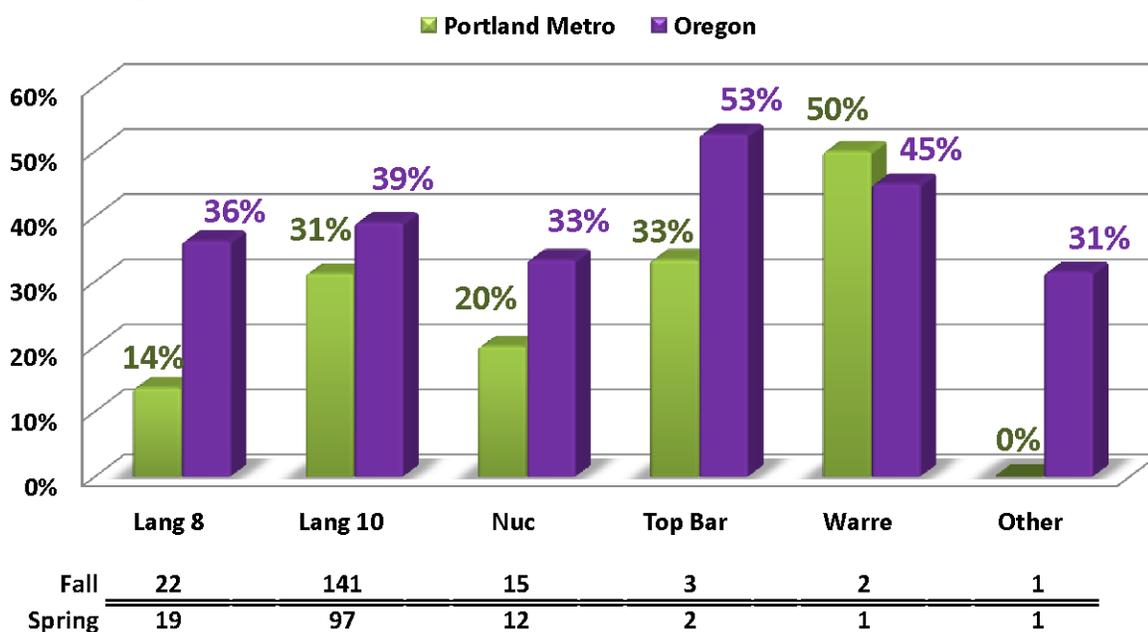


2017-18 Portland Metro Winter Loss by Dewey M. Caron

At the April PM meeting members were directed to a web-based survey document in our continuing effort to define overwintering success. This was the 10th year of such survey activity. I received 303 responses from Oregon backyarders and 104 from Washington beekeepers keeping anywhere from 1 to 50 colonies. Portland Metro (PM) members sent in 31 surveys of 184 fall colonies. This is one less individual response as last year representing 59 fewer colonies compared to last year.

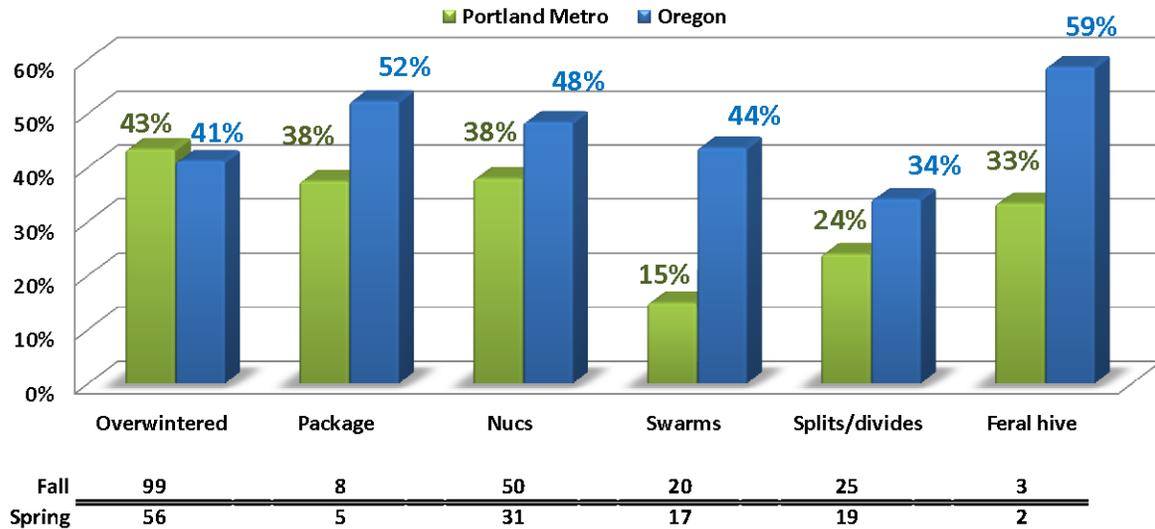
Overwintering losses of PM respondents was 52 colonies = 28%. This loss is 10 percentage point lower than the statewide loss of 38% (database of 303 OR backyarders.) Percent losses, determined for 5 hive types, is shown in Figure 1 comparing PM with the statewide backyarders. PM member respondents started winter with 141 Langstroth 10-frame and 22 Langstroth 8-frame hives (89% of total), 15 5-frame nucs (of which only 3 did not survive), 3 Top bar hives, 2 Warré hives, and one “other” (a “natural” hive – it survived winter).

