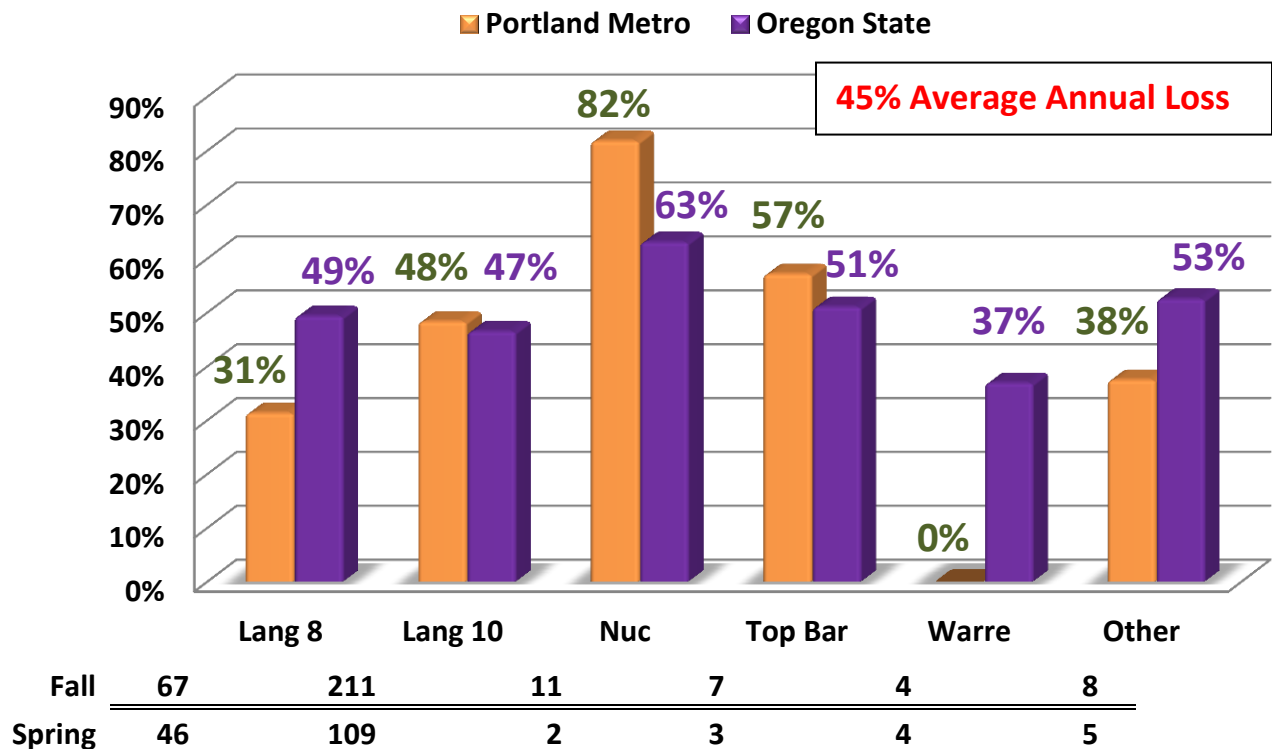


## 2018-19 Portland Metro Winter Loss by Dewey M. Caron

At the March PM meeting members were directed to a web-based survey document in our continuing effort to define overwintering success. This was the 10<sup>th</sup> year of such survey activity. I received 416 responses from Oregon backyarders and 98 from Washington beekeepers keeping anywhere from 1 to 38 colonies (OR)/ 40 colonies WA. Portland Metro (PM) members sent in 53 surveys of 308 fall colonies. This is 22 more individual responses and 124 more colonies compared to last year.

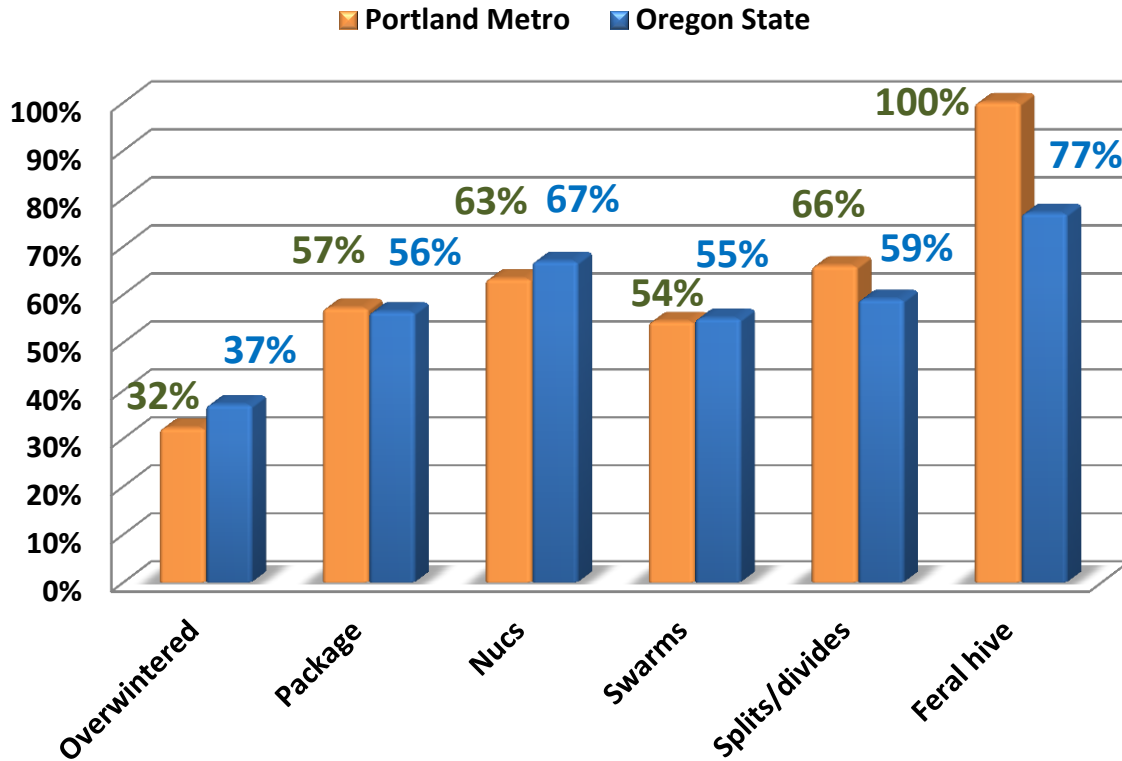
**Overwintering losses of PM respondents was 139 colonies = 45%.** This loss is 4 percentage point lower than the statewide loss of 48% (database of 416 OR backyarders.) Percent losses, determined for 5 hive types, is shown in Figure 1 comparing PM with the statewide backyarders. PM member respondents had 17% percentage point lower losses of Langstroth 8-frame hives compared to Langstroth 10 frames but statewide losses of the 2 hive types was the same. Nuc losses 82% were much higher (82% compared to 20% last year). Other hive types included 6 skeps (4 survived winter) and 2 not otherwise identified. Movable frame Langstroth and nuc colonies represented 94% of hive total. Figure 1

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



The survey also asked for hive loss by hive origination. Overwintered PM colony loss (32%) was considerably better than package bees, nucs, swarms, splits and feral hives. See Figure 2 for PM/statewide comparisons.

