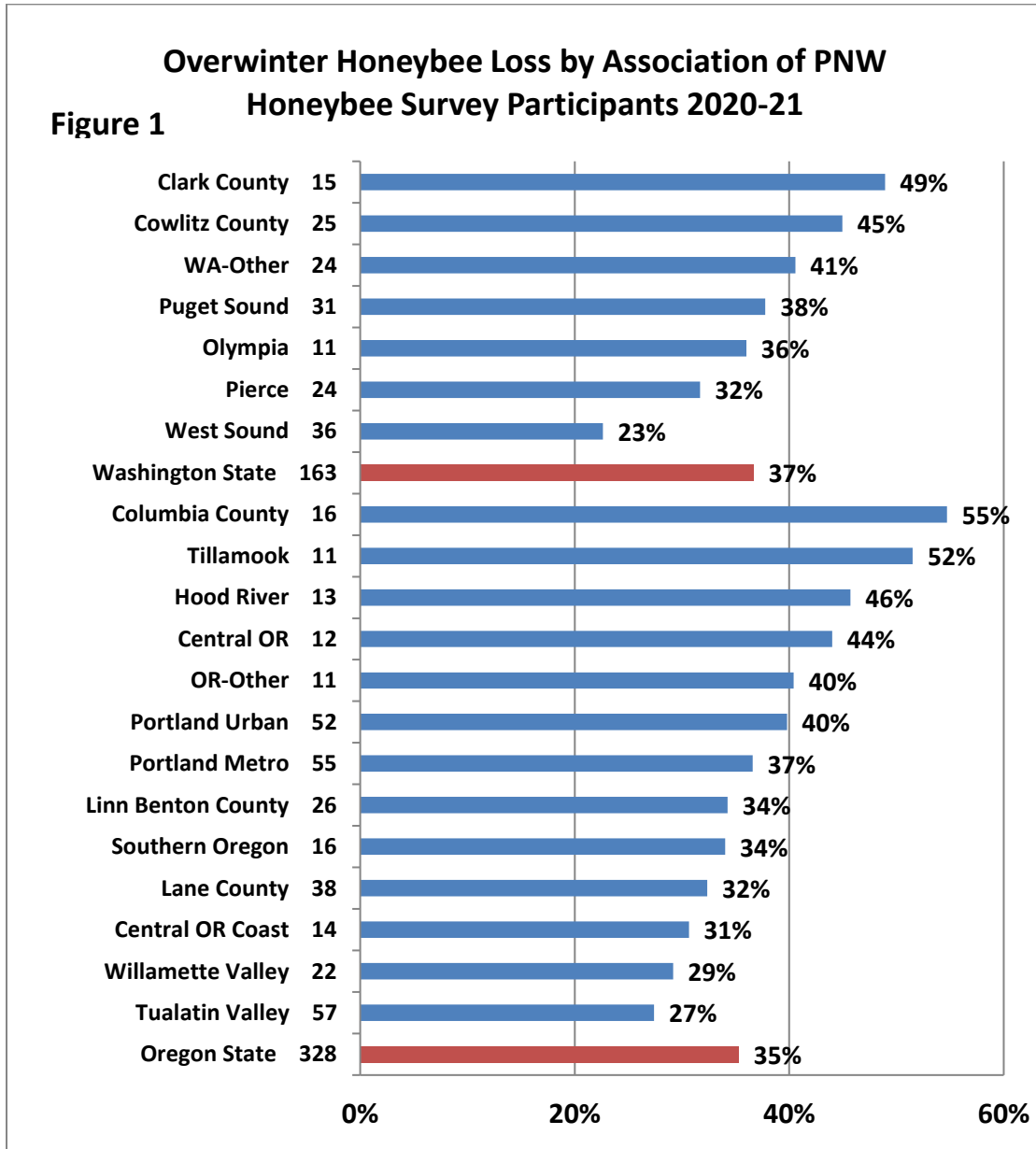


2020-21 PUB Winter Loss by Dewey M. Caron and Jenai Fitzpatrick

For the past 12 years, PNW winter colony losses and several managements related to bee health were solicited with an electronic honey bee survey instrument developed within the PUB bee group www.pnwhoneybeesurvey.com. A total of 328 responses were received from OR beekeepers with 163 additional returns from Washington beekeepers. During the 2020-2021 overwintering period, 52 PUB member surveys were returned, one more than last year reporting on 183 fall hives.

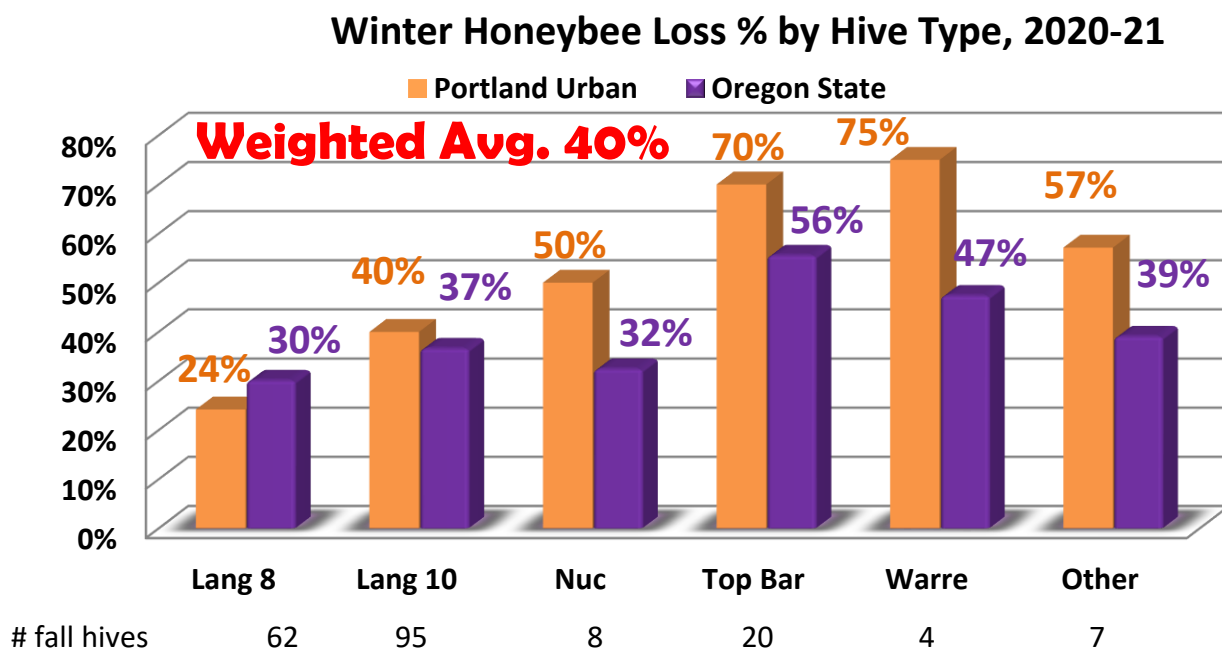


. Overwintering losses of small-scale Oregon backyard beekeepers was 35%, a decrease of 3 percentage points from last year TAverage overwintering losses of PUB

respondents was 40%, 2 percentage points higher than last year and second year of losses similar to the Oregon statewide loss average.

PUB losses of Langstroth 10 frame hives were slightly above statewide loss rate while losses of 8 frame Langstroth hives was slightly lower. For the past five years losses of 8 frame hives (37²/₃%) have averaged below the 10 frame hive losses (40%) statewide; for PUB members it is the opposite - 8 frame hive average PUB losses for past 5 years have been 46% and 10 frame Langstroth losses 41%. Nuc losses of PUB members (50%) were higher than statewide. Nuc losses are typically higher (6-year statewide average= 50%, exactly the loss level of PUB members this past winter). For PUB, the last 5-year average of nuc losses has been 49%.

