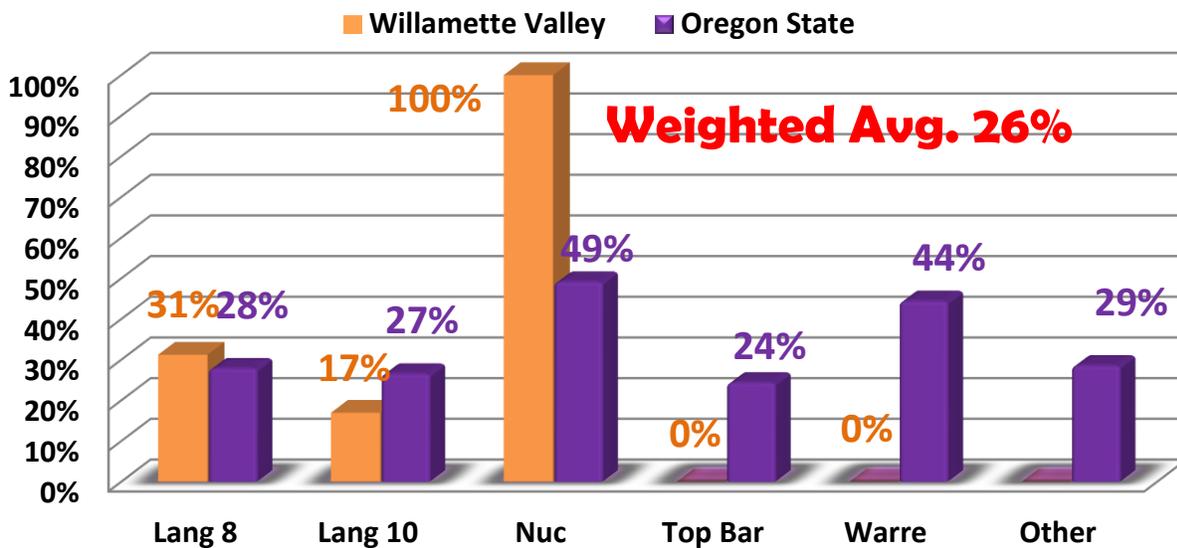


2021-2022 WVBA Winter Loss Report by Dewey M. Caron

WVBA members were encouraged to complete a web-based survey document in a continuing effort to define overwintering losses/successes of backyard beekeepers in Oregon. This was the 13th year of such survey activity. I received 243 Oregon beekeepers keeping anywhere from 1 to 40 colonies; Willamette Valley members sent in 10 surveys, less than ½ compared to last year, reporting on 90 fall colonies.

Overwintering losses of WVBA respondents =26 %two percentage point better than statewide loss average. Percent losses, determined by hive types were 31% for Langstroth 8 and 17% for Langstroth 10 frames hives; 4 nucs were lost but single Warré hive survived See Figure below.

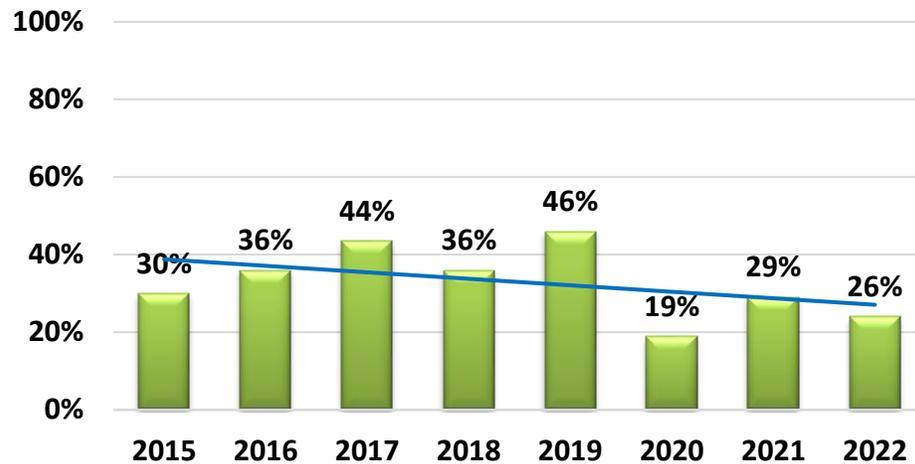
Winter Honeybee Loss % by Hive Type, 2020-21



