Winter Bee Losses of Washington Backyard Beekeepers for 2024-2025

by Dewey M. Caron

Overwintering losses of small-scale Washington backyard beekeepers = 34% an increase of three percentage points from last year, 11 percentage points below the 10-year loss average. One hundred and thirty Washington respondents, 9 more than last year. completed a survey and eleven above the 119.3 average respondent rate for the last six years. Individuals maintained up to 40 fall colonies. Information on winter losses and several managements related to bee health was included on the electronic honey bee survey instrument www.pnwhoneybeesurvey.com.

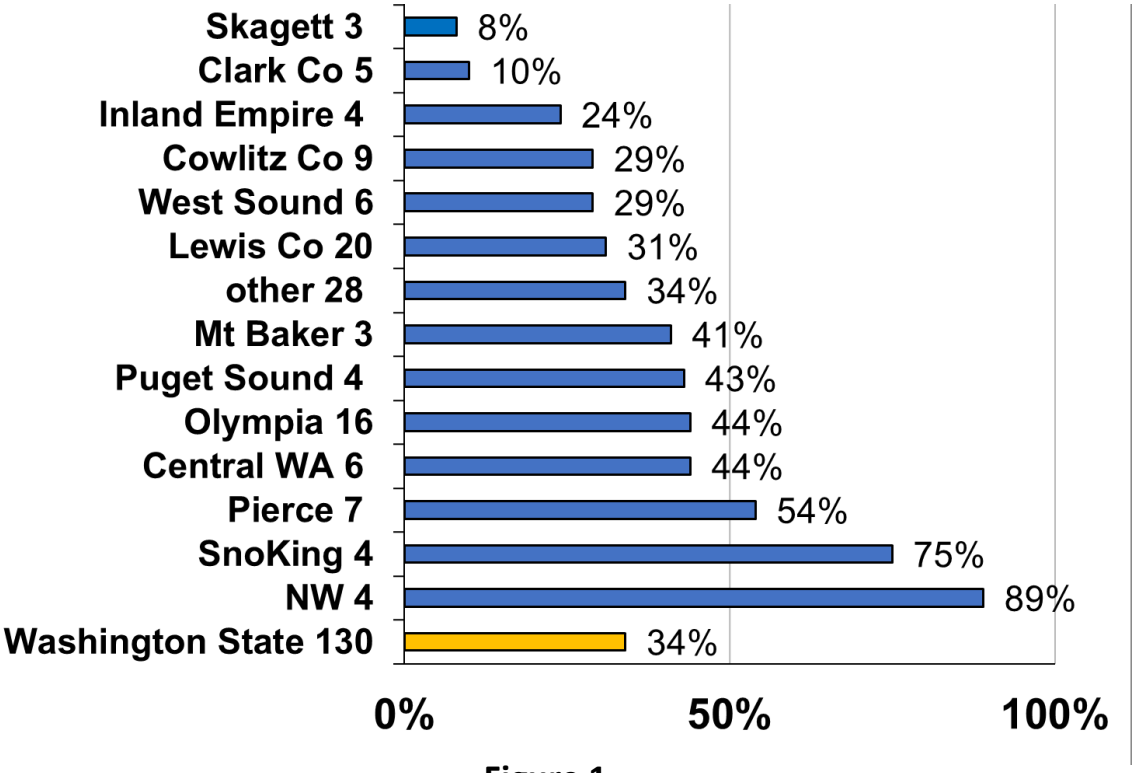


Figure 1

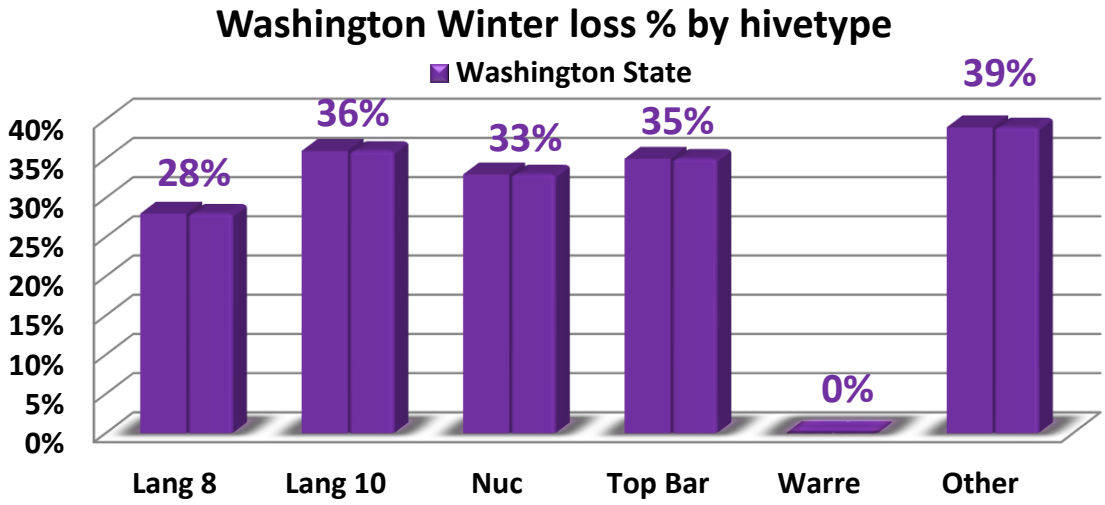
Response by local Washington (WA) association members varied as indicated by numbers adjacent to club name. Losses of those club individuals are shown in blue bars in Figure 1. Statewide loss level was 34%. The survey included 676 fall Washington beekeeper colonies (17 fewer than last year).

2024-2025 Overwinter Losses by Hive Type