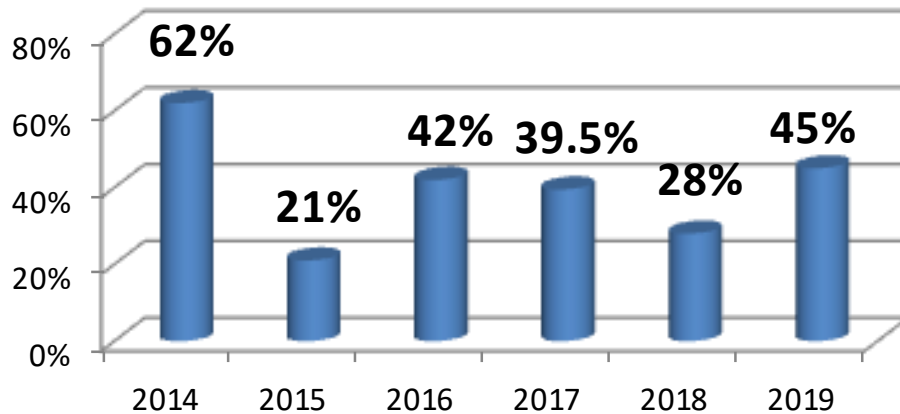
**Figure 2. 2018-19 Winter Honeybee Loss % by Origination**



Fall	165	14	68	46	47	1
Spring	112	6	25	21	16	0

Losses this past winter for PM beekeepers were 7 percentage points above the average of the last 5 years (38%). Figure 3. See [www.pnwhoneybeesurvey.com](http://www.pnwhoneybeesurvey.com) for last year's individual report for PM beekeepers.

**Figure 3. PMBA OVERWINTER LOSSES  
2014-2019.**

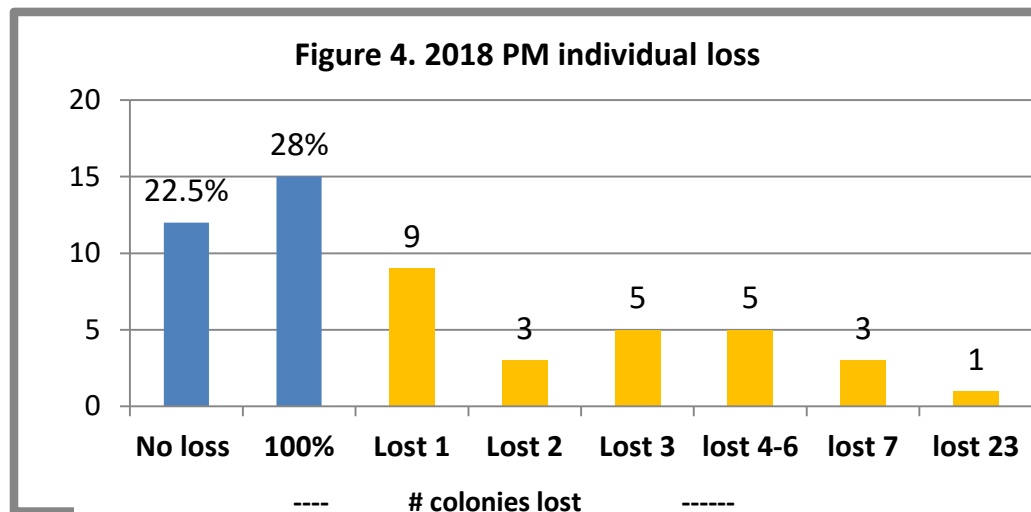


The PM survey respondents were a mixture of single digit colony beekeepers with those with more colonies, along with new and more experienced individuals. Twenty six PM respondents had 1, 2 or 3 fall colonies, 16 had 4 to 6 colonies (30%), 2 with 13 individuals and 4 with 9 individuals were the most common colony numbers, two had 7 – 9 and 9 had 10 or more colonies (17%) with 36 the highest number.

Twenty four individual had 1, 2 or 3 year of experience (39.5%), sixteen had 4 to 6 years experience (30%), 3 years experience (8 individuals) and 4 years experience (9 individuals) were most common, 10 individuals had 7 to 10 years experience and 3 individuals had 12 or more years experience with 2 listing 20 years and one 35, the highest. Thirty four individuals (64%) indicated they had a mentor their initial year of keeping bees.

Not everyone had loss. Twelve PM individuals (22.5%) reported total winter survival; unfortunately 15 individuals (28%) lost 100% of their colonies. Greatest loss was one colony (9 individuals). One individual lost 23 colonies (the greatest loss). Data is shown graphically below in Figure 4.

Four individuals had two apiaries and two individuals had bees at 3 apiary sites. Losses at 2<sup>nd</sup> /3<sup>rd</sup> apiaries (43%) was similar to primary apiary losses. Two individuals moved hives during the season, 1 for pollination and one to reduce apiary size.



### Reasons for Colony Loss/Acceptable loss

We asked individuals that had colony loss (12 individuals – 22.5% - had no loss) to estimate what the reason might have been for their loss (multiple responses were permitted). There were 94 total listing for PM, 2.3/individual, same as statewide. Twenty one PM individuals listed varroa (51% of respondent choices), followed by queen failure (34%) Poor wintering and weak in fall (24% each); 7 individuals chose don't know 17%. Choices were very similar to last year with Varroa higher by 12 percentage points; unlike last year pesticides were not listed as reason for loss. Table compares PM with % statewide selections.

	Varroa mites	Poor wintering conditions	Weak in fall	Queen failure	Starvation	CCD	Yellow jackets	Other
Portland (#)	21	10	10	14	7	2	5	3
Metro (%)	(51%)	(24%)	(24%)	(34%)	(18%)	(5%)	(12%)	(18%)
Statewide %	40%	23%	29%	27%	18%	4%	14.5%	15%

Survey individuals are asked to indicate what might be an acceptable loss level. The median (middle) selection was 20%. PM responses of 15% or less =38%, 19% of respondents each selected 20% and 33% with 1 individual answering 50%

**Why colonies die?** There is no easy way to verify reason(s) for colony loss. Colonies in the same apiary may die for different reasons. Examination of dead colonies is, at best

confusing, and, although some options may be ruled out, we are often left with two or more possible reasons for losses. I am working on a book chapter on necropsy of dead bees and will post it as report on the [www.pnwhoneybeesurvey.com](http://www.pnwhoneybeesurvey.com) website.

There is a good deal of variance in opinion as to what might be an acceptable loss level. We are dealing with living animals which are constantly exposed to many different challenges, both in the natural environment and the beekeeper's apiary. PM individual choices varied from zero to 50%, with medium of 20%. This acceptable loss level as 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, but by no means the only reason, colonies are not as healthy as they should be.**