Fall	32	53	4	0	1	0
Spring	22	44	0	0	1	0

Loss 2021-22 rate was 3 percentage points lower than the previous year when WVBA had the lowest loss average of all Oregon clubs. The level is 8 percentage points below the average loss level of previous seven years (34%) and 12 percentage points below Oregon statewide 13-year average (38%). Dashed line shows the trend which obviously is in the right direction.

Willamette Valley Loss History



The survey also asked for hive loss by **hive origination**. The members reported 15 ½ % loss of previously overwintered colonies, Loss of all 5 overwintered nucs ,loss of 1 of 7 swarms but reported survival of all splits (11 total) and feral colonies (2 total f respondents).

Two individuals had no loss (3 colonies) and two had total loss (4 colonies total). Three WVBA individuals lost one colony, two lost two colonies, one lost 3 and one lost 12 colonies.

Typical of the statewide data, the WVBA respondents had few colonies. our (400%) had 1 to colonies (43% loss). 3 ha 9 colonies (19% loss) and 3 had 10+ colonies (27% loss). Maximum was 27 colonies. Five individuals (50%) had more than one apiary site while one individual moved colonies during the year.

Consistent with statewide data as years of experience increase the loss level percentage decreases only slightly. This was the case for the 10 WVBA members. The four individuals with 1 to 3 years experience lost 33% of their colonies, the 3 who had 5 to 6 years experience lost 27% and the 2 individuals with 8 years experience lost 30%.

We asked individual why they thought they lost their colony. Multiple responses were possible. There were 16 total reasons offered by 7 individuals (2.3/individual); 1 individual had 5 selections. Four said varroa mites, followed by 3 who said queen issues and the three who said moisture. Two said starvation and 1 each did not know, said poor wintering, weak and yellow jackets

We asked about acceptable loss. Two individuals said 5 and 3 indicated 10%. Three said 20% and 2 25%. Statewide median acceptable loss level was 20%.

Why do colonies die?

There is no effortless 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.

Major factors in colony loss are mites and their enhancement of viruses especially DWV (deformed wing virus) and declining nutritional adequacy/forage and diseases. Pesticide exposure 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 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.

Management selections and losses

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 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 of those same individuals. Such analysis is correlative - doing a similar management as fellow beekeepers does not necessarily mean you too will improve success.

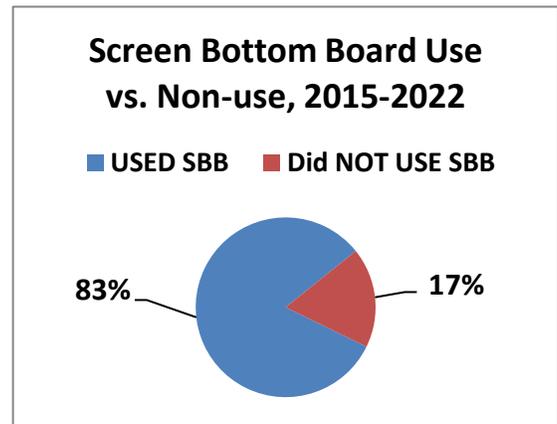
FEEDING: Willamette Valley survey respondents checked 31 feeding options = 3.1/individual. Five individuals said they fed frames of honey , 9 of 10 fed sugar syrup. 4 hard sugar candy, 3 dry sugar and one fed fondant. For protein One fed frame of pollen, 2 fed dry pollen and 6 fed via pollen patty.

