

2016-17 Lane County Beekeeper Winter Loss Report by Dewey M. Caron

At the April LCBA meeting I distributed paper copies and directed members to a web-based survey document as a continuing effort to define overwintering success. This was the 9th year of such survey activity. I received 282 responses from OR backyarders, keeping anywhere from 1 to 48 colonies; Lane County members sent in 29 surveys, 7 fewer than last year and 1/2 the number of the previous year.

A more complete report of the OR beekeeper survey responses, including losses and responses to management questions in the survey, with easy to understand graphs, is now posted at www.pnwhoneybeesurvey.com. This is the Lane Co. specific report.

Characterization of survey respondents

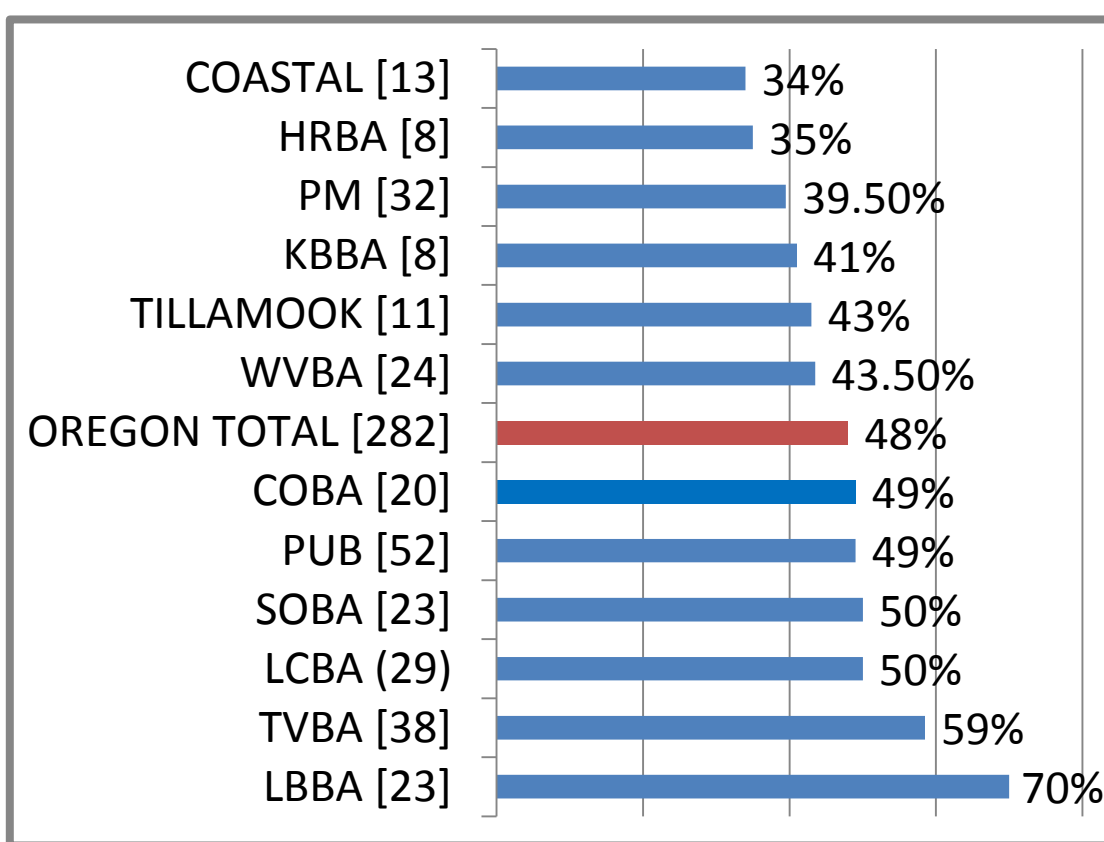
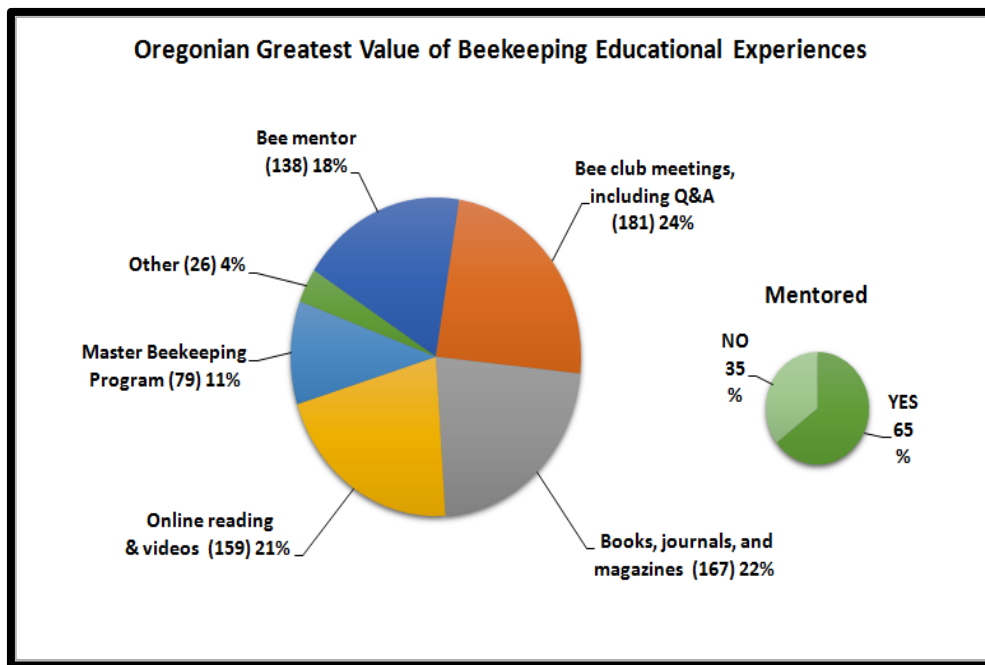


Figure 1

Surveys were received from members of 14 local Oregon (OR) associations and several Washington associations. The majority of the OR respondents (199= 70.5%) keep bees in the Willamette Valley of Oregon. Additional surveys were received from 13 Coastal beekeepers, 11 from Tillamook beekeepers, 8 from both Hood River and Klamath Basin beekeepers, 20 from Central OR and 23 from Southern Oregon beekeepers. In bar graph Figure 1, the number in () shows club respondent numbers and percent figure at end of bar is the loss level percent of each association.

In this snapshot of our industry, we asked individuals to identify the major source of their beekeeping education. **Bee club meetings, including Q & A, were indicated as the selection of greatest value statewide (24%) and for Lane County (also 24%).** However choices of Books, journals and magazines (22% statewide and by 15 individuals of LCBA =19%) and Online reading and videos (159 individuals statewide =21% and by 14 Lane County respondents = 17%) were also highly selected. Bee Mentors (18% statewide and by 12 LCBA members=15%) and Master Beekeeping Program (11% statewide and 6% - 5 individuals of LCBA) were next. Figure 2 below shows OR beekeeper responses by number of respondents (in parens) and % of total.