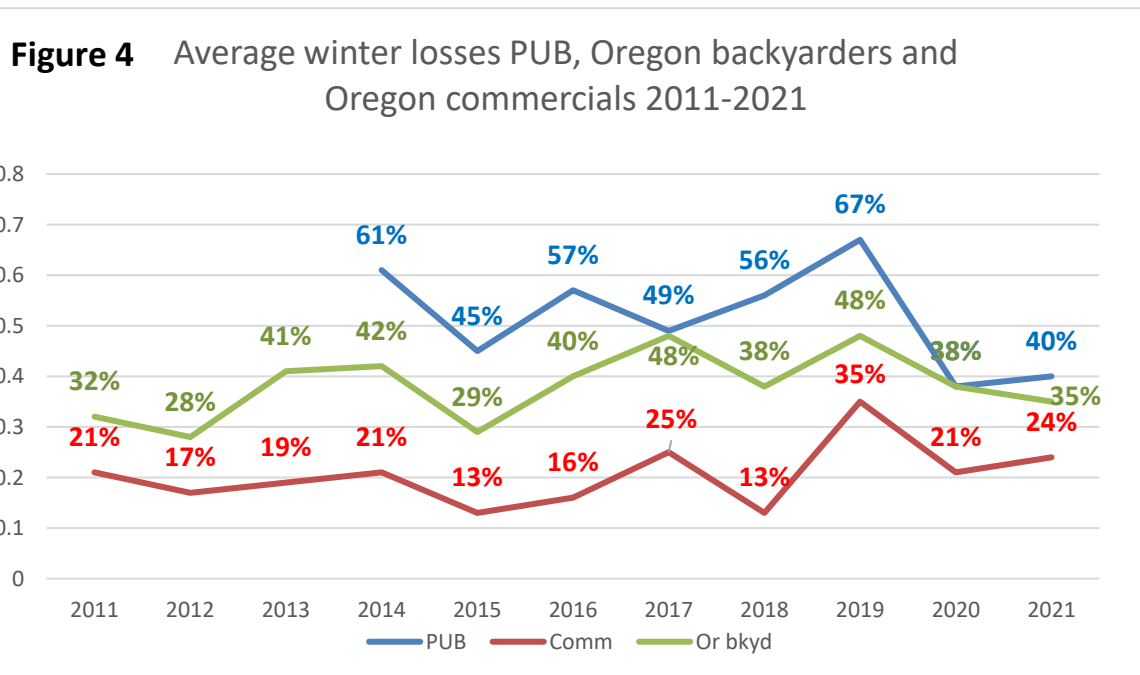
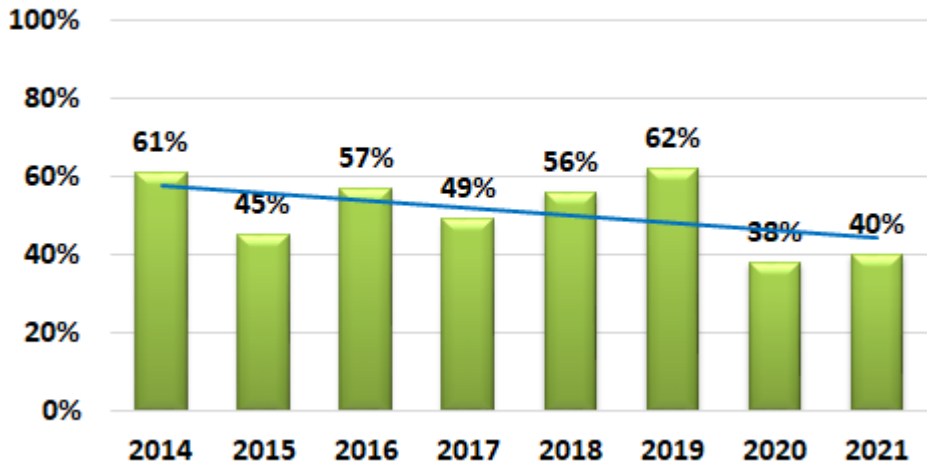
Figure 2



PUB top bar and Warré hive losses are higher than statewide levels. PUB member holdings of top bar and Warré hives were one half of the total 70 TB and Warré colonies statewide. Statewide the past 7-year loss averages have been 54% for Top Bar and 41% for Warré hives. The 7 “other hives” included 2 Langstroth long hives, with the remaining 5 not further identified. Losses by hive type of PUB compared to statewide loss is shown in Figure 2 above

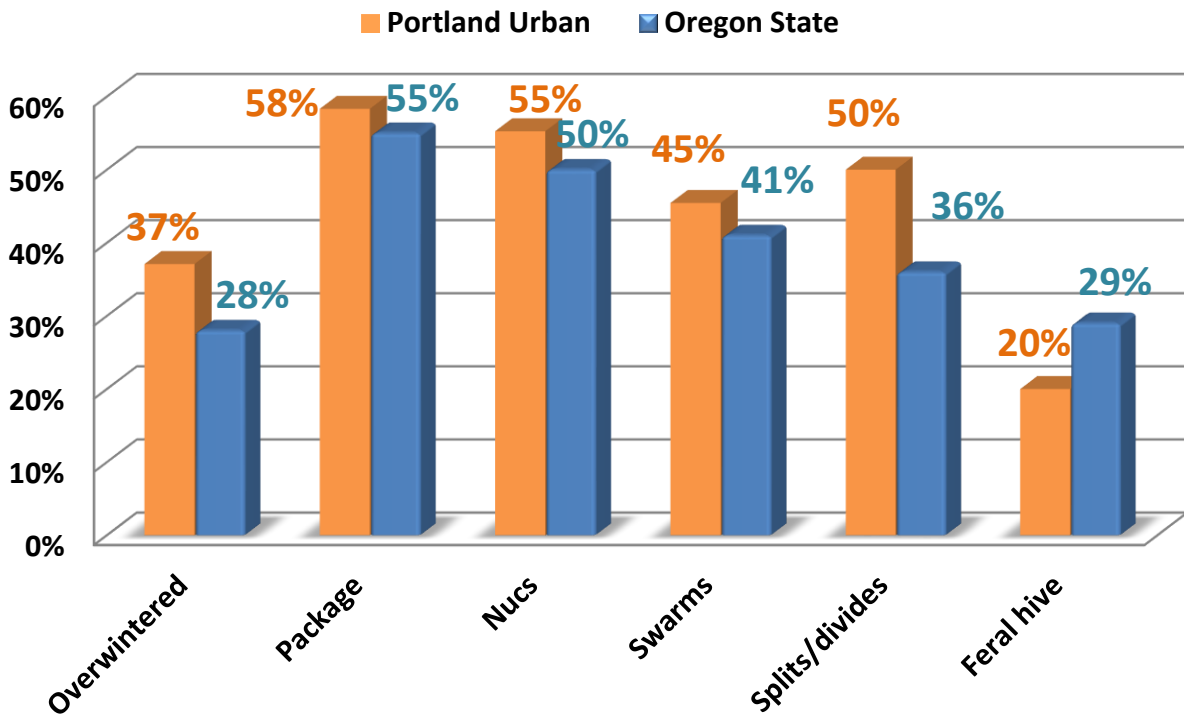
The two figures below illustrate the loss levels of PUB respondents. The bar graph (Figure 3) shows the loss level for past 8 years. The blue line is the trend line. Obviously, losses, although still high, are trending in the right direction. Average backyard losses for last 11 years of Oregon backyarders are 40%, same as PUB members in 2021. Figure 4 graphs PUB, Oregon backyard and Oregon commercial losses. Pub losses have consistently been higher than Oregon average losses. Commercial losses are typically about one-half of backyard beekeeper losses.