The Washington survey overwintering loss statistic was developed by subtracting the number of spring surviving colonies from fall colony numbers supplied by respondents by hive type. Results, shown in Figure 2 bar graph, illustrate overwintering **losses of 130 total WA beekeeper respondents.** Langstroth 8-frame beehives had lower average losses (28%) compared to Langstroth 10-frames hives (36%). Ten nucs of 30 in the fall failed to survive. Top Bar hive survival rate (35%, 11 of 17 in the fall) was similar to the Langstroth hives. There was single Warré hive and it survived. Of the 26 colonies

listed under “other” hive type, 8 were IDed as AZ (only 3[d] survived), 5 as Apimaye (2 survived), the single long hive survived, one of two Slovanian hives survived, the single feral hive survived and of 9 “other’ not identified, 8 survived.

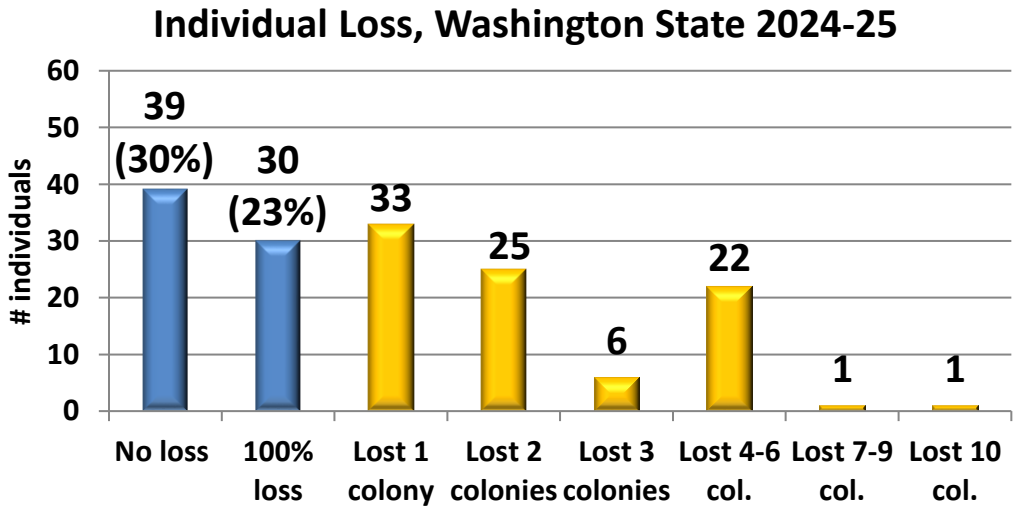
Figure 2



	Lang 8	Lang 10	Nuc	Top Bar	Warre	Other
Fall	155	447	30	17	1	26
Spring	112	286	20	11	1	16

Thirty-nine individuals had no loss (124 colonies) while 30 beekeepers lost 100% (87 colonies). The greatest loss was one colony. The heaviest loss was 10 colonies. See Figure 3 graph.

