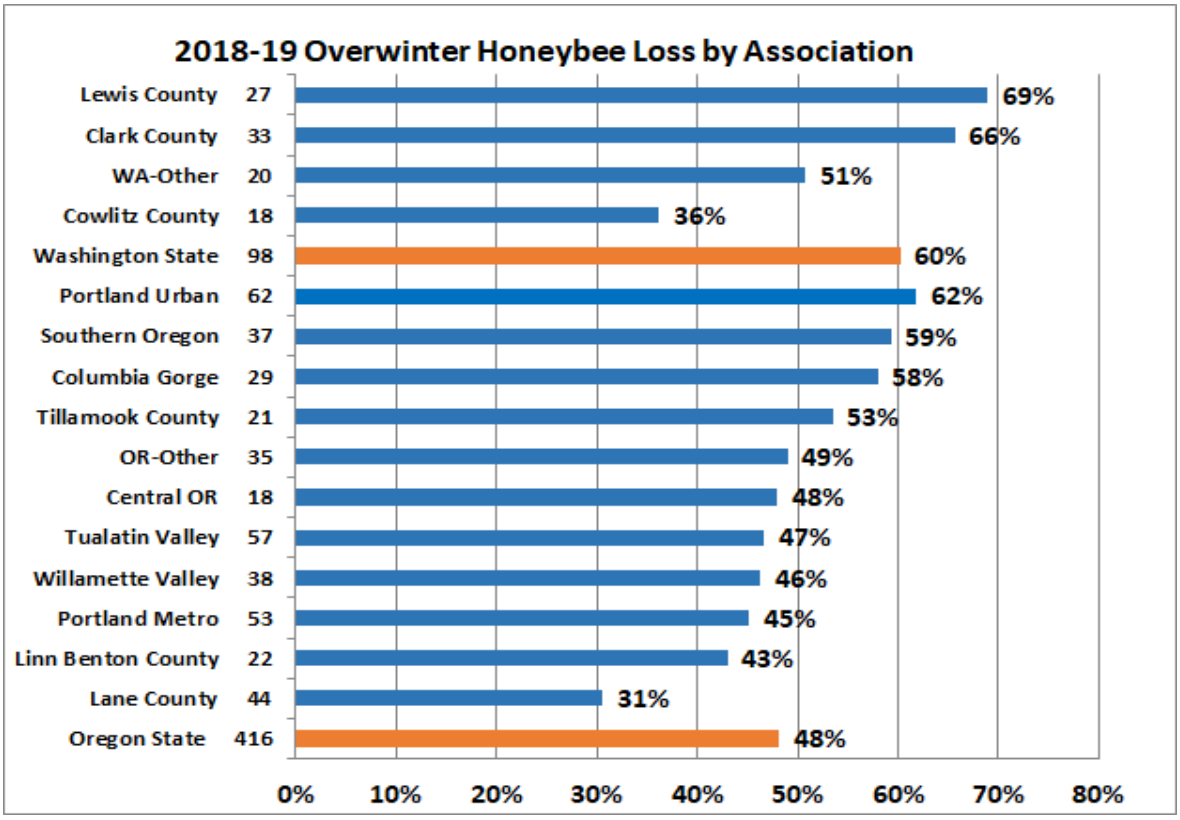
Lewis Co beekeeper Losses 2018-19 by Dewey Caron

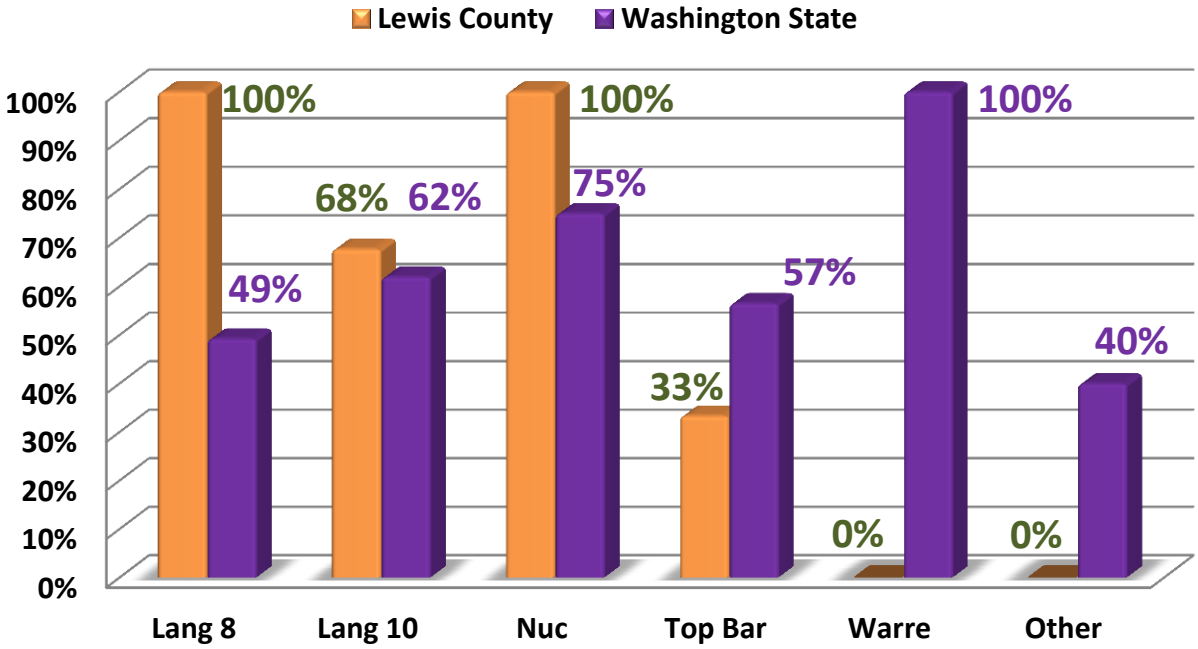
Overwintering losses of small scale Washington beekeepers was elevated by sixteen percentage points over the 2017-18 loss level (44%) returning to the high levels (60%) of 2016-17. Ninety-eight (98) WA beekeepers (six fewer than last year) supplied information on winter losses and several managements related to bee health with an electronic honey bee survey instrument www.pnwhoneybeesurvey.com. Figure 1 shows total WA & OR response. Or losses (48%) were 12 percentage points lower than those of Washington beekeepers.



Lewis Co backyard beekeeper overwinter loss = 69% loss.

The loss survey overwintering statistic was developed by our asking number of fall colonies and surviving number in the spring by hive type. Results, shown in Figure 2 bar graph, illustrates overwintering losses of 27 Lewis Co respondents compared with other Washington beekeepers. The extremely elevated Lewis losses have the unfortunate distinction of being the highest of any of the local groups. Non-traditional hives (8 in fall with 3 owners; 2 of 3 also maintained removable frame hives) had better survival (25% loss) compared to movable frame hives (68.5%); movable frames hives constituted 96% of respondent hives. Why the 12 Langstroth 8 frame hives did not survive is not known; statewide the 8 frame Langstroth hives had better survival compared to the 10 framers. Nuc losses were high but so too were high statewide.

