; it and distinctive hive

ID were the only 2 alternatives that did not show improved survival. Seven members had 1 selection (loss rate 26%), 5 made 2 choices (36% loss), 3 selected 3 managements (12% loss) and 2 had 4 (44% loss). LBBA members made 2.4 selections/individual.

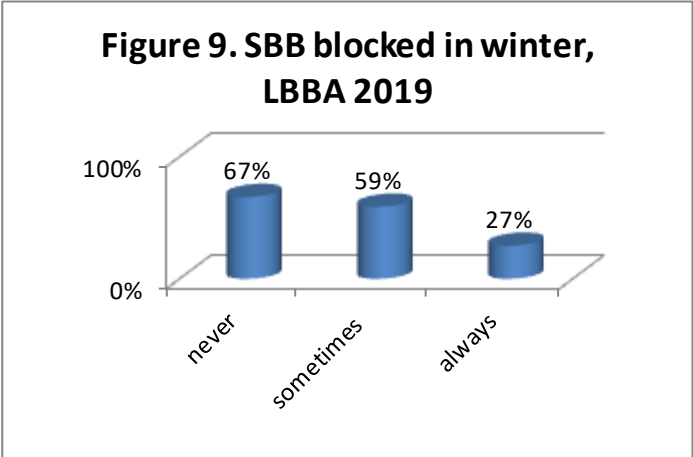
The two sanitation choices that did seem to improve survival statewide was reduce drifting by spreading colonies out and providing hives with distinctive ID /doing other hive ID measures. The later showed higher losses for Lin Benton beekeepers. See Figure 7. Number in ( ) is number statewide/number LBBA individuals.



**SCREEN BOTTOM BOARDS:** 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 the recent survey 63 individuals (20%) statewide among them a single LBBA members (6%) said they did not use screen bottom boards. Loss level statewide was 48% for the small number of non-users and 49% for those who used SBB (one percentage point difference is not significant); the loss rate of the single individual not using was 0%.

This one percentage point difference means that in the PNW surveys there have been differences of 1, 1, 2 and 13.4 percentage points better survival over 4 years (i.e. better survival), and for the fifth year 8 percentage points lower survival. **The five year average of SBB use, 42.8% loss level of those using SBB on all or some of their colonies and 44.2% for those not using SBB. The 3% positive gain illustrates how SBB are very minor in improving overwinter survival.**

The survey asked if the SBB was left open (always response) or blocked during winter. This past season 23% of individuals statewide said they always blocked SBB during winter; statewide loss rate was 37%; one hundred fourteen individuals statewide (44%) did not block them during winter (never response), of which 5 individuals were LBBA members. Statewide never responders had a 42% loss rate; i.e. statewide there was a 5 percentage points higher survivorship for those who blocked. For LBBA 14 individuals blocked with 27% loss and 5 never blocked had 61% loss a difference of 34 percentage points. **Comparing the always and sometimes left open with the closed in winter response reveals an average 10 percentage point difference (over 5 years) in favor of closing the SBB over the winter period for OR beekeepers.** See Figure 9 for Linn Benton.



There is no good science on whether open or closed bottoms make a difference in overwintering but some beekeepers “feel” bees do better with it closed overwinter. Five years of comparison shows those closing the screen during winter did have a 10 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.

### Mite monitoring/sampling and control management

We asked percentage of Oregon 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 277 individual respondents (67%) said they monitored all their hives. Losses of those individuals monitoring was 51%. Seventy six (18%) reported no monitoring; they had a higher loss rate of 59% loss. 63 individuals reported monitoring some of their colonies; they had a 50% loss.