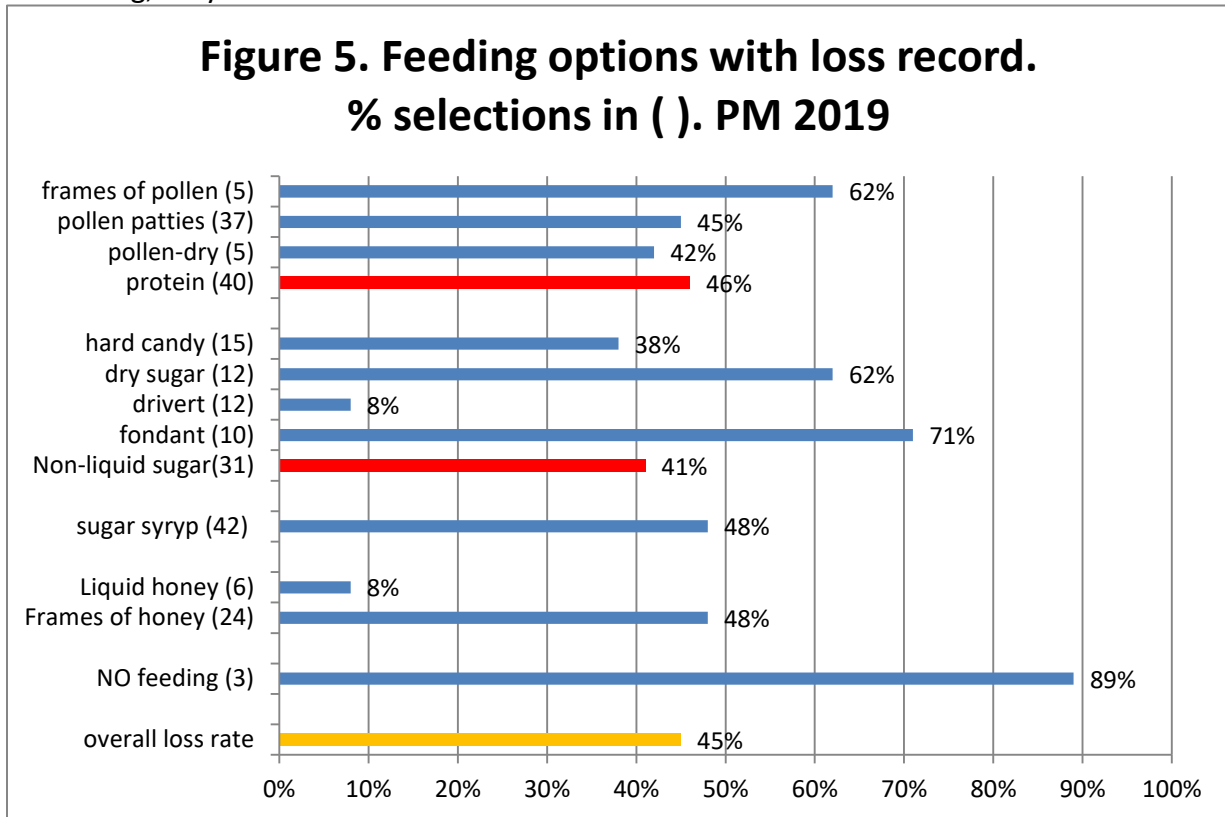
## **Management selections and losses**

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

Most Oregon beekeepers do not perform just one management to their colony (ies) toward improving colony health and overwintering success. This analysis however is mainly of a single factor equated with loss level. Such analysis is correlative and doing a similar management as fellow beekeepers do does not necessarily mean you too will improve success.

**FEEDING:** PM survey respondents checked 169 feeding options = 3.4/individual (statewide it was 2.8/individual). Nine individuals selected a single choice (they had a 43% loss), 4 chose 2, 15 (greatest number) chose 3 and 12 chose 4. Five individuals selected 5, 4 chose 6 and one listed 7; these last 10 had loss of 48%.

Percent colony losses are presented for feeding options of Portland Metro members; numbers indicating doing the management in ( ). Bar lengths of left of 45% bar indicate better than average survival while those to right had heavier than average losses. Fifty PM individuals indicated 169 feeding managements 3.2/individual. Nine individuals chose did one and had a 43% loss, four individual did 2 and had 50% loss, 15 had 3 (greatest number), 12 had 4 choices, 5 made 5 selections, 4 made 6 and one had 7; these last 10 individuals had a 44% loss level illustrating that doing more is not necessarily improving colony survival. Three individuals did no feeding; they had a 89% loss.



Protein in general had one percentage point higher loss level while those feeding non-liquid sugar had a 4 percentage point better survival; especially the 15 feeding hard candy (38% winter loss) and the 12 drivert users (8% loss). Forty two PM individuals (84% of respondents who did some feeding) said they used sugar syrup. They had a 48% loss rate, slightly higher than the overall PM loss level of 45%; individuals feeding liquid honey had losses below the overall PM average. There were three other selections, 2 grease patties and 1 candy cane; these 3 individuals had 14% loss.

For the last 3 years of heavier losses (48% in 2017 and 2019 and 38% in 2018 spring) individuals statewide and in PMBA doing no feeding had poorer survival all 3 years. Individuals that fed sugar syrup had a 10% lower loss level statewide (average for the 3 years). Individuals feeding non-liquid sugar (in any of the forms) had lower losses all three past winter seasons,

with 5 or 6 percentage point improvement from overall losses. Dry sugar and hard candy feeders had improved survival all 3 winters while fondant feeders had better survival 2 of the 3 winters. The respondents of PMBA that fed drivert had this past season had the best survival.

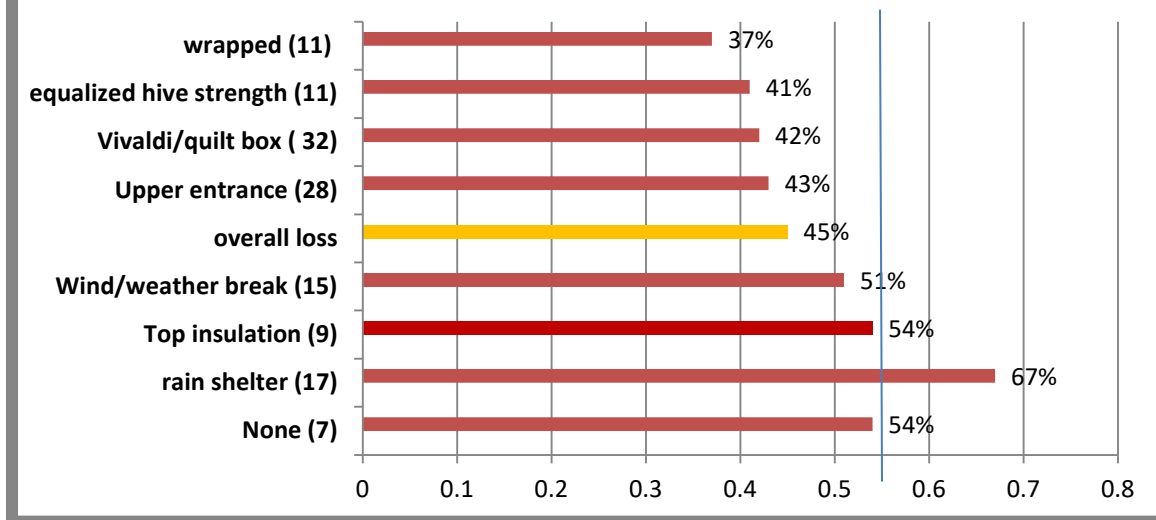
For individuals feeding protein, only the protein patty users showed marginally better survival all 3 years; dry pollen feeders had better survival in one of the three years with losses the remaining two were close to the overall average though the 5 PMBA members feeding dry pollen had the best survival this year.

**WINTERING PRACTICES:** Seven PMBA individuals (x%) reported doing no winterizing; they had loss level of 54%; statewide these 7 were among 51 individuals (12% of overall statewide respondents) that indicated none of the several listed wintering practices; statewide losses were 63% for those doing no winterizing managements, 15 percentage points higher loss than overall loss of 48%. Multiple selections were possible and in fact the 46 PMBA members doing some feeding averaged 2.9/individual. Eight individuals chose a single management and had a 54% loss level, 13 had 2 choices with a 41% loss, 14 had 3 selections, 7 had 4 and 2 each made 5 or 6 choices; these last 11 had a 0% loss, once again as with feeding demonstrating that more is not necessarily better.

