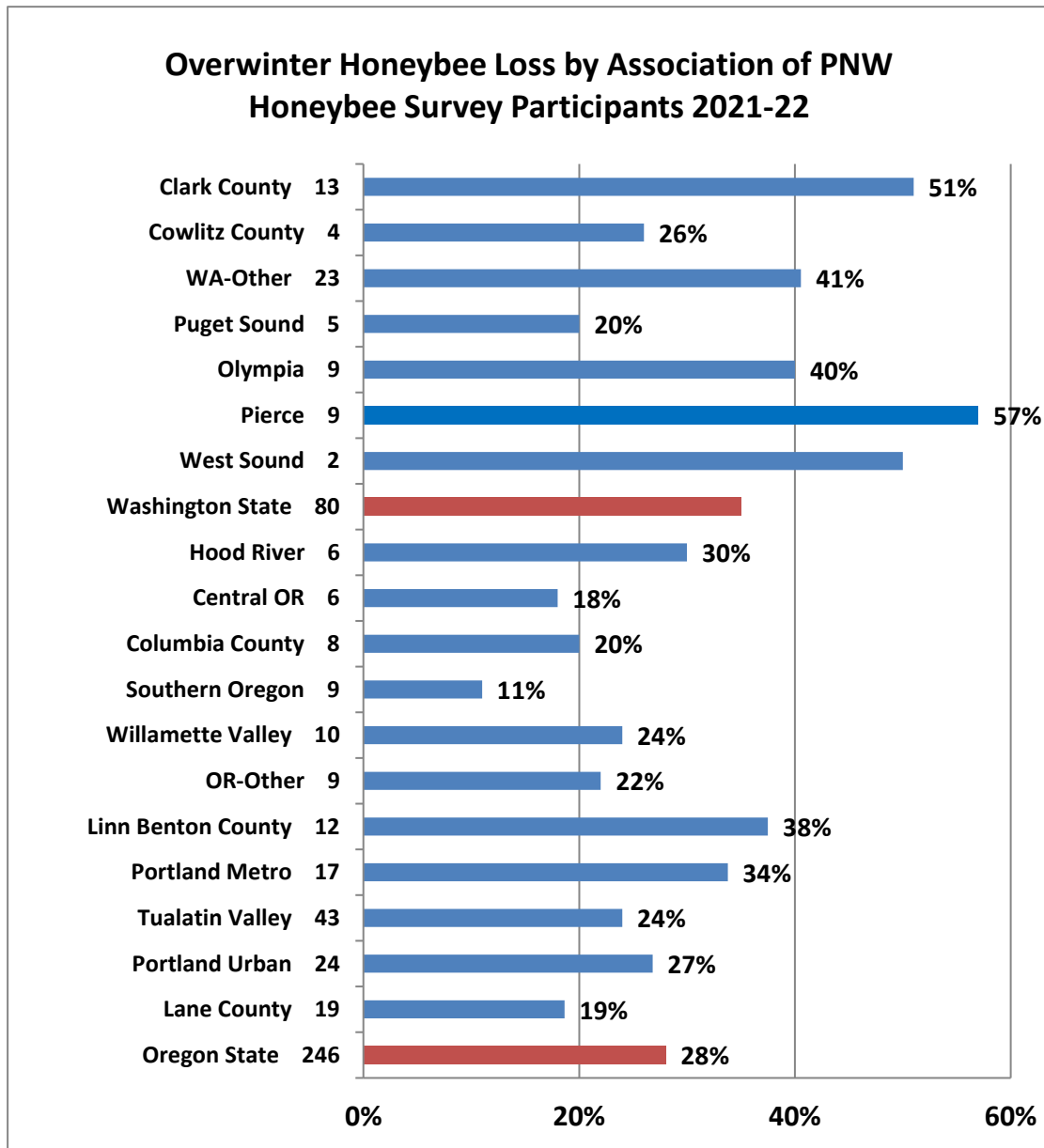


2021-22 Portland Metro Winter Loss by Dewey M. Caron

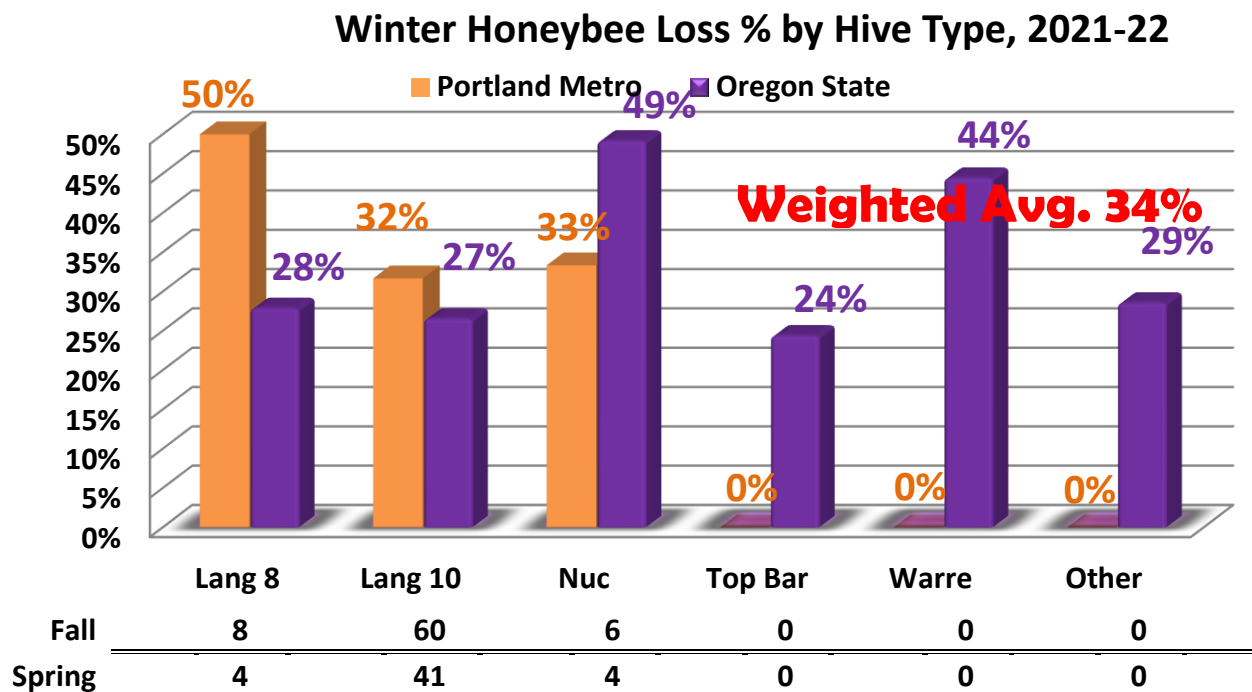
The pnwhoneybeesurvey.com is a continuing effort to define overwintering success of OR and WA beekeepers. This was the 13th year of such survey activity. I received 243 Oregon beekeepers; they had a 28% loss level the lowest level in the 13 years. For unknown reasons this is nearly 1/4th fewer respondents compared to last year when 328 Oregon beekeepers sent back a survey. Results of the 80 Washington respondents completing surveys (down over ½ from last year) are included in a separate loss report. Washington loss was 35%.



Portland Metro (PM) members sent in 17 surveys reporting on only 74 fall colonies. Response was drastically lower compared to past two years (55 PM surveys were returned last year 37 the year before) but the loss level was similar to past 2 years (last year 37% and 35% the previous year). Figure 1 shows loss by individual clubs. PM beekeeper respondents had a 34% loss level, 6 percentage points greater than the state level and second highest in the state. Number in () is number of responses for each.

Percent losses, determined for 5 hive types, is shown in Figure 2 comparing PM with the statewide backyarders. PM member respondents reported only 8 fall Langstroth 8-frame and 60 10 frames hives and 6 5 frame nucs; no Top bar, Warré or other hive types were included by respondents. Figure 2 below.