Figure 1. 2017-18 Winter Honeybee Loss % by Hive Type



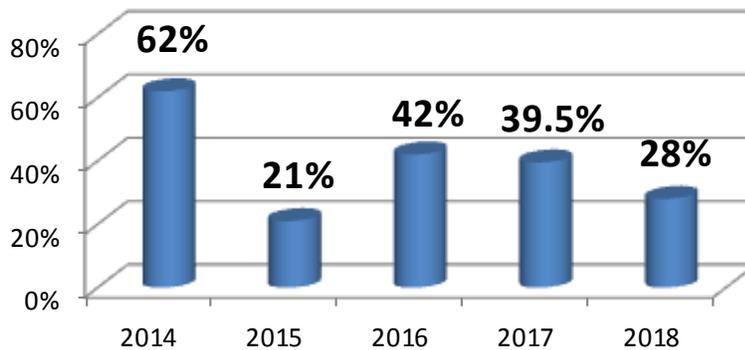
The survey also asked for hive loss by hive origination. Fifty-six of 99 overwintered PM colonies were alive in the spring (43% loss rate), similar to 41% losses statewide. PM respondents reported lower losses of package bees, nucs, swarms, splits and feral hives compared to overwintered losses and statewide. See Figure 2 for PM/statewide comparisons.

Figure 2. 2017-18 Winter Honeybee Loss % by Origination



Losses this past winter for PM beekeepers were 13 percentage points below the average of the last 4 years (41%). Figure 3. See www.pnwhoneybeesurvey.com for last year's individual report for PM beekeepers.

Figure 3. PMBA OVERWINTER LOSSES 2014-2018.

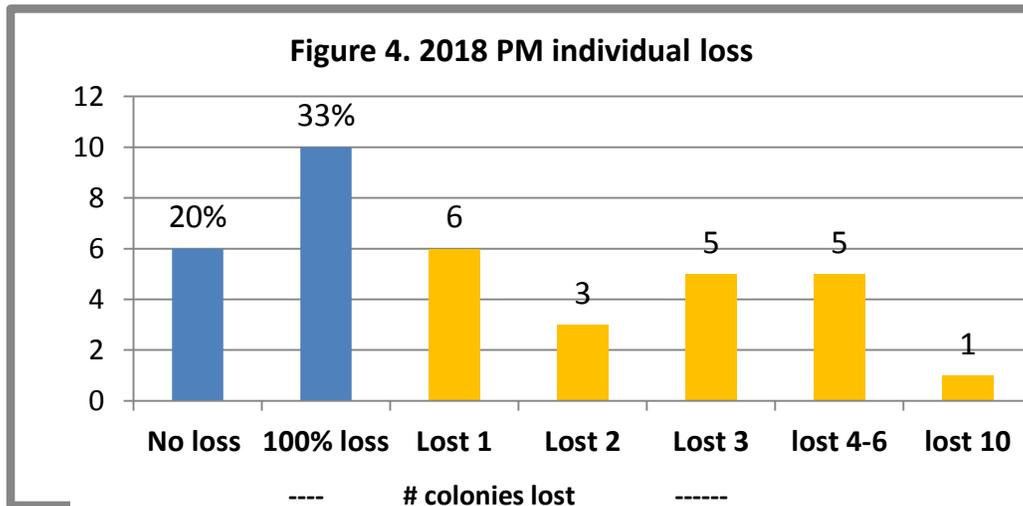


The PM survey respondents were a mixture of single digit colony beekeepers with those with more colonies, along with new and more experienced individuals. Eight PM respondents had 1 fall colony, 1 had 2 and 5 had 3 colonies (48% of PM respondents), 7 respondents had 4 to 6 colonies, 2 individuals had 7-9 colonies while six individuals (21% of total respondents) had 12 or more colonies; the largest number was 30 colonies.

Five individuals had one year of experience, three had two and an equal number had 3 years (total of 1, 2 or 3 years of beekeeping experience=35.5% of total respondents). Eleven individuals had 4 to 6 years' experience =35.5%), 4 respondents had 7 to 9 years of experience

and seven had 10+ years' experience (22.5% of total respondents); 35 years was largest. Half of PM beekeepers indicated they had a mentor their initial year of keeping bees.

Not everyone had loss. Ten PM individuals (33%) reported total winter survival; unfortunately however, six individuals (20%) lost 100% of their colonies. Six individuals lost 1 colony; heaviest loss was 10 colonies. Data is shown graphically below in Figure 4.



Two individuals had two apiaries; three individuals had bees at 3 apiary sites. Losses at 2nd /3rd apiaries was similar to primary apiary losses. Four individuals moved hives during the season, 2 only short distances (across yard for example) while the other 2 moved greater distances, one for pollination, one due to loss of apiary site.