The two most common wintering managements selected were use of a quilt box (Vivaldi board) at colony top (242 individuals statewide (58%) and 32 PMBA (70%) and use of an upper entrance (which is often part of the Vivaldi board, 28 PMBA (61%) respondents. Both had slightly better winter survival. Figure 6 shows number of individual choices for Portland Metro members in ( ) and percent loss of each selection. The 11 individuals who wrapped their colonies had the best survival.

Over the past three years no single winterizing management statewide improved survival each survey year. However 5 managements improved survival in 2 of the 3 years. Those managements were: equalizing colonies in the fall, use of the quilt box/Vivaldi board/moisture trap at top of colony, an upper entrance (most Vivaldi boards have an upper entrance built into the equipment), wrapping colonies, and wind/weather protection. Top insulation and wind/weather break did not improve winter survival for PM beekeepers last year.

**Figure 6. Winter managements PMBA 2019**

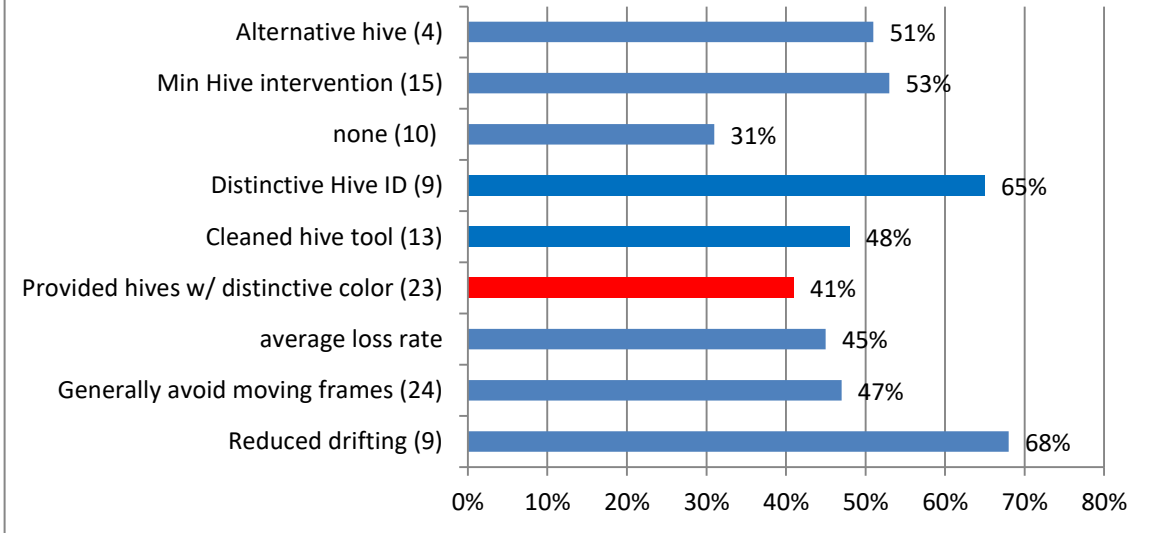


**SANITATION PRACTICES:** It is critical that we practice some basic sanitation (some prefer use of term bee biosecurity) in our bee care. We can do more basic sanitary practices to help insure healthy bees. PM beekeepers had 107 responses 2.5/individual. Sixteen percent statewide including 10 PM individuals (19%) said they did not practice any of the 6 offered alternatives. Loss rate statewide was 52%, four percentage points higher than the overall loss rate of 48%; for PM the 10 individuals had only a 31% loss rate, 14 percentage points better than overall PM average loss of 45%. Twelve PM members had 1 selection (loss rate 65%), 13 made 2 choices (42% loss), 10 had 3 selections and 4 had 4 and 1 each 5 and 6 selections; this las 6 individuals had 56% loss, once again demonstrating more managements is not necessarily better.

None of the alternatives particularly helped improved survival (except doing nothing). The two sanitation choices that did seem to improve survival statewide was reduce drifting by spreading colonies out and providing hives with distinctive ID /doing other hive ID measures but only the distinctive colors improved survival, marginally for PM members.



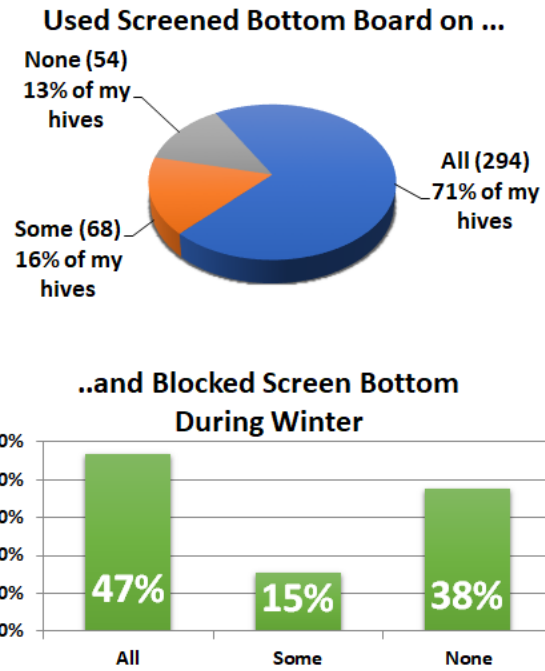
**Figure 7. Sanitation measures ( )= # individuals, bar length = 2019 loss % PMBA**



**SCREEN BOTTOM BOARDS**

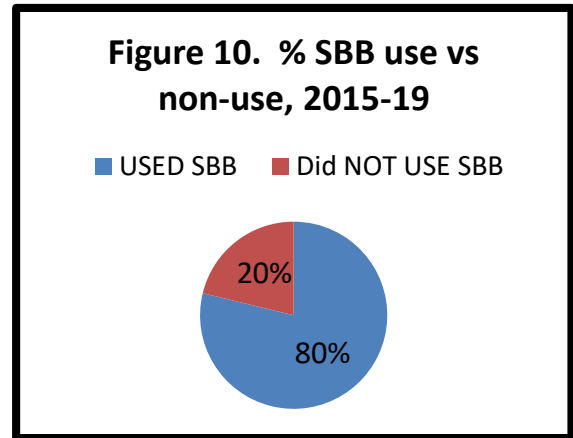
**(SBB):** Although many beekeepers use SBB to control varroa, BIP and PNW surveys clearly point out they are not a very effective varroa mite control tool. In the recent survey 54 individuals (16%) statewide said they did not use screen bottom boards. Figure 9. This past overwintering season, the 54 non-SBB users had 233 fall colonies of which they lost 122 for 48% loss. Those beekeepers using SBB on all of their colonies had 49% loss. For PMBA, the results were opposite; 77% used SBB on all colonies (42% loss) and 13% did not use them (22% loss).

**Figure 9**



In 5 survey years 20% said they did not use SBB and 80% did use SBB on some or all of their colonies. See Figure 10 to left for statewide results.

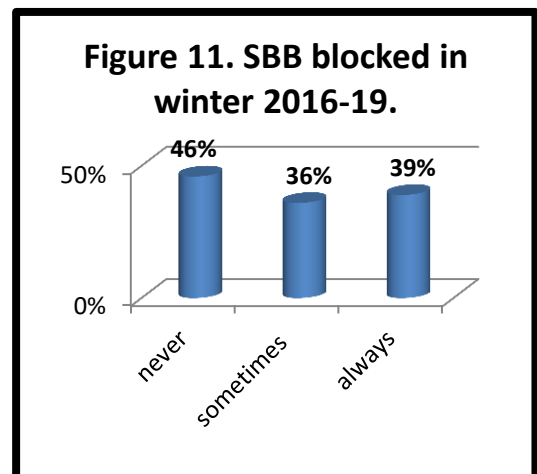
Examining the four year average of SBB use, loss level of those using SBB on all or some of their colonies had a 42.8% loss level whereas for those not using SBB had loss rate of 44.2% (a 3% positive survival gain for those using SBB versus those not using them). They are very minor in improving overwinter survival.