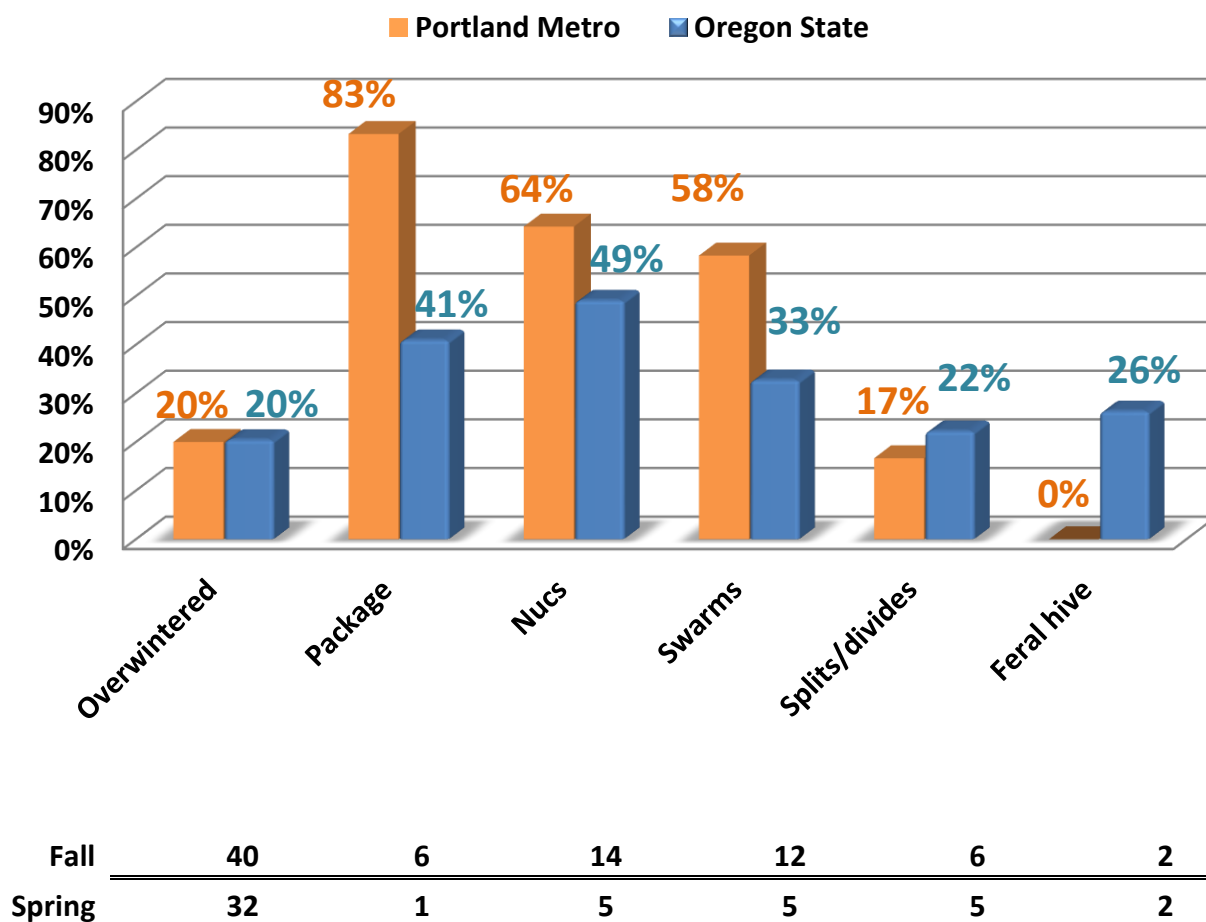
Figure 2



The survey also asked for hive loss by hive origination. Overwintered PM colony loss (27%) was comparable to success with splits and considerably better than nucs, packages or swarms. Numbers for the latter categories are small. See Figure 3 below for PM/statewide comparisons.

Figure 3

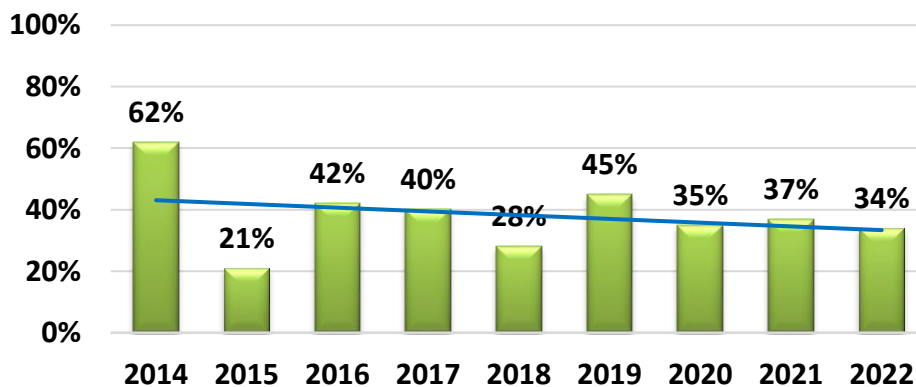
Winter Honeybee Loss % by Origination, 2021-22



Losses for PM beekeepers have been similar the last 3 seasons. Blue line is trend.

Portland Metro Loss History

Figure 4



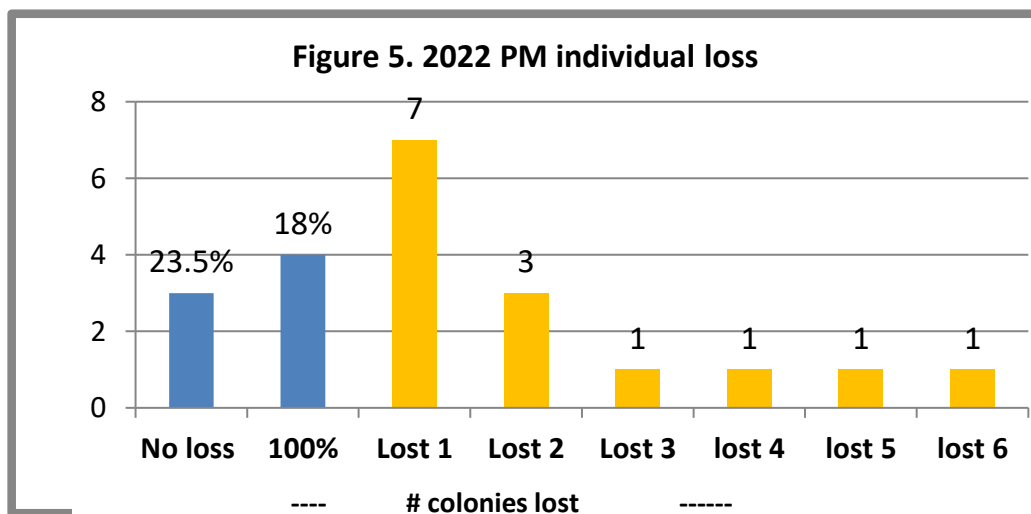
Who are the survey respondents?

The PM respondents to the electronic survey managed up to 21 fall colonies. Four individuals had 1 colony, another four respondents had 2 colonies and two individuals had 3 colonies (59 % of total respondents, had 1, 2 or 3 colonies with a tremendous loss level of 67%), 1 individual had 5, 2 individuals 6 and one individual had 8 colonies – loss level 44% and the two individuals with 10+ colonies lost only 2 for a 6% loss level.