Lane Co responses:

- (19) 28% Bee Club meetings, Q&A
- (15) 22% Books, Jour & magazines.
- (14) 21% Online reading & video
- (12) 18% Bee mentor
- (5) 7% Master Beekeep Program
- 2 (3%) Other

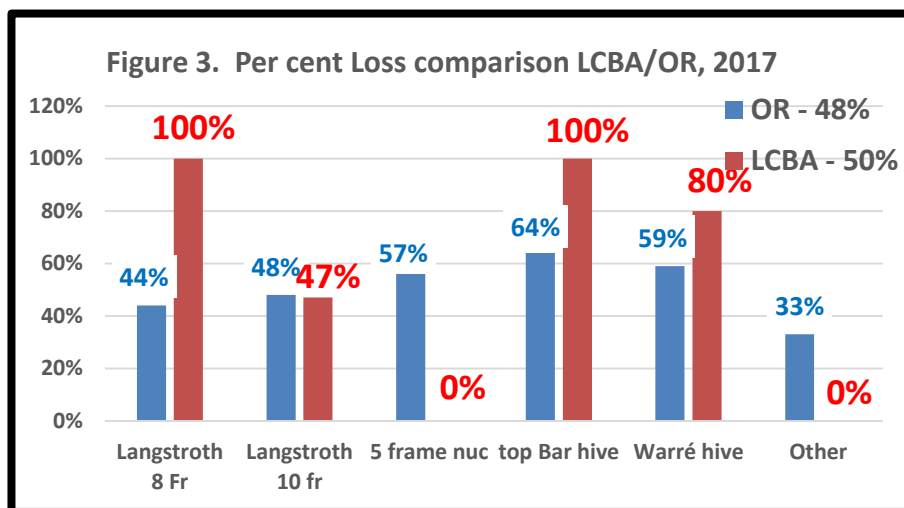
Figure 2

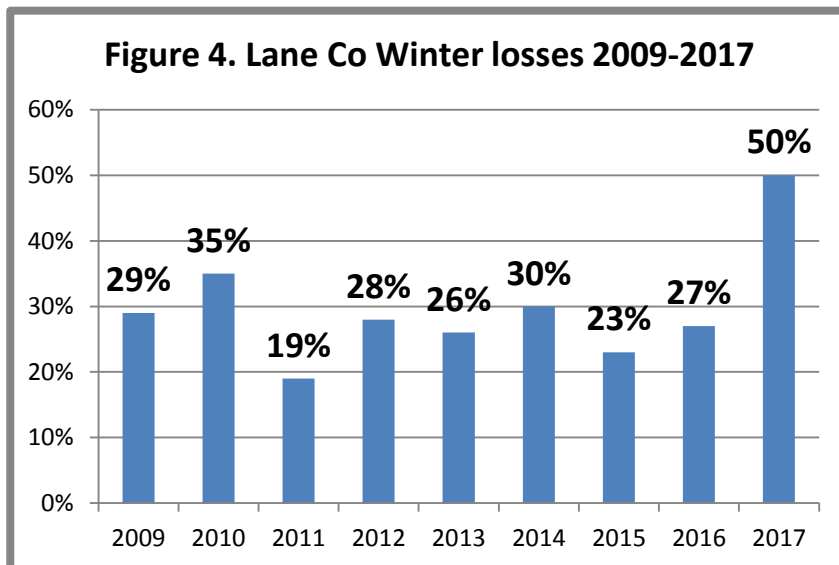
Statewide 65% of individuals indicated they had a mentor for their initial beginning in bees; for Lane county this number was lower - 17 individuals so indicated = 58.5%

Overwintering Losses LCBA

Overwintering losses were determined for 90 Langstroth 10 frame hives in the fall, of which 48 survived (47%) + 2 Langstroth 8 frame hives (neither survived), 1 Top Bar hive that didn't survive and 5 Warré hives, only one of which survived = 98 total fall hives, 49 spring . Data shown in figure 3.

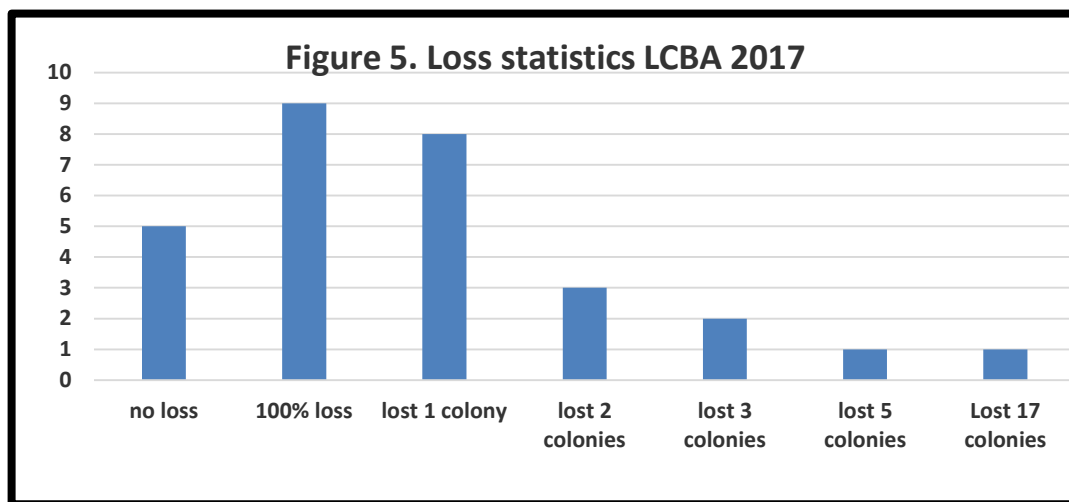
Total LCBA loss = 50%.





This loss level was almost double the previous year (27%) and the 27% seven-year average for LCBA, but similar to the 48% statewide loss rate. 9 year average loss record for LCBA survey efforts shown in Figure 4.