We asked if the SBB was left open (always response) or blocked during winter (bottom Figure 9). This past season 47% of individuals said they always blocked SBB during winter. They had 884 colonies in the fall and lost 503 for a 43% loss rate. One hundred forty seven individuals (38%) never blocked them during winter (never response). They had 724 colonies in the fall and lost 303 colonies =58% loss rate, 16 percentage points higher than the average of three previous years. Sixty individuals (16%) blocked them on some of their colonies. Their loss rate was 52%. One again PM responses were opposite with the 49% always blocking experiencing a slightly higher loss rate (44%) compared to the 39% who never blocked (loss rate 39%).

Comparing the always and sometimes left open with the closed in winter response reveals a 9 percentage point difference in favor of closing the SBB over the winter period Statewide. See Figure 11.

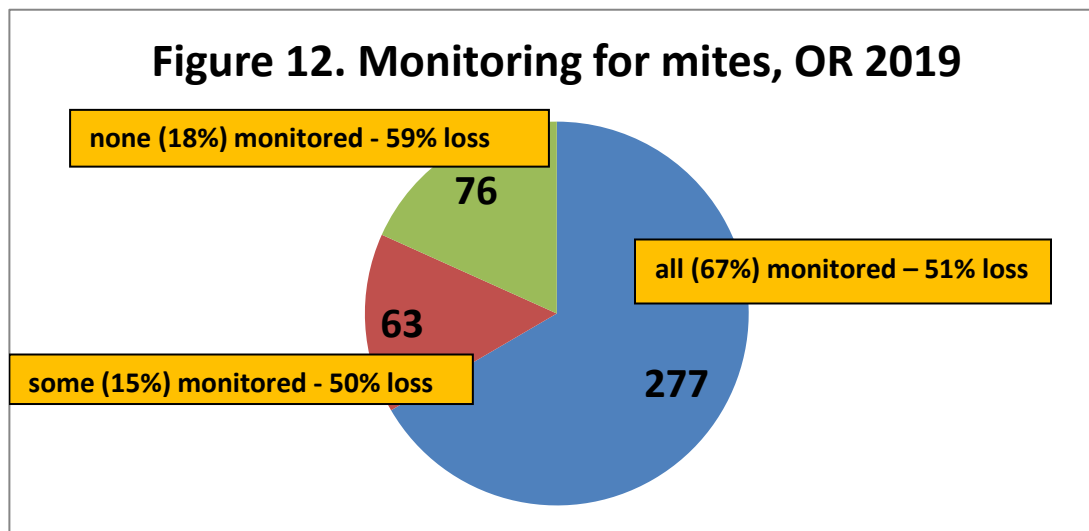
There is no good science on whether open or closed bottoms make a difference overwinter but some beekeepers “feel” bees do better with it closed overwinter. Four years of comparison shows those closing the screen statewide during winter did have a 9 percentage point improvement in colony survival. An open bottom, at least during the active brood rearing season, can assist the bees in keeping their hive cleaner and promote good hive ventilation. The reason results were the exact opposite for PM beekeepers is unknown.



## Mite monitoring/sampling and control management

We asked percentage of Oregon hives monitored for mites during the 2018 year and/or overwinter 2018-19, whether sampling was pre- or post-treatment or both and, of the 5 possible mite sampling methods, what method was used and when it was employed. Statewide 277 individual respondents (67%) said they monitored all their hives. Losses of those individuals monitoring was 51%. Seventy six (18%) reported no monitoring; they had a higher loss rate of 59% loss. 63 individuals reported monitoring some of their colonies; they had a 50% loss. See Figure 12.

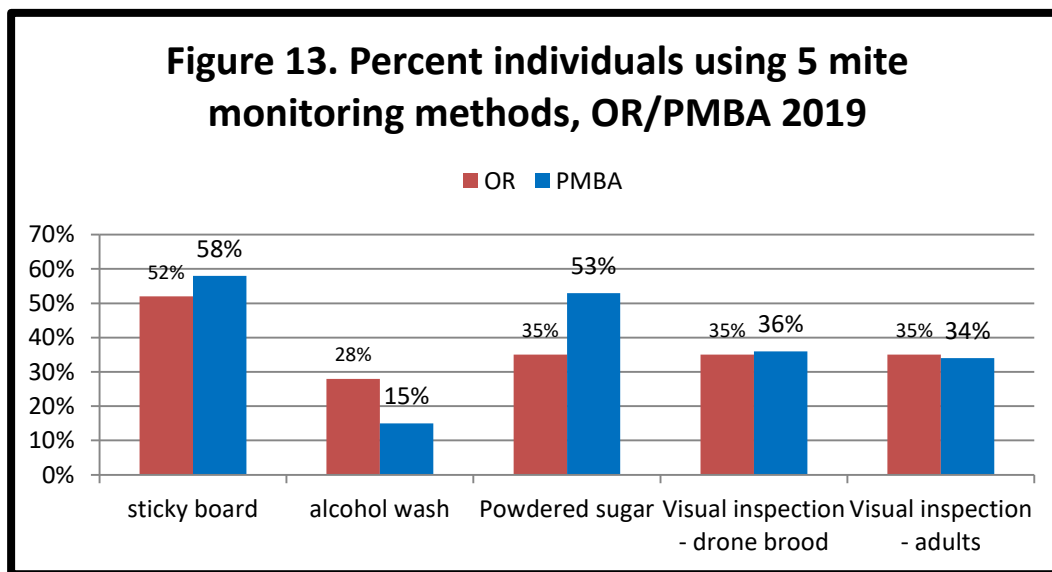
Among PMBA 43 individuals (81%) monitored all colonies; they had 50% loss. Three individuals (6%) did no monitoring and they had a 40% loss. This was opposite the statewide results.



Monitoring alone resulted in improved winter survival statewide but not for PMBA members. The table below compares % individuals and % winter loss for individuals statewide who monitored all colonies compared with those who monitored none. The 14-15% who monitored some colonies was variable but 3 year average mirrors those who monitored all colonies.