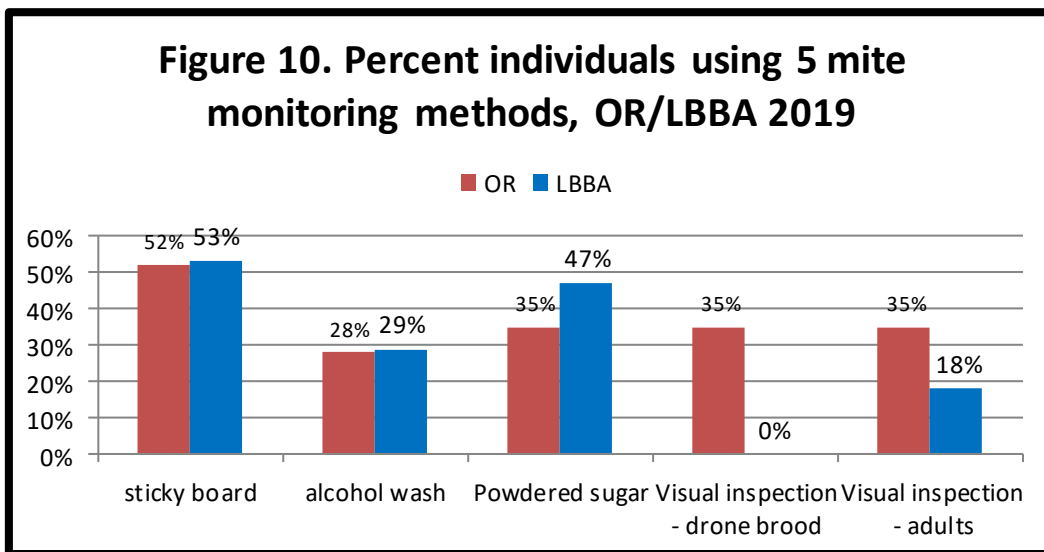
	<b>ALL Colonies Monitored</b>	<b>% loss</b>	<b>SOME Colonies Monitored</b>	<b>% loss</b>	<b>No colonies Monitored</b>	<b>% loss</b>
	<b>% individuals</b>		<b>% individuals</b>		<b>% individuals</b>	
2019	67%	51%	15%	50%	18%	59%
2018	63%	38%	14%	26%	26%	49%
2017	63%	43%	15%	60%	22%	48%
3 year loss age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

At last statewide, monitoring alone is a means towards improved winter survival. The table above compares % individuals and % winter loss for individuals statewide who monitored all colonies