Ten individuals (59% of respondents) had 1, 2 or 3 years of experience (medium number 3); four individuals (24% of total respondents) had 4 – 6 years' experience and three individuals had 10+ years experience (with 40 the greatest). When loss level was correlated to experience, the 10 individuals with 1-3 years experience had 47% loss level, those with 4-6 years experience had a 40% loss and the 3 with 10+ years had a 20% loss. Clearly new beekeepers lose more and individuals with smaller numbers lose more colonies. Numbers and experience count.

Fourteen of 17 (82%) PM beekeepers had an experienced beekeeper mentor available as they were learning beekeeping. This percentage was up from 73% the previous year.

Not everyone had loss. three PM individuals (18%) reported total winter survival; unfortunately, four individuals (24%) lost 100% of their colonies. Greatest loss was one colony (7 individuals) with six the heaviest loss). Individual loss data is shown below in Figure 5.



None of the 17 individuals moved hives during the season; two had bees in 2 apiaries.

Reasons for Colony Loss/Acceptable loss

We asked individuals that had colony loss (14 individuals) to estimate what the reason might have been for their loss (multiple responses were permitted). There were 24 total listings for PM, 1.7/individual. Eight individuals listed varroa (57% of respondent choices), followed by four listings each of Don't Know and weak. Starvation had 3 responses with poor wintering 2; queen failure had only a single response same as pesticides.

Survey individuals are asked to indicate what might be an acceptable loss level. Three individuals said none and 5 said 10% (the medium). Two each indicated 20 and 25%. Four individuals had 50% or greater.

Why do Colonies Die?

There is no easy way to verify reason(s) for colony loss. Colonies in the same apiary may die for varied 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. 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 10%.

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. Pesticides 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

The survey inquired about feeding practices, wintering preparations, sanitation measures utilized, screen bottom board usage, queens, mite monitoring and both non-chemical mite control techniques (such as screen bottom board use, drone brood removal efforts, etc.) and chemical mite controls utilized. Individuals could check none or more than one response; many PM beekeepers often do not do just one thing/management to their colony (ies) to control mites toward improving overwintering success. This analysis however is 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 54 feeding options = 3.4/individual (statewide it was 2.9/individual). One individual selected none; their loss was 100% (a single colony). More selection helped improve survival. Since number of respondents were low I suggest you compare your results with the state numbers.

Seven individuals fed honey but had 50% loss, the 16 individuals doing sugar water feeding had a 31.5% loss. Ten individuals did pollen patties and had 43% loss and the 3 feeding frames of pollen had 62.5% loss; statewide feeding protein helped survival. Four individuals fed dry sugar and had the average of 34% loss level, the four fondant feeders had a 15% loss and the five candy feeders a 16% survival.

Summary statewide: Syrup feeders had a 5-percentage point lower loss level (average for the 5 years); this year it was one percentage point greater survival statewide and 2 ½ percentage better survival for PM. Those feeding honey (as frames or liquid) had lower loss only during 2 of the past years. Individuals feeding non-liquid sugar (in any of the forms) had lower losses five of six past winter seasons; this provided the best survival for PM individuals this year. **individuals statewide doing no feeding had annual losses 12.6 percentage points higher than average overall losses.**

WINTERING PRACTICES: One PMBA individuals reported doing no winterizing (same individual that did no feeding and lost their single colony and did no feeding). Five individuals provided a rain shelter and had average losses of 33%. The single individual with upper entrance lost all of their 3 colonies. The eight individuals using quilt box/Vivaldi board had 23% loss. Nine individuals used an insulated top and had 27% loss level. The individuals wrapping their colonies (5 individuals) had only 10% colony loss and those with wind/weather protection had 21% loss. Doing some wintering obviously helped improve survival.

Over the past five years statewide individuals that did no winterizing practice (average 12% of individuals) averaged 41.5% loss compared to 39.2% overall average loss of last 5 years, only a 2.3 percentage point poorer survival rate. Only 2 winterizing managements improved survival all 5 years – wrapping (28.2% lost rate, a 11-percentage point improvement) and upper insulation (30.8%, an 8.4-percentage point improvement). Vivaldi/quilt box, upper entrance (most Vivaldi boards have an upper entrance built into the equipment) and wind/weather protection had only slightly improved survival rates and were not noted in all past 5 years. Equalizing hive strength was the best management to improve survival this past year.

SANITATION PRACTICES: It is critical that we practice some basic bee sanitation (some prefer use of term bee biosecurity) in our bee care to insure healthy bees. Six individuals did none of the selections nor did they indicate an other and they had a 54% loss. There were 2.3 selection per individual.

Avoiding moving frames and reducing drifting were the two sanitation choices that demonstrated better average survival the past five years statewide – 5-year loss rate was 34.8% for not moving frames which is 2.5 percentage points better survival (this year it was 2 percentage points higher than average) and 32.2% for reducing drifting a 5 percentage point improvement in survival. Other distinctive measures to reduce drifting had an 8 point improvement in survival this year; it has been a good sanitation in past years as well. Overall sanitation appears to be relatively minor toward improving survival.

