2017-18 Lane County Beekeeper Winter Loss Report by Dewey M. Caron

Oregon and LCBA beekeepers were directed to a web-based survey document as a continuing effort to define overwintering successes/losses. This was the 10t^{h} year of such survey activity. I received 303 responses from OR backyarders and 104 from Washington beekeepers keeping anywhere from 1 to 50 colonies. Lane County members sent in 34 surveys, 5 more than last year. A report of the OR beekeeper survey responses, including losses and responses to management questions in the survey, with easy to understand graphs, are posted at www.pnwhoneybeesurvey.com .

Figure below shows the number of respondents (within () next to association name) and bar length expresses overwintering bee losses in most recent overwintering period as reported by members.

Lane County overwinter losses = 37%, 1 percentage point lower than statewide.

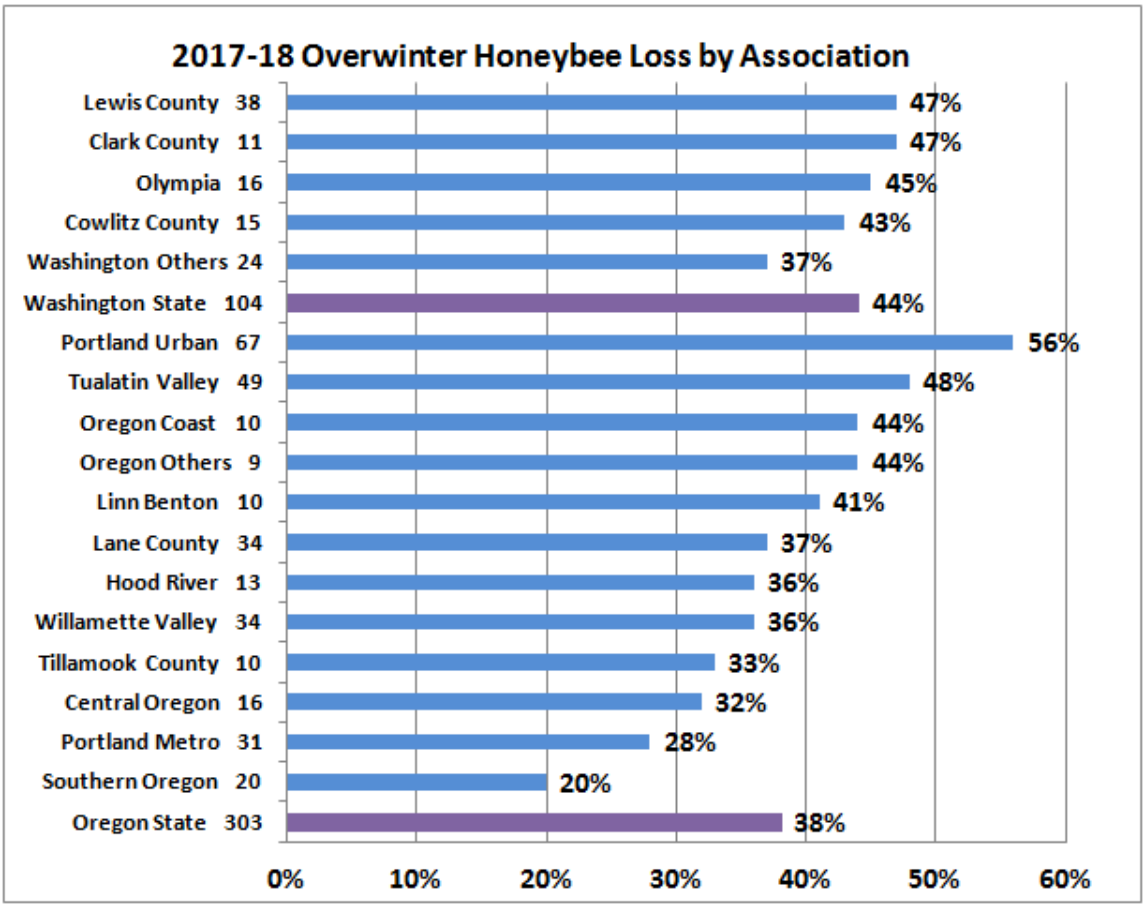


Figure 1

Overwintering losses were determined by asking number of fall (October) colonies by hive type and subsequently how many were still alive in the spring (April). LCBA response included 95 Langstroth 10 frame hives in the fall, of which 60 survived (37% loss) + 7 Langstroth 8 frame hives (3 survived, 57% loss), 6 nucs (all survived), 2 Warré hives, only one of which survived and one other (hollow tree hive) that did not survive. LCBA respondents did not report any top bar hives. Of 111

total fall hives, 70 spring = 41 colonies lost **Total loss = 37%.** Data comparing Lane Co and state-wide respondents shown in Figure 2.