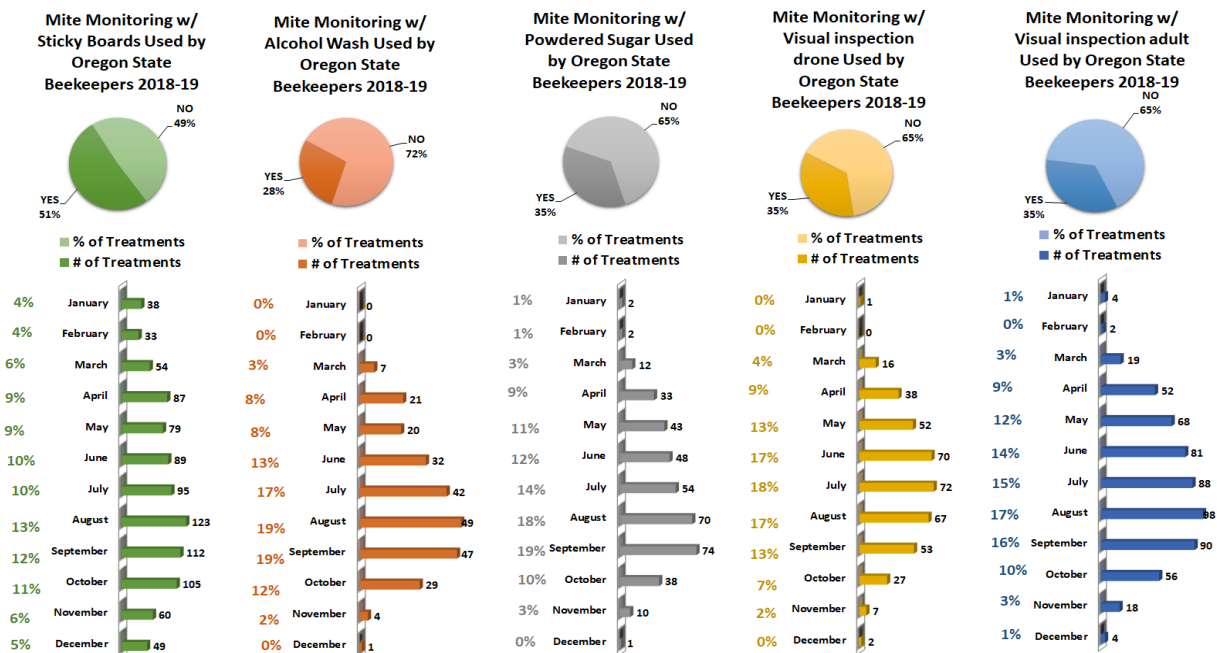


compared with those who monitored none. The 14-15% who monitored some colonies was variable but 3 year average mirrors those who monitored all colonies.

Among LBBA respondents, 14 individuals (64%) monitored all colonies; they had 26% loss). Five individuals (23%) did no monitoring and they had an 85% loss; the 3 monitoring some colonies had 31% loss. In order of popularity of use, Sticky boards were used by 52% of total respondents statewide, 35% of individuals used powdered sugar monitoring and visual inspection of drones and adults. Alcohol wash was used by 28% of the statewide respondents. Among LBBA respondents there was slightly higher use of powdered sugar and no use of looking for mites on drone pupae. Alcohol wash and powdered sugar are the 2 most reliable means of monitoring mite load in colonies while visual looking on adults for mites or from drone brood are not reliable methods of determining how many mites are in a colony.



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 above for number of months each of the 5 sampling methods were used.

**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.

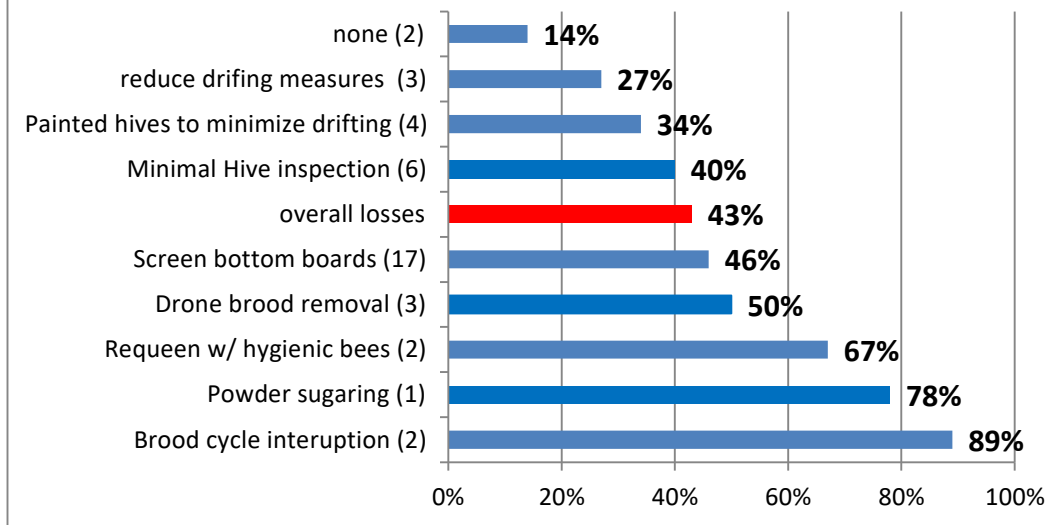
See ***Tools for Varroa Monitoring Guide*** [www.honeybeehealthcoalition.org/varroa](http://www.honeybeehealthcoalition.org/varroa) on the Honey Bee Health Coalition website for a description of and to view videos demonstrating how best to do sugar shake or alcohol wash sampling. The Tools guide also 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, same percentage as last year, said they did not employ a non-chemical mite control and 99 individuals (24%), nine more than last year, did not use a chemical control. Those 51 individuals statewide (12%) who did not use a non-chemical treatment reported a 50% winter loss (for LBBA the two individuals not using a non-chemical treatment had 14% loss), while those who did not use a chemical control statewide lost 69% of their colonies; for LBBA, 4 individuals (18%) not using any chemical had a loss rate of 79%. The individual options chosen for non-chemical and chemical control are discussed below