Reasons for Colony Loss/Acceptable loss

We asked individuals that had colony loss to estimate what the reason might have been for their loss (multiple responses were permitted). Of 377 statewide responses (1.8/individual), 82 chose varroa (39% of respondent choices), 63 chose Queen failure (30% of respondents), 52 chose Weak in fall (24.5% of respondents), 34 poor wintering conditions and don't know (16% of respondents). The 34 Portland Metro responses (2/individual) were led by varroa (53% of total individuals), 7 individuals said Queen Failure (41%) with 3 individuals each (18%) selecting poor wintering conditions, weak in fall, starvation, pesticides and yellow jackets. Two individuals expressed no opinion and one said it was a lack of "beekeeper love".

	Varroa mites	Poor wintering conditions	Weak in fall	Queen failure	Starvation	pesticides	Yellow jackets	Other
Portland Metro # (%)	9 (53%)	3 (18%)	3 (18%)	7 (41%)	3 (18%)	3 (18%)	3 (18%)	3 (18%)
Statewide %	39%	16%	24.5%	30%	9%	7%	11%	23%

Survey individuals are asked to indicate what might be an acceptable loss level. The median (middle) selection was 15%. PM responses were: zero (7 individuals), 10% loss acceptable (4 individuals), 15% (5 individuals), 25% (6 individuals) and 33% (1 individual). Two selected 50% and one checked 100%.

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. See report on dead colony examination workshop, 2018 at Zenger Farms apiary, a separate report on this 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. PM individual choices varied from zero to 100%, with medium of 15%.

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

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

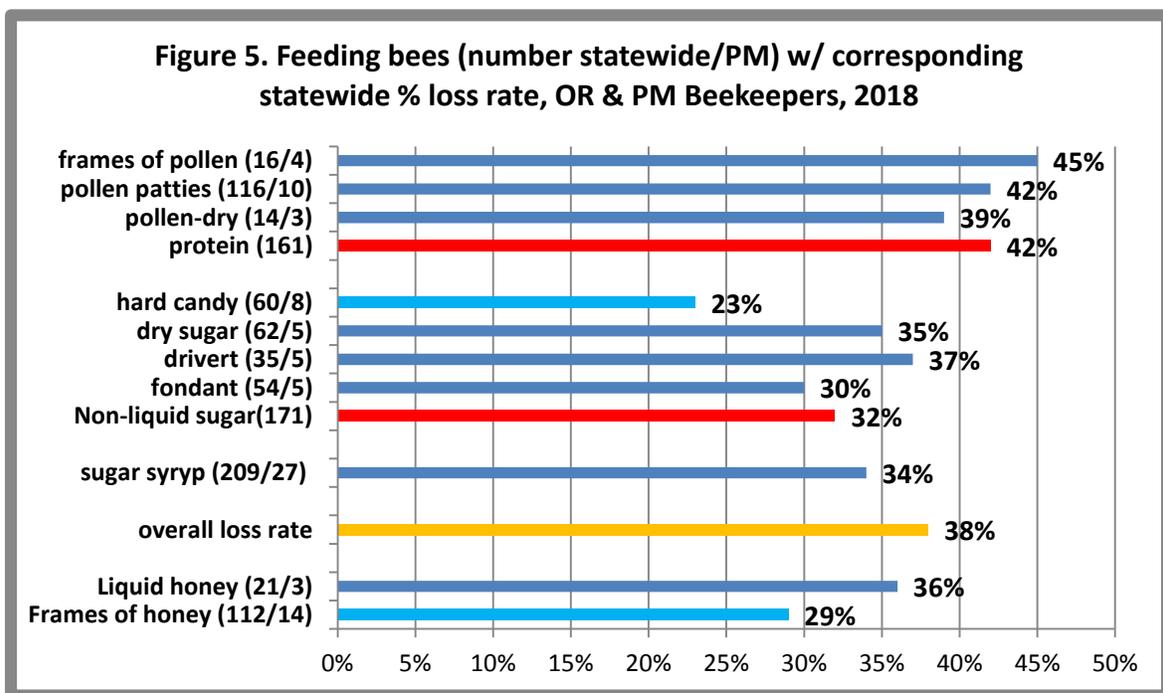
Part 2: Management selections and losses

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 PM and OR beekeepers most often do not do just one thing/management to their colony (ies) to control mites toward improving overwintering success.

PM survey respondents checked 70 feeding options = 2.4/individual, same ratio per individual as statewide. Four individuals (14%) selected a single choice (compared to 50% statewide having a single choice), 4 also had 2 choices, (the medium number), 3 had 3 choices and 9 individuals used 4 choices (The medium number). Three individuals (10%, 2 percentage points higher than statewide respondents), indicated 5 choices and 6 had 2 choices. Those 6

individuals had a 17% loss level). One individual said they did NO FEEDING. They had a 100% loss level.

The results of statewide feeding compared to loss level is shown in Figure 5. 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 PM individuals are shown as the second number with () following the choice. All but 2 PM 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; 14 PM individuals (also ½ of total PM respondents) fed frames of honey. The 21 individuals who fed liquid honey, 3 of them PM beekeepers, had 36% loss level, similar to overall losses.