Figure 3 Portland Urban Loss History



The survey also asked for **loss by hive origination**. Overwintered colonies had the best survival in PUB (37%) and statewide (28%). Package (58%) and nuc losses (55%) were similar. Swarms (45%) and splits (50%) were slightly less. Eight of 10 feral transfers survived.

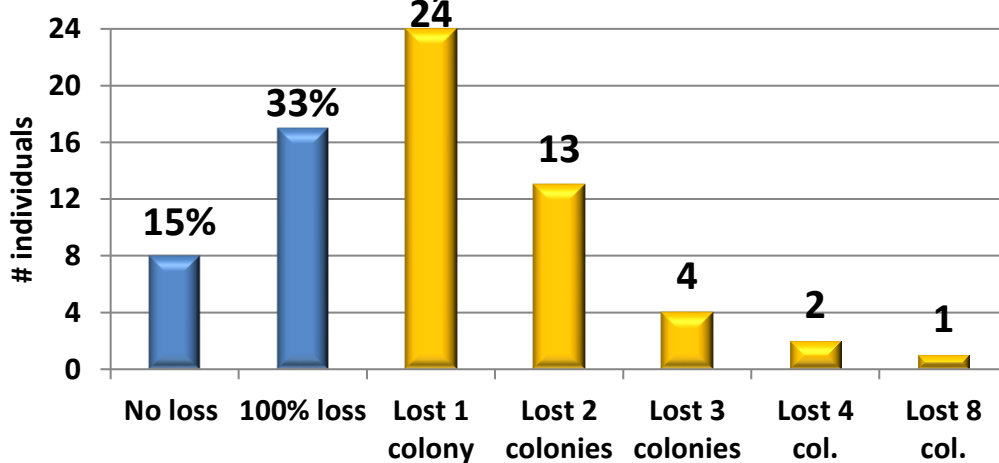
Figure 5 Winter Honeybee Loss % by Origination, 2020-21



fall colonies 62 12 38 77 24 10

Not all individuals had loss. Eight individuals had total survival, no colonies lost. Unfortunately, double that number – 17 individuals - had 100% loss. Greatest loss was one colony (24 individuals) and heaviest loss was 8 colonies. See Figure 6.

Figure 6 Individual Loss, Portland Urban 2020-21

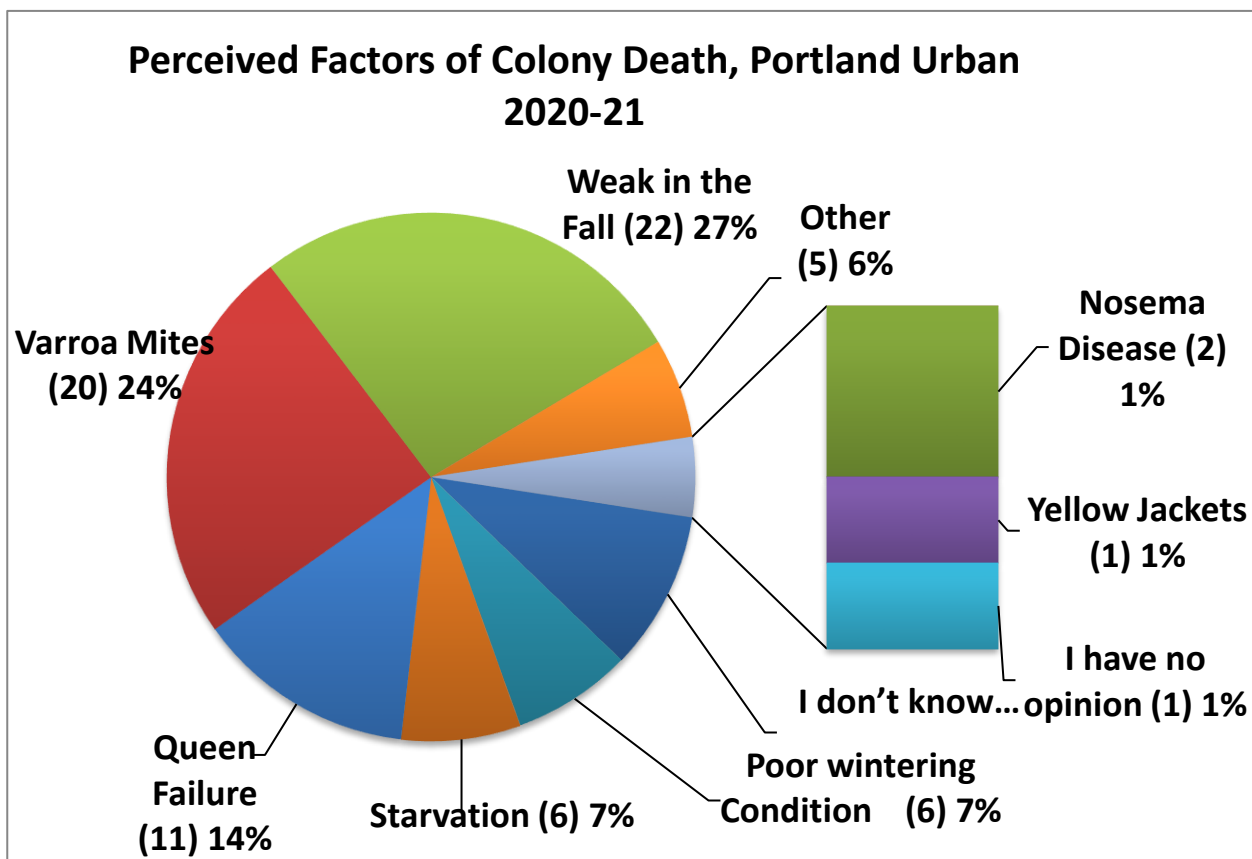


Typical of the statewide data, the PUB respondents are largely beekeepers with few colonies. 54% of PUB respondents had 1 or 2 fall colonies (2 was median number), another 21% had 3 to 6 colonies, while 7 respondents (13.5%) had 9+ colonies – maximum number for any respondent was 13 colonies. Individuals with 1 to 3 colonies (63.5% of respondents) lost 65% of their colonies, Individuals with 4-6 colonies lost 46%, the 4 individuals (8% of respondents) with 7 to 9 colonies lost 37% and the 4 individuals with 11 to 13 colonies lost 25%. The greater the number of colonies the low the percentage of loss.

PUB survey respondents reported a **range of beekeeping experience**. Twelve individuals had one year experience (they had 42% loss), 7 individuals had two and 6 members had 3 years experience; the 48% having 1 to 3 years experience had a 45.5% loss. Fifteen individuals had 4 to 6 years experience (4 was median number) with 40% loss, 8 individuals had 7-9 years experience with 45% loss and 4 individuals had 10+ years experience (55 was the highest number). They had only 13% loss. The loss number was similar to years of experience until the 4 individuals with 10+ years experience. Thirty-five of 52 PUB respondents (67%) said they had a mentor available as they were learning beekeeping.

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 – recall that 8 individuals had no loss). A total of 82 choices, 1.9/individual were listed. Twenty PUB individuals listed varroa (45% of respondents, 56 % of respondent choices). Weak in fall (22 respondents, half of respondents,



27 of choices) was the most common selection. Queen failure (25% of respondents, 14% of respondent choice) was next. Six individuals said starvation as did 6 in choice of poor wintering conditions. Among 5 listing other, mice, froze in ice storm, moving, kids toppling hive and queen excluder interference were listed. Two listed nosema and 1 yellow jacker. None listed pesticides or CCD or small hive beetle.