WINTERING PRACTICES: One WV individual reported doing no winterizing; they had 100% survival (3 of 3 colonies survived). Multiple selections were possible; Willamette Valley members checked 27 winter management options, average 3/individual. Four equalized hive strength, six used an insulated top and 7 said they used upper entrance. Three respondents said they used a rain shelter, 2 wind weather protection and one said they wrapped.

SANITATION PRACTICES: It is critical that we practice some basic bee sanitation (some prefer use of term bee biosecurity) in our bee care toward insuring healthy bees. Willamette Valley beekeepers had 19 responses 2.1/individual to sanitation management questions (11 had 1 to 3 and one indicated 6 options). Forty-one statewide individuals including one WB individual said they did not practice any of the 6 offered alternatives. Loss rate statewide was 31% slightly higher than average level of 28%) and for the single WV member the single colony owner had total winter success and colony survived.

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, statewide 38 individuals (15%) said they did not use screen bottom boards (last 2 years it was 10 and 11% respectively not using SBB). For WV 6 used SBB on all, 2 on some and 2 (20%) said they did not use them (their loss was 45%). Average non-use for last eight years is 17%, vs 83% use, on some or all colonies. Figure right.



This past overwintering season, the 38 non-SBB users had winter losses of 103 of 27% loss. The 47 beekeepers using SBB on all or some of their colonies had 29% 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 34.7% loss level whereas the 17% not using SBB had loss rate of 38%, a 3.3-percentage point positive survival gain for those using SBB versus those not using them. Screen bottom boards offer a minor improvement for overwinter survival.**

We asked if the SBB was left open (always response) or blocked during winter. This past season, 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. Figure 14 shows that those who never blocked had a 42% winter loss, a 3-percentage point difference. FOR WV 6 always blocked and 2 did not (25%). Loss rate for not blockers was 45%. As in past years there was a slight advantage **in favor of closing the SBB over the winter period to improve survival.**

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 the inability of bees to manage moisture overwinter kills bees, 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 yields 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. Replacing standard bottom boards for screened bottoms marginally improved winter survival. It is apparently advantageous to close the bottom screens during winter.

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

One individual used terramycin and had a 14% loss rate. None reported using antibiotic for Nosema.

Mite monitoring/Sampling and Control Management

We asked percentage of 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. Two individual respondents of 9 total (22%) said they did not monitor – they had a 25% loss, 3 percentage points below average statewide loss. Statewide losses of those individuals monitoring were 34 % and those reported no monitoring had a higher loss rate of 36% loss.

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 13-15% 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%
5-year loss avg		40%		38%		48%

Individuals indicated use of 1.25 monitoring techniques on average. In total choices, in order of popularity of use, stick boards were used by 3 of 8 respondents, alcohol wash, powdered sugar and drone brood monitoring by 2 individuals each and one individual was looking at adults. In past 5 years, statewide the use of sticky boards has decreased and both alcohol wash and powdered sugar shake have increased in use. Whatever technique used most sampling to monitor mites occurred in July – September, as might be expected since mite numbers change most quickly during these months and sampling results key control decisions. The most common sampling of respondents is both pre- and post-treatment Sampling pre-treatment percentage has been decreasing but for WVBA it was greater than post treatment sampling. Treatment without sampling

has been steadily increasing.

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 counting the mites can be hard, especially for new beekeepers). Sticky boards used for a single day pre- and post-treatment can help confirm the effectiveness of a treatment, if 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 is useful as an early warning that mites are present; if done, look at what percentage of drone cells had mites.