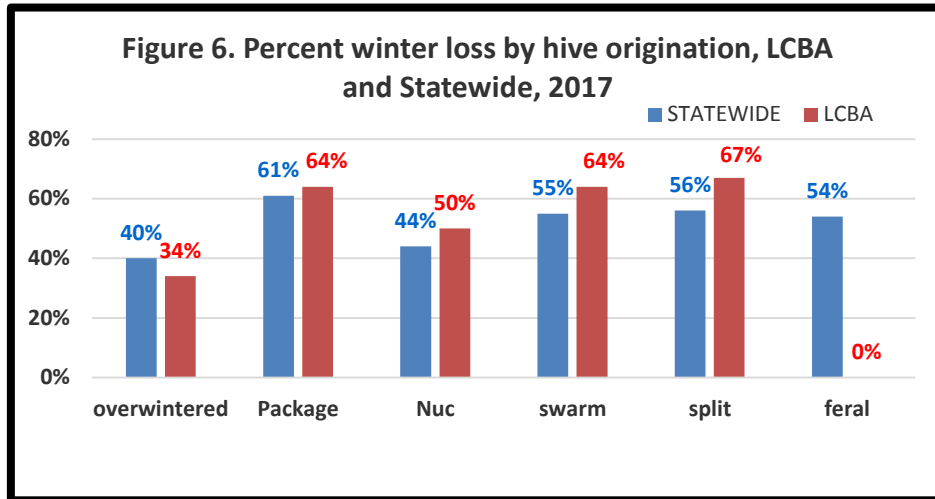
Nine LCBA individuals (31%) had total loss and 5 (17%) had total survival. Eight individuals lost one colony, three lost two colonies, two lost 3 colonies and one individual lost 5 colonies; greatest loss was 17 colonies.



Typically survey respondents are newer beekeepers; 11 LCBA individuals had a single colony in the fall, three had 2 colonies, 7 owned 3 colonies, 5 owned 4-6 colonies and there were only two individuals with 10+ colonies; 22 was greatest number. Forty-one percent (41%) of respondents were 1st, 2nd or 3rd year beekeepers, 17% had 4, 5 or 6 years of beekeeping experience; 31% had 8+ years of experience with 38 being the greatest.

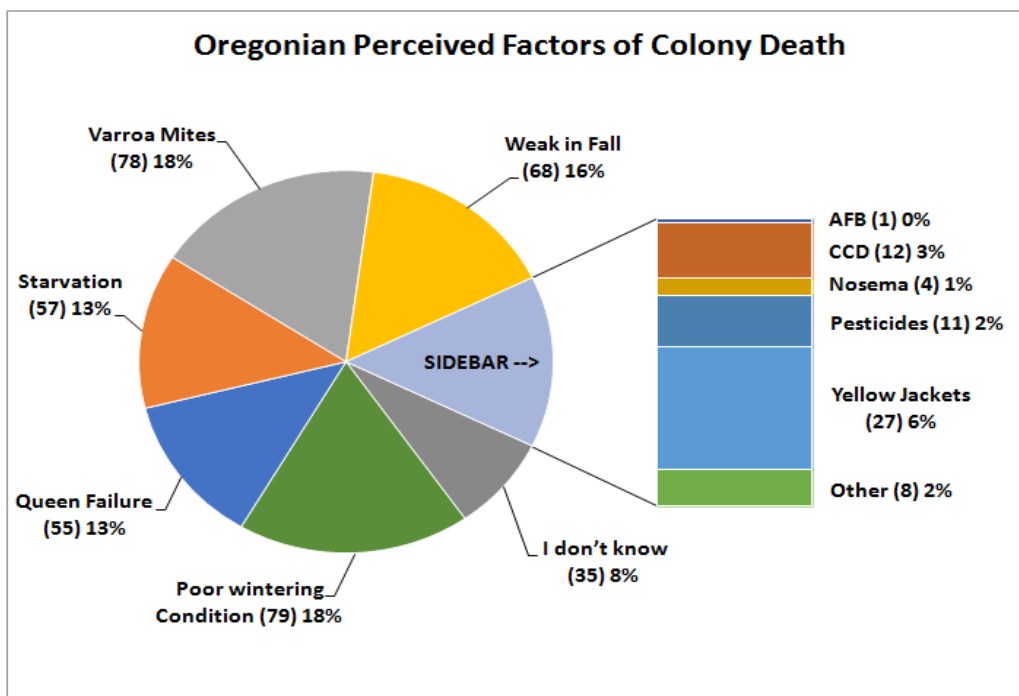
The survey also asked loss of colonies by hive origination. Responses for OR and LCBA beekeepers shown in Figure 6. Loss of colonies that had successfully overwintered last spring was 34%, slightly better than the statewide percent of 40. Other LCBA loss rates were similar to statewide. Of 11 packages only 4 survived (64% loss), 3 of 6 nucs as hive origin survived (50%), 8 of 22 swarm captures survived (64% loss) and three of 9 splits survived (67% loss rate). No feral transfers were included in responses this year.

Four individual respondents (14%) kept their bees in 2 apiaries and 3 moved bees a short distance and a 4th individual indicating moving their hives, moved to another state during the year.



Reasons indicated for losses

Individuals with loss were asked to what they attributed their loss (multiple factors could be chosen; one individual chose 5 factors). Statewide 79/78 individuals (18%) and seven LCBA individuals (19%) selected both poor wintering conditions and varroa, 68 (15%) choose Weak in fall (5 LCBA individuals (13.5%) indicated Weak in the fall), Statewide 6% said yellow jackets but the percentage with this selection (13.5%) was double for Lane Co beekeepers, 57 (13%) said Starvation; 4 (11%) in LCBA said Starvation. Queen failure by listed by 3 Lane Beekeepers (8%) compared to a 13% choice statewide. Also listed by LCBA were CCD (2 individuals, 5.5%), pesticides and don't know, 1 (3%) each. Under other winter moisture and tree falling on colony were listed. 9 individuals, including the 5 without loss, did not respond.



Lane Co responses:

- (6) 18% Poor winter Conditions
- (6) 18% Varroa
- (5) 13.5% Weak in the fall
- (5) 13.5% Yellow jackets
- (4) 11% Starvation
- 3 (8%) Queen failed
- 2 (5.5%) CCD
- 1 (3%) Pesticides
- 1 (3%) Don't know

Figure 7

The companion question to reason for loss asked for an expression of an acceptable loss level. Comparison of Statewide and LCBA by percent is shown in Table 1.

	Zero	10%	25%	33%	50%	75%	100%
STATEWIDE	25%	22%	29.5%	12%	8.5%	<1%	2%
LCBA	24%	27.5%	31%	10%	3.5%	0	3.5%

There is no easy way to verify reason(s) for colony loss nor an acceptable loss level. 51% percent of LCBA beekeepers felt 10% or less was acceptable while statewide 47% felt likewise. 10.5% statewide stated 50% or higher was acceptable while among LCBA beekeepers 7% indicated the same thing. Colonies in the same apiary may die for different reasons. **Doing the forensics is the first step in seeking to solve the heavy loss problem. More attention to colony strength and possibility of mitigating winter starvation will help reduce some of the losses. Effectively controlling varroa mites will definitely help reduce losses.**