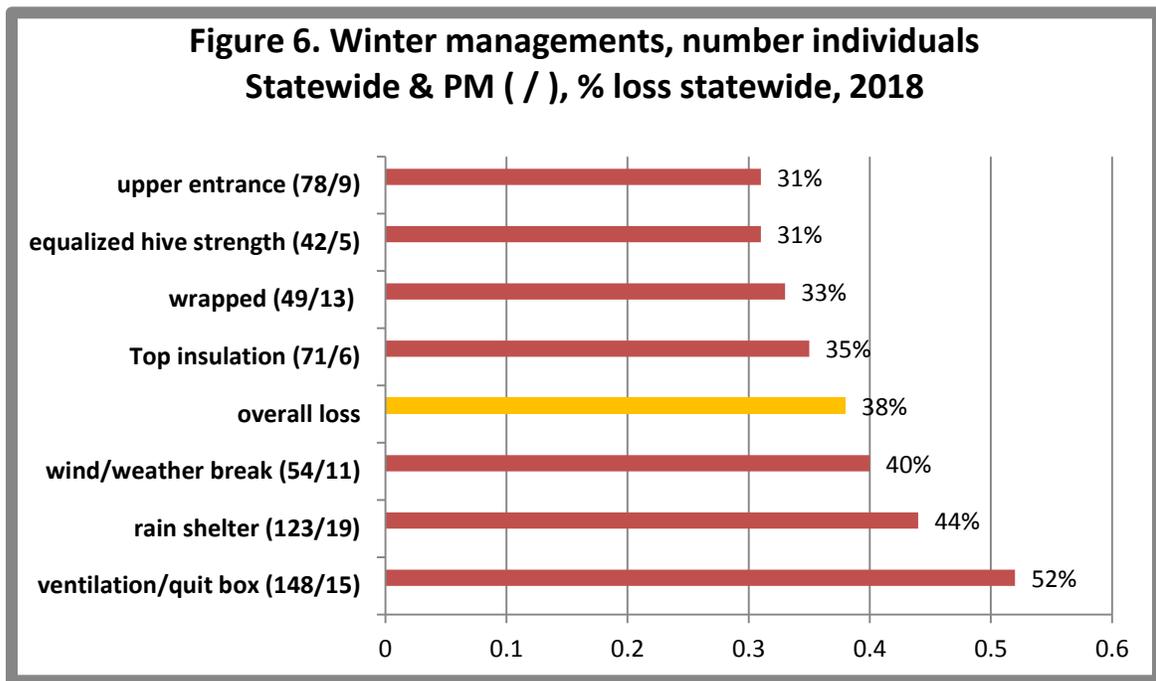


Statewide Individuals that fed non-liquid sugar collectively had a lower loss level of 32%. Most useful would appear to be hard candy (60 individuals said they supplied their bees with hard candy and had 23% winter losses) and feeding of fondant sugar (54 individuals feeding fondant had a 30% loss level). Among PM respondents 8 individuals used hard candy and 5 each used fondant and 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: One PM individual (3%) 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 1 PM member had 100% winter loss.

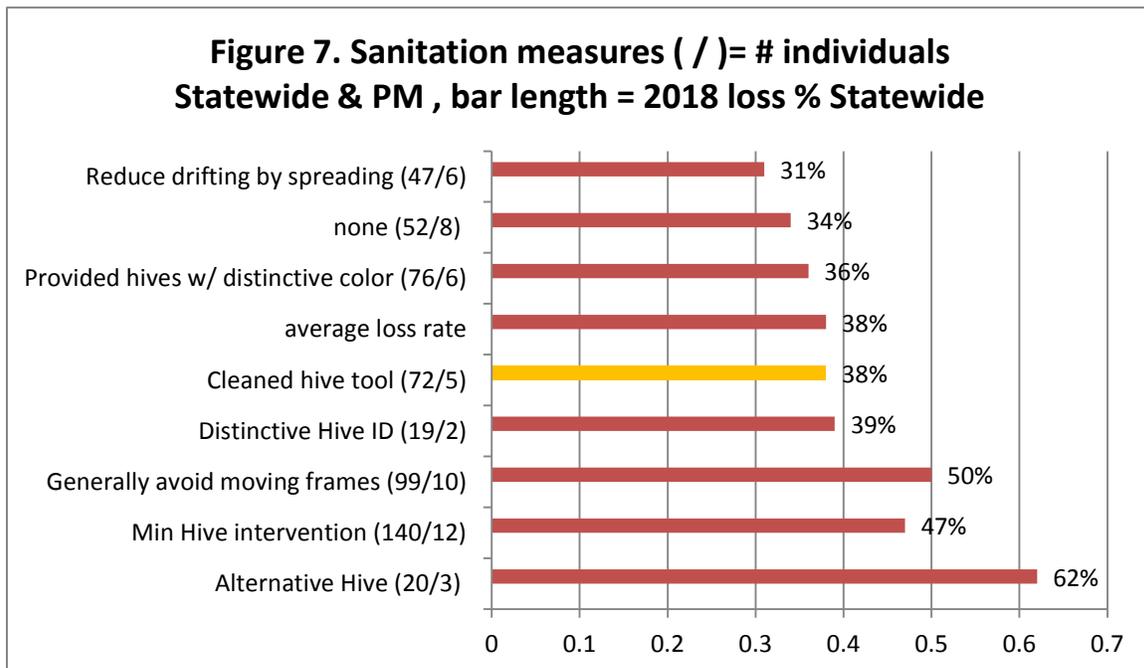
Statewide there were 588 responses from OR beekeepers on wintering management practices (more than one option could be chosen). PM beekeepers had 78 choices (2.7/individual, same as statewide). For those PM beekeepers indicating some managements, 5 did one single thing, 10 did 2, 7 did three (medium number) and 3 did 4. Four individuals (14%), slightly more than double the percentage statewide, did 5 or more (3 did 5, and 1 used 6 choices). Those indicating 5+ had an 18% loss level.