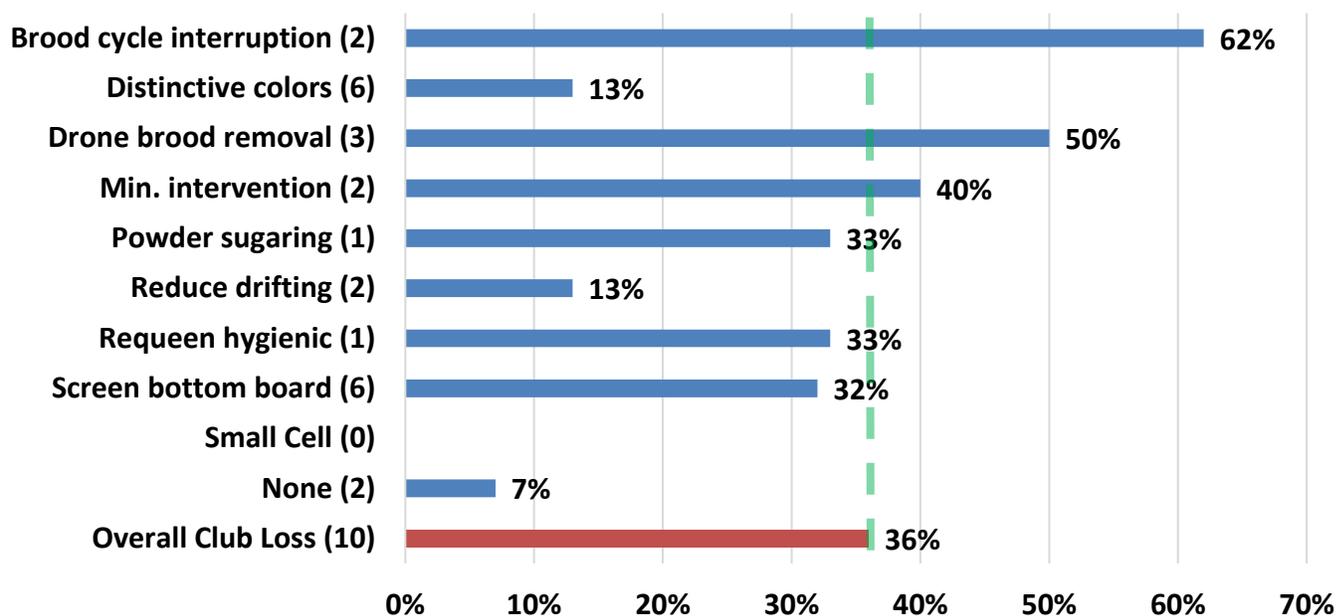
See **Tools for Varroa Monitoring Guide** www.honeybeehealthcoalition.org/varroa on the Honey Bee Health Coalition website for a description of and to view videos demonstrating how best to do sugar shake or alcohol wash sampling. The Tools guide also includes suggested mite level to use to base control 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 challenging 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. There were 46 choices, 2.4/individual. Fourteen percent (14%) of statewide respondents, including 2 WVBA members, said they did not employ a non-chemical mite control and 19% statewide but all WVBA individuals used a chemical control. Those 45 individuals who did not use a non-chemical treatment reported a 48% winter loss; the 2 WVBA members had 7% loss. Statewide survey respondents who did not use a chemical control lost 61% of their colonies. 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,) 2 individuals used none and experienced only a 7% loss. Three respondents used one method, 3 used three and one each 4 and another 5. Total number of selections were 21 for 2.6/individual. Most common choice was screen bottom board (5 individuals) but overall, with small respondent pool the numbers are small to be highly meaningful. Painting hives distinctive colors and reducing drifting were the two choices that resulted in best survival.