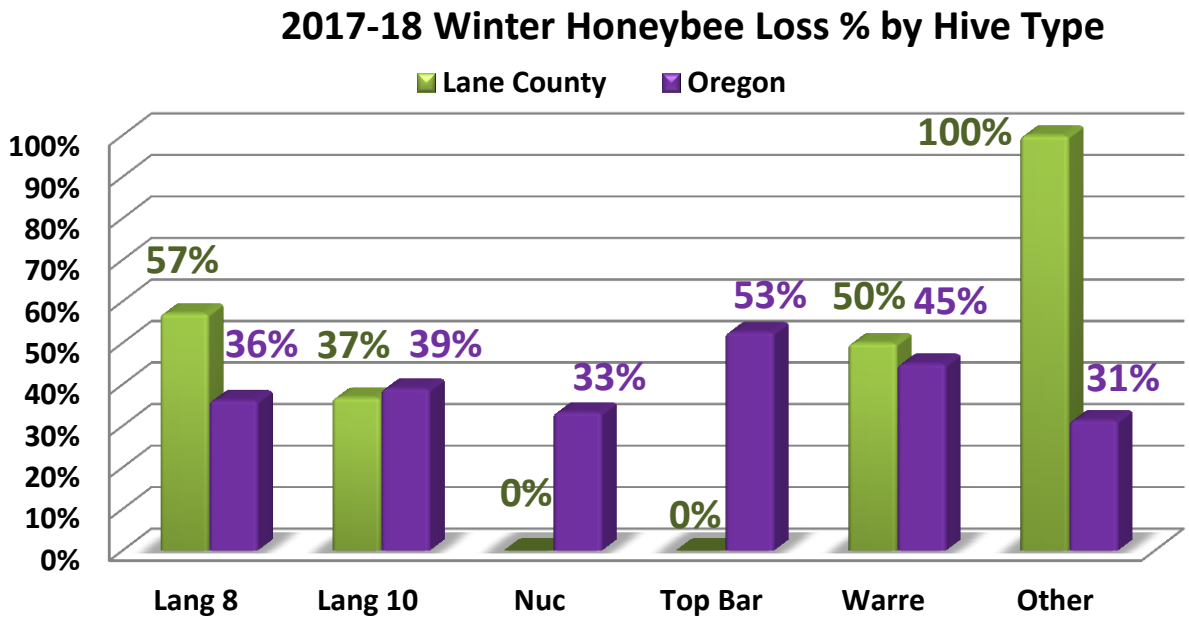
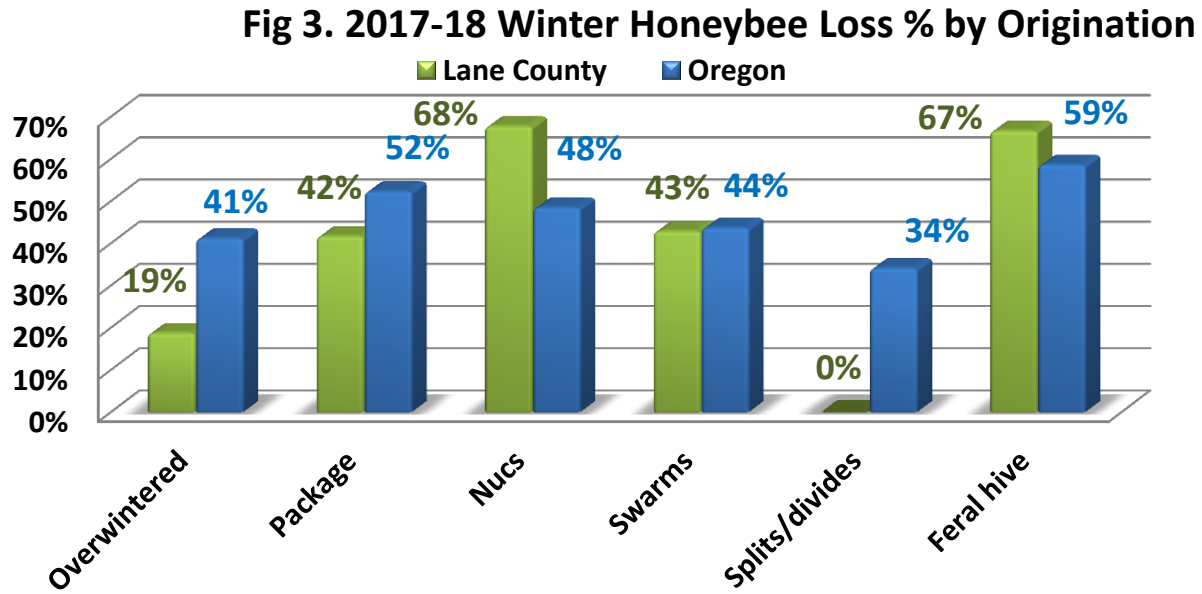


Figure 2

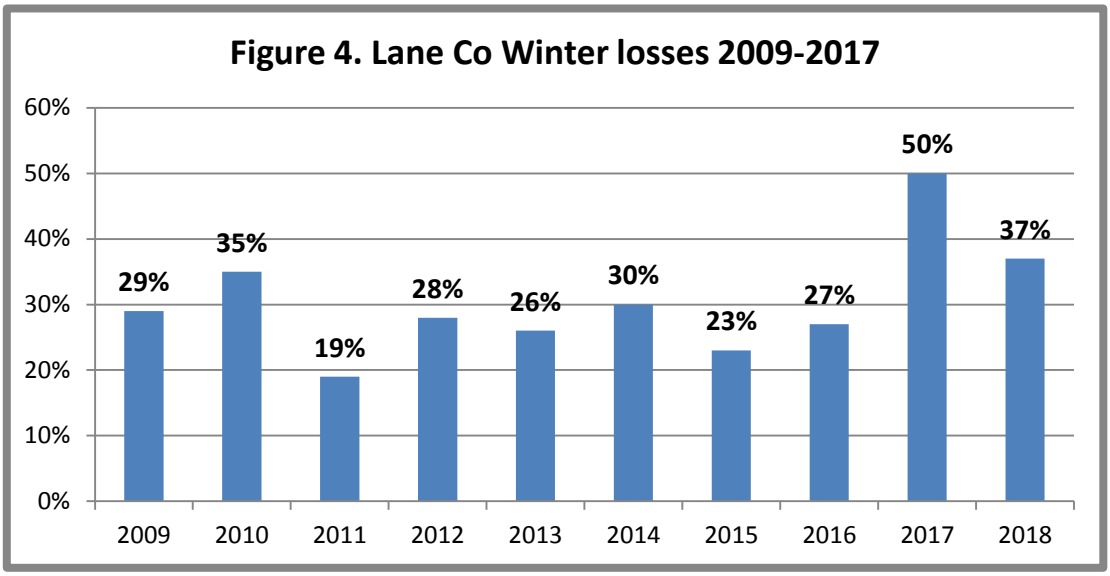
Fall Col # (loss) 7(4) 95(35) 6(0) 0(0) 2(1) 1(0)

Survey also asked about colony losses by hive origination. Sixteen of 16 splits survived, most unusual, followed by 39 of 48 overwintered colonies (19%). Nucs did poorly (68% loss) while swarms and packages did OK with just over 40% loss. Two of three feral hives did not survive. LCBA compared with statewide in Figure 3.



Fall col # (loss) 48(9) 12(5) 31(21) 14(6) 16(0) 3(2)

Losses this past overwinter were reduced from the very heavy losses last winter, both by Lane County beekeepers (50%) and statewide beekeepers (48%) but they are 7 percentage points higher than average of colony losses for past 9 seasons (30%) and in fact are the 2nd highest loss level in past 10 years.