Management selections and losses

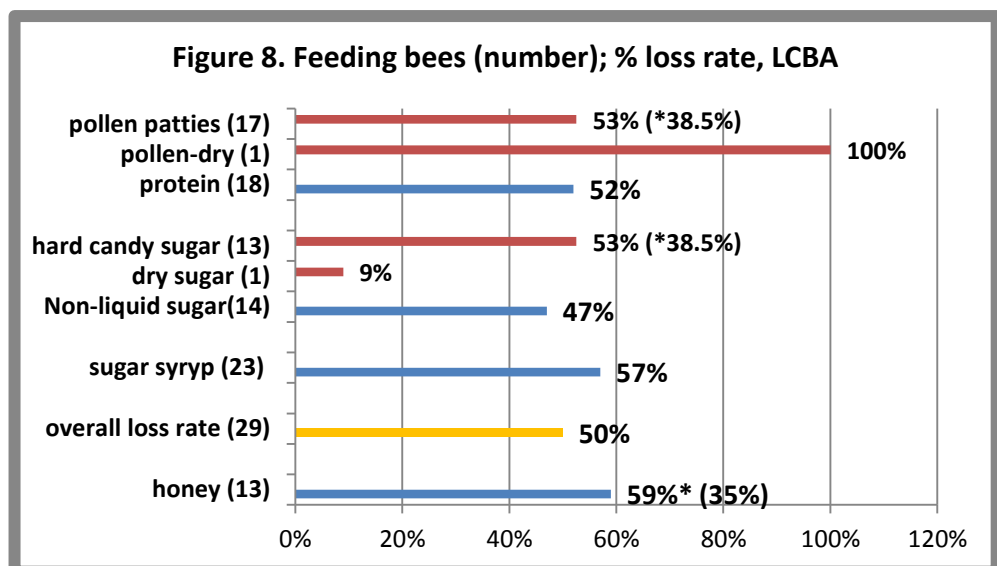
The survey inquired about feeding practices, wintering preparations, sanitation measures utilized, screen bottom board usage, queens, mite monitoring and both techniques (such as screen bottom board use, drone brood removal efforts, etc.) and chemical mite controls used. Individuals could check none 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.

For the larger data base of OR beekeepers, feeding dry sugar or candy board, as well as adding top insulation, a moisture absorbent feature at top of colony and/or an upper entrance resulted in significantly fewer losses. Screen bottom board usage, monitoring with alcohol wash or powdered sugar for mites and use of several of the chemical mite control options did likewise. See this analysis in the OR beekeeper report; www.pnwhoneybeesurvey.com. Comparisons to LCBA data results are included in this narrative.

For LCBA, with 29 respondents, one individual responder, an ‘outlier’ in survey terms, can strangely influence the comparisons (but in the larger data base of 282 OR respondents is less of a data modifier). This one individual, a veteran of 8 years of beekeeping, managed nearly one quarter of the colonies of all the LCBA respondents. This individual did many of the managements but, likely due to use of ineffective mite monitoring techniques (sticky boards and visual) and use of only two control techniques (Apiguard and powdered sugar dusting), had a 77% loss rate.

FEEDING: Among LCBA respondents, 70 options were checked; the highest number was 4 choices selected by 4 individuals; all LCBA respondents chose at least one option. Thirteen (45%) indicated they fed honey; their overwinter loss was 59%, however removing the ‘outlier’ reduced this level to 35%. Twenty three individuals fed sugar syrup; their loss rate was 57% but removal of ‘outlier’ reduced this to 49%. Statewide, feeding honey or sugar syrup did NOT reduce loss level below the overall loss average.

Individuals who fed dry sugar did have lower losses. Statewide those beekeepers feeding hard candy and dry sugar (but not drivert or fondant) had better winter survival; among LCBA respondents 1 individual used dry sugar and had a 9%



loss and 13 fed the hard sugar candy. Removing the ‘outlier’ showed improved survival, reducing the Lane loss rate of those 12 individuals to 38.5%. See Figure 8 for LCBA responses (note the * and percent in () represents the loss rate minus the ‘outlier’ individual.)

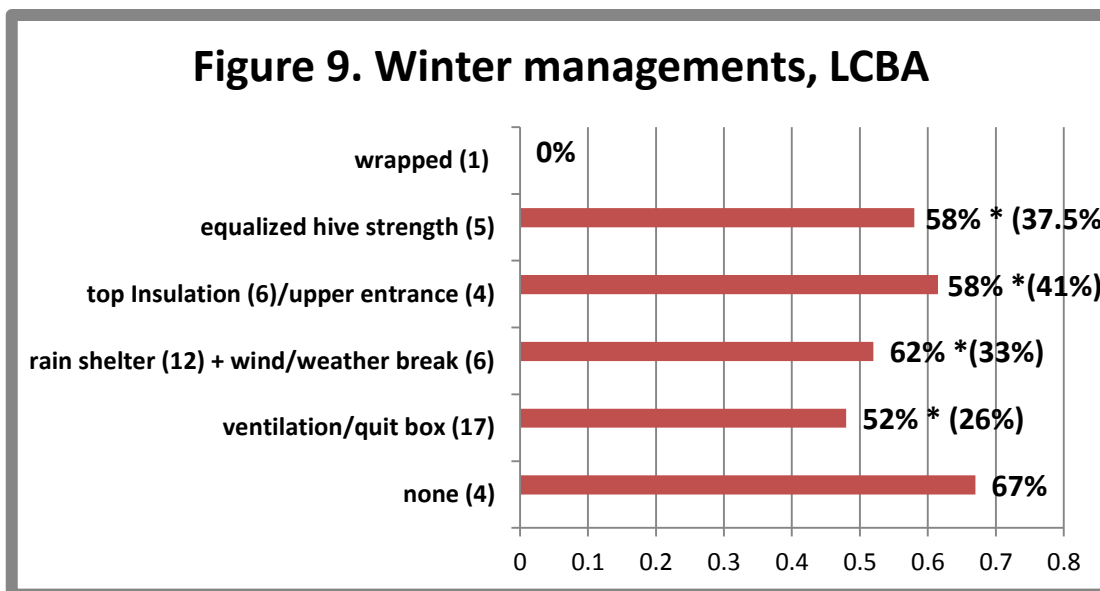
Feeding protein as dry pollen or pollen patties meant better survival for OR beekeepers; for Lane beekeepers the one individual who fed dry pollen unfortunately lost the one colony owned (100% loss). The 17 individuals feeding pollen patties, when the one ‘outlier’ is removed, had a 38.5% loss rate, a better survival than the total 29 Lane respondents.

It appears feeding protein, dry pollen or a pollen patty, improves survivorship. Also feeding dry sugar or a hard sugar candy, typically the sugar feeding method most appropriate during later fall or over the winter period, improves survivorship. Feeding can apparently improve overwinter survival.

WINTERING PRACTICES: Statewide 538 responses about OR beekeeper wintering management practices were selected (more than one option could be chosen). Forty-six individuals, 17.5% of the respondents, indicated not doing any of the several listed wintering practices; these individuals had a 49.5% winter loss compared to overall of 48%. Among the LCBA respondents there were 57 choices indicated; 4 individuals each had 4 selections. Four individuals (14%) checked none; their winter loss rate was 67%, considerably higher than the overall Lane Co rate of 50%.