When asked about an acceptable loss, three said none, 6 said 10%, 5 said 15% , 9 said 20% and 4 indicated 25% (the median number). Nine individuals said 1/3 loss of colonies was acceptable and 12 said a 50% loss level was acceptable.

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 often confusing, 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. Our acceptable loss level has crept upwards over time.

Major factors in colony loss are thought to be mites and their enhancement of viruses, especially DWV (deformed wing virus, plus declining nutritional adequacy/forage and diseases. Pesticides in the agricultural environment weakens colonies. Yellow jacket predation is a constant challenge 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 currently facing honey bees. Varroa mites and the viruses they transmit are considered a major factor why colonies are not as healthy as they should be.

Managements

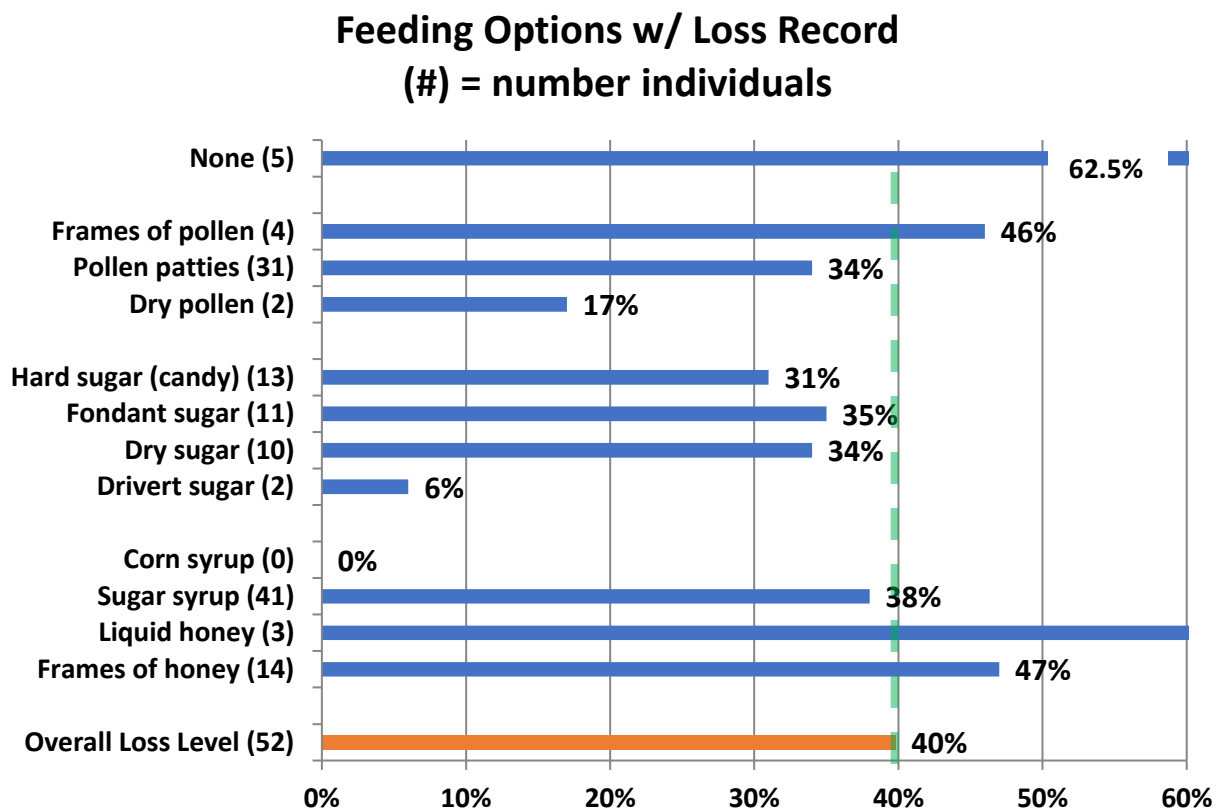
We asked in the survey for information about some managements practiced by respondents. The survey inquired about feeding practices, wintering preparations, sanitation measures utilized, screen bottom board usage, mite monitoring, both non-chemical and chemical mite control techniques and queens. Respondents could select multiple options and

there was always a none and other selection possible. This analysis seeks to compare responses of this past season to previous survey years.

Most PUB beekeepers do not perform just one management to their colony (ies) to improving colony health and overwintering success. Some do no management of their colonies. This analysis compares 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. But it is evident that some things can be done to reduce losses.

FEEDING: PUB survey respondents checked 131 feeding options = 2.7/individual. Five individuals made no choices – their loss rate was 63%. Seven individuals (14%) selected a single choice (they had loss rate of 83%), 9 individuals had 2 choices (loss rate 37%), 21 (the medium number) made 3 choices (39% loss rate), 7 individuals selected 4 options (38%loss) and 3 individuals had 5 choices (16% loss rate). More selections generally lead to better survival.

Figure 9



Percent colony losses statewide are presented for feeding options with numbers of PUB member numbers in (). For loss levels to left of green dotted line survival was improved with use of that management. Forty-one PUB individuals (79% of respondents) said they used sugar

syrup. They had a 38% loss rate, slightly less than the overall PUB average loss of 40%. As with statewide, the PUB individuals that fed protein had a survival improvement, except for the 4 individuals feeding frames of pollen. Similarly use of dry sugar in any form meant increased survival. The 2 PUB members using drivert had only a 6% loss.

For the last 5 years (including this year) individuals statewide (average loss rate =41%), doing no feeding had 6 percentage point higher losses (poorer survival) 4 of the 5 years – this year was the exception years. Average percent doing no feeding = 8% of individuals. For PUB, the 5 doing no feeding (10% of PUB members returning a survey) had loss level of 62.5%. Clearly doing some feeding improves the chances for survival.

Individuals statewide that fed sugar syrup had a 6-percentage point lower loss level (average for the 5 years) but this did not occur this year; for PUB it was only 2 percentage points different this year. Those feeding honey (as frames or liquid) had lower loss only during 2 of the past 5 years (2018 and 2020) but not this year; likewise for PUB members. Individuals feeding non-liquid sugar (in any of the forms) had lower losses four of five past winter seasons (this was the year where it was not better; for PUB it was an improvement in survival), with 5 or 6 percentage point improvement from overall losses.

Dry sugar feeders had slightly better survival all 5 winters (average= 37%) while hard candy feeders had a much-improved survival 4 of 5 past winters (this was the exception) (=33% average survival); fondant feeders had better survival 3 of the 5 (not this past winter) (37% 4-year average). Recall that average loss for past 5 years was 41%. Using drivert as sugar source has not improved survival but for 2 PUB individuals, it's use led to a better survival this past winter (only 6% loss).

For individuals feeding protein, only the protein patty users had better survival all 5 years; dry pollen feeders had much better survival in two of the past five years with losses the remaining three years, including the past one, close to the overall yearly average. Dry pollen feeders have had better survival some years, including 6 percentage points this year; for PUB members, it was a 23-percentage point improvement.

WINTERING PRACTICES: Five PUB individuals (10%) reported doing no winterizing; they had loss level of 71%; statewide these 5 individuals were among 39 individuals (12% of overall statewide respondents) that indicated none of the several listed wintering practices; **statewide losses were 39% for those doing no winterizing managements 4 percentage points higher loss than overall loss of 35%; in PUB the 5 individuals had a 71% loss, approaching double the average loss of members.** Multiple selections were possible and in fact the 47 PUB members who did some winter management averaged 2.8/individual. Ten individuals chose a single management and had a 50% loss level while the 12 individuals checking 2 had 48% loss

and the 12 selecting 3 had 25% loss level. Three individuals selected 4 (75% loss) while 8 electing 5 had 22% and the 2 with 6 & 7 selections had 20% loss.