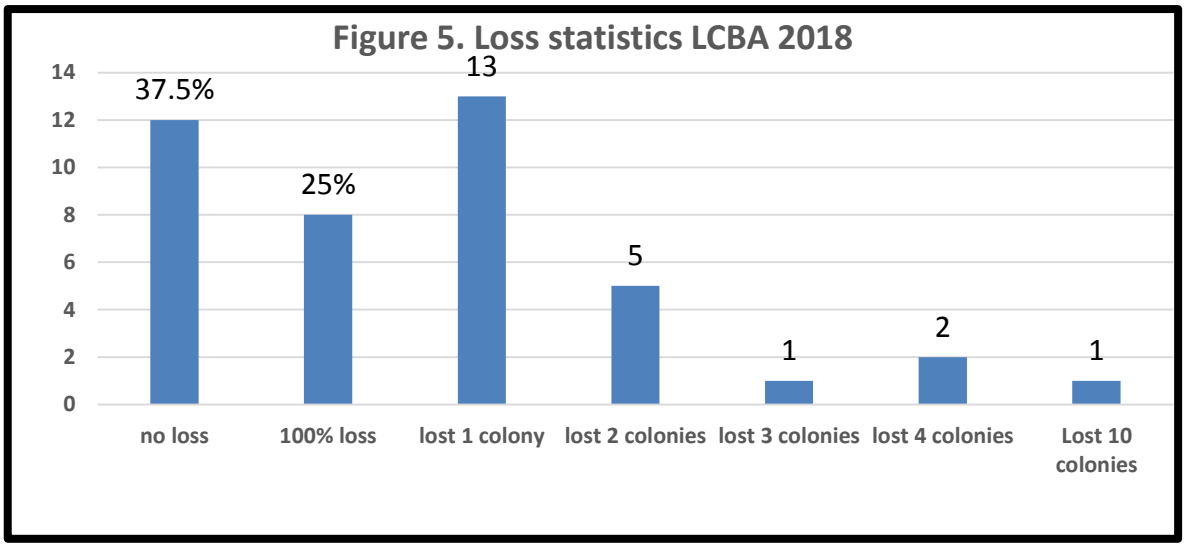


The LCBA association respondents can be characterized, as are the state respondents, by small numbers of colonies and a wide range of years of experience. Eight individuals had 1 fall colony, 10 had two and 2 had three (60%). Six individuals had 4 colonies, 3 had 5 fall colonies and 2 had 6 colonies in the fall (33%). Two individuals had 10+ colonies. One had 12 and another had 15 fall colonies (their respective losses were 1 (8% of total) and 10 of 15 colonies (67% of total).

Years experience shows a broad spread. There were 9 individuals with 1, 2 or 3 years, 16 with 4, 5, 6 or 7 (medium =5 years experience which was also the most common) with 8 individuals indicating they had 5 years of beekeeping experience) and there were 9 individuals with 10+ years, 3 over 20 years and 2 over 40 years. Forty nine years experience was the greatest. Twenty one individuals (64%) said they had a mentor available when they were learning beekeeping, same as statewide.

Not all LCBA individuals had losses Twelve individuals (37.5%) had NO LOSS while 8 (25%) lost all their fall colonies. Thirteen individuals lost one colony, 5 lost two colonies, one individual lost 3 colonies, two individuals lost 4 colonies and one individual (7 years experience) lost 10 colonies, the heaviest loss (in this case a 67% total loss).

Two individual respondents (6%) kept their bees in 2 apiaries. Those two individuals had no loses in their home apiary but 75% loss rate in the 2nd apiary site. N0 LCBA member said they moved colonies 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. There were 40 choices (1.7/individual) selected. Varroa with 9 selections and Weak in the fall, 7 individuals + queen failure, 6 individuals, were the most common selections. Yellow jackets were selected by 4, poor wintering by 3 and don't know + starvation by 2 individuals each. Single indications were pesticides, bear attack, Nosema, moisture, swarmed, cold and no opinion. Asked to indicate an acceptable level of loss choices rangedfrom zero to 100%. No loss, 8 individuals and 10%, also 8 individuals, were the most common selections. 10% was the medium choice.

There is no easy way to verify reason(s) for colony loss nor an acceptable loss level. 59% 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 only one individual stated over 50%. Colonies in the same apiary may die for different reasons. **Doing the dead colony necropsy 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.**

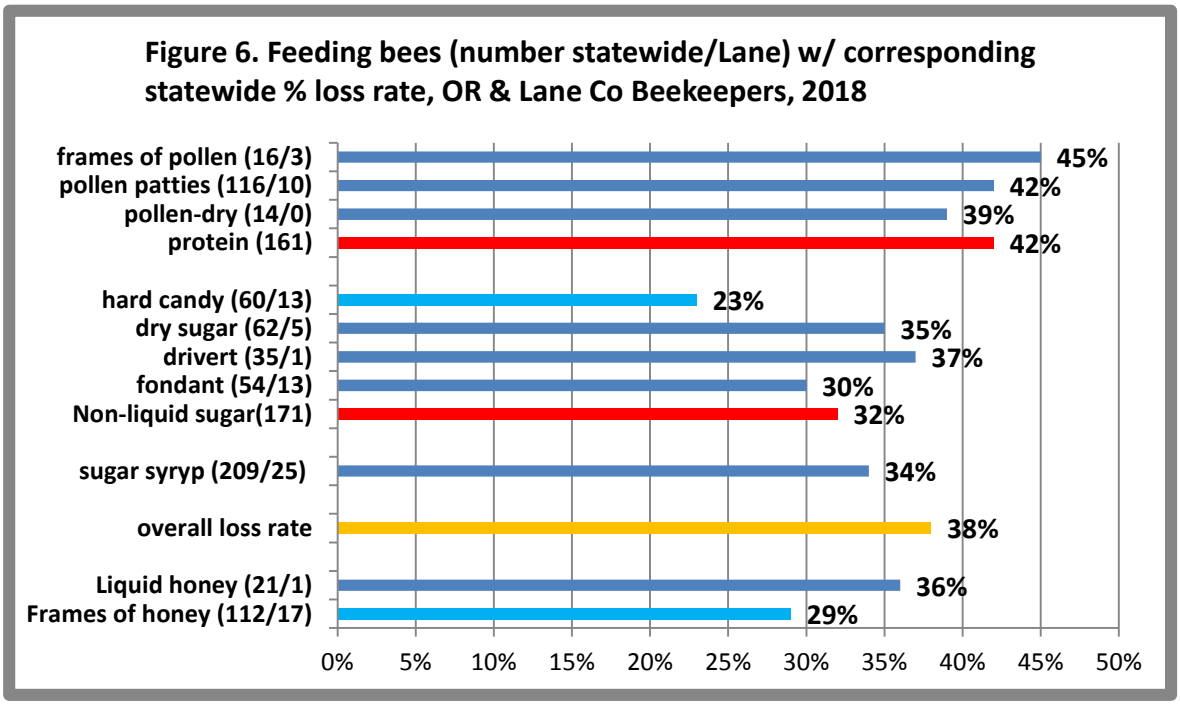
Management selections and losses

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

Lane County survey respondents checked 104 feeding options = 2.6/individual, about same ratio per individual as statewide. Five individuals (15%) selected a single choice (compared to 50% statewide having a single choice), 4 had 2 choices, 12 had 3 choices (the medium number), 6

individuals used 4 choices and 7 had 5 choices. One individual said they did NO FEEDING and their single colony survived.