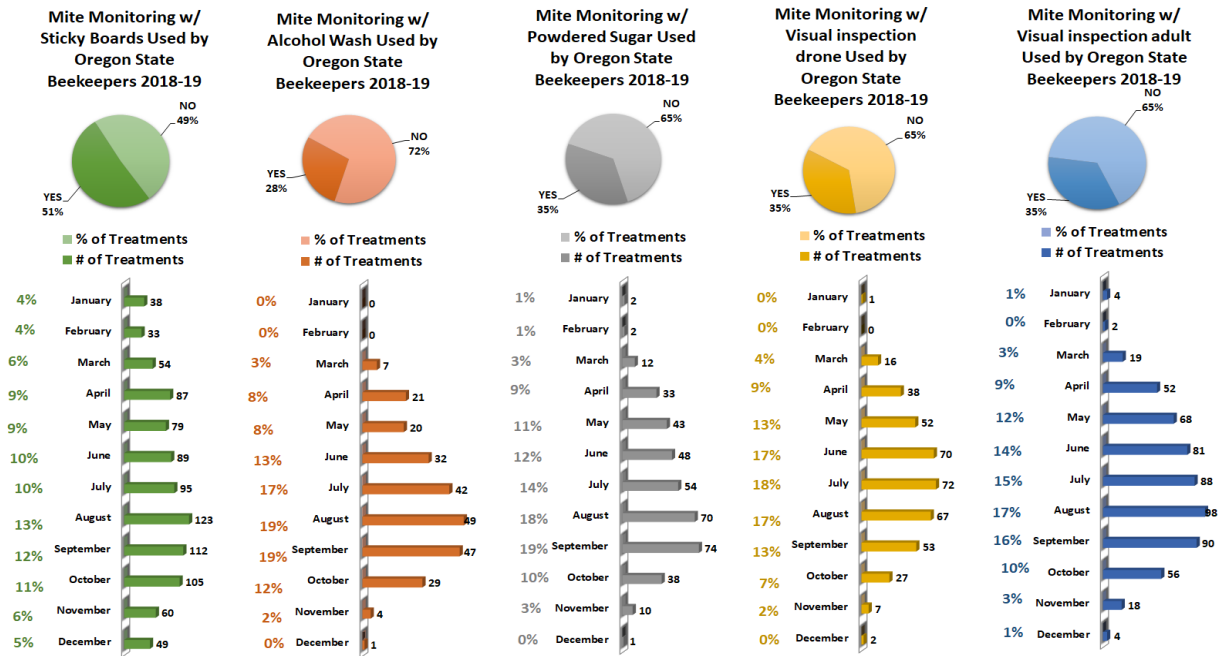
	<b>ALL Colonies Monitored % individuals</b>	<b>% loss</b>	<b>SOME Colonies Monitored % individuals</b>	<b>% loss</b>	<b>No colonies Monitored % individuals</b>	<b>% loss</b>
2019	67%	51%	15%	50%	18%	59%
2018	63%	38%	14%	26%	26%	49%
2017	63%	43%	15%	60%	22%	48%
3 year loss ave		44%		45%		53%

In order of popularity of use, sticky boards were used by 52% of total respondents statewide 35% of individuals used powdered sugar monitoring and visual inspection of drones and adults. Alcohol wash was used by 28% of the statewide respondents. PMBA members use sticky boards and powdered sugar at slightly higher level and alcohol wash nearly 50% less. In past 5 years, the use of sticky boards has decreased in use and both alcohol wash and powdered sugar shake have increased in use. Figure 13 red bars are statewide responses and blue is PMBA.



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

Figure 14



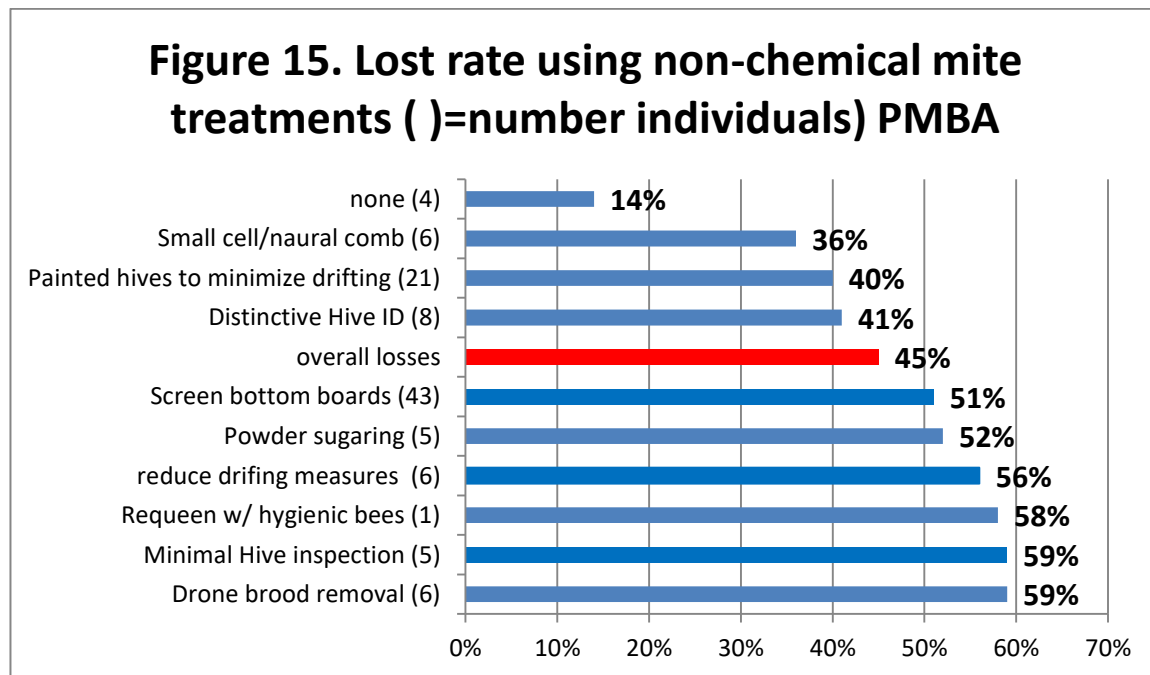
It is important to **KNOW** mite numbers. Less effective mite monitoring methods include sticky (detritus) boards below the colony (often so much detritus drops onto a sticky board that picking out the mites can be hard, especially for new beekeepers) but sticky boards used for a day can help confirm the usefulness of a treatment when inserted post treatment. Visual sampling is not accurate: most mites are not on the adult bees, but in the brood. Unfortunately looking for mites on drone brood is also not effective as a predictive number but can be used as an early warning that mites are present; if done, look at what percentage of drone cells had mites.

See **Tools for Varroa Monitoring Guide** [www.honeybeehealthcoalition.org/varroa](http://www.honeybeehealthcoalition.org/varroa) on the Honey Bee Health Coalition website for a description of and to view videos demonstrating how best to do sugar shake or alcohol wash sampling. The Tools guide also includes suggested mite level to use to base control decisions based on the adult bee sampling. A colony is holding its own against mites if the mite sample is below 2%. It is critical to not allow mite levels to exceed 2% during the fall months when bees are rearing the fat fall bees that will overwinter. It is also the most difficult time to select a control method (if one is deemed needed) as potential treatment harm may negatively impact the colony. We are seeing more colonies suddenly disappear (abscond?) during the fall, which may be related to the treatment itself.

## Mite control treatments

The survey asked about non-chemical mite treatments and also about use of chemicals for mite control. Fifty one individuals (12%) statewide, same percentage as last year, said they did not employ a non-chemical mite control and 99 individuals (24%), nine more than last year, did not use a chemical control. Those 51 individuals statewide (12%) who did not use a non-chemical treatment reported a 50% winter loss (for PMBA the 4 individuals (8%) not using a non-chemical treatment had 14% loss), while those who did not use a chemical control statewide lost 69% of their colonies; for PMBA, 14 individuals (36%) not using any chemical had a loss rate of 56%. The individual options chosen for non-chemical and chemical control are discussed below

**Non-Chemical Mite Control:** Of nine non-chemical alternatives offered on the survey (+ other category,) 89 individuals used one method, 118 used two, 95 used three, 54 used 4 or 5 and 9 individuals used 6. Among TVBA respondents 16 used one (had 49% loss), 20 used 2, 8 used 3 selections, while 5 used 4 and 2 each used 5 and choices; this last three lost 45% of colonies.