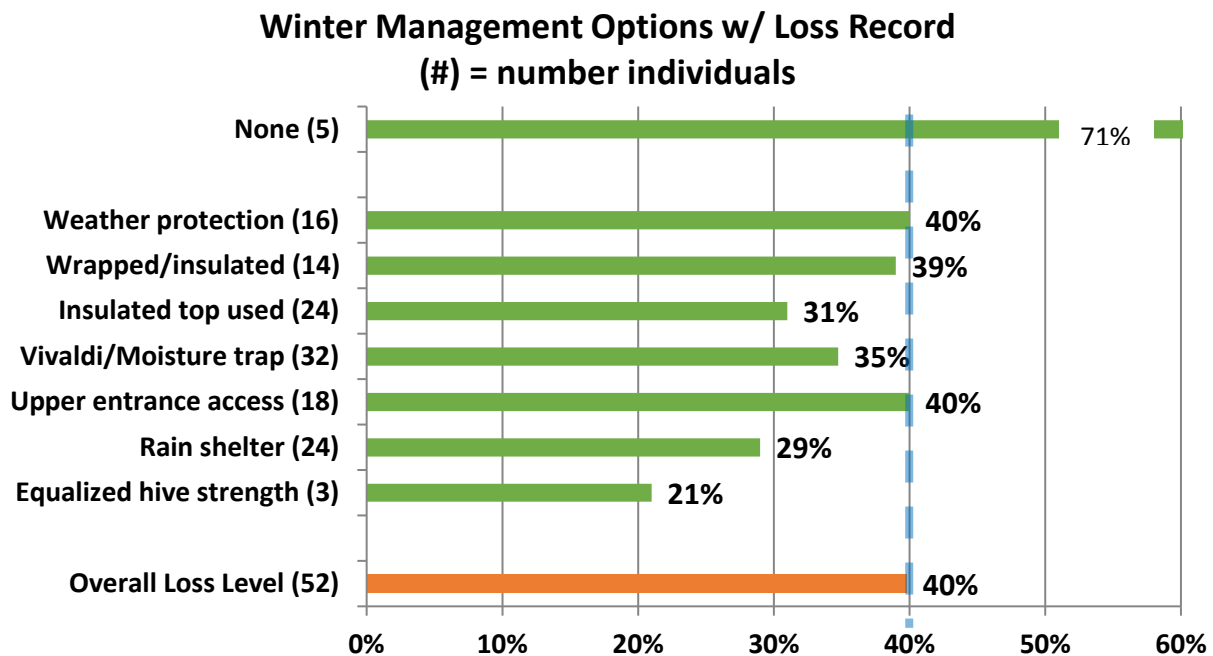


Figure 10

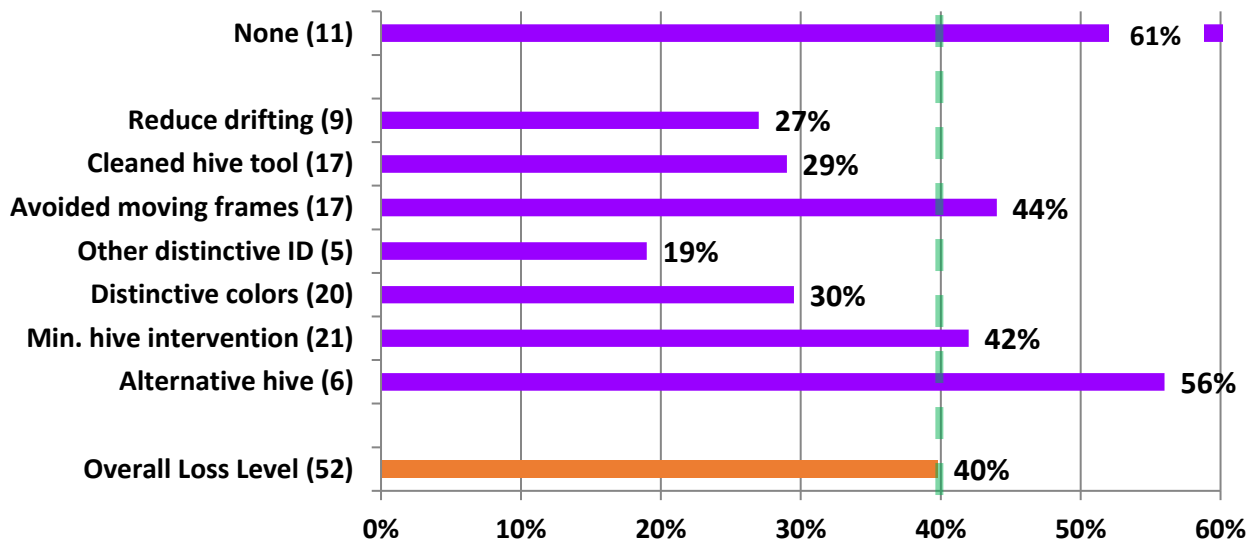
The three most common wintering managements selected were use of a quilt box (Vivaldi board) at colony top (32 PUB individuals) and use of a rain shelter and insulated top (24 individuals each). Figure 10 shows number of individual choices for PUB members in () and percent loss of each selection. All managements showed better survival with equalizing hive strength exhibiting one-half average loss.

Over the past four years individuals that did no winterizing practice (average 13.4% of individuals) averaged 46% loss compared to 42% overall average loss, a 4-percentage point poorer survival rate; 5 PUB members had heavy losses when they elected to do no winter management's (there was always an alternative other category to select). Only 2 winterizing managements improved survival all 4 years statewide – wrapping (29% lost rate, a 13-percentage point improvement) and upper insulation (32%, a 10-percentage point improvement). Vivaldi/quilt box (38%), upper entrance, also 38% (most Vivaldi boards have an upper entrance built into the equipment) and wind/weather protection (36%) had only slightly improved survival rates. Average loss rate for last 4 years was 42%.

SANITATION PRACTICES: It is critical that we practice some basic bee sanitation (some prefer use of term bee biosecurity) in our bee care to help insure healthy bees. Eleven individuals said they did none of the sanitation – their loss rate was 61%, (state loss rate was 71%). We received 95 PUB selections, 2.3/individual. Eleven PUB members had 1 selection (loss rate 56%), 11 also made 2 choices (65% loss), the median choice 14 selected 3 managements (25% loss), and 5 made 4 choices and had loss rate of 24%. Clearly doing more helps survivorship.

Figure 11

Sanitation Practice Options w/ Loss Record
(#) = number individuals

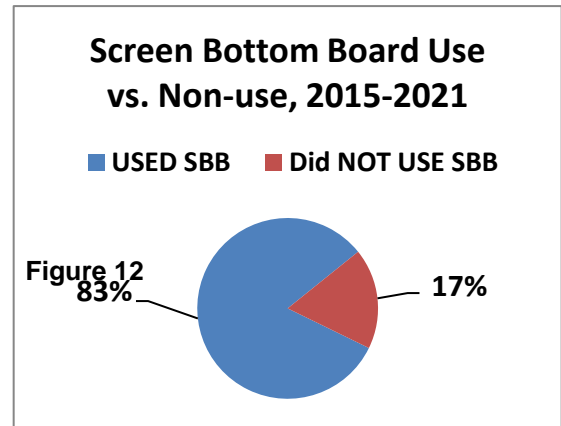


Minimal hive intervention (27 of them PUB beekeepers) and avoiding moving frames (17 PUB members) were the most common options selected statewide. It could be argued that less intervention might mean reduced opportunity to compromise bee sanitation efforts of the bees themselves and that excessive inspections/manipulations can potentially interfere with what the bees are doing to stay healthy. These options however did not improve winter survival, either for statewide or PUB members.