The most common wintering management selected (148 individuals statewide and 15 PM) was ventilation/use of a quilt box at colony top, followed by rain shelter (123 individuals statewide, and 19 PM respondents). Figure 6 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 PM individuals, 9 used upper entrance, 5 equalized hive strength and 13 indicated they wrapped colonies. The number of Statewide and number of PM respondents for each choice is shown within (/).

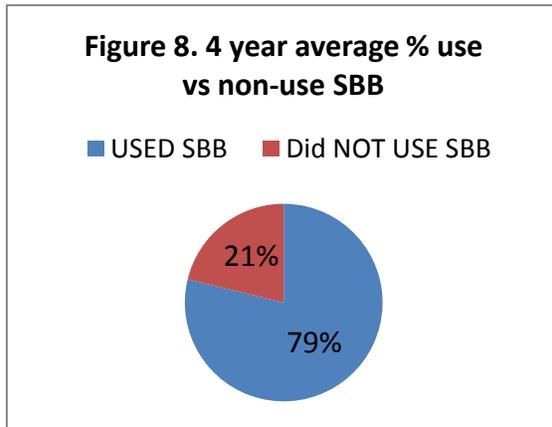
Combining an upper entrance, insulation at top and a ventilation board (alone or in combinations with other managements) did have a slightly lower winter loss rate last year. The variety of indicated choices of these wintering selections demonstrates that OR and PM backyard beekeepers are taking extra 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, 44 were PM member responses. Fifty two individuals statewide (22%) and 8 among PM (28%) said they did not practice any of the 6 offered alternatives but loss rate statewide (34%) was slightly less than the overall loss rate of 38%. Eight PM members had 1 selection, 7 made 2 choices, 3 selected 3 managements and 2 had 4 choices and 1 5 selections. There were 2.1 selections per individual.



Minimal hive intervention (138 individuals, 12 of them PM 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%; 10 PM individuals indicated this management. Reducing drift, 6 PM members, among 52 Statewide, had the best survival. The 8 PM individuals doing none had a 19% loss rate, 15 percentage points better than the 47 statewide loss rate of 34%.

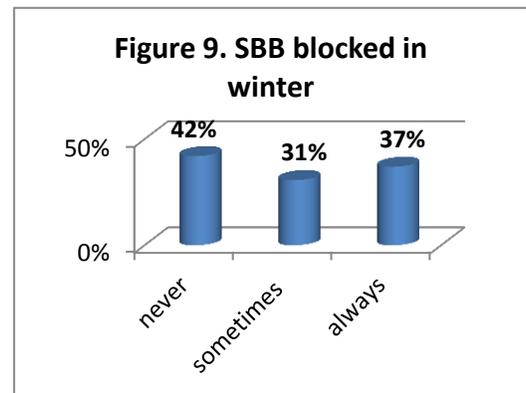
SCREEN BOTTOM BOARDS: Although many beekeepers use SBB to control varroa, BIP and PNW surveys clearly point out they are not a very effective varroa mite control tool. In this



recent survey 63 individuals (20%) statewide said they did not use screen bottom boards of which 28 (of 30) were PM 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%).

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 (PM 47%) 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 10 individuals (33% of PM response rate) were PM members. Statewide never responders had a 42% loss rate, 4 percentage points lower than the average of three previous years. Forty four individuals (17%, 20% PM) 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 9.



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 PM members, 17 individuals (57%) monitored all their hives. Losses of those individuals monitoring statewide was 38% (26% for PM members). Seventy seven individuals (22%) statewide and 4 PM members reported no monitoring; statewide there was a higher loss rate, 49% while the 4 PM members had a much higher loss. 33 individuals statewide monitored some of their colonies; they had a 26% loss; 9 PM individuals monitoring some of their colonies and these individuals had the highest level of loss of the 3 groups.