**Non-Chemical Mite Control:** Of nine non-chemical alternatives offered on the survey (+ other category,) 89 individuals statewide used one method, 118 used two, 95 used three, 54 used 4 or 5 and 9 individuals used 6. Among LBBA respondents 9 used one (had 36% loss), 6 used 2 (35% loss), 4 used 3 selections, while 2 used 4; those using 3 had 45% loss and individuals with 4 had 91% loss. More is not better.

**Figure 12. Lost rate using non-chemical mite treatments, LBBA ( )=number individuals)**



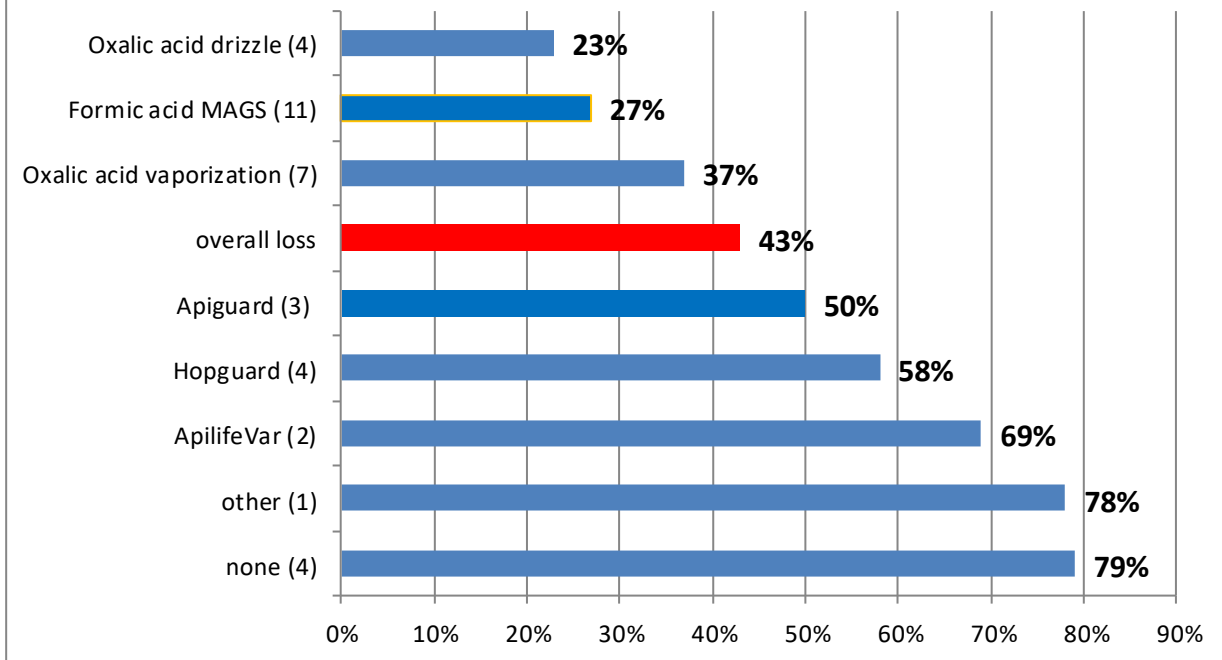
Use of screened bottom board (17 of 22 individuals) was most common among LBBA respondents. SBB use shows a slight disadvantage toward survival. The 2 individuals using none of the non-chemical treatments had the best survival. The treatments that showed improved survival for LBBA were reduce drifting and painting hives to minimize drifting. Reducing drifting measures such as spreading colonies and different colony colors in apiary has demonstrated a 13% better survival statewide, Brood cycle interruption statewide realized an 11% better survival and drone brood removal a minor 2% advantage but neither did as well for LBBA member respondents.