The results of statewide feeding compared to loss level is shown in Figure 6. Statewide, 209 individuals said they used sugar syrup. They had a 34% loss rate, slightly lower than the overall average of Oregon backyard beekeeper losses of 38%. The number of Lane Co individuals are shown as the second number with (/) following the choice at left. Twenty-five (25) LCBA individuals indicated they fed sugar syrup. Slightly more than ½ this number of statewide respondents (112 individuals), said they fed frames of honey – their lost level (29%) was 9 percentage points better than the overall loss rate; 17 LCBA individuals (also ½ of total Lane respondents) fed frames of honey. Of the 21 individuals who fed liquid honey, 1 a Lane beekeeper, had 36% loss level, similar to overall losses.



Statewide Individuals that fed non-liquid sugar collectively had a lower loss level of 32%. Most useful would appear to be hard candy (60 individuals said they supplied their bees with hard candy and had 23% winter losses) and feeding of fondant sugar (54 individuals feeding fondant had a 30% loss level). Among LCBA respondents 13 individuals used hard candy and 13 used fondant and 1 drivert.

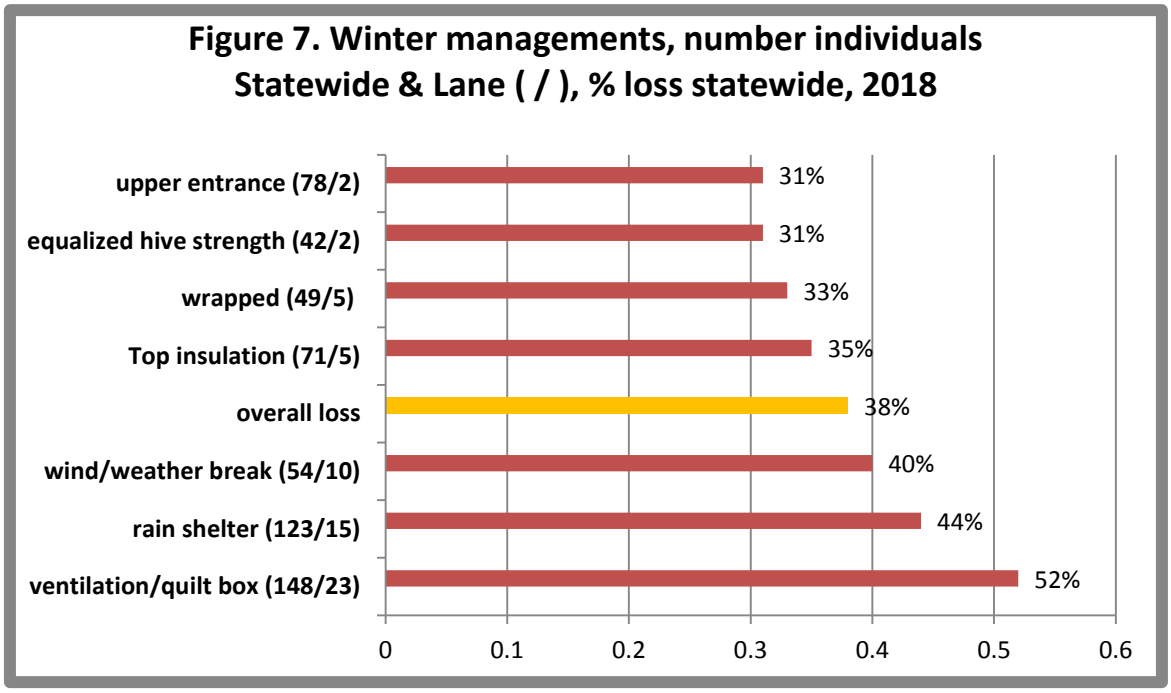
Feeding of protein did not seem to help lower winter survival this past season (but there might be other good reasons for supplementing protein in bee colonies). All options exhibited losses higher than overall losses.

WINTERING PRACTICES: Four Lane individuals (12%) was among the thirty seven (15%) individual statewide respondents indicating doing none of the wintering practices ; Statewide

individuals doing none of the winterizing managements had a 43.5% winter loss compared to overall of 38% while the 5 LCBA members had a 20% winter loss.

Statewide there were 588 responses from OR beekeepers on wintering management practices (more than one option could be chosen). Lane beekeepers had 78 choices (2.0/individual, 0.7 less than statewide). For those LCBA beekeepers indicating some managements, 8 did one single thing, 11 did 2 (medium number), 7 did three and 3 did 4. One individual did. 6 choices).

The most common wintering management selected (148 individuals statewide and 23 LCBA) was ventilation/use of a quilt box at colony top, followed by rain shelter (123 individuals statewide, and 1 Lane respondents). Figure 7 shows number of individual choices and percent of each selection statewide. Upper entrance and equalizing hive strength were the 2 selections that had lowest losses along with those who wrapped also showing higher survivorship (33%) compared to overall loss rate. For Lane individuals, 2 used upper entrance, 2 equalized hive strength and 5 indicated they wrapped colonies. The number of Statewide and number of LCBA respondents for each choice is shown within (/).



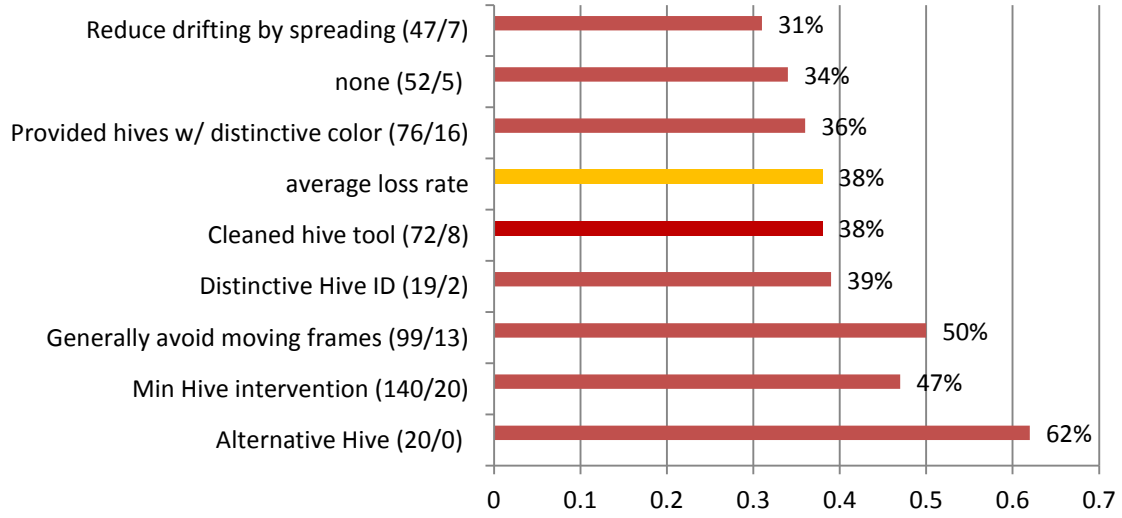
Combining an upper entrance, insulation at top and a ventilation board (alone or in combinations with other managements) did have a slightly lower winter loss rate last year. The variety of indicated choices of these wintering selections demonstrates that OR and Lane backyard beekeepers are taking extra measures to help colonies survive winter conditions.