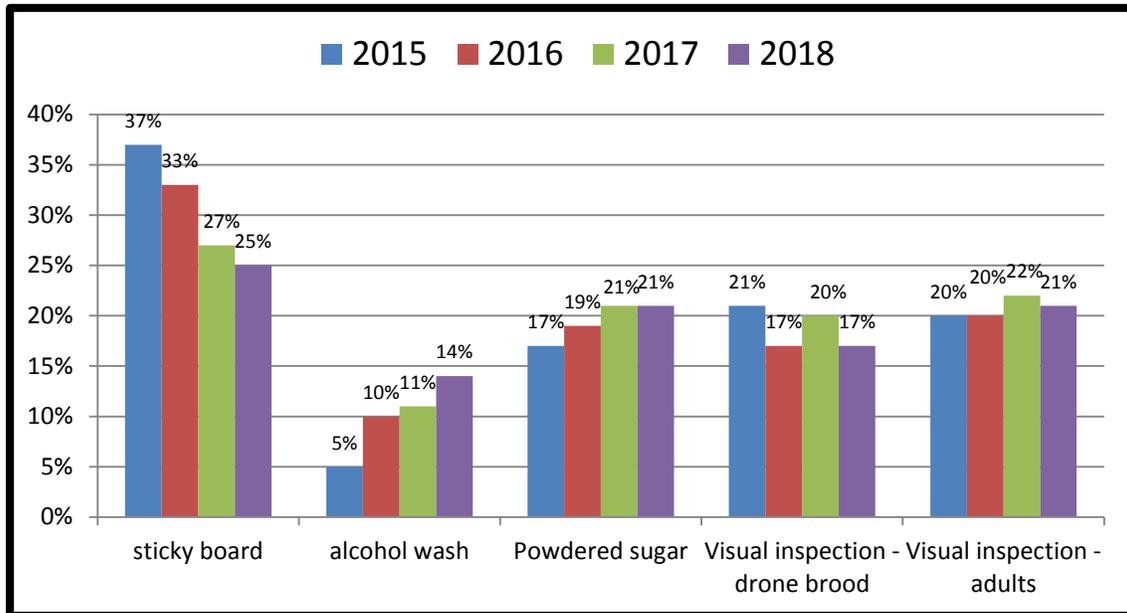
	ALL colonies monitored	SOME colonies monitored	NO colonies monitored
Statewide	43% loss	26% loss	49% loss
TVBA	26% loss (17 indiv)	71% loss (9 indiv)	59% loss (4 indiv)

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 pronounced difference between monitoring all vs only some or none for PM 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 10 below.

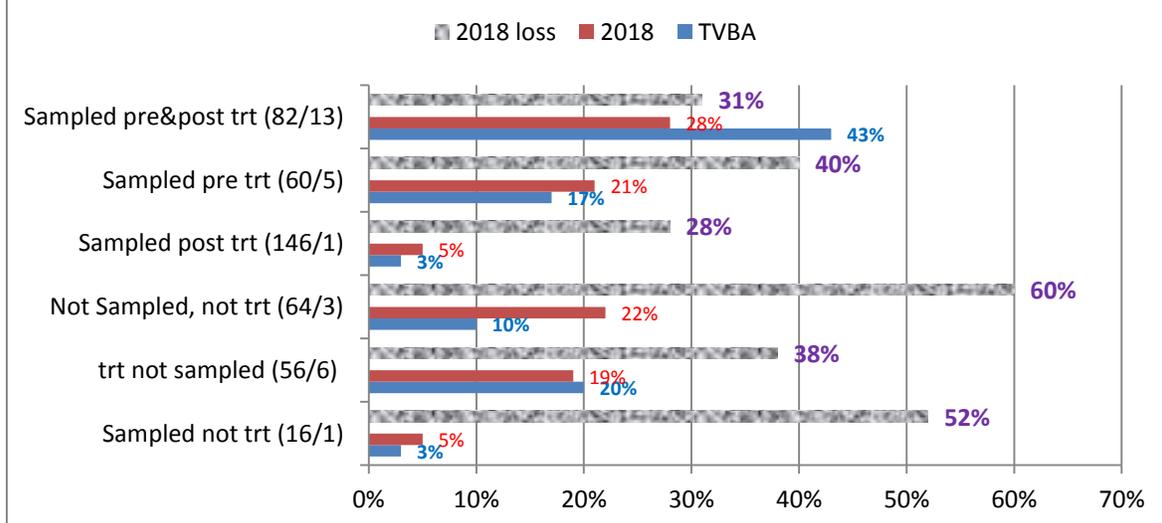


Statewide 68% of individuals used more than one monitoring method. 32% of individuals used a single monitoring method (23 individuals used alcohol wash, 19 sticky board and 18 powder sugar), 39% used 2 methods, 24% used 3, 5% (10 individuals) used 4 and 1 individual used all 5. Among PM members 10 individuals (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 PM respondents 13 indicated both, 1 just post, 5 pre-treatment (17%), and 6 individuals indicating treated but did not sample. Three individuals (10%) did NOT sample or treat; they had the highest loss level (64%). One sampled but did not treat in PM; this was the 2nd highest among statewide beekeepers in loss level. Figure 14 shows both PM (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.