Figure 2 **2018-19 Winter Honeybee Loss % by Hive Type**



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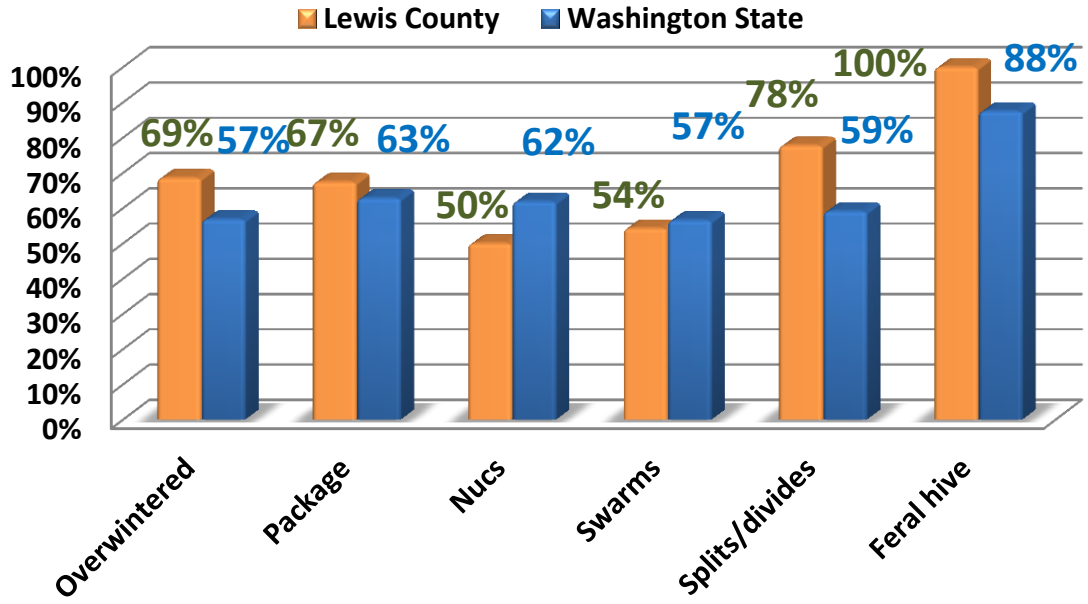
Fall	12	167	6	6	0	2
Spring	0	54	0	4	0	2

Loss by hive origination: We also asked survey respondents to list their loss by hive origination. The result is graphically presented below for the 27 Lewis Co respondents alongside

Figure 3 **2018-19 Winter Honeybee Loss % by Origination**

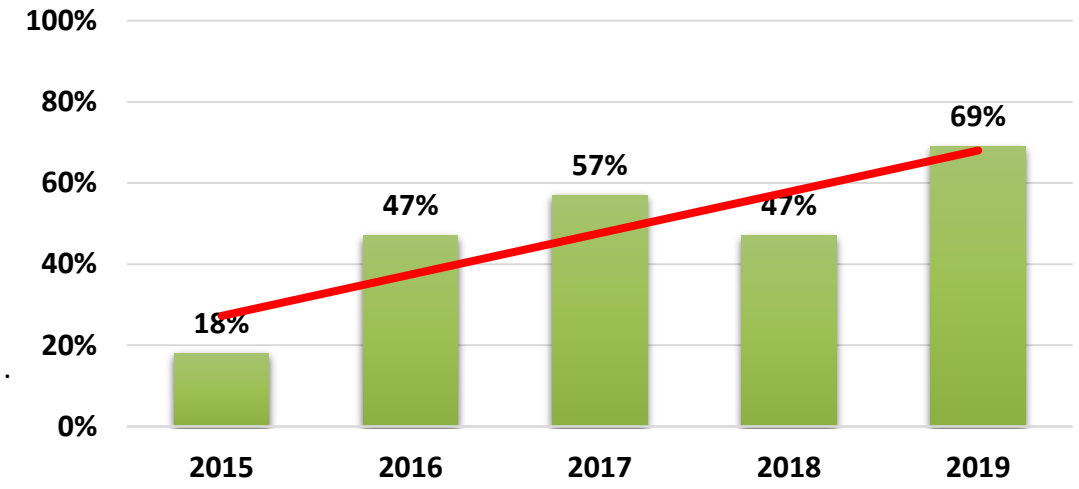


Fall	**105**	**43**	**14**	**35**	**27**	**10**
Spring	**33**	**14**	**7**	**16**	**6**	**0**

Washington State respondents. Colonies established form nucs and those from swarms did slightly better than statewide but loss number otherwise are similar to those suffered statewide.

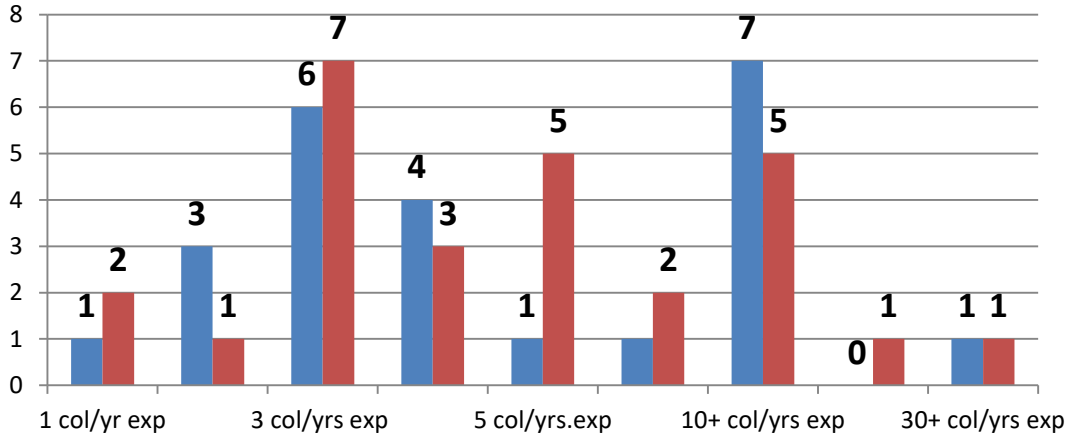
Loss History Losses this past overwinter were heaviest of our 5-year history of survey. Figure 4 shows percent loss for past five seasons. Trend line red.; it is obvious it is not headed in right direction.

Figure 4. Lewis County Loss History



The 27 Lewis Co respondents to the electronic survey were a mix of smaller colony number and fewer years experience and higher colony number and higher number of years experience.

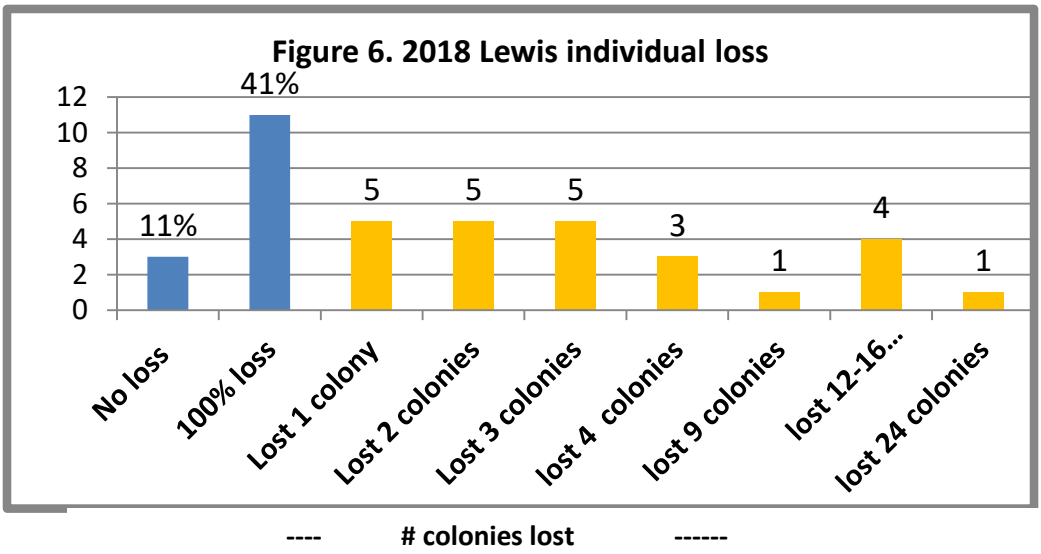
Figure 5. Number colonies (blue bar) and individual years of bee experience (red bar), Lewis Co, 2019



Eighteen individuals (67%) had 1 to 5 colonies while the remainder had up to 30 colonies. In years experience 18 individuals (67%) had 1 to 5 years of beekeeping experience with the remaining 9 having up to 39 years experience. In terms of loss, the 2/3rds with 1 to 5 colonies lost 67% while those with 1-5 years experience lost 63%. The 1/3rd that had 9 to 30 colonies had 63 % loss while those with 6 to 39 years experience ((9 individuals) had 77% loss. Results are counterintuitive for years experience those with less experience lost less percentage-wise than those with more experience. I have no explanation for these results.