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 525 responses for this survey question statewide, 46 were Lane member responses. Fifty two individuals statewide (22%) and 5 among Lane (17%) said they did not

practice any of the 6 offered alternatives; loss rate statewide (34%) was slightly less than the overall loss rate of 38% but for the 5 Lane members doing nothing there was loss rate of 65%. Eleven Lane members had 1 selection, 6 made 2 choices (medium), 10 selected 3 managements, 2 had 4 choices and 1 indicated 5 selections. There were 1.6 selections per individual.

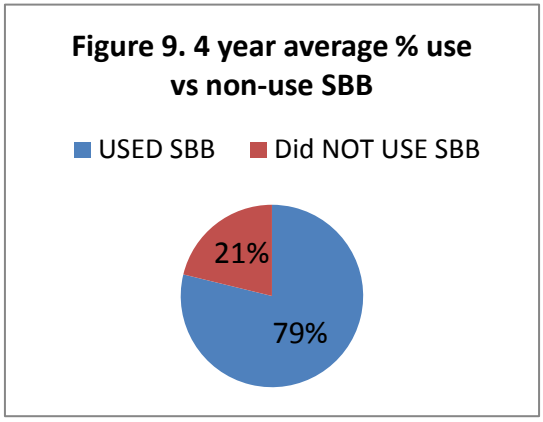
Minimal hive intervention (138 individuals, 20 of them Lane beekeepers) was the most common option selected. It could be argued that less intervention might mean reduced opportunity to compromise bee sanitation efforts of the bees themselves and that excessive inspections/ manipulations can potentially interfere with what the bees are doing to stay healthy. This option however did not improve winter survival; the loss rate for this group was 47%. Last year this selection also did not show better survival. The management of generally avoiding moving frames also did not seem to reduce losses and in fact showed the highest loss rate statewide at 50%; 13 Lane individuals indicated this management. Reducing drift, 7 LCBA members, among 52 Statewide, had best survival.

Figure 8. Sanitation measures (/)= # individuals Statewide & Lane, bar length = 2018 loss % Statewide

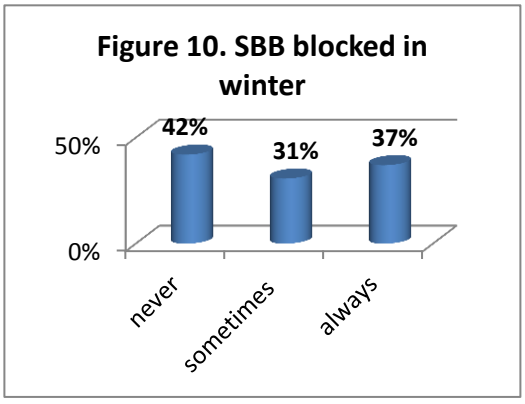


SCREEN BOTTOM BOARDS: Although many beekeepers use SBB to control varroa, BIP and PNW surveys clearly point out they are not a very effective varroa mite control tool. In this recent survey 63 individuals (20%) statewide said they did not use screen bottom boards of which all but 3 were Lane members. In 4 PNW survey years, 21**% said they did not use SBB and 79% did use SBB on some or all of their colonies.** See Figure 8 to left. The loss rate for the 80% who used SBB on some or all of their colonies, was 38% statewide, one percentage point better than the non-users (39%).

Figure 9. 4 year average % use vs non-use SBB



This one percentage point difference means that in the PNW surveys there have been differences of 1, 2 and 13.4 percentage points in better survival 3 of 4 years); for the fourth year, here was a lower survival of 8 percentage points. **The four year average of SBB use, 41.3% loss level of those using SBB on all or some of their colonies and 43.4% for those not using SBB (a 5% positive gain), illustrates how they 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 (Lane 40%) 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 11 individuals (33% of Lane response rate) were LANE members. Statewide never responders had a 42% loss rate, 4 percentage points lower than the average of three previous years. Forty four individuals (17%, 30% LANE) blocked them on some of their colonies. Their loss rate statewide was 30.7%, which was 10.2 percentage points higher than the three year average. **Comparing the always and sometimes left open with the closed in winter response reveals a 10 percentage point difference in favor of closing the SBB over the winter period for OR beekeepers.** See Figure 10.

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. Four 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

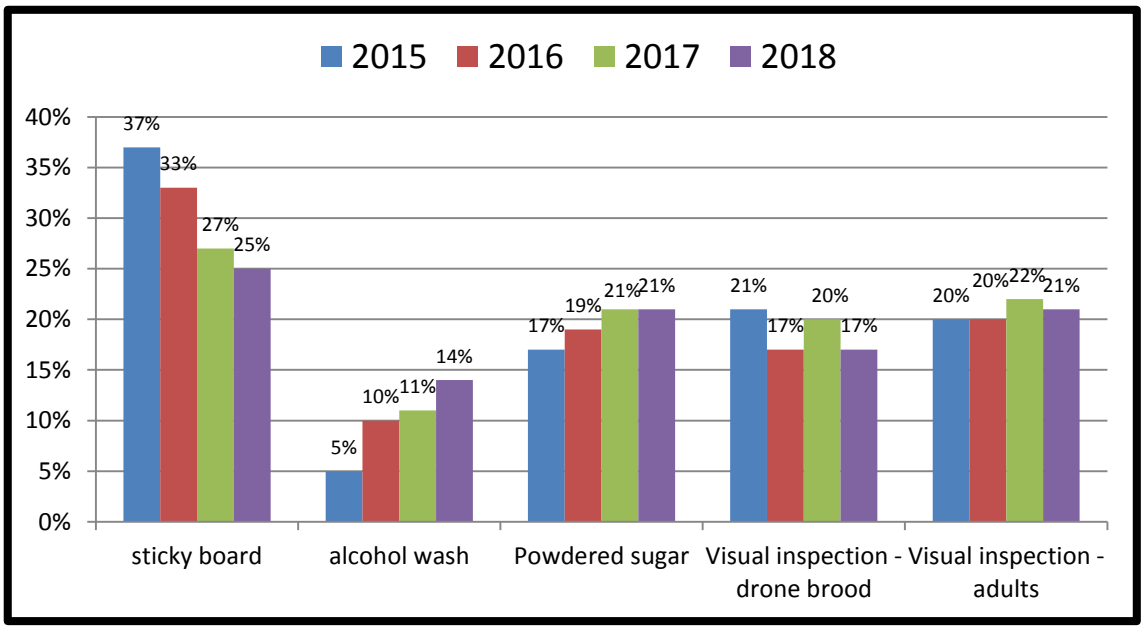
We asked percentage of Oregon hives monitored for mites during the 2017 year and/or 2017/18 overwinter, whether sampling was pre- or post-treatment or both and, of the 5 possible mite sampling methods, what method was used and when it was employed. Statewide, 184 individual respondents (63%) said they monitored all their hives. For LCBA members, 27 individuals (81%) monitored all their hives. Losses of those individuals monitoring statewide was 38%. Seventy seven individuals (22%) statewide and 6 Lane members (12%) reported no monitoring; statewide there was a higher loss rate, 49% while the 6 Lane members had a 41% loss. 33 individuals statewide monitored some of their colonies; they had a 26% loss; 1 Lane individual monitored some of their colonies.