Figure 11. Sampling & treatment (trt) record, PM (blue) & statewide (red) + 2018 loss statewide

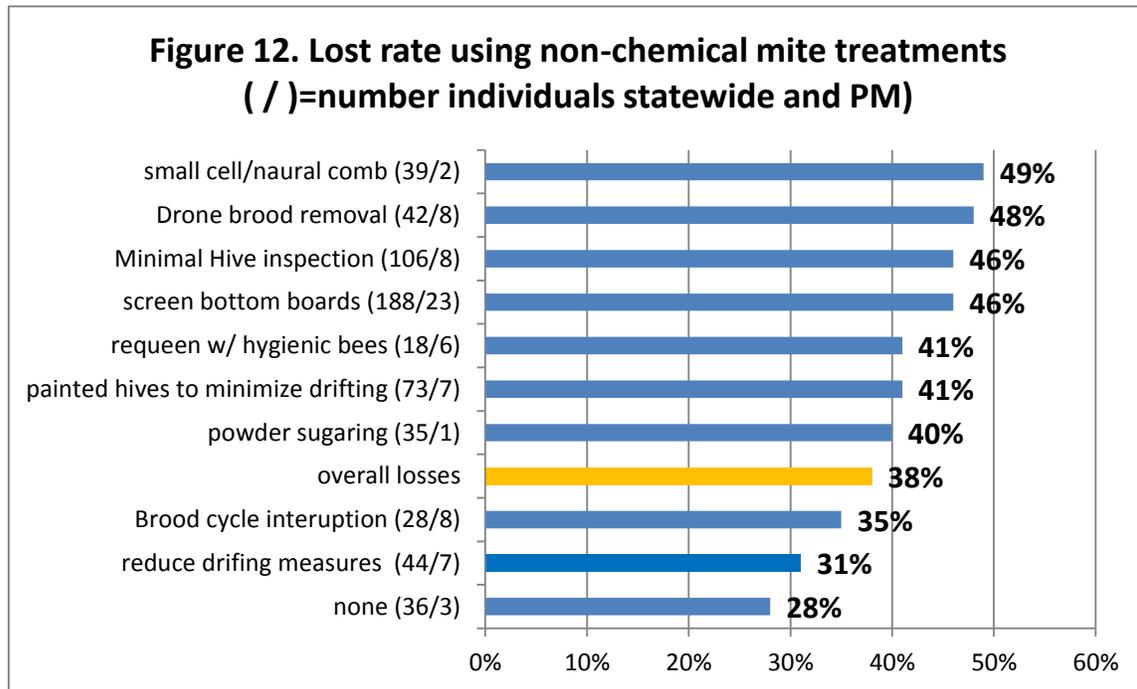


It is important to KNOW mite numbers. Less effective mite monitoring methods include sticky (detritus) boards below the colony (often so much detritus drops onto a sticky board that picking out the mites can be hard, especially for new beekeepers). Visual sampling is not accurate: most mites are not 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; 3 were PMBA members (18%) and 1 of those also did not use a chemical control. Among the statewide beekeepers, 90 individuals (29%) did not use a chemical control; 5 were PM members (17%). Statewide those who did not use a non-chemical treatment reported a 28% winter loss, a lower loss rate than those who did use a non-chemical control; this was true also for the PM members – 19% loss rate. 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 Pm members not using a chemical control had a 65% 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 23 PM beekeepers. The next most common selection was minimal hive inspection (114 individuals statewide and 8 PM members). Employment of the remaining 7 selections are shown in Figure 12 as number in (/) with first number statewide individuals and second number PM members. Bar length shows percent loss rate of statewide individuals.



For PM members 6 did just one non-chemical treatment (5 of the 6 listed just use of SBB), 2 were indicated by 10 individuals, 7 said they did 3 non-chemical treatments, 2 did 4 and one each did 5 and 6 non-chemical treatments. Other than doing nothing two of the non-chemical alternatives, brood cycle interruption (28 individuals 2 in TVBA, loss level 35% statewide and managements to reduce drifting such as spreading colonies in apiary (44 individuals, 7 in PM, 31% loss statewide) had losses below the overall loss rate.

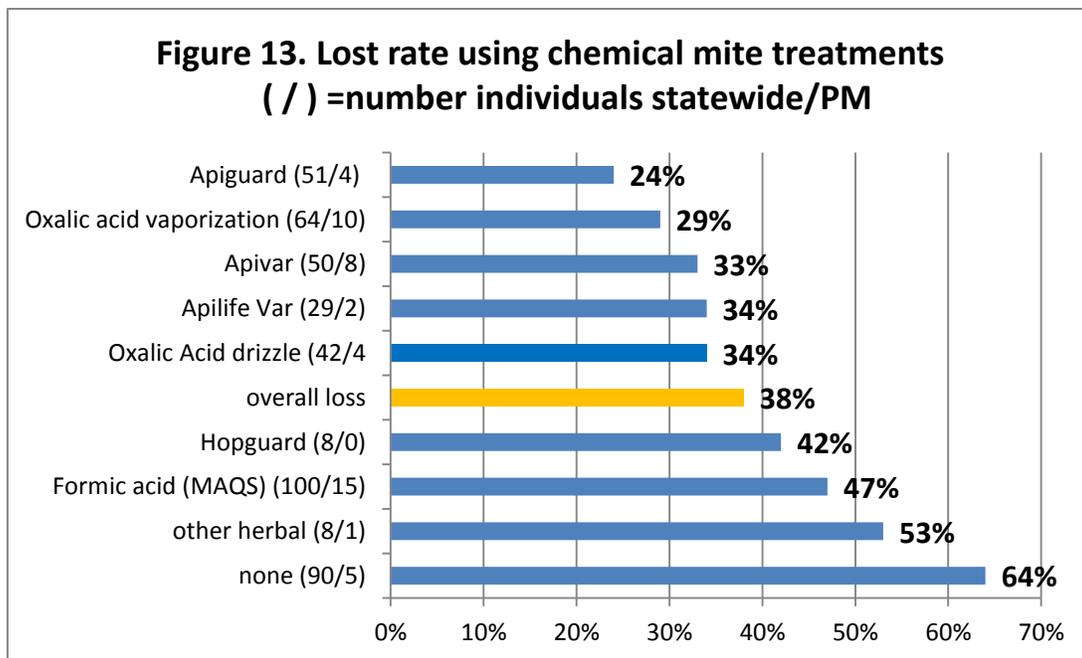
Chemical Control: For mite chemical control, 100 OR Beekeepers (47% of total chemical uses) indicated they most commonly utilized MAQS, formic acid, followed distantly by Oxalic acid vaporization (64 individuals, 30%); 15 PMBA members used formic, including one using shop towels soaked in oxalic acid and glycerine and one said they used formic pro.