The most common wintering management selected (17 LCBA members) was ventilation/use of a quilt box at colony top followed by rain shelter (12 individuals), all but one of which also additionally checked wind/weather protection (6 total). Figure 9 shows number of individual choices and percent of each selection for LCBA beekeepers (note the * and a different percent in () represents the loss rate minus the ‘outlier’ individual.)

Statewide, using a quilt/ventilation box slightly improved survival (45% loss rate versus 48% overall) while for Lane Co the 17 individuals had a 48% loss rate; the 16 remaining individuals, removing the ‘outlier’, had a 26% loss. Use of rain shelter (103 OR individuals) did not improve winter survival - 48% loss, same as total OR backyarders statewide; for LCBA, rain shelters (12) and wind/weather break (6 individuals, all but one checking wind/weather break also chose rain shelter) had a 52% loss; minus the ‘outlier’ the loss rate was (33%). Individuals who equalized hive strength (5) or used top insulation (6), + upper entrance (3 using top entrance also indicated use of top insulation) had heavier losses but when the one ‘outlier’ respondent is removed, it would seem there is an advantage of these managements for winterizing colonies. The one individual who wrapped had total survival of their 3 colonies.

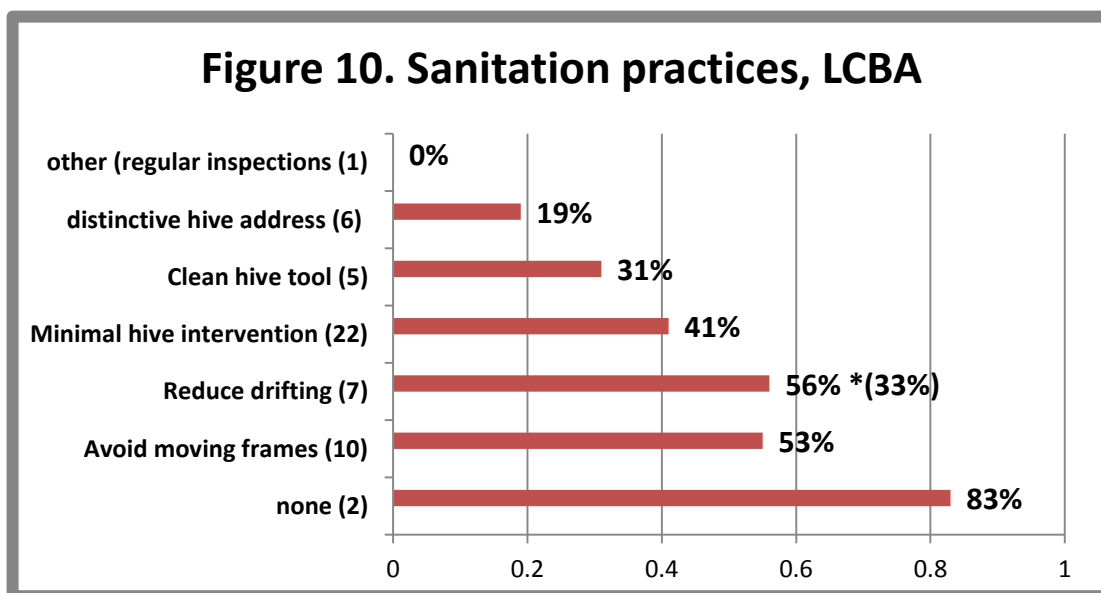


The varieties of choices of these wintering selections demonstrate that backyard beekeepers are taking extra measures to help colonies survive winter conditions. If we remove the ‘outlier’ from the LCBA data, it would appear that several winterizing managements might improve winter survival and reduce beekeeper losses.

SANITATION PRACTICES: It is critical that we practice some basic sanitation (some prefer use of term bee biosecurity) in our bee care. We should do more basic sanitary practices to help insure healthy bees. We received 512 statewide responses for this survey question. Eighteen percent (51 individuals) said they did not practice any of the 6 offered alternatives; they had a loss rate of 46% compared to overall rate of 48%. For LCBA respondents, there were 57 choices indicated; 1 individual had 4 selections and 7 made 3 choices. Two LCBA individuals (7%) checked none; their winter loss rate was 83%, considerably higher than the overall Lane Co loss rate of 50%.

Minimal hive intervention (22 individuals) was the most common option selected. It could be argued that less intervention might mean reduced opportunity to compromise bee sanitation efforts of the bees themselves and that excessive inspections/manipulations can potentially interfere with what the bees are doing to stay healthy. This option however did not improve winter survival of statewide beekeepers (138 individuals) but for the 22 Lane Beekeepers there was a lower loss rate of 41% (i.e. better survival).

Statewide the two hive sanitation choices that showed improved survival was providing hives with a distinctive ID + cleaning hive tool regularly; loss rate of this first option was 43% and hive tool cleaning was 41%, both slightly lower than the statewide loss of 48%. In Lane Co, 7 individuals indicated they gave their hives a distinctive ID and they had loss of only 19%. The 5 individuals who reported cleaning hive tool had a loss rate of 31%. In LCBA, 7 individual respondents who indicated they arranged their apiary by spreading out colonies to help reduce drifting had a 56% loss rate; however if the ‘outlier’ respondent is removed, then the remaining 6 had a loss rate of 33%. The one other practice listed was regular hive inspections, checked by one individual but this individual lost all 3 (100%) of their colonies overwinter. Figure 10 shows number of individual choices and percent of each selection for LCBA beekeepers (note for reduce drifting the * and a different percent in () represents the loss rate minus the ‘outlier’ individual.)



SCREEN BOTTOM BOARDS: All but 6 LCBA individuals (23 total) used screen bottom boards; 2 who did not use SBB (with Langstroth hives) had 75% loss (compared to 50% overall loss rate). Removing

the 'outlier' response reveals that the 22 using SBB on all their colonies had a 37% loss. Statewide the 50 individuals not using a SBB, had a higher winter loss rate, 58% compared to those using them on 100% of their colonies - they had a loss rate of 45%. Five Lane Co beekeepers who blocked the screen during winter (always response) had better winter survival with a 36% loss rate compared to those 7 individuals who indicated they sometimes blocked the screening (54% loss) and those 16 individuals who said they never blocked the screens over the season (50% loss rate). There was no difference among the larger data base of 282 OR beekeepers between the never, always or sometimes responses.