Statewide those with more colonies (10+ to 40 colonies – 18% of respondents), though they lost more numbers, had only a one percentage point difference in loss compared to the 73% of respondents with 5 or fewer colonies - 60% vs 59%). The opposite result, similar to Lewis county, was the case for years experience. Individuals with 10+ years experience (16%) had higher loss 71% compared to those with 1 to 5 years experience (65% loss) or compared to those 39% of Washington state respondents who had 1 to 3 colonies (=62% loss level). Years experience does not seem to result in a better winter survival; managing fewer colonies made a slight difference (lower losses) for Lewis Co respondents but not to the larger data base of Washington beekeepers.

Colony Losses. For the 27 respondent Lewis Co. beekeepers, 3 individuals (11%) had no loss but 11 individuals =41%) loss all their colonies. Five individuals each lost 1, 2 and 3 colonies. Heaviest loss was 24 colonies. Figure 6 shows loss data.



<u>Self-reported "reasons" for colony losses</u>: One survey question asked respondents to check the "reasons" for winter loss; multiple responses were possible. There were a total of 59 selections (2.5/individual) provided by Lewis County respondents as the reasons for their overwintering losses. Weak in the fall was most commonly chosen by Lewis beekeepers followed by

yellow jackets, queen failure, and poor wintering conditions. Under other, CCD (4 Lewis individuals Nosema, 2 individuals, swarm/abscond by 2 and long winter and farming operations 1 each.

	Varroa mites	Poor wintering conditions	Weak in fall	Queen failure	Star-vation	pesticides	Yellow jackets	Other
Lewis Co # %	6 (25%)	7 (29%)	10 (42%)	8 (33%)	4 (17%)	1 (7%)	9 (37%)	10 (42%)
Statewide %	33%	28.5%	32%	23%	21.5%	7%	28.5%	28.5%

Acceptable loss. When asked to choose an acceptable loss Lewis Co mirrored statewide respondents. Greatest % selection was 25%, both for Lewis Co and Statewide. Medium number for Lewis and statewide was 20%.

Don't know	None 0%	5%	10%	15%	20%	25%	33%	50%	75%	Total 100%
Lewis CO 0	2	3	4	1	5 MED	6	2	3	1	0
Statewide 2	12	7	10	4	16 MED	21	12	8	3	1

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. Lewis Co individual choices varied from zero to 75%, with medium of 20%. This acceptable loss level has crept upwards over time.

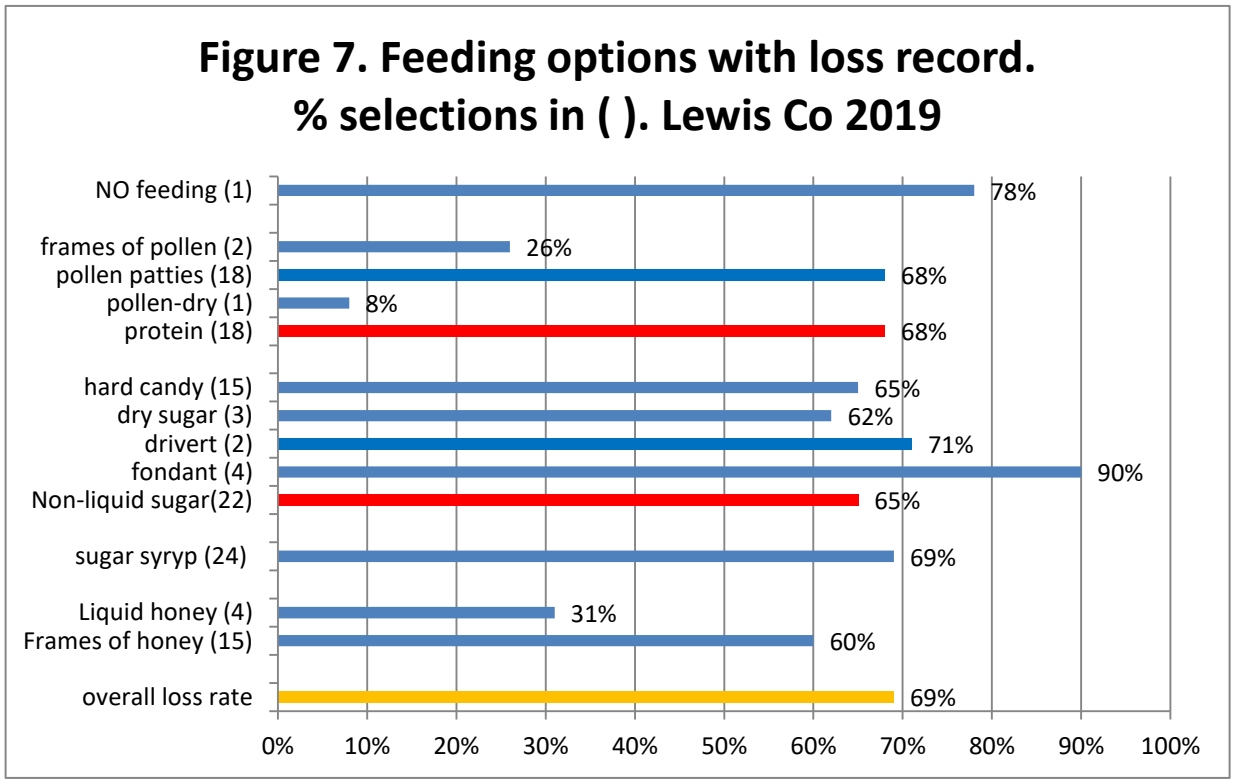
Major factors in colony loss are thought to be mites and their enhancement of viruses especially DWV (deformed wing virus) and declining nutritional adequacy/forage and diseases. Pesticide in the agricultural environment weakens colonies. Yellow jacket predation is a constant danger to weaker fall colonies, 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.

Management selections 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; many WA and Lewis Co beekeepers often do not do just one thing/management to their colony (ies) to control mites toward improving 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: Washington survey respondents checked 278 feeding options = 3.0/individual while Lewis Co had 88 selections 3.3/individual. Statewide 4 individuals (4%) indicated no feeding while 1 individual (also 4%) indicated they did no feeding in Lewis; they had a 78% loss. One individual selected a single choice and had 100% loss level, 5 (19% of respondents) indicated 2 choices and had an 89% loss, 9 (the greatest choice and also the median) made 3 choices and reported an 11% loss level. Seven respondents had 4 choices with a 12% loss, 3 individuals had 5 choices with 35% loss; 1 individuals each made 6 choices with 33% loss. More choices seem to improve survival.



The choices, with percent of individuals making that selection is in ( ); bar length indicates loss level of individuals doing this management. Figure 7. Those bar lengths to left of 69% had better survival while those to right had greater loss level.

Four individuals statewide and one in Lewis said they did **NO FEEDING. Both had high loss of 78%,** 18 percentage points higher than state loss level and 9 percentage points higher than the very high Lewis rate. For individuals indicating one or more feeding managements, feeding sugar syrup was the most common feeding option of respondents (24 individuals, 89% of respondents). Their loss rate was same as overall average. Individuals feeding honey as liquid or honey frames also had better survival.

Eighty one percent of individuals fed non-liquid sugar with those using dry sugar or hard candy demonstrating a slight advantage. Eighteen individuals fed protein (67%) with all feeding pollen patties and one also using dry pollen and 2 pollen frames. Statewide both dry sugar and protein feeders collectively had slightly better survival rate. Statewide dry pollen and dry sugar plus those using hard candy had lower losses than the average overall loss rate.