Statewide moving frames and reducing drifting were the two sanitation choices that demonstrated better average survival the past four years – 4-year loss rate was 36% for not moving frames which is 6 percental points better survival (this year it was 3 percentage points higher than average) and 35% for reducing drifting compared to overall rate of 42%. Alternative hive, 14 individuals had the best survival this year, but it has not been over past 4 years. Sanitation appears to be relatively minor toward improving survival.

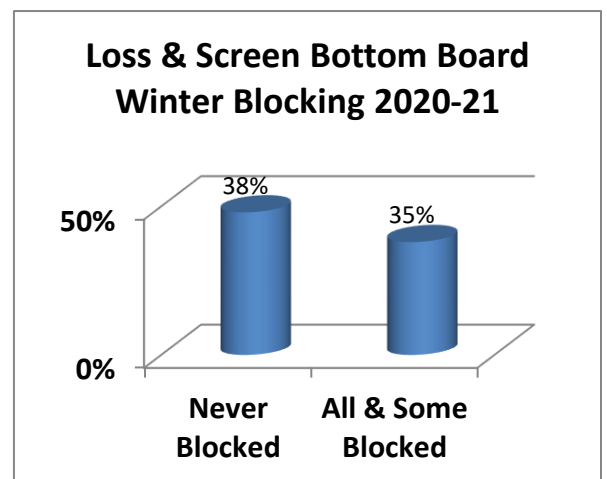
SCREEN BOTTOM BOARDS (SBB)

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 this recent survey 36 individuals (11%) statewide, 1/3rd of which were PUB respondents, said they did not use screen bottom boards (last year it was 10% not using SBB). This was the second lowest percent of respondent non-use of SBB in last 7 years. Average non-use is 17%, vs 83% use, on some or all colonies over the 7-year period. Figure 12 right.



This past overwintering season, the 36 statewide non-SBB users had 165 fall colonies of which they lost 103 for 38% loss. The 292 beekeepers using SBB on all or some of their colonies had 36% loss. **Examining the seven-year average of SBB use, loss level of the 83% using SBB on all or some of their colonies had a 36% loss level whereas the 17% not using SBB had loss rate of 40%, a 4-percentage point positive survival gain for those using SBB versus those not using them. Screen bottom boards offer a very minor improvement for overwinter survival.**

We asked if the SBB was left open (always response) or blocked during winter. This past season 48%, 83 individuals, said they always blocked SBB during winter; 66 individuals statewide said they blocked some of the SBBs. Statewide those who blocked always or sometimes had 1139 colonies in the fall and lost 744, a 35% loss rate. Figure 13 shows that those who never blocked had a 38% winter loss, a 3-percentage point difference, a slight advantage **in favor of closing the SBB over the winter period to improve survival.** Figure 13 right. For PUB, the 12 who indicated as never blocking had an 18% loss, so blocking did not appear to be of benefit for PUB member this past year.



Screen bottom board use has a slight survival advantage. For those using SBB, the advantage appears to be to close, partially or completely, the screen 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. Individual 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 colonies are in an exposed site, providing some extra wind/weather protection and wrapping/insulating colonies might improve survival.

Feeding, a common management, appears to be of some help statewide in reducing losses. Feeding fondant sugar, a hard sugar candy or dry sugar during the winter means lower loss levels. Providing frames of honey and feeding sugar syrup also means lower losses for some individuals. Such feeding management is of great value for spring development and/or development of new/weaker colonies as well as for colony rearing of bees to overwinter. Feeding protein in form of dry pollen and pollen patties did slightly improve survival. 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. To determine if feeding might help, monitor what sources your bees are visiting and manage accordingly.

Winterizing measures that apparently helped lower losses for some statewide beekeepers were a moisture trap (Vivaldi board or quilt box) and upper insulation and 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 2020 year and/or overwinter 2020-21, 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. 32 individual respondents, (61.5%), said they monitored all their hives. Losses of those individuals monitoring was 34 %. Fourteen (27%), reported no monitoring; they had a single percentage point higher loss rate of 35% loss. Six individuals reported monitoring some of their colonies;

they had a 38% loss. Monitoring alone did not improve survival for PUB members. However statewide it does make a difference.

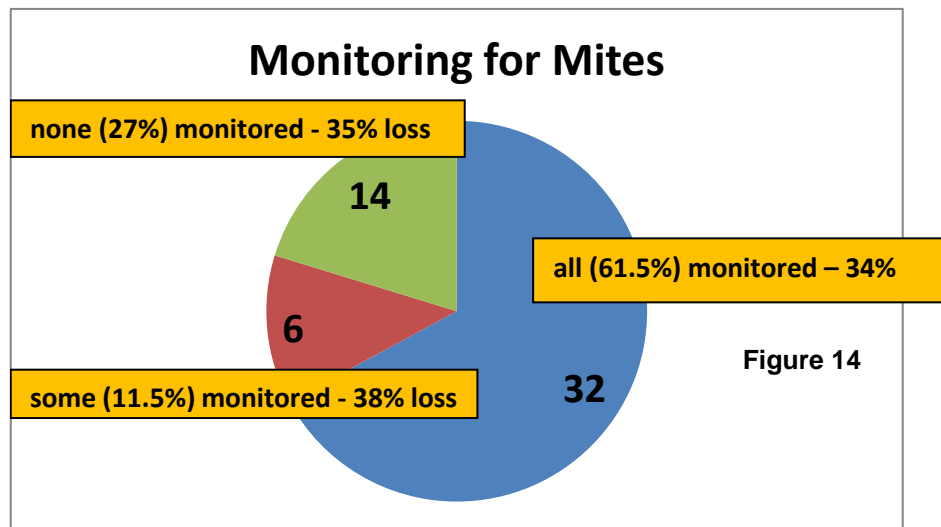


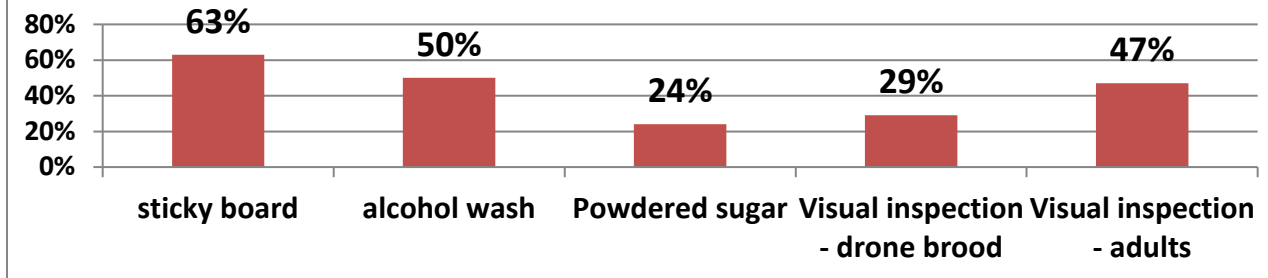
Figure 14

Monitoring alone is a means towards improved winter survival. The table below compares % individuals and % winter loss for individuals who monitored all colonies compared with those who monitored none. Five-year difference is 8 percentage point better survival monitoring all colonies. The 11-15% who monitored some colonies was variable.