**Chemical Control:** For mite chemical control, 99 individuals (24% of total statewide respondents) used NO chemical treatment Statewide and for LBBA members 4 individuals (18%) used no chemical treatments. Those using chemicals used at rate of 1.9/individual (slightly higher use than statewide 1.6/individual). Statewide, one hundred thirty three individuals (42%) used one chemical, 122 used two (medium), 54 used 3 (17%), 7 used 4 and one used 5. With Linn Benton respondents 7 individuals (39%) used one chemical (they had a 43% loss, same as overall). Use of 2 chemicals 7 individuals 19% loss and 3 (3 individuals 31% loss) improved survival. One individual used 4 chemicals but had 78% loss.

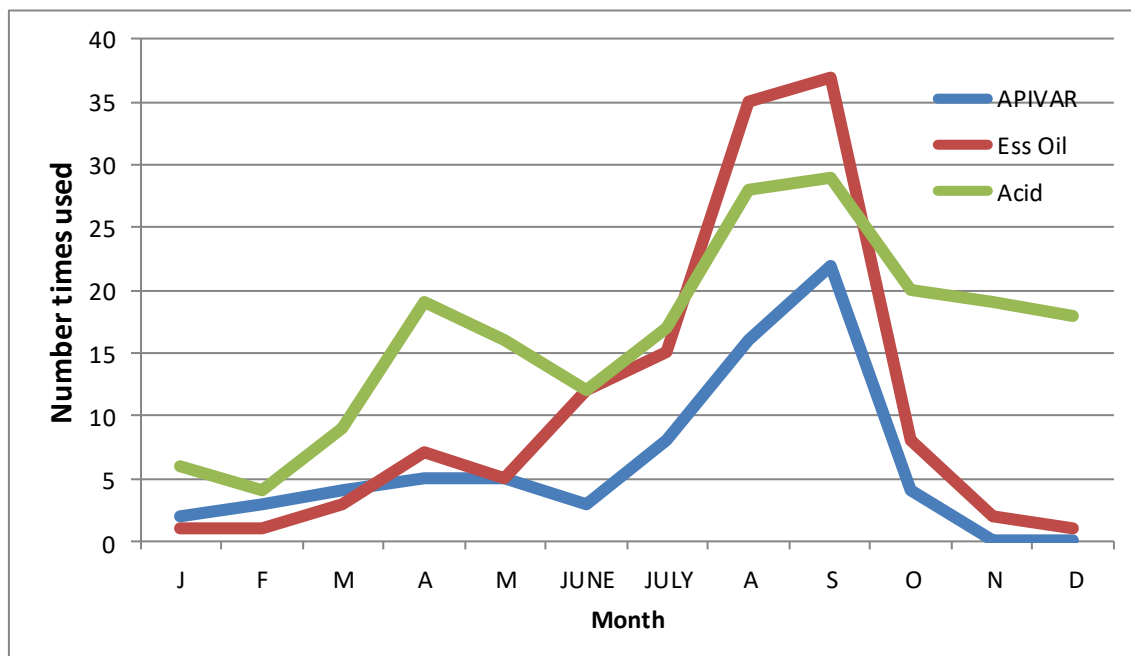
One hundred fifty OR Beekeepers (23% of total chemical uses) indicated they most commonly utilized MAQS, formic acid; among LBBA respondents 11 individuals used MAQS, they had a 27% loss. Six individuals used oxalic acid drizzle and seven used oxalic; both had improved survival. Figure 13 illustrates 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 statewide realize better survival. The essential oils Apiguard and ApiLifeVar have consistently demonstrated the lowest loss level statewide; Apiguard had a 31% better survival and ApiLifeVar a 30% better survival record over past 4 years statewide. Neither demonstrated improved survival for LBBA members this past year.