When use of screen bottoms was compared to non-use, there was a 5 percentage point difference in improved survival overwinter last year (271 PNW beekeeper respondents) and a 12.5 improvement this year among OR beekeepers (282 individuals). The difference was 13 percentage points for Lane Co beekeepers. **It does appear there may be an advantage to use of screen bottoms.**

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 necessarily do only one management 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 out of the wind, in the sun, and, when exposed, providing some extra wind/weather/rain protection might improve survival. Use screened bottom boards leaving them open (or closed) as per your preference for ventilation. Use of insulated tops/quilt box with moisture collector such as burlap, straw, old towels, etc. with extra top ventilation to vent the moisture is also a good idea and helps improve survival. Feeding bees either sugar syrup or honey from other disease-free hives, helps insure enough food stores during early fall management. Once fall rains start, halt syrup feeding and switch to feed dry sugar or a hard sugar candy to avoid adding additional moisture stress to colonies. Finally, it would seem prudent to review basic sanitation measures, as anything we can do to help reduce sick bees and improve colony health, will improve overall survival.

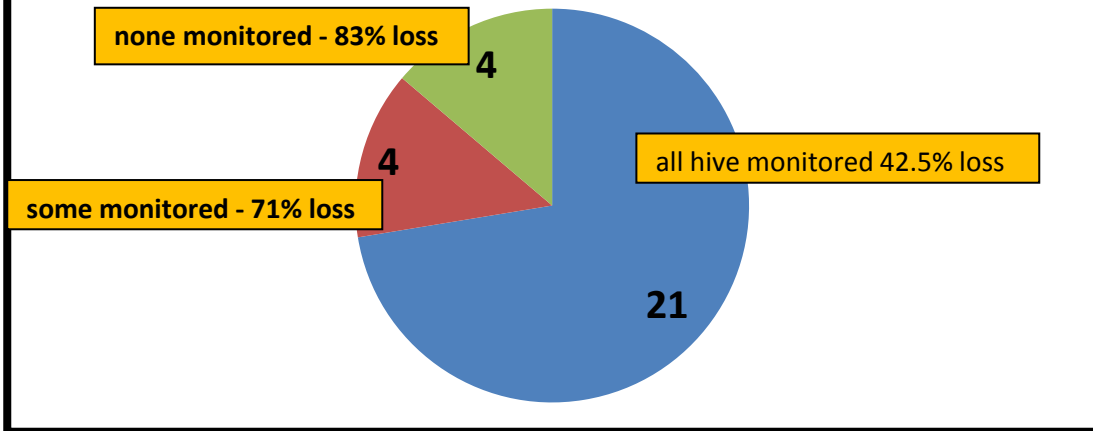
Monitoring for mites

All OR bee hives have or will have varroa mites. It is important to know how many mites are present for the season as it provides an estimate of approximate risk to mites reducing winter survival or leading to total colony loss. Mites are not the only pest/predator/pathogen that can seriously weaken or kill colonies but studies point to their being the most significant.

To know how many, beekeepers need monitor/sample hives for mites. So the survey asked percentage of OR hives monitored for mites during the 2016 year and/or 2016-17 overwinter, whether sampling was pre- or post-treatment or both and, of the 5 possible mite sampling methods, what method was used including, when (month) it was employed. Statewide, 178 individual respondents (63%) said they monitored all their hives. Comparison of losses of those individuals monitoring all their hives with those not monitoring along with those who indicated they monitored some of their hives, reveal a 43% loss of those monitoring all their hives, the 62 individuals (22%) who reported they did no monitoring had the statewide average loss of 48% loss and the 43 individuals reported monitoring some of their colonies had a 60% loss.

The comparable numbers for LCBA respondents was 21 monitored all their hives, with a 42.5% loss rate, 4 individuals doing no monitoring had a 83% loss while the 4 who monitored some of their hives had a 71% loss rate. See Figure 11 which shows numbers and loss rate as insert.

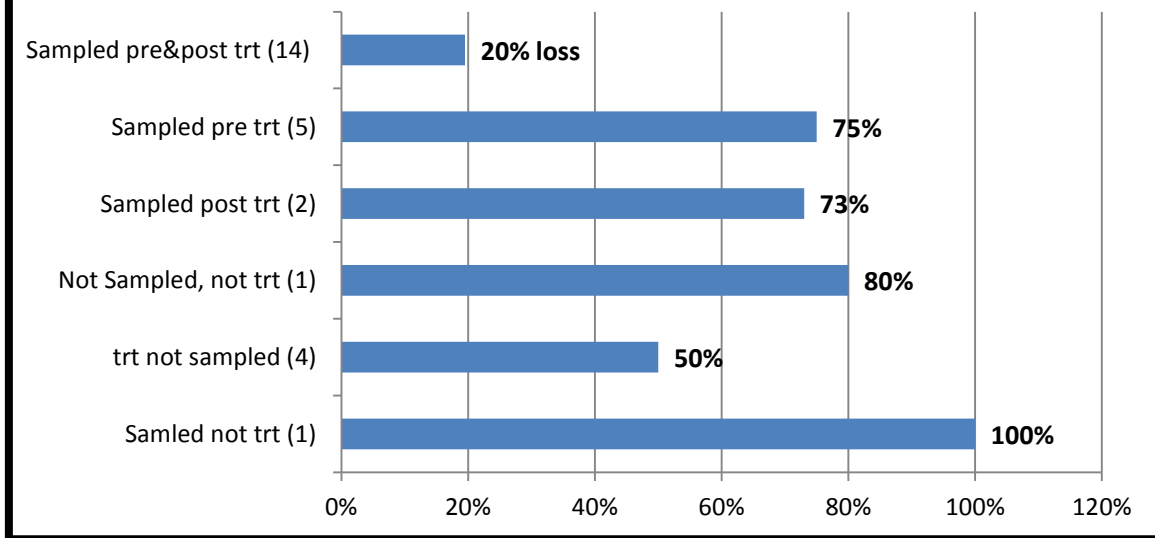
Figure 11. Number monitoring hives for mites, LCBA



Five Lane Co individuals monitored with powdered sugar and one with alcohol wash; those using powdered sugar had a 22% loss rate, the one using alcohol wash lost 5 of 6 colonies (an 83% loss rate). Individuals using sticky boards (21 individuals) had 47% loss rate, the 7 using visual inspection of drone brood had a 69% loss and those 7 using the visual inspection of adults a 63% loss rate. Statewide, the two monitoring techniques that seemed more effective as a mite monitoring methods (i.e. losses below the 48% overall level) were Alcohol wash (42% loss level) and powdered sugar, a 44% loss rate.

Survey asked about the relationship of treatments to monitoring with several options. Sampling both pre and post treatment was the most effective in demonstrating a reduced loss rate.

Figure 12. Sampling & treatment (trt) record, LCBA 2017
 Number in ()= # individuals



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 seeing mite drop can be difficult). Visual sampling of adults is not accurate: most mites present in the colony are not phoretic on the adult bees, but are reproducing within capped brood cells. Likewise looking at drone brood for mites is not effective to determine how many mites are present but it can be useful to key the more reliable adult washing technique when we start seeing mites on drone brood.