	ALL Colonies Monitored % individuals	% loss	SOME Colonies Monitored % individuals	% loss	No colonies Monitored % individuals	% loss
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%
4 year loss age		40%		38%		48%

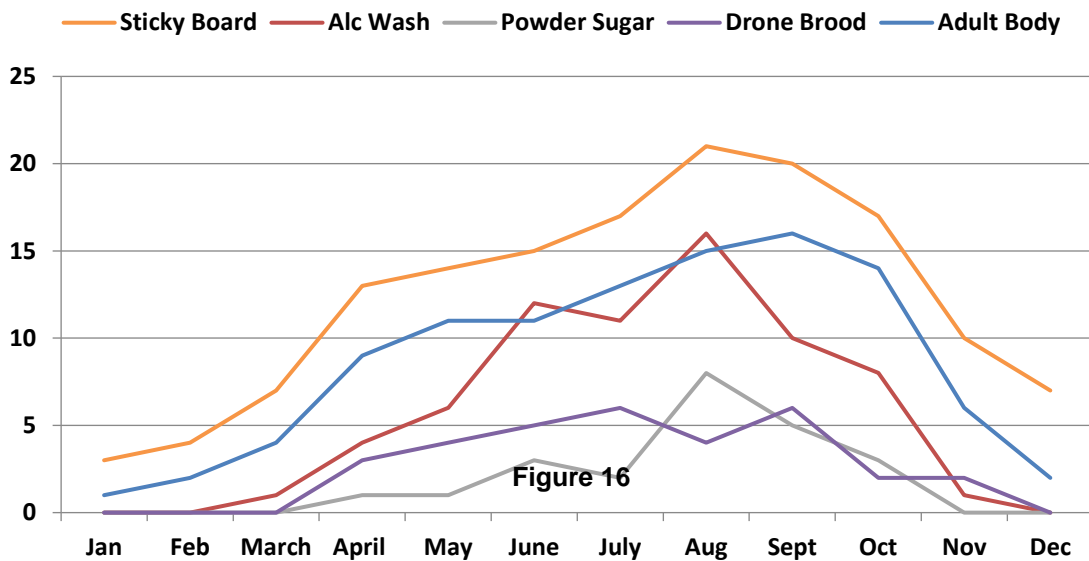
Individuals indicated use of 1.9 monitoring techniques on average. In total choices, in order of popularity of use, sticky boards were used by 24 individuals, 63% total of 52 individuals who did some or all monitoring of colonies. Nineteen individuals used alcohol wash to monitor (50% of total number of individuals who monitored), nine individuals (24% of individuals) used powdered sugar monitoring; visual inspection of drones (11 individuals) and inspection of adults (18 individuals) were also indicated (Figure 15).

Percent Individuals Using 5 Mite Monitoring Methods, PUB 2020-2021

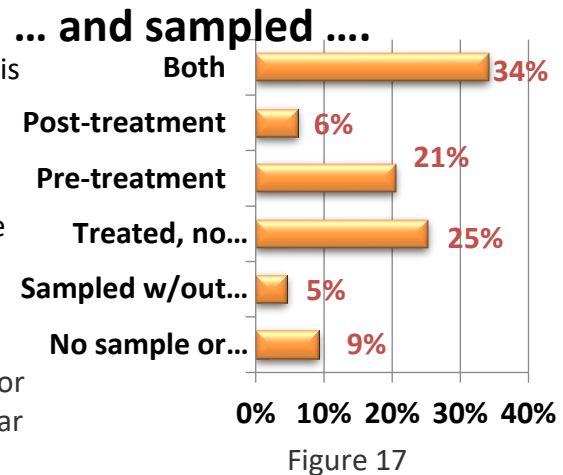


Whatever technique used, most sampling to monitor mites was done in July – September, as might be expected since mite numbers change most quickly during these months and sampling results key control decisions. Figures 16 below illustrates monthly sampling five methods statewide.

Monthly Monitoring of Portland Urban Beekeepers 2020-21



The most common sampling of respondents is both pre- and post-treatment (31% average last 5 years). Sampling pre-treatment percentage has been decreasing while post treatment sampling has slowly been increasing. It is important to know if the treatment works so post treatment should not be avoided. Treatment without sampling has been steadily increasing (25% this past year, more than double 5 years previous). Statewide sampling data for last four years in Figure 17 right. PUB numbers similar (33% both and 25% treated without sampling).



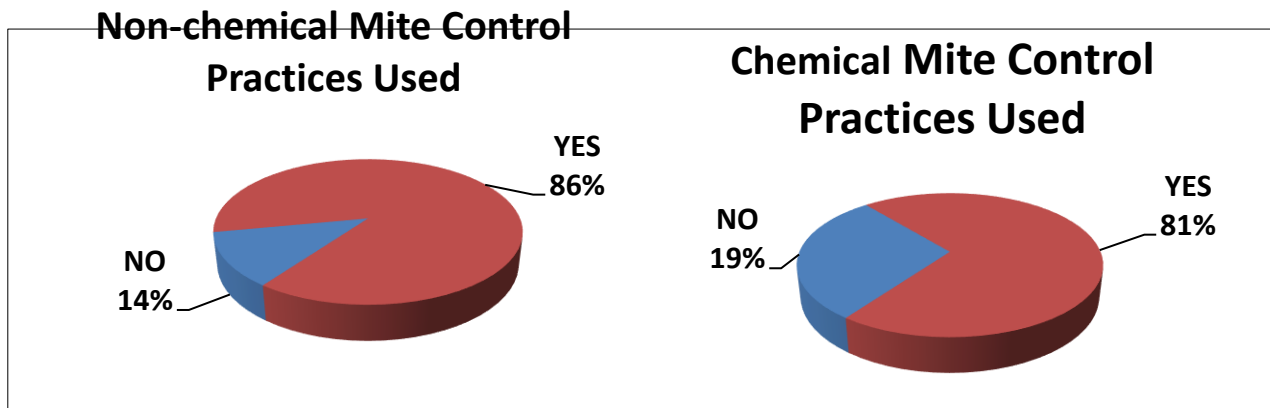
It is important to KNOW mite numbers. Less effective mite monitoring methods include sticky (detritus) boards below the colony (often so much detritus drops onto a sticky board that picking out the mites can be hard, especially for new beekeepers) but sticky boards used for a single day pre- and post-treatment can help confirm the effectiveness of a treatment if lower numbers drop post treatment. Visual sampling is not accurate; most mites are not on the adult bees, but in the brood, especially when there is a lot of brood and the adult mites are NOT on the adult body where they can be observed (over 90% are on the lower abdomen, tucked within the overlapping bee sternites). Sampling 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. We are not certain why such sampling is indicated for August to December months (see Figure 17 & 18) – there simply is little drone brood to sample during these months.

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 the treatment itself.

Mite Control Treatments

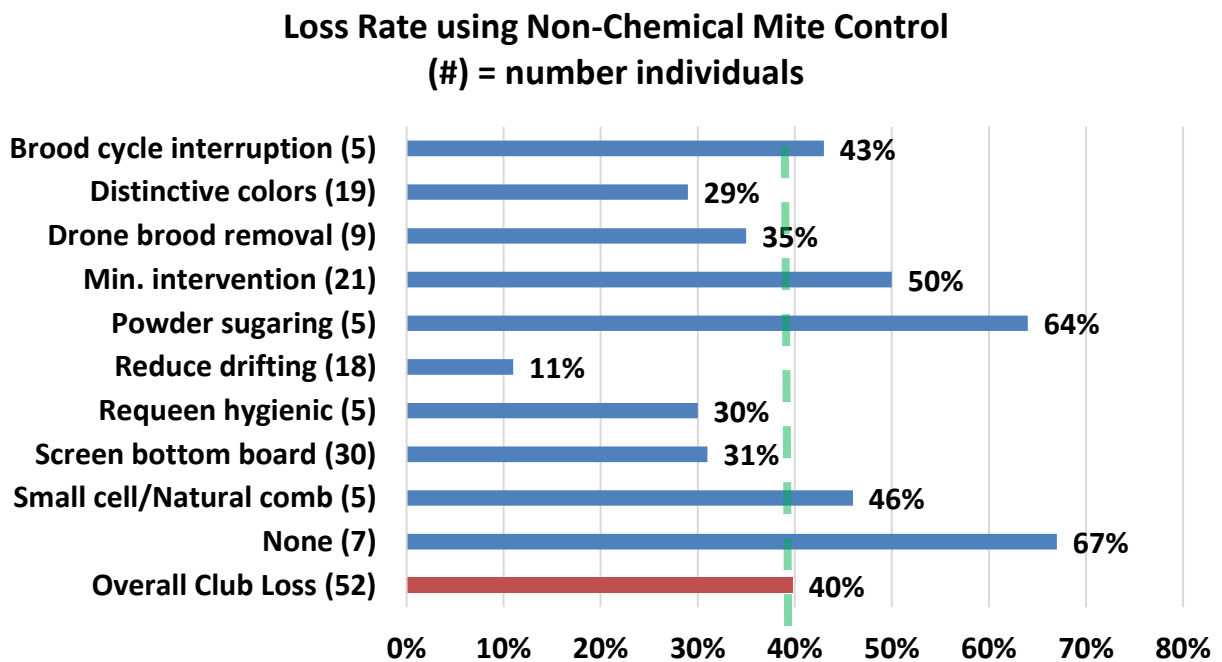
The survey asked about non-chemical mite treatments and also about use of chemicals for mite control. Seven individuals (14%), said they did not employ a non-chemical mite