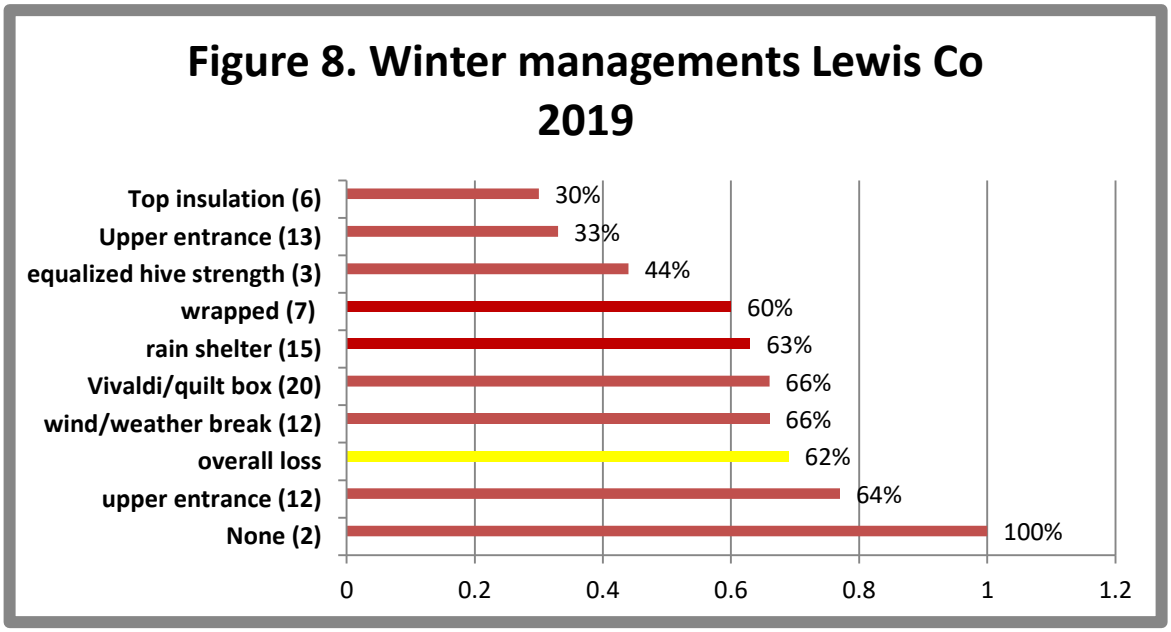
Looking at the extremes of 100% survival (no loss) vs total loss of Lewis Co individuals does not point to a clear advantage of feeding as regards survival. The 10 individuals with total loss had 4.3 col/individual and the 3 with zero loss had 2 col/individual. Three individuals with 100% loss fed frames of honey and 2 of the 3 with no loss also fed frames of honey. Four individuals with 100% loss fed pollen patties and all 3 with 0% loss did as well. Seven of 10 with 100% loss fed sugar syrup as did 2 of 3 with 0% loss. One in each group fed hard sugar. Clearly no feeding management was advantageous.

For the last 3 years of losses statewide individuals doing no feeding had poorer survival all 3 years, including this year with 78% loss reported by the 4 individuals who indicated they did no feeding. Individuals that fed sugar syrup had marginal lower loss level in 2 of three years as did those using frames of honey to feed bees Individuals feeding non–liquid sugar in the form of fondant and hard candy likewise had lower losses in at least one year (fondant - 13 individuals had 22 percentage point lower losses in 2017) and hard candy in two of the three years (31 individuals had 7 percentage point better survival this season and 22 percentage point improvement by 13 individuals in 2018). For individuals feeding protein, protein patty users showed slightly better survival in 2 of 3 years; dry pollen feeders had significantly better survival in two of the three years, including this past year when 5 individuals had only a 17% loss, 43 percentage point improvement compared to overall loss. In 2016 the gain was 40 percentage points but only 2 individuals reported use of dry pollen.

WINTERING PRACTICES: We received 256 responses (2.9/individual) statewide for WA beekeeper wintering management practices (more than one option could be chosen). Eleven individuals (11%) percent of the respondents indicated none of the several listed wintering practices was done; these individuals had an 83% winter loss, 23 percentage points higher loss than overall loss of 60%. For Lewis Co the same level of multiple selectins of 2.9/individual; 2 individuals made no selections and had 100% winter loss.

For those indicating some managements, one individual had one section with a 75% loss 6 (24%) did 2 and had 62% loss, 8 had 3 choices with an 83% loss (the medium choice), 5 did 4 selections (48% loss), and 2 did 5 (78% loss).

The most common wintering management selected was ventilation/use of a quilt box at colony top (51 individuals (51%), statewide and 20 individuals (80%) in Lewis Co. Figure 8 shows number of individual choices and percent of each selection. Equalizing hive strength and top entrance (most Vivaldi boards have this upper entrance) and use of top insulation were choices that provided the best survival.



Over the past three years a couple of winterizing management improved survival. Those doing no winterizing had higher losses (this year a 100% loss by 2 Lewis Co individuals). Equalizing hive strength in the fall demonstrated lower loss levels in all three recent winter periods (statewide 7 percentage points this past winter, 9 percentage points last winter and 6 percentage points in 2016-17 winter).Top insulation has demonstrated lower loss in two of the three years, in the most recent winter, 32 individuals statewide realized a 12 percentage point improvement as did 6 Lewis Co respondents. Ventilation above the colony (Vivaldi Board/quilt box) demonstrated improved survival two of the three winters but difference was only minor this past one (2 percentage point higher loss).

Looking at the 100% loss individuals practices compared to the 0% loss members does not clearly identify wintering practice differences. Three of each group used Rain shelter, 3 used upper entrance of the 10% loss group and 1 among the 0% loss (same 30-33% use rate), 6 having 100% loss use upper entrance while one of 3 did among the 0% loss group, 2 used an insulated top in 100% group and 1 among the 0% loss, same numbers of both groups did wrapping and wind/weather protection.

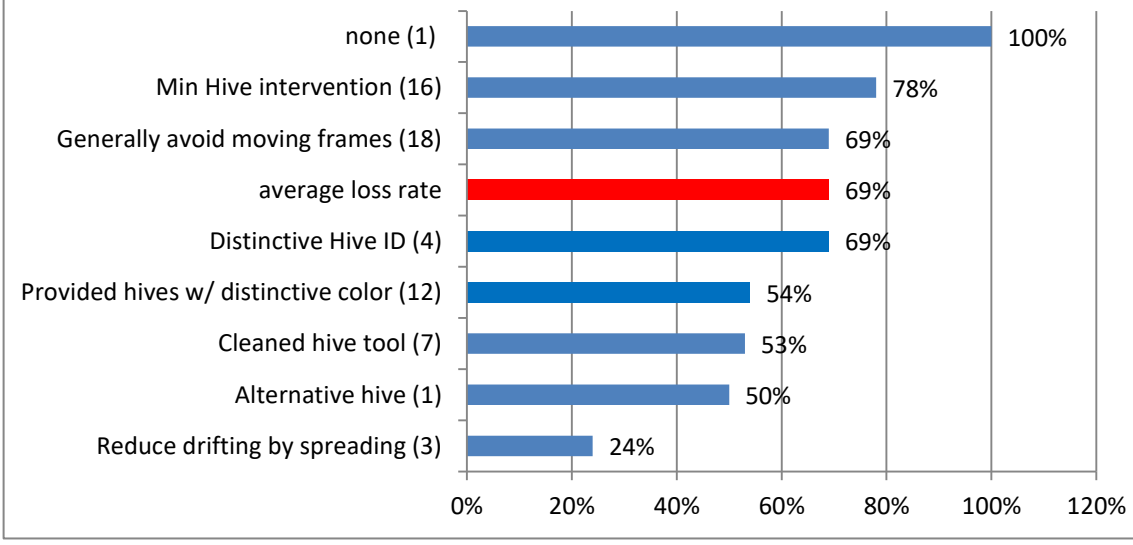
SANITATION PRACTICES: It is critical that we practice some basic sanitation (some prefer use of term bee biosecurity) in our bee care. We can do more basic sanitary practices to help insure

healthy bees. We received 211 responses for this survey question statewide. Seven individuals (7%) said they did not practice any of the 6 offered alternatives; they had a loss rate of 88% compared to overall rate of 60%; One Lewis Co individual did not make any selections and they had a 100% loss.

Six individuals (23 %) had 1 selection and had 77% loss, 7 (27%) had 2 choices with 81% loss, 8 selected 3 managements with 43%; 3 had 4 (73% loss) and 1 single individual made 5 choices (50% loss). There were 2.3 selections per individual, same as statewide.