PMBA beekeepers had 62 responses 1.9/individual. Four individuals did none. These 4 were among the 42 statewide individuals (14%) indicating they did not practice any of the 6 offered alternatives. Loss rate statewide was 52%, fourteen percentage points higher than the overall loss rate of 38%; for PM the 4 individuals doing nothing had only an 11% loss rate. Thirteen PMBA members had 1 selection (loss rate 28%, most were minimal hive intervention), 12 made 2 choices (the medium – loss rate was 44%), 7 had 3 choices and 1 selected 4 items- those with 3 and 4 selections had a 52% loss rate.

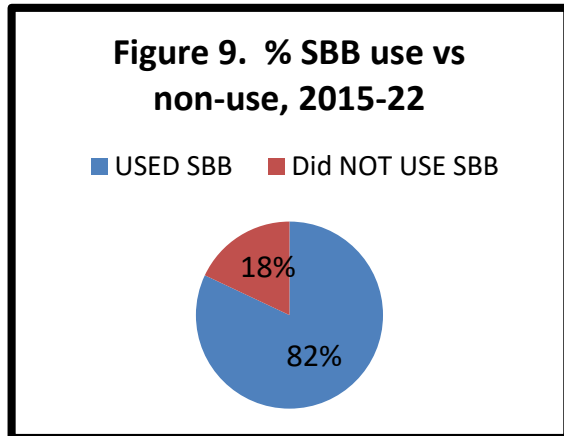
Minimal hive intervention (145 individuals, 17 of them PMBA beekeepers) was the most common option selected statewide along with generally avoiding moving frames (also 17 PMBA members). Neither improved PM member survival. The two sanitation choices that did seem to improve survival were provided hives with distinctive colors (28% loss) and reduce drifting by spreading out colonies (29% loss).

Avoiding moving frames was the only sanitation choice statewide that demonstrated better survival the past three years - loss rate was 35% compared to overall rate of 41%, a

minor 6 percentage point difference. Avoiding moving frames (40% last 3 years) plus distinctive hive address via painting (also 40%) had but a single percentage point advantage over last 3 years. It is clear that sanitation, while it might make sense, does not result in better survival.

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 the recent survey 38 individuals statewide (15%) including one PM person said they did not use screen bottom boards (they had 50% loss level). Average non-use is 18% vs 82% use on some or all colonies over the 6 year period. Figure 6 shows 8-year data.

This past overwintering season, the 38 statewide non-SBB users fall colonies of which they lost 120 for 54% loss. The 220 beekeepers using SBB on all of their colonies had 37% loss. This was the greatest difference between non-users and users in past 5 years. Examining the five year average of SBB use, loss level of those using SBB on all or some of their colonies had a 41% loss level whereas those not using SBB had loss rate of 36% (a 5 percentage point positive survival gain for those using SBB versus those not using them). SBBs are very minor in improving overwinter survival.

We asked if the SBB was left open (always response) or blocked during winter. This past season 11 PM respondents (65%) always or sometimes blocked their SBBs. They had a 29% loss. Those who said they never blocked (6 individuals in PM) had a 67% winter loss. This past season statewide, 66% (163 individuals), said they always blocked SBB during winter; 38 individuals statewide said they blocked some of the SBBs. Statewide those who blocked always or sometimes had 704 colonies in the fall and lost 273, a 39% loss rate. Those who never blocked had a 42% winter loss, a 3-percentage point difference statewide compared to the wide difference for PM beekeepers.

Summary: Screen bottom board use has a minor survival advantage. For those using SBB, the advantage appears to be to close, partially or completely, the open screen bottom over the winter period.

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. Portland Metro beekeepers do not 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 in the sun out of the wind. If exposed, providing some extra wind/weather protection might improve survival.

Feeding, a common management appears to be of some help for beekeepers statewide in reducing losses. Feeding fondant sugar, a hard sugar candy or dry sugar during the winter means lower loss levels. Feeding sugar syrup also meant lower losses for some individuals and such feeding management is of great value for the spring development and/or development of new/weaker colonies. Feeding honey was not as successful. Feeding protein in form of dry pollen and pollen patties did not improve survival for PM but does when examining statewide respondent data. The supplemental feeding of protein (pollen patties) might be of assistance earlier in the season to build strong colonies and in the fall to build the fat bee population needed for successful overwintering.

Winterizing measures that apparently helped lower losses for some statewide beekeepers were a moisture trap (Vivaldi board or quilt box) and upper insulation, plus wrapping the colonies (or otherwise adding some insulation to provide added protection against the elements). Spreading colonies out in the apiary and doing other measures to reduce drifting also appeared to be of some value in reducing winter losses. Avoiding movement of frames from one colony to another might also improve survival but the gain over what this interchange might accomplish to bolster weak colonies and start new divides might be greater than a minor advantage in survival.

It is clear that doing no feeding, winterizing or sanitation resulted in the heaviest overwinter losses.