See Tools for Varroa Monitoring Guide www.honeybeehealthcoalition.org/varroa on the Honey Bee Health Coalition website for a description of and 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% in spring (i.e. 2 mites/100 adult bees) and below 5% (no more than 5 mites to 100 adults) when at its largest size during nectar flow following buildup. It is critical to not allow mite levels to exceed 2-3% during the fall months when bees are rearing the fat (large amount of fat body) fall bees that will overwinter.

Mite Control

We asked about non-chemical mite treatments and also about use of chemicals for mite control. **Twelve percent (35 OR individuals statewide) said they did not employ a non-chemical mite control and 83 OR individuals (29%) did not use a chemical control.** See Figure 13. Those who did not use a non-chemical treatment reported a 40% winter loss, a lower loss rate than those who did not use a chemical control (61%). The medium weighted average for numbers is close to the overall loss rate of 48%.

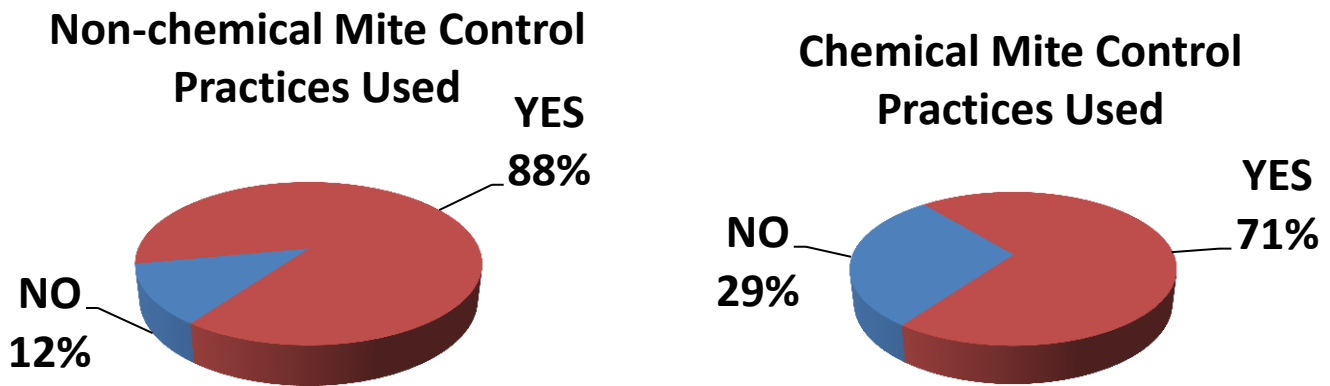
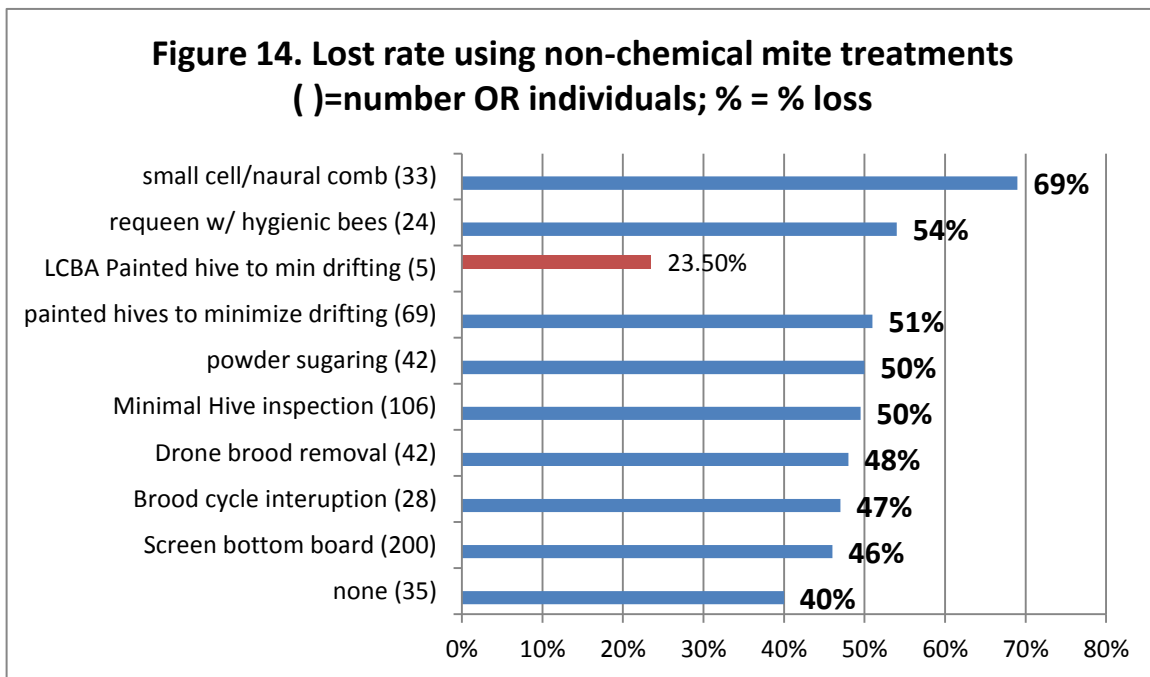


Figure 13

NON-CHEMICAL MITE CONTROL: Examining losses by individual options for statewide OR Beekeepers did not demonstrate that any non-chemical technique, except for a slightly lower rate for those using screen bottom boards, was useful to lower loss levels (See figure 14). Two hundred OR individuals checked this technique and they had a 46% loss rate. Twenty-one LCBA checked the SBB option and their losses were 49. Removing the ‘outlier’ response reveals that the remaining 22 using SBB on all their colonies had a 37% loss, an improvement in survival.

For TVBA respondents, one individual said they did none of the Non-chemical mite control practices; this individual had one colony and they lost it (100% loss). The one ‘outlier’ individual indicated they did Drone brood removal (as did one additional individual who lost 2 of 3 colonies 67% loss), this individual also said they requeened with hygienic queen stock (only LCBA member to check this choice) and, along with 2 other LCBA individuals, used powdered sugar on their colonies (loss of the other 2 individuals was 50%, 1 of 2 colonies). Thirteen LCBA individuals selected Minimal hive intervention and had a 57% loss rate. Two individuals checked small cell and had 71.5% loss. The single management, Painting hive to give them a distinctive address, done by 5 LCBA individuals, revealed only a 23.5% loss, a good survival increase.

There are too few data points and thus the management selections, as selected for the larger statewide data base (average loss = 48%), is shown in Figure 14 with addition of the LCBA number (in ()) and loss rate (as %) added.