	ALL colonies monitored	SOME colonies monitored	NO colonies monitored
Statewide	43% loss	26% loss	49% loss
LCBA	36% loss (27 indiv)	50% loss (1 indiv)	41% loss (6 indiv)

The previous year those individuals statewide monitoring all colonies (178 individuals) had a 43% loss while the 62 individuals not monitoring had a 48% loss. Thus for past 2 survey years there was an average advantage with monitoring of 8 percentage point lower losses (48.5% no monitoring vs 40.5% loss total monitoring). This means for the two years there is a 20% advantage (lower losses) to those monitoring.

Powdered sugar shake and alcohol wash are the preferred monitoring methods that best estimate the size of the mite population. Sticky boards are useful to check the treatment efficacy when used post treatment. There was a small difference between monitoring all vs only some or none for Lane members. **Monitoring empowers us to make a more informed decision – we need not ask does my colony have mites but rather how many mites does my colonies (do my colonies) have!**

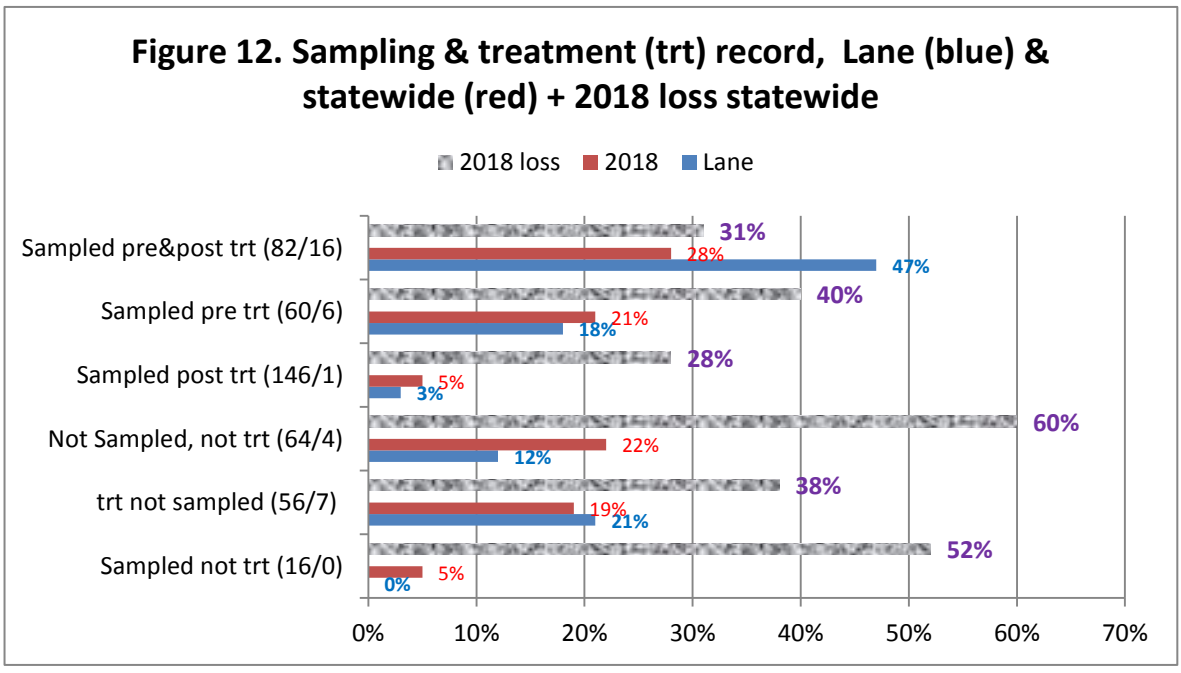
In order of popularity of use statewide, Sticky boards were used by 110 individuals (25%), which has continued to decrease in use popularity, followed by 95 individuals using powdered sugar monitoring (21%), and visual inspection of adults, both 21%. Visual inspection of drone brood was done by 72 individuals=17% and alcohol wash was reported by 61 individuals - 14%. Figure 11 below.



Statewide 68% of individuals used more than one monitoring method. 32% of individuals used a single monitoring method (23 individuals used alcohol wash, 19 sticky board and 18 powder sugar), 39% used 2 methods, 24% used 3, 5% (10 individuals) used 4 and 1 individual used all 5. Among Lane members 10 individuals (33%) used Sticky boards, 3 (10%) used alcohol wash, 16 individuals (53%) used powdered sugar, 12 (40%) used monitoring of drones and 13 (43%) monitored adults for mites (numbers are greater than 100% since multiple methods were utilized).

The most common sampling of statewide respondents in 2017-18 was both pre and post-treatment (34%), as was the case the previous year. Sampling just pretreatment was similar each year but sampling just post treatment, also practiced at a similar level both years, showed a lower loss level similar to both pre and post treatment sampling. Other sampling treatment/sampling combinations exhibited higher loss levels than the overall mean (38%). The option 'Neither Sampling nor treating' had the highest loss level (60%) with 'Sampling and not treating' (52% loss level of those using this approach) also exhibited a loss level above the mean. Both these selections showed the greatest 2-year variation.

Among Lane respondents 16 indicated both, 1 just post, 6 pre-treatment, and 7 individuals indicating treated but did not sample. Four individuals (12%) did NOT sample or treat; they had the highest loss level (64%). None sampled but did not treat in Lane; this was the 2nd highest level among statewide beekeepers in loss level. Figure 14 shows both Lane (blue bar) percentage of individuals doing the action and statewide as well. The single bar (mottled gray color) shows statewide losses associated with each management.