control and 11 individuals (19%), did not use a chemical control. See Figure 18. Those 7 individuals who did not use a non-chemical treatment reported a 67% winter loss, while those who did not use a chemical control lost 70% of their colonies. The individual options chosen for non-chemical control are discussed below.



Non-Chemical Mite Control: Of nine non-chemical alternatives offered on the survey (+ other category,) 13 individuals (29%) used one method (35% loss), 13 also used two, 11 used 3 (52%), 6 used 4 (17%) and 2 used 5 /6 with 27% loss. Clearly using one method with proper timing or using more than one tool improves success.

Figure 19



Use of screened bottom board was listed by 30 individuals (67% of total respondents), 10 fewer than in a different section of survey. Of the next most common selections, distinctive colors (19 individuals) showed better survival than minimal hive inspection (21 individuals, 50% loss). The use of the remaining selections are shown in Figure 19; number of individuals in (), bar length represents average loss level of those individuals using each method. Those left of **green dashed** line had improved survival.

Three of the non-chemical alternatives have demonstrated reduced losses over past 5 years. Reducing drifting such as spreading colonies (33% loss average for 3 years – question not asked in 2016-17 survey) and brood cycle break (36% 5-year average) have consistently year after year demonstrated somewhat better survival than average loss (41%). For PUB, reducing drifting (18 individuals) had very good survival (18% loss) while the 9 individuals doing brood break had slightly less survival (43%) than average. Some non-chemical control alternatives demonstrate an advantage on one or two years (such as requeening with hygienic queens (30%) and screen bottom boards (31%).

Chemical Control: For mite chemical control, 11 individuals (21% of total respondents) used NO chemical treatment. They had a loss level of 70%. Those using chemicals used at rate of 1.2/individual. Twenty-four individuals (46%) used one chemical (had 43% loss level), 10 used two (32% loss), 6 used 3 (also 32% loss level) and a single individual used four and had 7 of 9 colonies survive (22% loss).

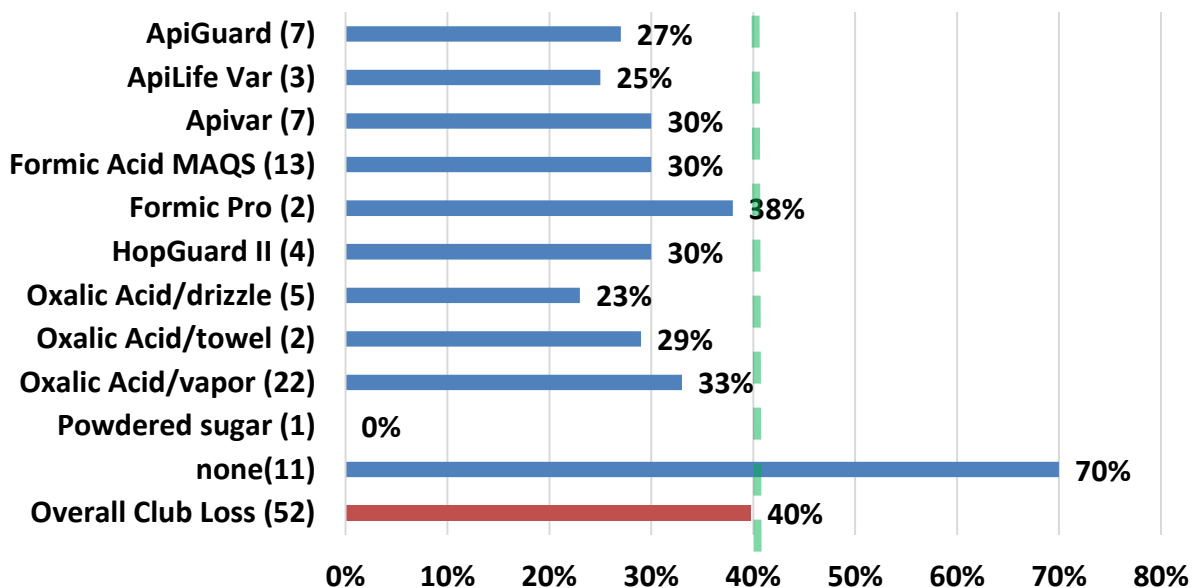
Twenty-two respondents (54% of individuals using a chemical) indicated they used oxalic acid vapor and 13 PUB Beekeepers (32% of total individuals using a chemical) indicated they most commonly utilized MAQS, formic acid. Both chemicals improved survival (33% loss rate, 7 percentage points better than average survival). Two said they made their own oxalic acid formulation to apply via shop towels (29% loss), plus 5 said they used the oxalic acid drizzle (23% loss). Two said they used Formic Pro rather than MAQS and had a 38% loss, 2 percentage points better than average; statewide Formic Pro users in past three years had average loss of 25% (compared to statewide average of 40%). All three api's- Apivar, Apiguard, ApiLifeVar - once again had very decent survival rates. Figure 20.

Consistently, over the last 5 years five different chemicals have helped beekeepers improve survival. The essential oils Apiguard (average 5-year loss level 31.6%), Apivar (32% average 5-year loss level), Oxalic acid vaporization (32.6% average loss level over last 5 years – in contrast the oxalic acid drizzle average of last 4 years is 40% loss level), ApiLifeVar (34.4% average loss level over last five years) and formic acid MAGS formulation 39.4% loss level the last 5 years. Average loss level has been 41% the last 5 years. Those who mix formic into shop

towels have heavier losses. Formic Pro has increased in use – it looks very promising at a 25.3% loss level the past three years (when average loss was 40.3%).

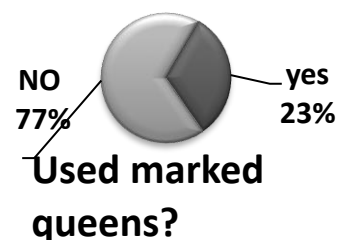
Figure 20

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



Queens

We hear lots of issues related to queen “problems”. 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. Twelve individuals (23%) said yes 40 said no. The related question then was ‘were your hives requeened in any form?’ to which 44% (23 individuals) said yes, 27% (14 individuals) said no and the remainder that responded (15 individuals) said ‘not that I am 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 45 responses. Sixteen respondents (35.5%) indicated their bees were requeened with a mated queen, 18% split (divided) hives, 22% indicated it was the bees that requeened via swarming, 15.5% via supersedure. Four individuals introduced queen cells.

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 (See *American Bee Journal* April 2020 article by Dewey). 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 with Jenai Fitzpatrick, July 2021

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