Four managements displayed better survival with apiary managements to reduce drifting showing the lowest loss level. In two of three years doing none of these managements resulted in improved survival; this was not the case last winter when the 7 individuals statewide doing nothing had very high losses of 88%; the one individual in Lewis Co had 100% loss. Using an alternative hive resulted in lower losses in two of three winters which is also shown in Figure 2 (loss by hive type) with 6 of 8 Top bar or other hives types survived winter (25% loss). Providing hives with color and cleaning hive tools also showed an improvement in Lewis Co respondents. Statewide distinctive hive ID and measures to reduce drifting were helpful managements in 2 of past winters but not in the previous two seasons though their loss level was same as or similar to overall loss level (the exact same choices were not always available in previous survey years).

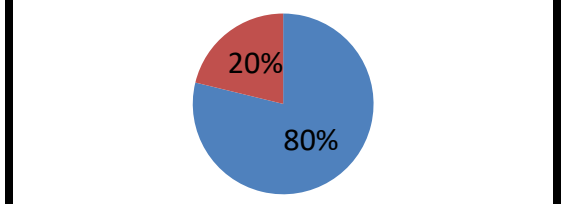
Figure 9. Sanitation measures ()= # individuals, bar length = 2019 Lewis Co WA loss %



Comparing the 10 individuals with 100% loss and 3 with 0% loss does not help clarify if sanitation improves survival. Seven individuals **with 100**% loss and all 3 of those with 0% loss checked minimal hive intervention, 2 individuals checked Distinctive colors and 3 hive distinctiveness were checked by those with 100% loss (but none of those with 0% loss checked these two options, 5 Individuals checked avoid moving frames for those with 100% loss and 1 of 3 with 0% losses also did and finally 2 with 100% loss cleaned hive tool while 2 with 0% loss did also

SCREEN BOTTOM BOARDS (SBB): Although many beekeepers use SBB to control varroa mites, BIP and PNW surveys clearly point out they are not or at best not a very effective varroa mite control tool. In this recent survey 16 Washington individuals (16%) said they did not use screen bottom boards. This past overwintering season, the 16 non-SBB users had 87 fall colonies of which they lost 47 for 54% loss. Those 65 beekeepers using SBB on all of their colonies had 64% loss. The 17 individuals using SBB on some of their colonies had 57% loss. For Lewis Co respondents 22 (81%) said they used SBB on all colonies, 2 on some of their colonies and 3 (11%) reported they did not use screen bottom boards.

Figure 10. % SBB use vs non-use, 2015-19 PNW

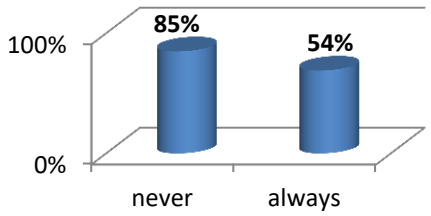


In 5 survey years, 20**% of OR and WA beekeepers said they did not use SBB and 80% did use SBB on some or all of their colonies.** See Figure 10.

Examining the five 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). This indicated SBB are very minor in improving overwinter survival.

We asked if the SBB was left open (always response) or blocked during winter (Figure 11). This past season 11 individuals (51%) said they always blocked SBB during winter. They had a 69% loss rate, average loss rate for statewide. Thirty seven individuals said they never blocked SBB and had loss rate of 85%.

Figure 11. SBB never vs always blocked in winter Lewis Co WA 2019.



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. **Comparing the always and sometimes left open with the closed in winter response reveals a slight percentage point difference in favor of closing the SBB over the winter period.** See Figure 10. **This relationship has been consistent over the past five years averaging nearly a 10 percentage point advantage when the SBB is closed during the winter.** 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.

Things that seem to improve winter success: It should be emphasized that these comparisons are correlations not causation. They are single comparisons of one item with loss numbers. Individual beekeepers do not do only one management option nor do they necessarily do the same thing to all the colonies in their care. We do know moisture kills bees, not cold, so we recommend hives be located in the sun out of the wind. If exposed, providing some extra wind/weather protection might improve survival.

Feeding, a common management, appears to be of some help in reducing losses. Feeding dry sugar or a hard sugar candy during the winter meant lower loss levels. Providing frames of honey or sugar syrup, the most common selection, also meant slightly lower loses for some individuals but these basic managements are useful in other ways such as for spring development and/or development of new/weaker colonies in addition to insuring better winter survival.

Feeding protein in form of frame of pollen or dry pollen improved survival. The supplemental feeding of protein (pollen patties), might be of assistance earlier in the season to build strong colonies and in instances where there is too little bee bread stores.

Winterizing measures that apparently helped lower losses for some beekeepers was equalizing strength, providing an upper entrance, a moisture trap (Vivaldi board or quilt box) and some attention to adding protection against the elements. Spreading colonies out in the apiary and painting distinctive colors or doing other measures to reduce drifting also appeared to be of some value in reducing winter losses. Avoiding movement of frames from one colony to another might also improve survival but the gain over what this interchange might accomplish might be greater than a minor advantage in survival.

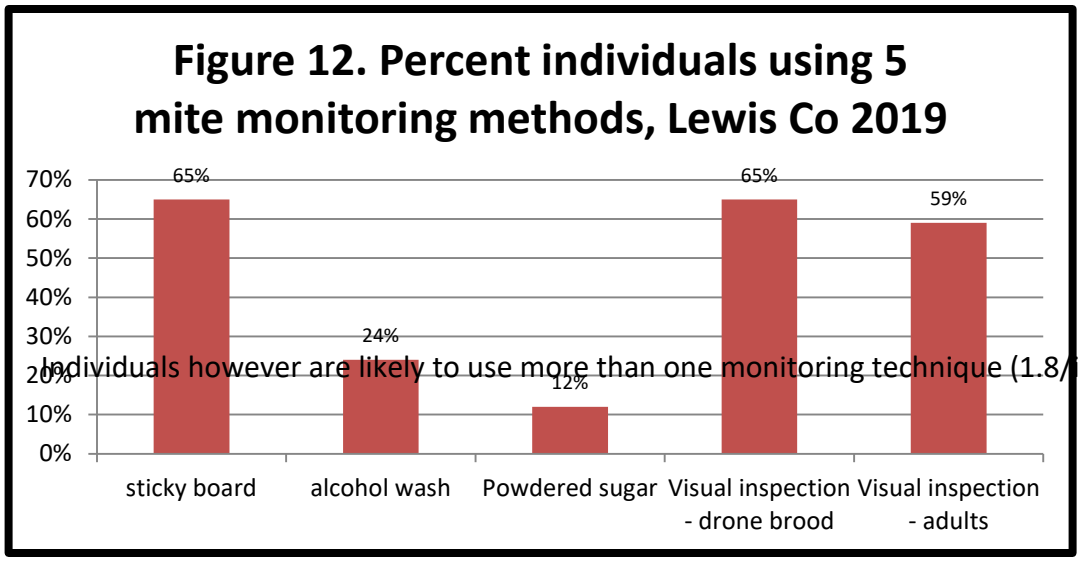
It is clear that doing nothing for feeding or winterizing or this past season in sanitation resulted in the heaviest overwinter losses.

Replacing standard bottom boards for screened bottoms only marginally improved winter survival. It is apparently advantageous to close the bottom screens during winter.

Mite monitoring/sampling and control management

We asked percentage of Washington 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. Sixty eight individual statewide (68%) said they monitored their hives; 17 Lewis Co individuals (63%) did so. Losses of those individuals monitoring was 58% statewide and 66% in Lewis Co. Twenty four (24%), reported no monitoring; they had a higher loss rate of 74% statewide 85% loss for the 10 Lewis Co respondents who did not monitor. Six individuals monitored some with loss rate 57% statewide but no Lewis Co individual respondents checked this option. Monitoring helps.

In order of popularity of use, Sticky boards were used by 11 individuals, 65% total of 17 individuals who did some or all monitoring of colonies and 41% of total selections, followed by 10 individuals (59% of individuals doing monitoring) that used visual inspection of adults and 11 individuals (65%) that used visual inspection of drones brood. For the two most accurate means of determining mite load, alcohol wash was used by 4 individuals (12%) and powdered sugar was employed by 2 respondents (12%). The monitoring methods of Lewis Co respondents were similar to Statewide except higher use of visual monitoring (18 and 5 percentage points respectively). Figure 11.