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). Visual sampling is not accurate:

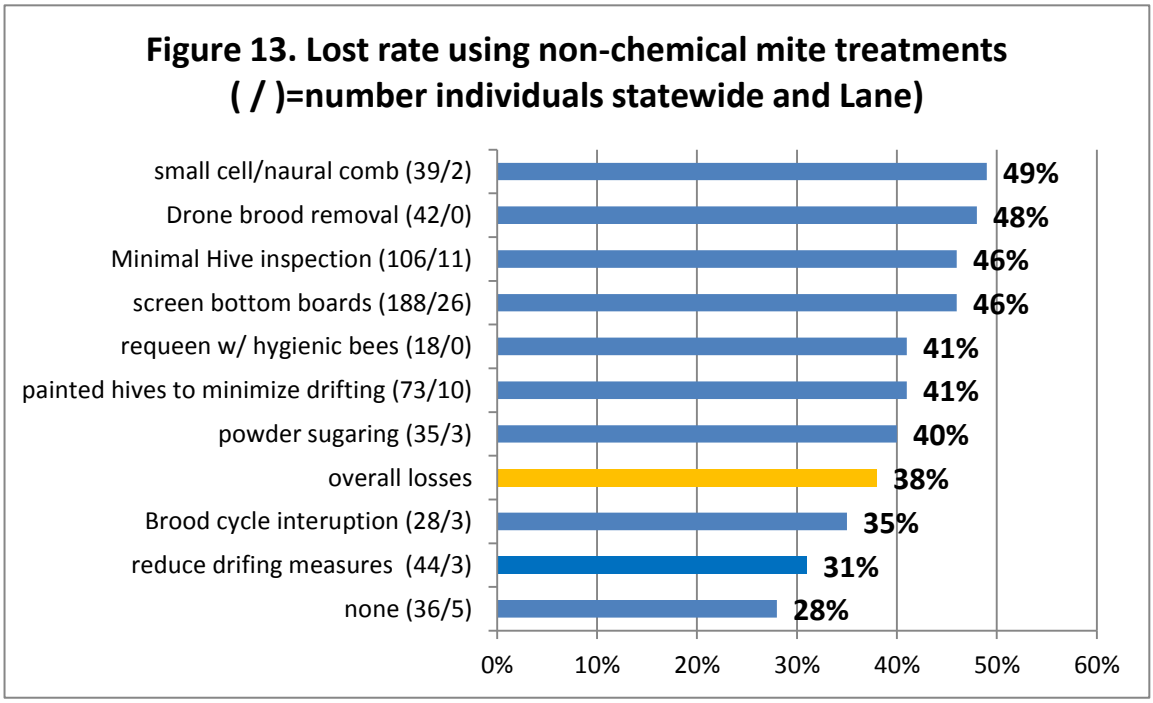
most mites are not on the adult bees, but in the brood. Even looking at drone brood is not effective; if done, look at what percentage of drone cells had mites. **Powdered sugar shake and alcohol wash are the preferred monitoring methods that best estimate the size of the mite population. Sticky boards are useful to check the treatment efficacy when used post treatment.**

Control Management

The survey asked about both non-chemical and chemical mite treatments. Statewide 36 individuals, (14.5%) said they did not employ a non-chemical mite control; 5 were Lane members (16%) and 2 of those also did not use a chemical control. Among the statewide beekeepers, 90 individuals (29%) did not use a chemical control; 4 were LCBA members (12%). Statewide those who did not use a non-chemical treatment reported a 28% winter loss, 10 percentage points better compared to those who did use a non-chemical control; this was true also for the 5 Lane members – 15% loss rate,1/2 that of the statewide figure.. This paradox is explained perhaps by individuals relying too heavily on those control techniques or although controls were needed they were not effective in mite control? In contrast, those statewide who did not use a chemical had a 63.5% loss rate, compared to overall loss rate of 38% while the 4 Lane members not using a chemical control had a 84% loss rate.

Non-Chemical Mite Control: Of nine non-chemical alternatives offered on the survey (+ other category) use of screened bottom board was listed by 188 individuals statewide and 26 Lane beekeepers. The next most common selection was minimal hive inspection (114 individuals statewide and 11 Lane members). Employment of the remaining 7 selections are shown in Figure 13 as number in (/) with first number statewide individuals and second number Lane members. Bar length shows percent loss rate of statewide individuals.

Figure 13. Lost rate using non-chemical mite treatments (/)=number individuals statewide and Lane)



For Lane members 8 did just one non-chemical treatment (5 of the 88 listed just use of SBB), 2 were indicated by another 8 individuals, 8 said they did 3 non-chemical treatments, 3 did 4 and one did 5. Other than doing nothing, two of the non-chemical alternatives, brood cycle interruption (28 individuals 3 in LCBA, loss level 35% statewide and managements to reduce drifting such as spreading colonies in apiary (44 individuals, 3 LCBA, 31% loss statewide) had losses below the overall loss rate.

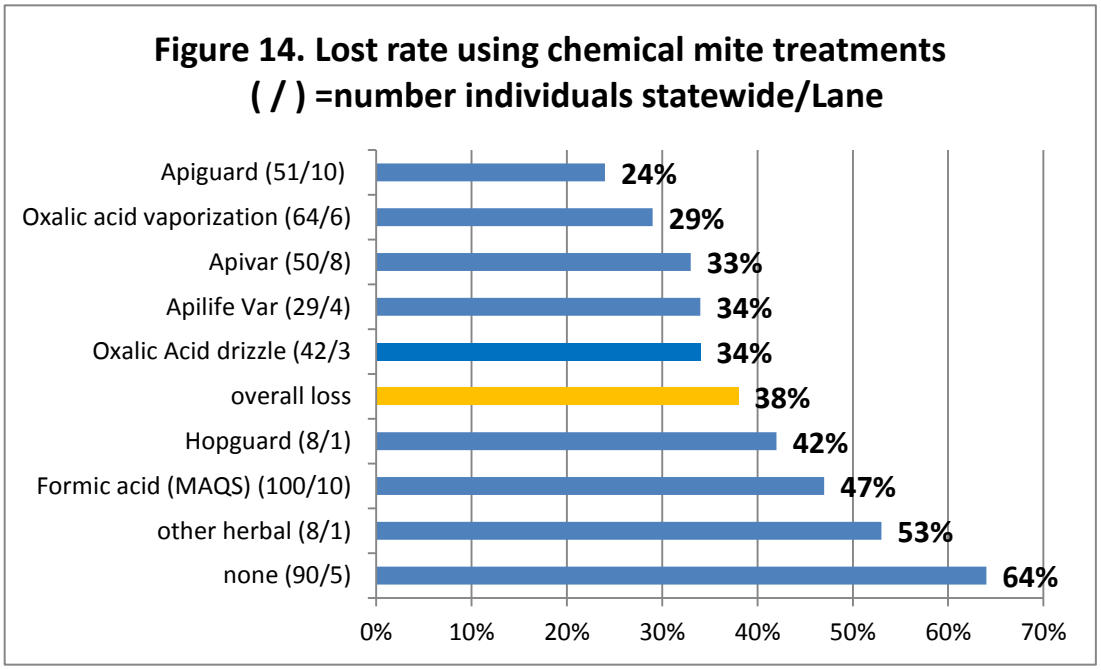
Chemical Control: For mite chemical control, 100 OR Beekeepers (47% of total chemical uses) indicated they most commonly utilized MAQS, formic acid, followed distantly by Oxalic acid vaporization (64 individuals, 30%); 10 Lane members used formic, including one using shop towels soaked in oxalic acid and glycerine,

Apiguard had the lowest loss rate of 24% of all the chemical choices statewide, 14 percentage points lower than the overall loss rate of 38%. It was used by 51 individuals (of which 10 were a Lane member); last year it had a loss rate of 38%, which was 10 percentage points lower than overall rate. Oxalic acid vaporization use increased this year (64 individuals compared to 38 last year statewide; 6 individuals within Lane) and there was a loss rate that was 9 percentage points below overall statewide (last year 14 percentage points below overall).