**Figure 13. Lost rate using chemical mite treatments LBBA ( ) =number individuals**



Apivar, the synthetic (amitraz), has demonstrated a 29% better survival statewide over past 4 years (2016-19); no LBBA respondent used it. Oxalic acid vaporization over past 3 years has a 13% better survival. No LBBA members indicated use this past season. Oxalic acid vaporization demonstrated 13% improvement in survival the last 3 years (survey did not differentiate Oxalic vaporization from drizzle in 2016) and was helpful for LBBA users. Formic acid demonstrated a 14% better survival statewide 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 example Formic Pro seemed to perform better than the traditional formic MAQs pads. Seven LBBA members found it helpful as well.

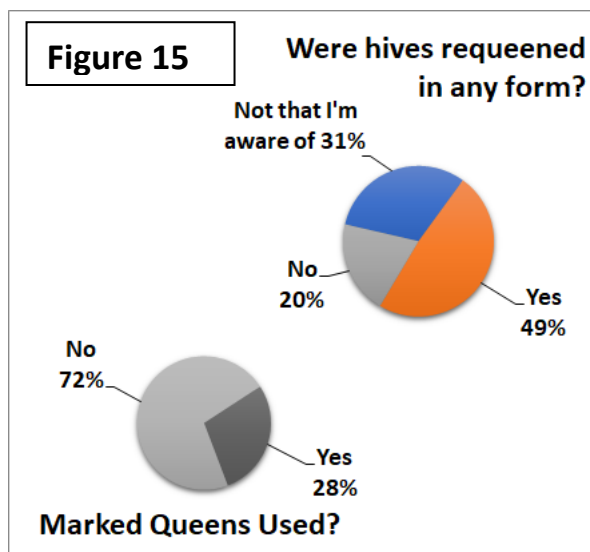


The monthly use of Apivar (blue line), essential oil (red line) or an acid (green line) is shown in Figure 14 for 2016-17 season. Further review is needed to determine if the timing of treatments was more below for statewide users. The acids and oils are used spring and post-harvest whereas most Apivar use is following removal of supers.

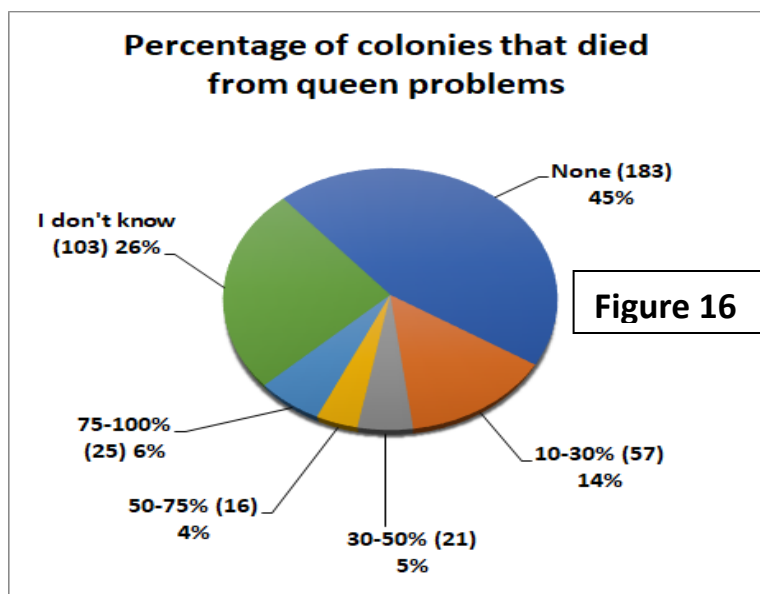
## Queens

We hear lots of issues related to queen “problems”. Statewide 129 individuals subdivided queen related issues from 10 to 100% of their hives. A larger number 183 (44%) said they had no queen problems; an additional 103 individuals (24.5%) said they didn’t know. The number and percent expressed from statewide survey is shown in pie chart Figure 15. For LBBA (50%) said no, 32% said yes and 4 said they didn’t know. Those indicating no had a 25% loss while those saying yes greater than double the loss 68%; the don’t know individuals had a 54% loss rate.