Individuals however are likely to use more than one monitoring technique (1.8/individual). In total choic

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

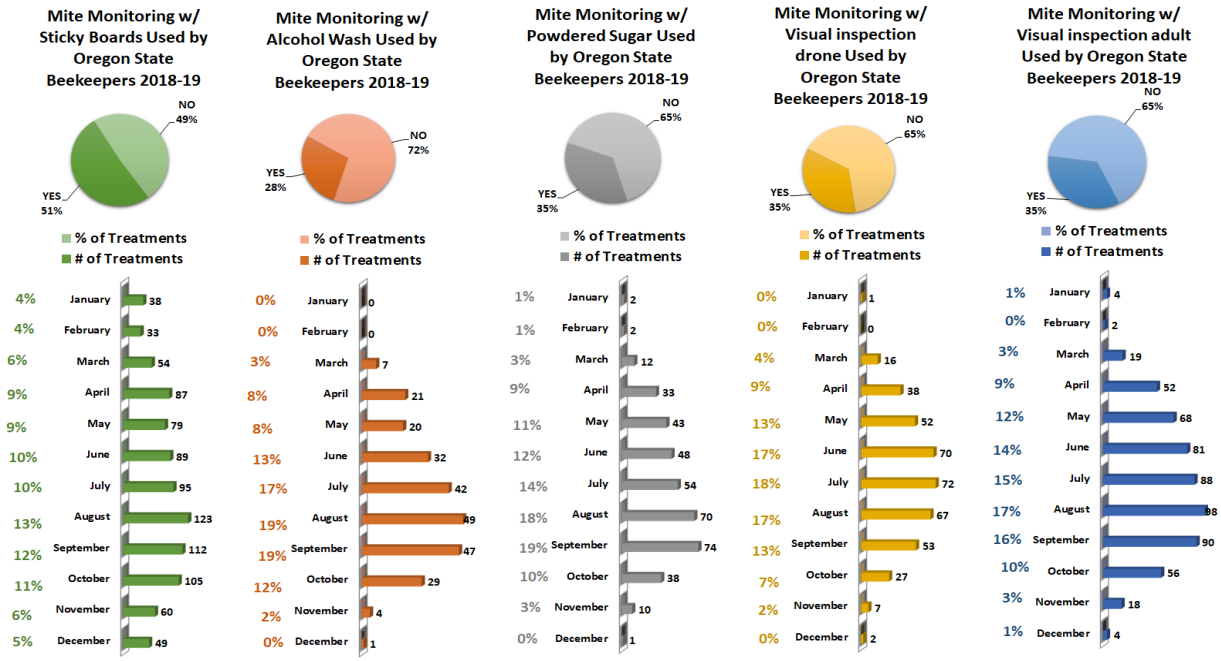
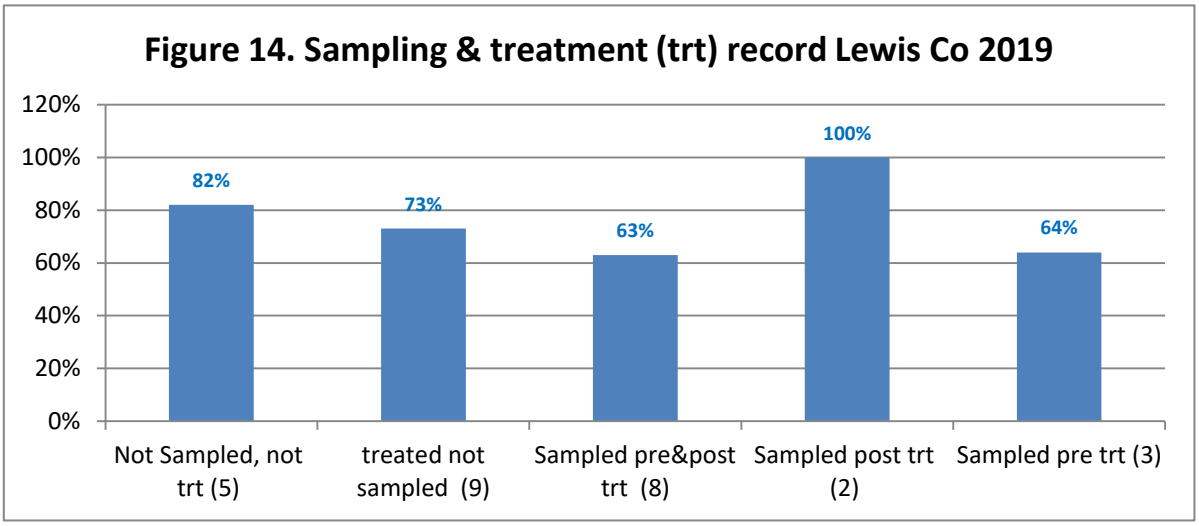


Figure 13

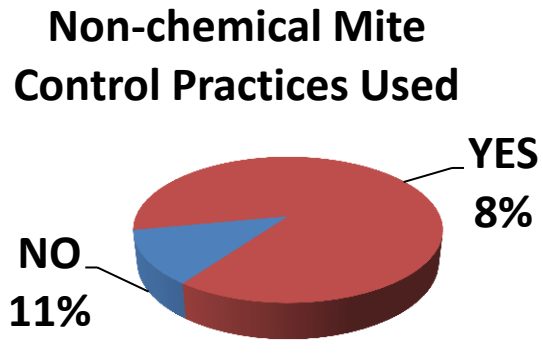
The most common sampling of respondents in 2018-19 was treated but did not sample (32% individuals) followed by both pre and post-treatment (24%). Nine individuals said they did not sample or treat. Data for loss level % shown in Figure 14; # respondents in ( ).

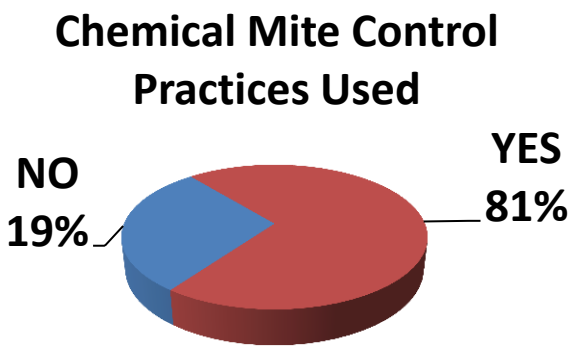


It is important to KNOW mite numbers. Less effective mite monitoring methods include sticky (detritus) boards below the colony (often so much detritus drops onto a sticky board that picking out the mites can be hard, especially for new beekeepers) but sticky boards used for a day can help confirm the useful 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