Apivar also had a low loss rate by users of 35% but this was elevated compared to the previous 2 survey seasons (27% loss 2016-17 and 23% loss rate 2015-16). It was used by 8 individuals within Lane. Oxalic acid drizzle use was higher this year (42 individuals compared with 27 last year statewide) and loss rate indicates, like vaporization, that it can reduce loss rate (4 percentage points below overall this season: last year 7 percentage points lower). Its use continues to grow in popularity each survey season; in 2015-16, 20% (both methods) to 50% of users last year statewide. ApiLife Var, used by 29 individuals (increase from 16 last year) had a loss rate of 34% (10 percentage points greater than last year); 4 Lane members indicated using it.

Chemical use was 2.3 choices/individuals statewide and 1.4 choices/individual in Lane. 104

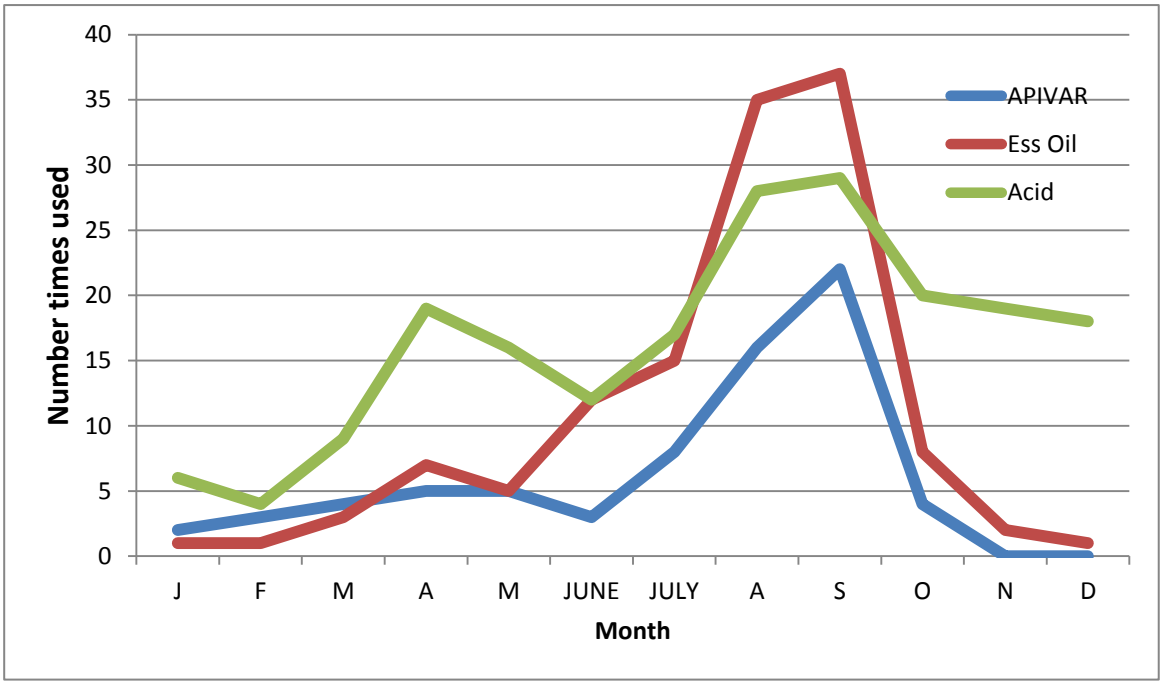
Figure 14. Lost rate using chemical mite treatments (/) =number individuals statewide/Lane



individuals (48.5%) statewide and 15 Lane individuals (50%) indicated use of a single compound, 33% used two statewide, 9 in LCBA (33%), 16% used three statewide (last year 15%) of which 5 were Lane individuals, 4 individuals used and one used 5 among Lane members.

Along with None, MAQS (formic acid), other herbal treatments and Hopguard II users all had losses heavier than overall. Hopguard II has performed poorly in reducing losses.. Under other, one Lane member listed other herbal use and 2 indicated use of powdered sugar.

The monthly use of Apivar (blue line), essential oil (red line) or an acid (green line) is shown in Figure 15 for 2016-17 season statewide. Further review is needed to determine if the timing of treatments was more effective than at other times for the various chemicals.



Antibiotic use

Thirteen individuals statewide (4%) used Fumigillan (for Nosema control); their loss rate was 52&; 2 were Lane members. Two individuals (one less than last year) indicated use of terramycin, neither were Lane members.

Queens

We hear lots of issues related to queen "problems". Under the questions asking the reasons why colonies didn't survive 62 individuals statewide (17%) and 6 (27%) of LCBA respondents selected queen failure as one of their choices. In Section 8 of the survey we asked what percentage of loss could be attributed to queen problems. 48% (129 individuals) statewide, 14 Lane (51%) respondents said none. An additional 61 individuals (22% statewide, 8 (34%) TVBA) said they didn't know. Of those

81 individuals statewide indicating loss due to queen failure (and 5 Lane), 15% statewide, 8% Lane said queen failure could have been responsible for 10-30% of their loss; 2 Lane members checked 30-50% (8%) and one said 75-100%.

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. Eighty one (up 7 from previous survey year) (29% stateside, 40% Lane) said yes. The related question then was did you or your bees replace their colony queen? Forty-three percent (121 individuals) said yes, 36% said no and the remainder 'not that that I am aware of statewide. For Lane respondents 10 individuals said yes, 12% said no and 10 individuals said 'Not they were 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 197 responses (more than one option could be checked) statewide of which 9 were LCBA members. Statewide over one-third of respondents indicated their bees were requeened with a mated queen. Bees did their own requeening more commonly via swarming than supersedure according to respondents. For Lane members 6 introduced mated queen, 4 swarmed, 2 superseded, 2 requeened via splitting and one used virgin queen to requeen.

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 2018