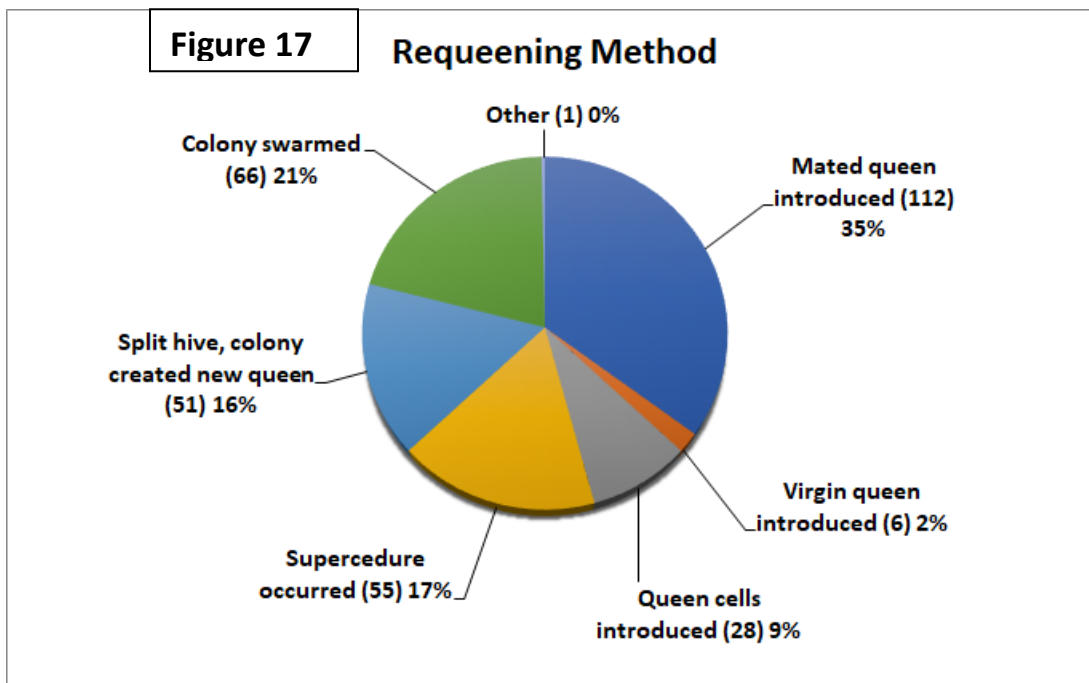
Queen events can be a significant factor contributing to a colony not performing as expected. We asked if you had marked queens in your hives. One hundred sixteen (28%) statewide said yes with considerably fewer, only 10%, saying yes in LBBA. The related question then was did you or your bees replace their colony queen? Forty-nine percent (204 individuals) said yes, 31% said no. and the remainder ‘not that that I am aware of.’ For LBBA 59% said YES and 5 (23%) no with 4 saying ‘not that I am aware of’.



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 statewide responses (more than one option could be checked); data illustrated in Figure 16. Although over one-third of respondents indicated their bees were requeened with a mated queen, more than one half (54%) indicated it was the bees that requeened via swarming, supersedure or emergency rearing statewide. Among LBBA



respondents 41% said they requeened with mated queen (8 individuals) or with queen cell (1 individuals); 64% indicated the bees requeened themselves, via supersedure (5 individuals) or swarming (7 individuals) and 2 via splits. 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](http://www.beeinformed.org) and individuals are encouraged to examine that data base as well. Recall that the BeeInformed survey is measuring the larger scale OR beekeepers not the backyarders (figure 6 of OR state loss 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](mailto:info@pnwhoneybeesurvey.com) with “REMINDER” in the subject line. We have a blog on the [pnwhoneybeesurvey.com](http://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