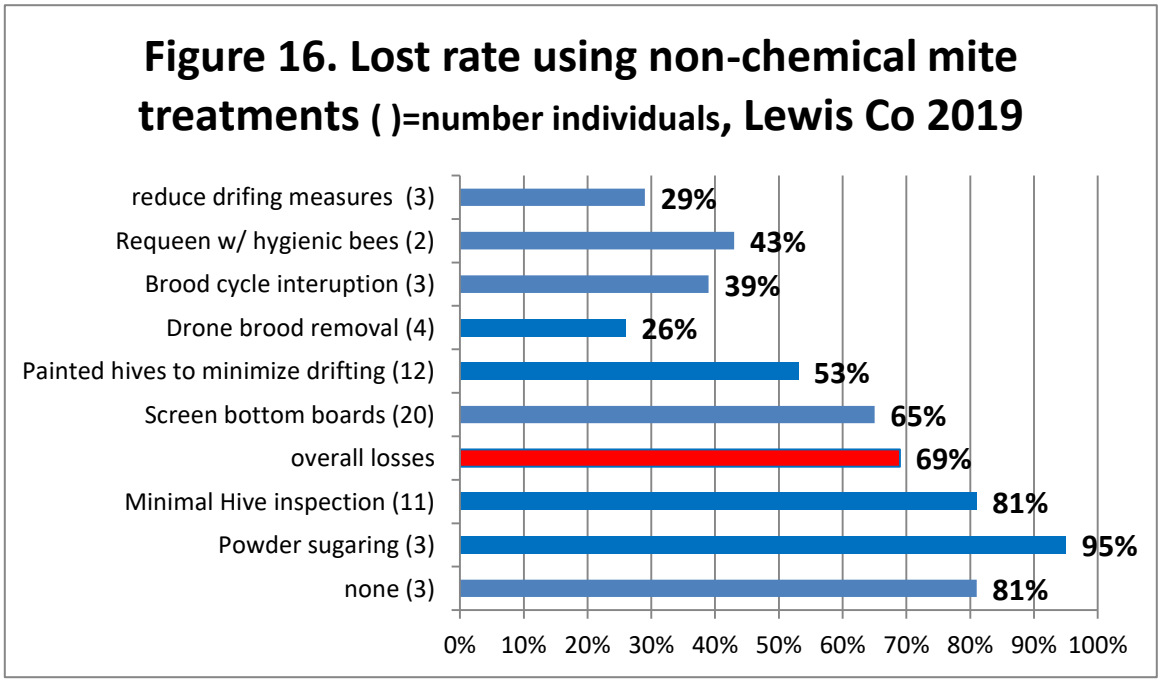


The survey asked about non-chemical mite treatments and also about use of chemicals for mite control. Eighteen individuals (18%) statewide and 3 Lewis individuals (11%) said they did not employ a non-chemical mite control and 20 individuals (20% statewide) and 5 Lewis Co individuals (19%), did not use a chemical control. Those 3 individuals who did not use a non-chemical treatment reported an 81% winter loss, while those 5 who did not use a chemical control lost 82% of their colonies. 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,) 27 individuals statewide used one method and had an 85% loss (Lewis Co 8 individuals had 81% loss), 20 used two (53% loss level) and in Lewis 6 with 70% loss , 14 used three (60% loss – in Lewis 6 with 68% loss), 8 used 4 statewide(67% loss) with the single Lewis person a 50% loss, 8 statewide used 5 with a 53% loss and 2 Lewis Co respondents had 29% loss. The 3 statewide using 6 selections had 55% loss and the single Lewis individual 53%. Using more options was of benefit.

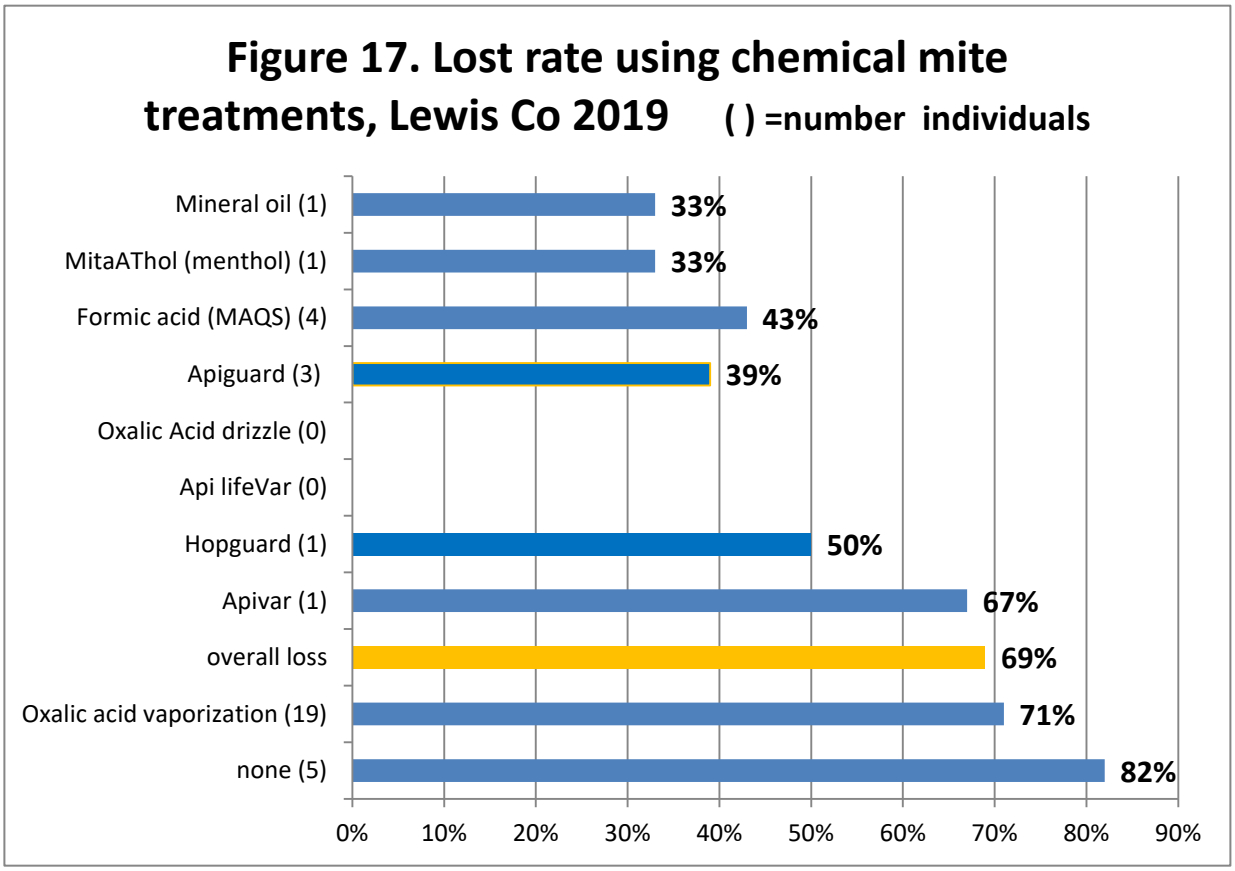
Use of screened bottom board was listed by 62 individuals statewide and 20 Lewis Co. As demonstrated in the section on Screen bottom boards the advantage relative to survivorship is minimal. The next two most common selections were Painting distinctive colors (12 individuals) and minimal hive inspection (34 individuals statewide including 11 Lewis Co persons). 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.

Two of the non-chemical alternatives that demonstrated reduced losses this past year were brood cycle interruption and Drone brood removal but only 7 individuals used these labor intensive methods. Painting hives to reduce drifting also showed a 3 percentage point reduced loss. Painting hives reduced loss along with reducing drifting measures were the two non-chemical treatments that showed the best survival. The 2 individuals requeening with hygienic stock also showed better survival but statewide requeening had essentially the same loss level as average statewide.



Chemical Control: For mite chemical control, 20 individuals statewide (20% of total respondents) used NO chemical treatment; these individuals had a 77% loss level. Five Lewis Co respondents (18%) did not check any of the options and they had a loss of 82%. (Those using chemicals used at rate of 1.6/individual statewide and 1.5/individual among Lewis members). Fifty one individuals (51%) used one chemical and had 64% loss (in Lewis 16 individuals (73%) indicated a single choice), 19 used two and showed better survival of 40% loss (Lewis 3 had 2 selections with 60% loss), 6 (statewide) and 2 in Lewis used 3 (57% loss both statewide and Lewis), 1 used 4 (33% loss both statewide and in Lewis). It is clear that multiple chemical uses were more favorable for survival.

Forty one individuals (53% of total chemical uses) indicated they most commonly utilized Oxalic acid vaporization; this was also the most common choice among Lewis members but their loss was about the same as the overall loss average. 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 realize 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 (none of the 27 Lewis Co respondents reported using it). 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.

The monthly use of Apivar (blue line), essential oil (red line) or an acid (green line) is shown in Figure 18 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.