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 4 were a PM 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; 10 individuals within PM) and here was a loss rate that was 9 percentage points below overall statewide (last year 14 percentage points below overall).

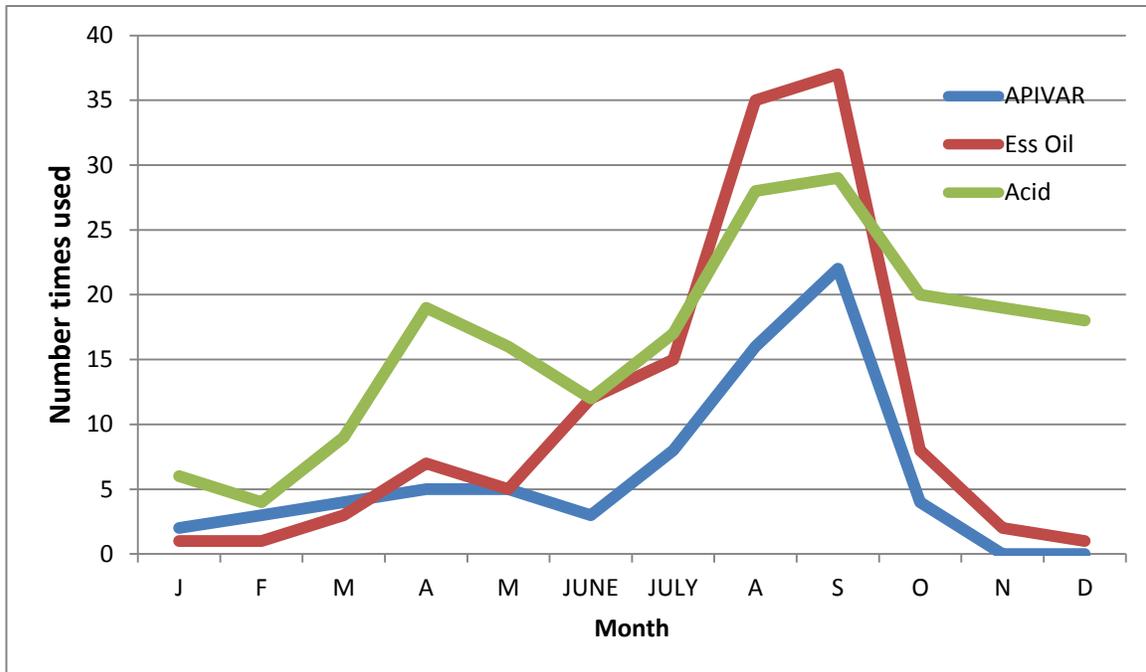
Apivar also had a low loss rate by users of 35% but this was elevated compared to the previous 2 survey seasons (27% loss 2016-17 and 23% loss rate 2015-16). It was used by 8 individuals within PMBA. Oxalic acid drizzle use was higher this year (42 individuals compared with 27 last year statewide) and 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); only 2 PMBA members indicated using it. (12 users.)

Chemical use was 2.3 choices/individuals statewide and 1.9 choices/individual in PM. 104 individuals (48.5%) statewide and 12 PM individuals (50%) indicated use of a single compound, 33% used two statewide, 7 in PMBA (29%), , 16% used three statewide (last year 15%) of which 3 were PMBA individuals (13%) and only 4 individuals used 4 (2 in PM). chemical treatments.



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. Eight individuals, but none in PM reported its use. Under other, PM members listed other herbal use, mineral oil 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 21 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%; none were PM members. Two individuals (one less than last year) indicated use of terramycin, none were PM 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 7 (41%) of PMBA 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, 10 PM(45%) respondents said none. An additional 61 individuals (22% statewide, 5 (20%) TVBA) said they didn’t know. Of those 81 individuals statewide indicating loss due to queen failure (and 10 PM), 15% statewide, 30% PM said queen failure could have been responsible for 10-30% of their loss; 3 PM members checked 30-50% , one 50-75% and 3 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 54% PM) 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 PM respondents 52% said yes, 28% said no and 5 individuals (20%) 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 13 were PMBA 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 PM members 10 introduced mated queen, 5 swarmed, 4 superseded, 2 requeened via splitting and one used queen cells 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