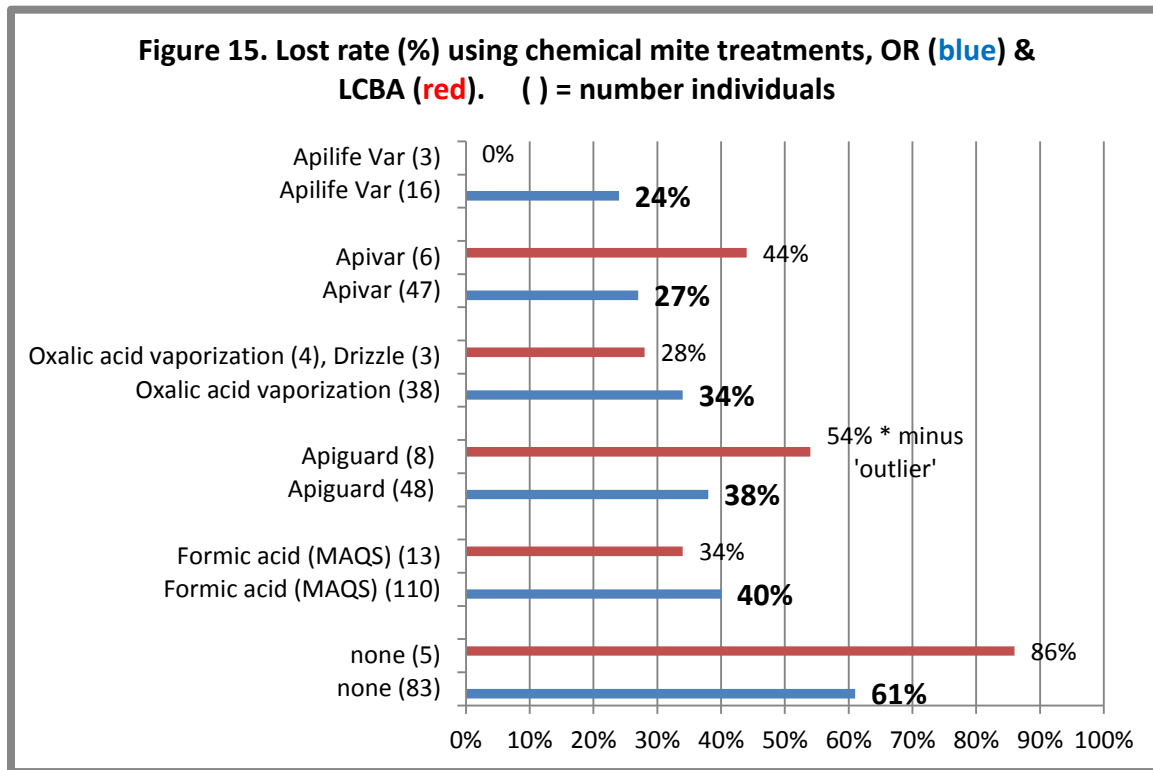


CHEMICAL CONTROL: 83 OR individuals (29%) did not use a chemical control and had a 61% loss. For mite chemical control, 110 OR Beekeepers indicated they most commonly utilized MAQS (formic acid), 35% of total chemical uses. Following distantly was use of Apiguard (essential oil thymol), indicated by 15%. Oxalic acid vaporization (utilized by 38 individuals) and oxalic acid drizzle (27 individuals) was also commonly used. Apivar (amitraz) use was indicated by 47 individuals. Figure 20 illustrates number of uses () and bar length indicates the loss rate for those using that chemical. Apilife Var, although used by only 16 individuals had the lowest loss rate of 24% overwintering colonies, 1/2 the average loss. Apivar also had a low loss rate by statewide users (27% loss this year, 23% loss rate last year).

88 individuals (52%) indicated use of a single compound, 29% used two, 15% used three and 7 individuals (5%) used 4 chemicals. Compared with last year, use of oxalic acid (4% last year) has increased (to 20% both methods combined), and MAQS, last year 21% had higher adoption this year (35%). Use of Apivar was at same level as last year (15%). Statewide data by number of users and percent loss is shown in Figure 15.

Among Lane Co responses, five individuals (17%) said they did not use any chemical control; these five had an 86% loss rate. A total of 37 chemicals were used by the remaining 23

respondents, with one individual using 4, one three and 9 used two. The ‘outlier’ used Apiguard and powdered sugar. The most



commonly used chemical was MAQS (formic acid) by 13 individuals; their loss rate was 34%. Eight individuals said they used Apiguard; minus the ‘outlier,’ their loss rate was 54%. Six used Apivar and had loss rate of 44%, 3 individuals using Apilife Var and they lost none of 10 colonies treated (0%). Finally seven individuals total used oxalic acid, 4 as vaporization and 3 as drizzle, with loss of 28%; the three using drizzle lost only 1 colony of 8 treated for 12.5% loss rate.

It is clearly evident that use of several chemical mite control materials reduced overwinter losses and improved survival. The non-chemical techniques may help reduce losses but to a lesser extent. As for using more than one, and which ones to use during a season, there appears to be NO one best combination. Control choices should be driven by monitoring, seasonal considerations and an estimation of size of mite population.

Queens

The PNW honey bee survey asks individuals with overwinter loss to what they attribute their loss. Fifty-five of the 282 OR respondents (19%) attribute at least some of the loss of their colonies to queen failure; among LCBA respondents, only 3 (8%) indicated queen failure was one of the contributing reasons for their losses.

However, with the health and welfare of the queen (the ‘heart of the hive’) critical to bee hive development and success, we also have a survey section just covering queens. We ask specifically what percentage of colonies might have been lost to queen related issues. For the total OR respondents, 127 (47%) said none and 66 respondents (24%) checked ‘I don’t know.’ Twenty-nine percent (29%) responded that queen loss might have been a factor in colony losses.

Among Lane Co respondents, 16 individuals (52%) said none of their losses were likely due to queen failure and 11 (38%) said they did not know. Only four LCBA individuals (14%) did attribute possible winter losses to queen failure, half the percent statewide. This last response required an estimate of the approximate percent of colony loss that might be attributable to queen failure. One individual said 10-30%, 2 indicated 50-75% and one said 75-100% of their loss could be due to queen failure.

One non-chemical management technique to reduce mite buildup in a colony is to requeen/break the brood cycle so we also asked about how managed colonies are requeened. Twelve LCBA individuals said their colony (ies) did not requeen and 5 said they No not that they were aware of (59%) Thus 41% of respondents indicated their colony (ies) did requeen. One of the 12 individuals said colony queen replacement was via swarming, another said they split their hive to allow it to requeen and 10 said they introduced a mated queen as the requeening method.

We asked if queens were marked. Five LCBA individuals said yes. Marked queens are more expensive but are easier to find in a colony. Marked queens are also a means of tracking queen replacement. It would be difficult to be able to say yes or no if a hive requeened, with absence of queen marking, unless requeening was done by the beekeeper.

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. Reports for individual bee groups are customized. As they are completed they will be posted by the name of the group. Additionally analysis will be performed and these reports will be posted to pnwhoneybeesurvey as they are completed.

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 2017