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

Mite Monitoring/Sampling and Control Management

We asked percentage of Oregon hives monitored for mites during the 2021 year and/or overwinter 2021-22, 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. Among PMBA, 11 individuals (65%) monitored all colonies; they had 26% loss. Three individuals monitored some colonies; they had a 50% loss level. Three individuals (18%) did no monitoring

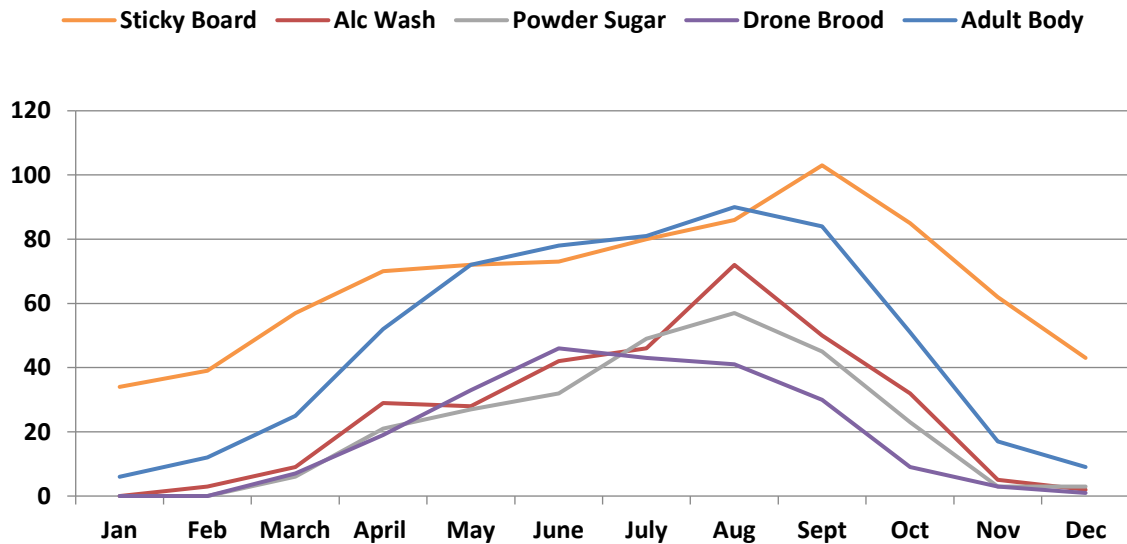
and they had a 67% loss. Statewide 82% said they monitored all or some of their hives (losses =51%); 18% reported no monitoring (loss rate = 59% loss). Statewide the last 6 years are illustrated in table. Monitoring helps improve survival.

	ALL Colonies Monitored % individuals	% loss	SOME Colonies Monitored % individuals	% loss	No colonies Monitored % individuals	% loss
2022	66%	37%	15%	27%	18%	42%
2021	73%	34 %	11%	36%	17%	36%
2020	67%	33%	13%	16%	20%	49%
2019	67%	51%	15%	50%	18%	59%
2018	63%	38%	14%	26%	26%	49%
2017	63%	43%	15%	60%	22%	48%
6 year loss ave		39%		36%		47%

Twenty-three monitoring choices were indicated by 14 PM respondents. Sticky boards were used by 36% of total PMBA respondents (of those 82% who monitored 18% did no monitoring), 64% (11 individuals) used alcohol monitoring, 5 individuals used powdered sugar monitoring. Two individuals used drone monitoring and double that looked at adults. In past 5 years, the use of sticky boards has decreased in use statewide and alcohol wash has increased in use. Six individuals sampled both pre and post and 4 said pre. Four individuals treated without sampling and 3 did not sample or treat.

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 below for record by months each of the 5 sampling methods were used (data from statewide respondents).

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); sticky boards 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.



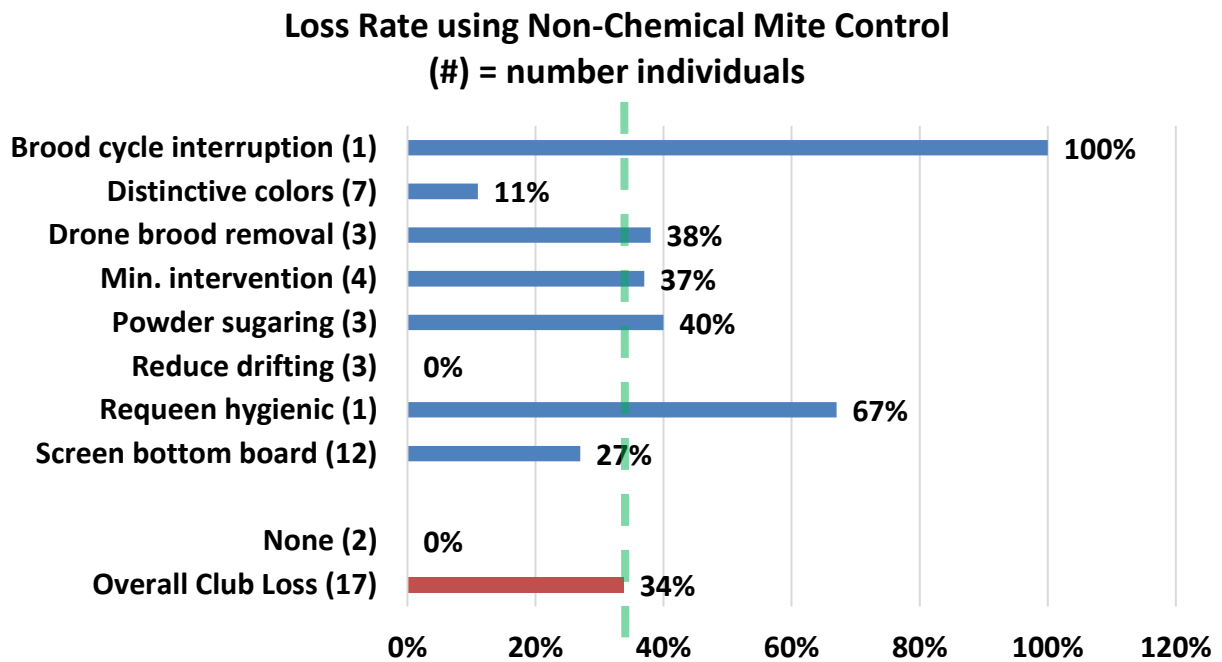
See *Tools for Varroa Monitoring Guide* www.honeybeehealthcoalition.org/varroa on the Honey Bee Health Coalition website for a description of and to view videos demonstrating how best to do sugar shake or alcohol wash sampling. The Tools guide also includes suggested mite level to use to base control 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 2-3% 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 high number of mites or treatment itself.