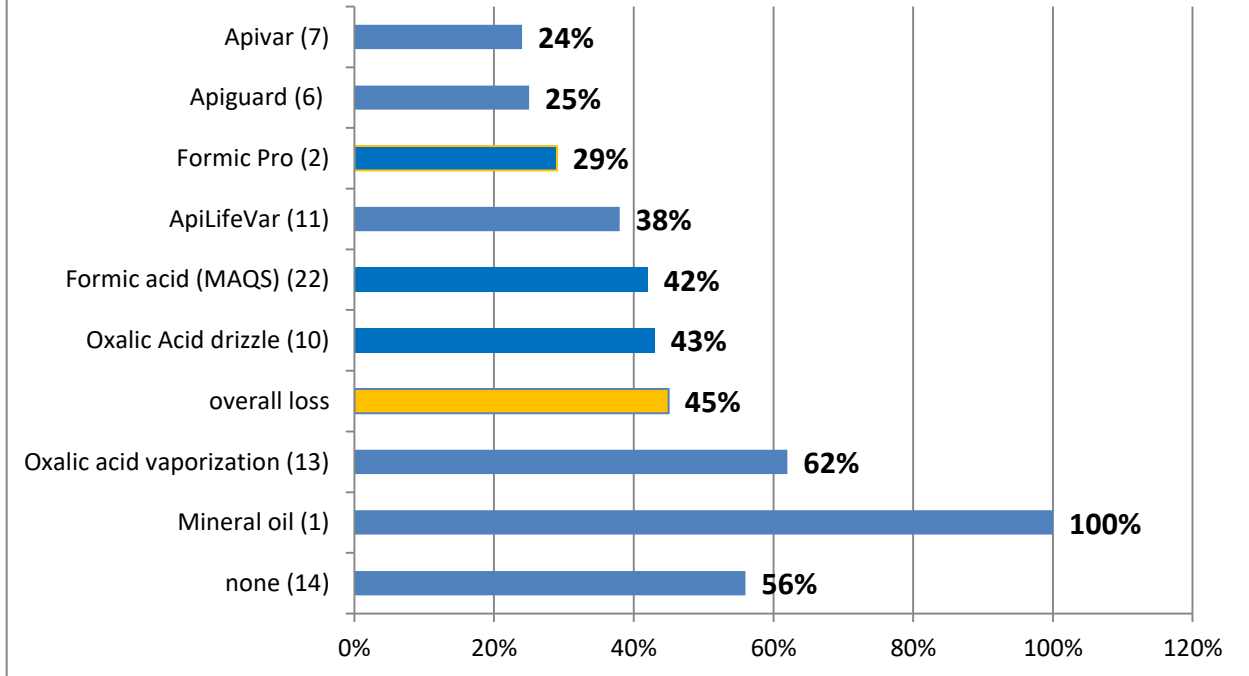
Use of screened bottom board and minimal hive inspection (43 and 27 individuals respectively among PMBA respondents) were most common. As reported above SBB show a slight advantage (45% loss compared to 47% overall for PMBA members) but minimal hive intervention does not, either statewide nor in PMBA member use. The use of the remaining 7

selections are shown in Figure 15; number of individuals in ( ), bar length represents average loss level of those individuals using each method.

Three of the non-chemical alternatives have demonstrated reduced losses over past 4 year. Reducing drifting such as spreading colonies, different colony colors in apiary has demonstrated a 13% better survival, Brood cycle interruption an 11% better survival and drone brood removal a minor 2% advantage. Some control alternatives demonstrate an advantage on one or two years but overall no improvement.

**Chemical Control:** For mite chemical control, 99 individuals (24% of total respondents) used NO chemical treatment Statewide and for PMBA members 14 individuals (26%) used no chemical treatments. Those using chemicals used at rate of 1.8/individual statewide and 1.9/individual among PMBA members. Statewide, one hundred thirty three individuals (42%) used one chemical, 122 used two (medium), 54 used 3 (17%), 7 used 4 and one used 5. With PMBA respondents 15 individuals (39%) used one chemical (they had a 57% loss) 19 used 2 (loss rate 25%) and 4 used 3 and one each 4 and 5; these last 6 individuals had an 18% loss level. Seems more is better with chemical use.

**Figure 16. Lost rate using chemical mite treatments PMBA ( ) =number individuals**



One hundred fifty OR Beekeepers (23% of total chemical uses) indicated they most commonly utilized MAQS; 22 of PMBA (56%) used it and had slightly better survivorship. The 2 formic pro users had only a 29% loss rate.

Consistently the last 3-4 years five different chemicals have helped beekeepers statewide improve better survival. The essential oils Apiguard and ApiLifeVar have consistently demonstrated the lowest loss level and did well for PM members. Apiguard has a 31% better survival and ApiLifeVar had a 30% better survival record over past 4 years. 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) but did not do as well for PM respondents (62% loss rate). Formic acid demonstrated a 14% better survival statewide but this product has changed and how we use it is changing so this information is more difficult to tease out of the data. This past season for example Formic Pro seemed to perform better than the traditional formic MAQs pads.



The monthly use of Apivar (blue line), essential oil (red line) or an acid (green line) is shown in Figure 17 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.

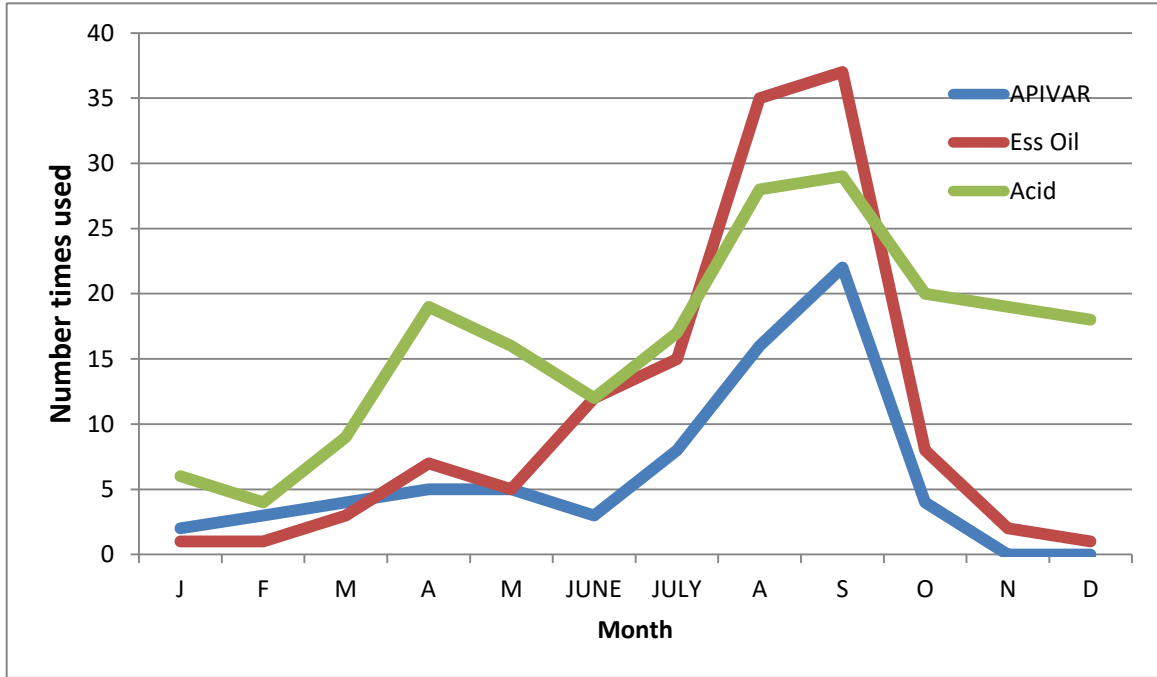
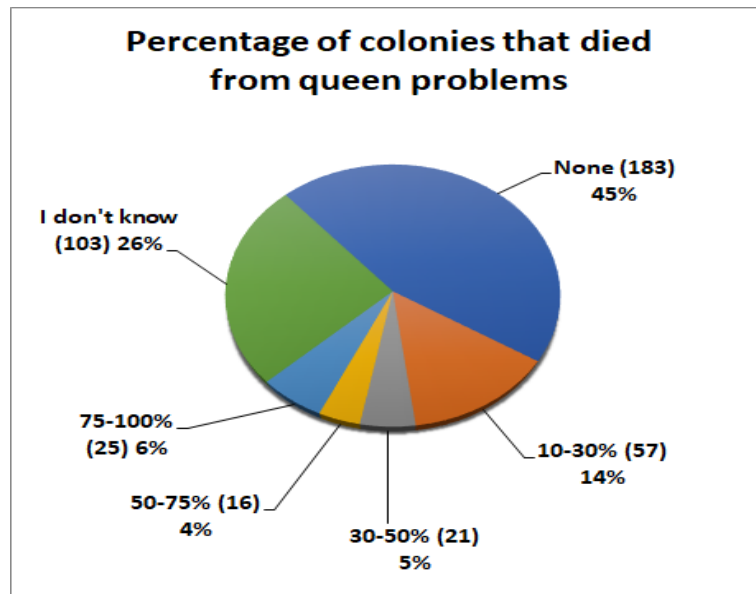