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

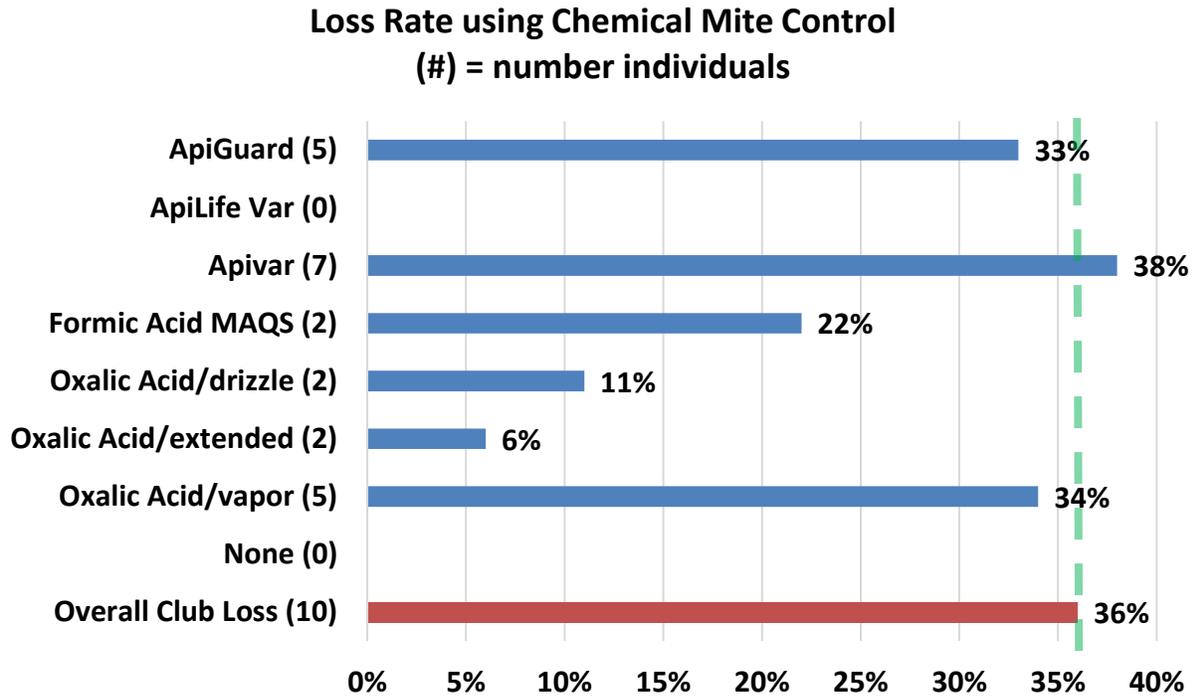


Three of the non-chemical alternatives have demonstrated reduced losses over past 6 years for Oregon statewide respondents. Reducing drifting such as spreading colonies (31% loss average for 4 years – question not asked in 2016-17 survey) and brood cycle break (34.5% average) have consistently year after 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%).

Chemical Control: For mite chemical control, 30 statewide individuals (12% of total respondents) used NO chemical treatment. They had a loss level of 50%. All WV member respondents used a chemical for mite chemical control Those using chemicals used at rate of 2.4/individual. Two individuals used one chemical (had 25% loss level, 3 used 2, 2 used 3 and the two using 5 had a 20% loss. Apiguard and Oxalic acid vaporization (OAV) were each used by 5 individuals; loss rates were 33% and 23.5% respectively. Number is small but information on chemical and loss are shown in figure below.

Consistently the last 5 years statewide 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 a 25.3% loss level the past three years (when average loss was 36.5%).



Queens

We hear lots of issues related to queen “problems.” Recall under the question asking the reasons why colonies did not survive those 3 individuals noted queen issues as one of their selections. In Section 8 of the survey, we asked what percentage of loss could be attributed to queen problems. Five individuals said no queen issues, 4 indicated 10-30% issue and one 75-100% an issue.

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. Equal numbers, 5 each said yes and no they had marked queens. The related question then was ‘were your hives requeened in any form?’ to which 7 individuals said yes. For the 7 they indicated 13 selections 1.9/individual. Six said they split hive, 3 introduced mated queens, 1 introduced a virgin queen and 1 introduced queen cells. One said colony swarmed and another their colony superseded.

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 July 2022