Mite control treatments

The survey asked about non-chemical mite treatments and also about use of chemicals for mite control. Four PM individuals (11% - statewide percentage 12%) said they did not employ a non-chemical mite control and 7 individuals (11%), did not use a chemical control (statewide=24%). Those PMBA individuals who did not use a non-chemical treatment had a 42% loss; statewide reported a 50% winter loss. Seven PMBA members not using a chemical control had a loss rate of 59%; statewide lost rate=69%. 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) respondents selected 2.1/individual. 4 individuals used one method 6 used two and 2 used both 3 and 4. The selections are shown in Figure - number of individuals in (), bar length represents average loss level of those individuals using each method.

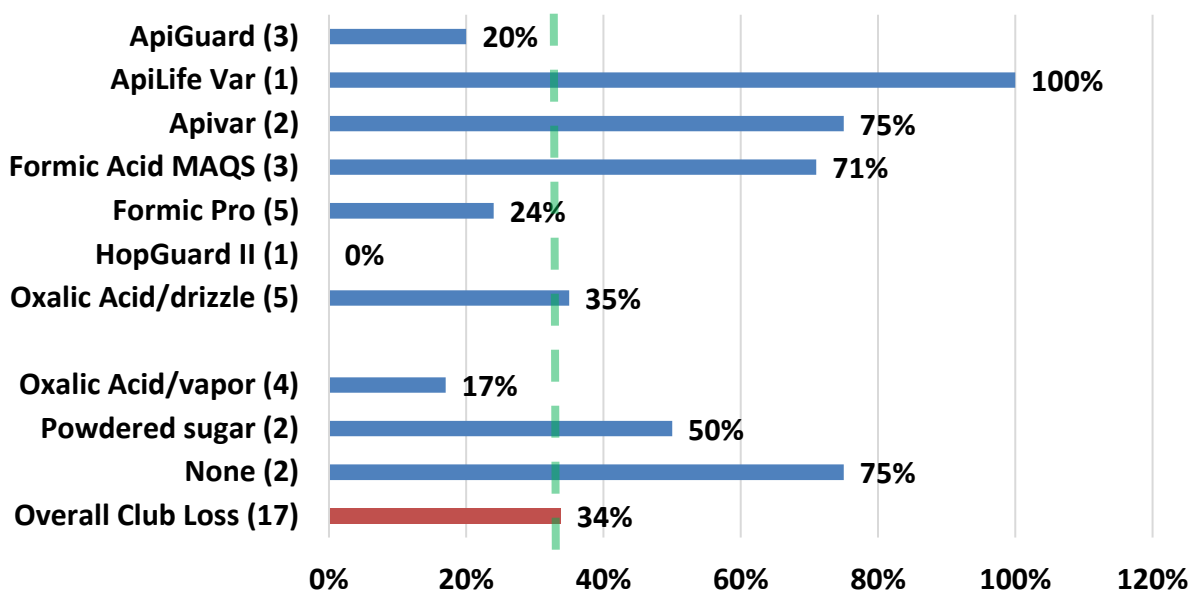
Use of screened bottom board (12 individuals) among PMBA respondents) was most common. SBB users had 27% loss, 7 percentage points below the average PM loss. The 3 individuals while minimum intervention had nearly double the losses. Reducing drifting (3 individuals) and distinctive colors (7 individuals) were the best managements to improve survival.



Three of the non-chemical alternatives have demonstrated reduced losses over past 6 years statewide. Reducing drifting such as spreading colonies (31% loss average for 4 years – question not asked in 2016-17 survey) and brood cycle break (34.5% average) have consistently year after year demonstrated somewhat better survival than average loss (37% average loss last 4 years and 39% loss last 6 years respectively 37%). Different colony colors in apiary 37.7% average loss and drone brood removal (38.7% average loss) were just slightly better than average 6-year loss (39%). Some non-chemical control alternatives demonstrate an advantage on one or two years (such as small cell/natural comb this past season) but overall show no improvement.

Chemical Control: For mite chemical control, 30 individuals (12% of total respondents) used NO chemical treatment. They had a loss level of 50%; 2 PM individuals (12%) used no chemical treatment – they had 75% loss (total 4 colonies). Those PM individuals using chemicals used at rate of 1.8/individual. Among Portland Metro respondents, 4 individuals (27%) used one chemical (they had a 25% loss), 8 used 2 (19% loss) and 3 used 3 (8% loss). It seems use of more than one chemical is beneficial.