Figure 17

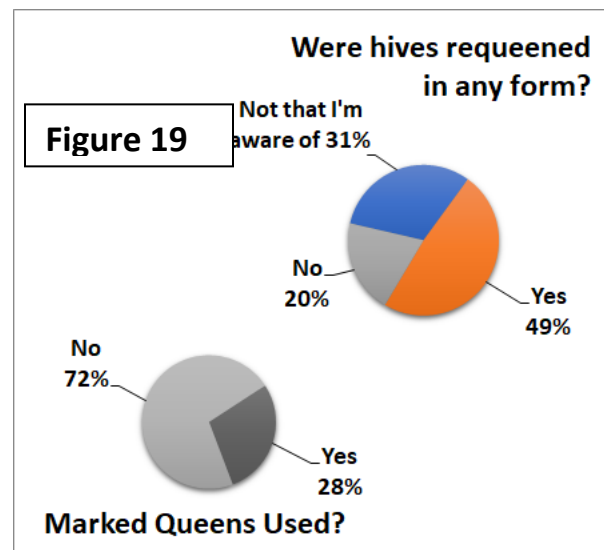
## Queens

We hear lots of issues related to queen “problems”. . In Section 8 of the survey we asked what percentage of loss could be attributed to queen problems. One hundred twenty nine individuals subdivided queen related issues from 10 to 100% of their hives. One hundred eighty three (44%) said none; an additional 103 individuals (24.5%) said they didn’t know. The number and percent expressed from statewide survey is shown in pie chart Figure 18. For PMBA 23 individuals (44%) said no, 33% said yes and 11 individuals (21%) said they didn’t know.

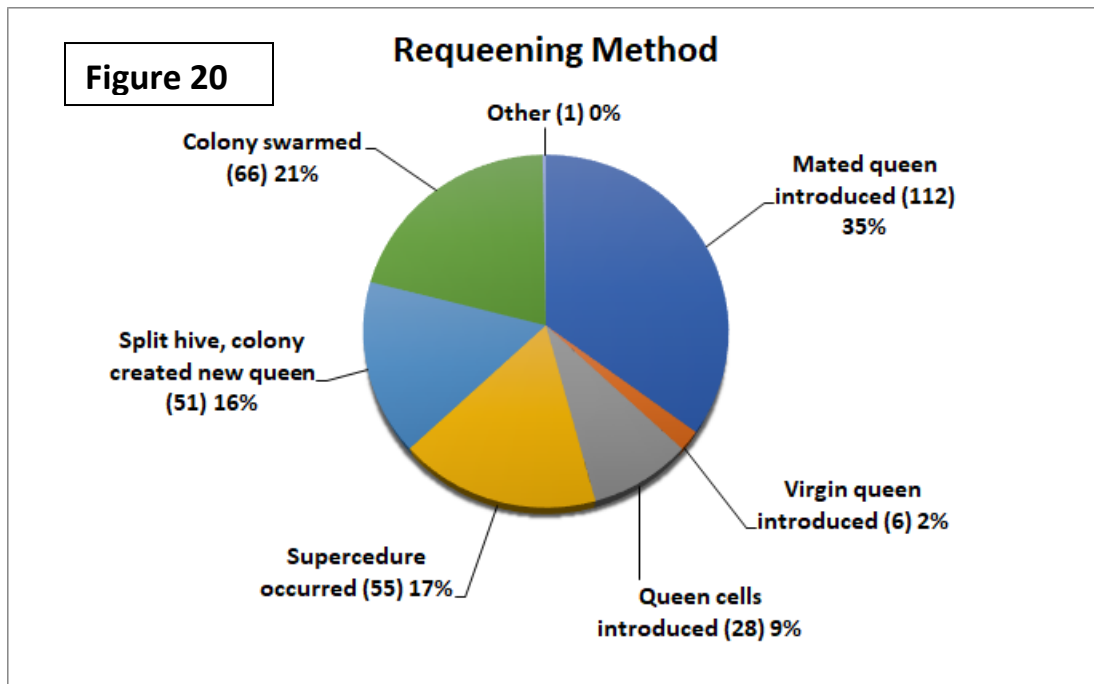
Figure 18



Queen events can be a significant factor contributing to a colony not performing as expected. We asked if you had marked queens in your hives. One hundred sixteen (28%) statewide said yes with 41% saying yes in PMBA. The related question then was did you or your bees replace their colony queen? Forty-nine percent (204 individuals) said yes, 31% said no, and the remainder 'not that that I am aware of.' Figure 19. For PMBA 60% said YES their colonies requeened, 21% said no and 10 individuals (19%) saying not that 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 318 statewide responses (more than one option could be checked) as illustrated in Figure 20. Although over one-third of respondents indicated their bees were requeened with a mated queen more than one half (54%) indicated it was the bees that requeened via swarming, supersedure or emergency rearing. Among PMBA respondents 41% said they requeened with mated queen and 6% with queen cells; 53% requeened themselves, mostly via supersedure (13 individuals). That means too few were seeking to use this valuable tool for mite control.



### Closing comments

This survey is designed to ‘ground truth’ the larger, national Bee Informed loss survey. Some similar information is additionally available on the BeeInformed website [www.beeinformed.org](http://www.beeinformed.org) and individuals are encouraged to examine that data base as well. Recall that the BeeInformed survey is measuring the larger scale OR beekeepers not the backyarders (figure 6 of OR state loss report.) Reports for individual bee groups are customized and posted to the PNW website.

We intend to continue to refine this instrument each season and hope you will join in response next April. If you would like a reminder when survey is open please email us at [info@pnwhoneybeesurvey.com](mailto:info@pnwhoneybeesurvey.com) with “REMINDER” in the subject line. We have a blog on the [pnwhoneybeesurvey.com](http://pnwhoneybeesurvey.com) and will respond to any questions or concerns you might have.

**Thank You to all who participated.** If you find any of this information of value please consider adding your voice to the survey in a subsequent season. Dewey Caron  
June 2019