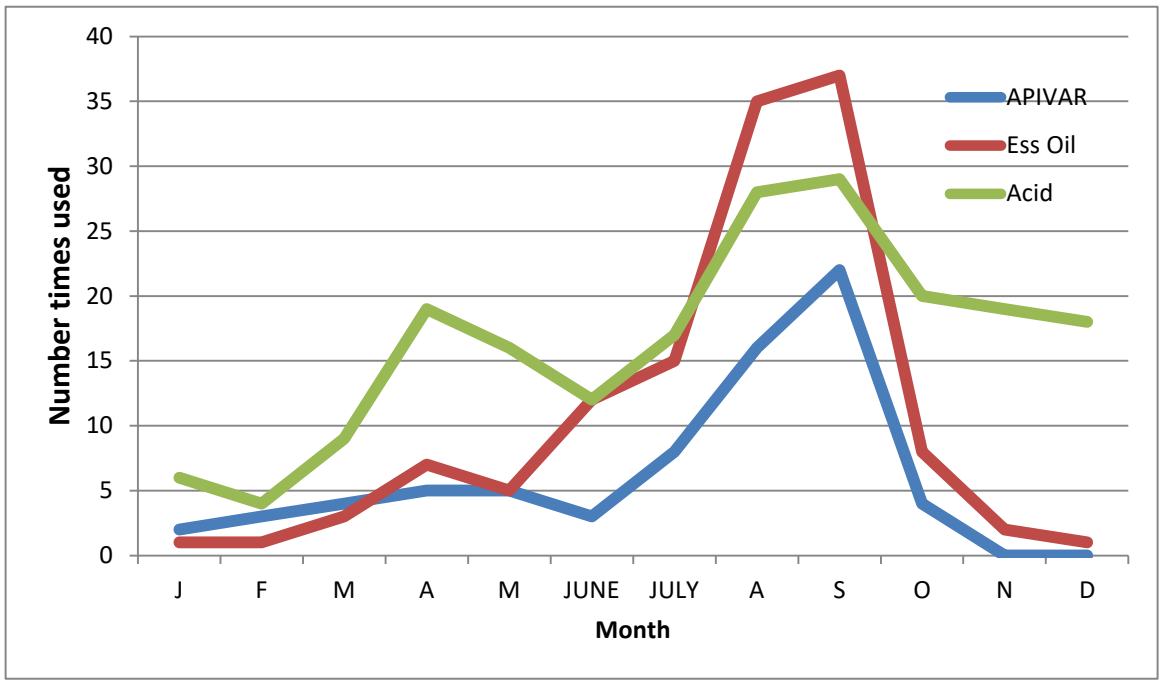


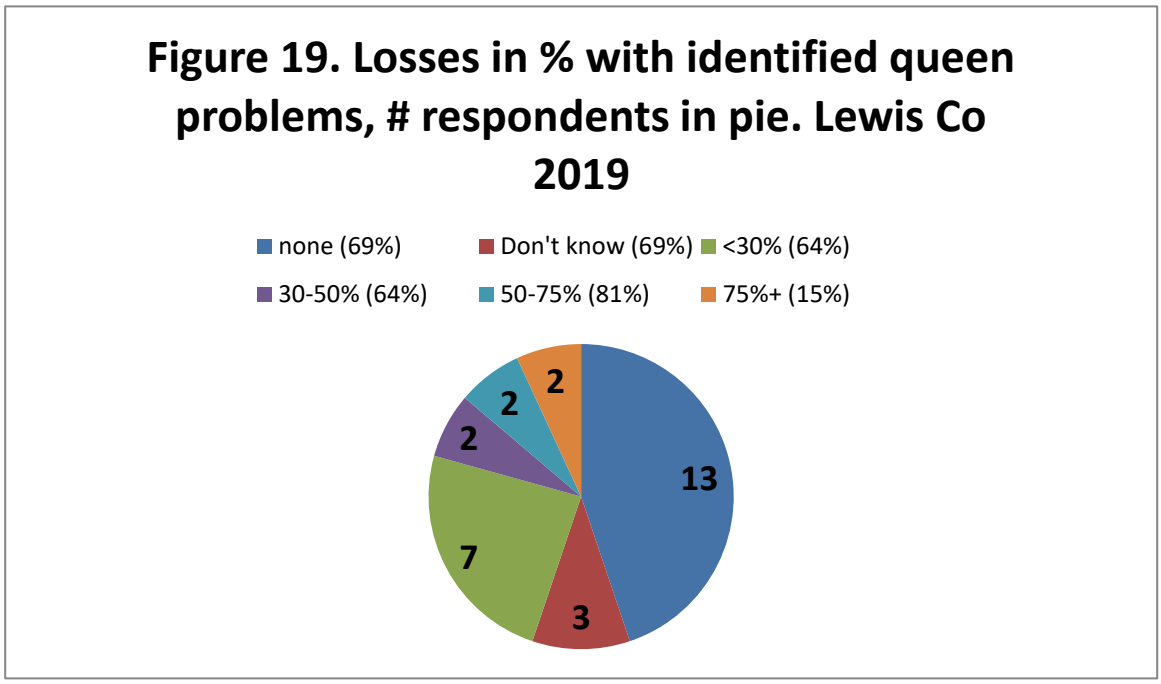
Figure 18

Antibiotic use

Six individuals (22%) used Fumigilian (for Nosema control); their loss rate was 66%, slightly lower than overall loss level. One used nosevet in addition. One individual indicated use of Tylan (50% loss) for bacterial brood disease control.

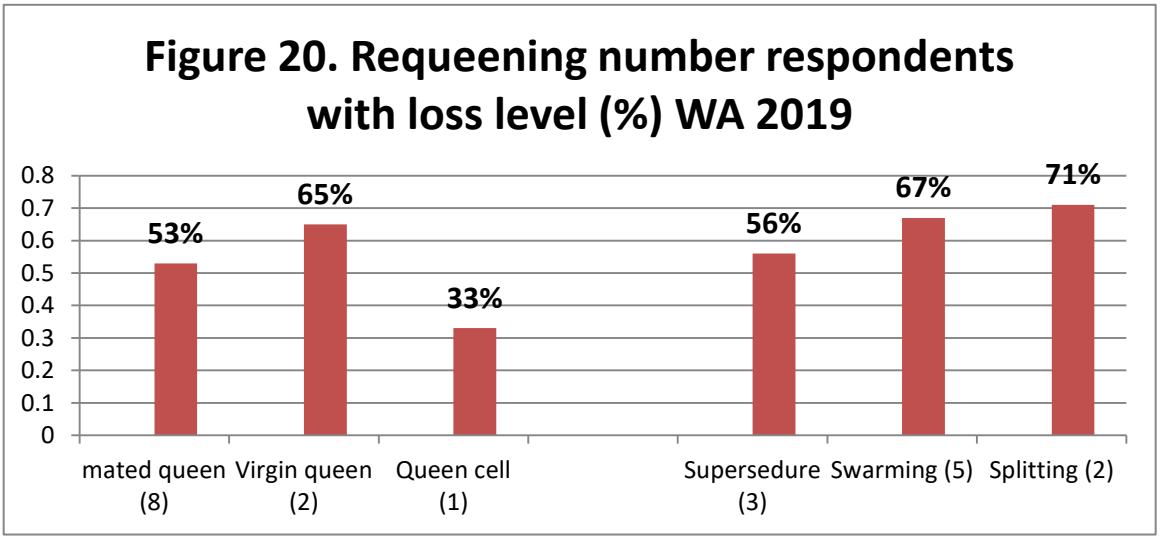
Queens

We hear lots of issues related to queen "problems". Recall under the questions asking the reasons why colonies didn't survive that 20 individuals, 20%, believed queen failure as one of their selections statewide which included 8 Lewis individuals (33%). In Section 8 of the survey we asked what percentage of loss could be attributed to queen problems. One half of the Lewis respondents subdivided queen related issues from 10 to 100% of their hives; the majority (7 individuals) indicating up to 30% Ten individuals (52%) said none; an additional 3 individuals (11%) said they didn't know. The number of respondents and percent losses of each is shown in pie chart 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 (28%) said yes; in Lewis Co 37% said yes. The related question then was did you or your bees replace their colony queen? Fifty three said yes, 28 said no. and the remainder 'not that that I am aware of.' Lewis respondents recorde 14 yes, 9 no and 4 not that they are 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 92 responses (more than one option could be checked) with 27 from Lewis members Figure 20. Eight individuals indicated they requeened with a mated queen and they had a 53% loss level, two used a virgin queen (65% loss) and 1 used a queen cell (33% loss). Almost an equal percentage (10 instances vs 11) said the bees requeened via Supersedure (3 instances, 56% loss), splitting (5 individuals, 67% loss) or swarming (2 individuals, 71% loss). Loss levels were higher for bee methods for bee methods of requeening.



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. Recall that the BeeInformed survey is reporting losses of the larger scale WA beekeepers not the backyarders (figure 5A.) Reports for individual bee groups with 18 or more respondents 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 July 2019