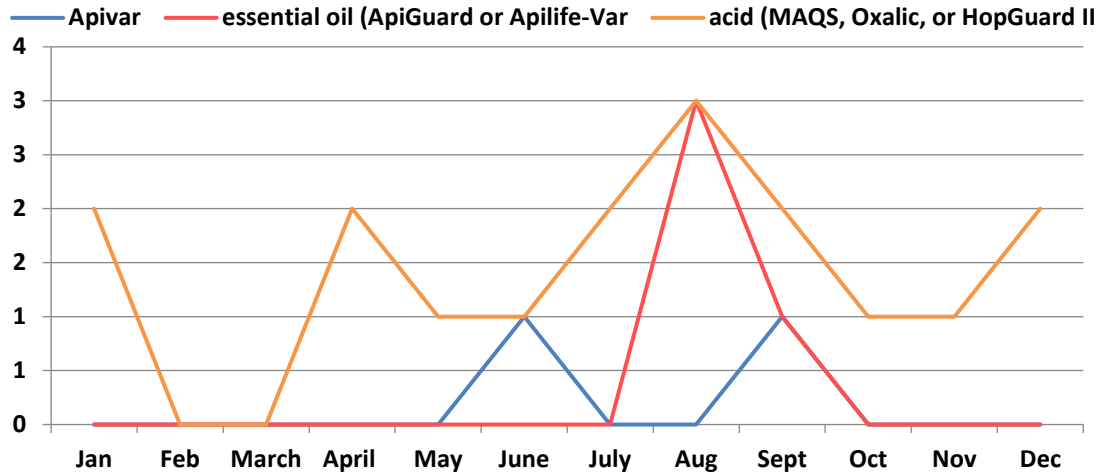
Loss Rate using Chemical Mite Control
 (#) = number individuals



The results are really mixed. Small numbers from club response. Oxalic acid vapor (4 individuals) and Formic Pro (5 individual users) provided the best response. Statewide consistently the last 5 years five different chemicals have helped beekeepers improve survival. The essential oils Apiguard (average 6-year loss level 30.5%), Apivar (31.2% average 6-year loss level), Oxalic acid vaporization (31.3% average loss level over last 6 years – in contrast the oxalic acid drizzle average of last 5 years is 37.8% loss level which is 0.4 percentage points above the 5-year average of 37.4%), ApiLifeVar (34.4% average loss level over last six years) and formic acid MAGS formulation 39.4% loss level the last 6 years. Average loss level has been 39.2% the last 6 years. The formic acid extended OAE absorbing oxalic acid and glycerin into sponges had slightly better than average loss but this has not been the case in previous years. Formic Pro has steadily increased in use – it looks very promising at 25.3% loss level the past three years (when average loss was 36.5%).

The monthly use of Apivar (blue line), essential oil (red line) or an acid (green line) is shown in Figure 16 for 2019-20 season. Further review is needed to determine if the timing of treatments was more effective than at other times for the various chemicals.

Mite Control Products used by Portland Metro Beekeepers 2021-22



Queens

We hear lots of issues related to queen “problems”. Nine PM individuals (53%) said they did not have any queen issues and 3 (18%) said they did not know. Four individuals of the 17 respondents who said they did have queen issues checked 10-30%. 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. Nine individuals said yes and 8 said no. This percentage with marked queens was well above the statewide ninety individuals (37%) that said they had marked queens.

The related question then was ‘were your hives requeened in any form?’ to which 50% (122 individuals statewide) said yes, 32% (79 individuals) said no and the remainder that responded (43 individuals) said ‘not that that I am aware of.’ For PM respondents, 8 individuals (47%) said yes, five said no and 4 that they were not aware of queen replacement.

One technique to reduce mite buildup in a colony is to requeen/break the brood cycle. Responses to the question “How did bees/you requeen” included five individuals who used a mated queen and 4 who used queen cells and 1 a virgin queen. The remainder said their colonies requeened naturally via supersedure (1 individuals), split and raised their own queens and 1 said their colonies swarmed as queen replacement method. Statewide, one-third of

respondents indicated their bees were requeened with a mated queen and 58% indicated it was the bees that requeened via swarming (22%), supersedure (16%) or emergency rearing (20%). That means too few were seeking to use this valuable tool for mite control. Sixty-one respondents indicated their bees were requeened with a mated queen (27%), 47 individuals 20% split (divided) hive (21%)s, 51 (23%) indicated it was the bees that requeened via swarming and 35 (16%) via supersedure. Six percent introduced queen cells and 2% introduced virgin queens.

Closing comments

This survey is designed to ‘ground truth’ the larger, national Bee Informed loss survey. Some similar information is additionally available on the BeeInformed website www.beeinformed.org and individuals are encouraged to examine that data base as well. Recall that the BeeInformed survey is 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 with “REMINDER” in the subject line. We have a blog on the pnwhoneybeesurvey.com and will respond to any questions or concerns you might have.

Thank You to all who participated. If you find any of this information of value please consider adding your voice to the survey in a subsequent season. Dewey Caron July 2022