Figure 3



The WA respondents to the electronic survey managed up to 40 fall colonies. Seventeen individuals had a single colony (and had colony loss of 47%), 29 respondents had two colonies (the greatest number) with 45% loss and thirteen individuals had three colonies (44% loss). Typical of previous surveys, fifty-nine individuals (45% of respondents) had 1, 2 or 3 fall colonies (loss level of 45%). Forty-two individuals had 4 to 6 fall colonies and had loss level of 48%. Four was the median number. Thirteen individuals had 7 to 9 colonies; they had a loss level of 21%. Ten individuals had 10-19 colonies with a loss level of 32%, 7 individuals had 20-40 colonies had a loss level of 18%. The 15 individuals with 10+ colonies lost 23%.

Forty-nine respondents (37.5% of total) had 1, 2 or 3 years of experience; they had a 37% loss level. The 8 individuals with one year of experience had the heaviest loss of 47%. Thirty individuals (23% of total respondents) had 4 – 6 years' experience (medium number = 5 years' experience) with a 32% loss, 21 individuals had 7-9 years' experience (loss level 31%), 21 had 10-18 years keeping bees and 358% loss level and nine had 20+ years' experience (4 individuals had 50 years' experience, the maximum beekeeper experience years (these 4 had a 20% loss) and they had a 21.5% loss level. Examining the relationship of colony numbers and years' experience related to loss shows that loss of colonies decreases by about 1/3rd with the greater number of colonies and/or years of experience.

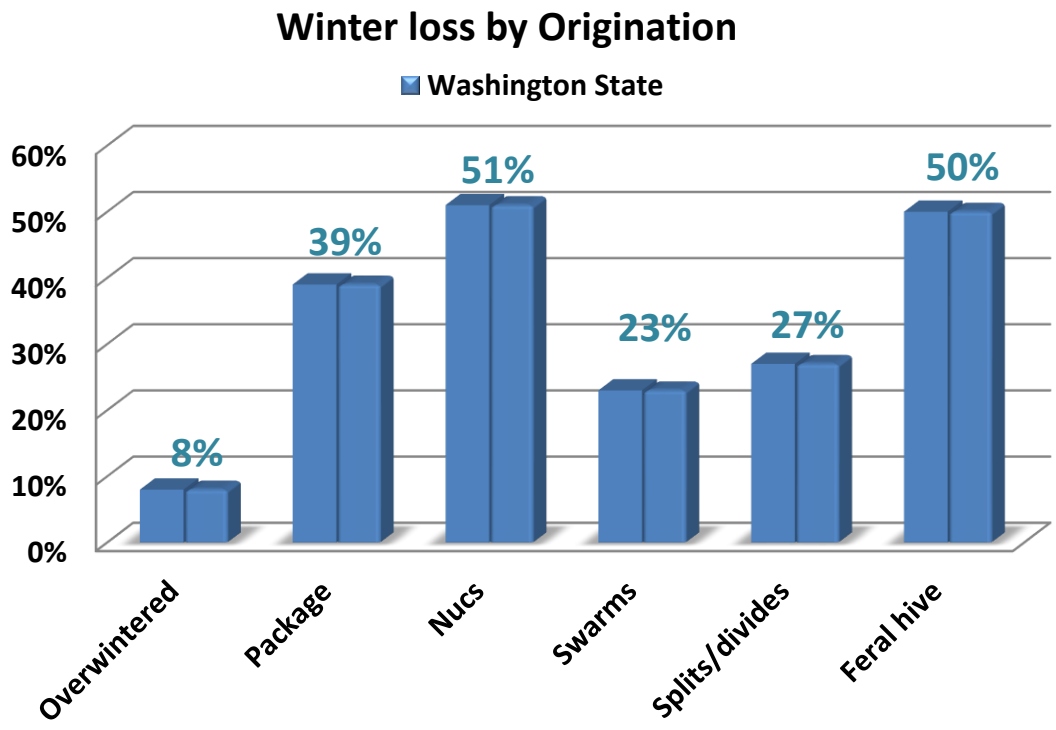
Summary Statewide WA

1-3 colonies	45% loss	10+ colonies	23% loss
1-3 years' experience	37% loss	10+ years' experience	31.5% loss

One hundred six (81%) WA beekeepers had an experienced beekeeping mentor available as they were learning beekeeping. This percentage was six percentage points higher than last year, slightly higher than the 6-year average.

Survival Based on Hive Origination

We also asked about hive loss by origination. This year individuals could FAST TRACK the survey and bypass this question. Less than half of respondents, 62 individuals, did answer. Data shown in Figure 4 below. The best survival was previously overwintered, only 8% loss rate. Nuc-originated overwintered fared worse.



Fall	**156**	**26**	**37**	**40**	**84**	**2**
Spring	**114**	**16**	**18**	**31**	**65**	**1**

Figure 4

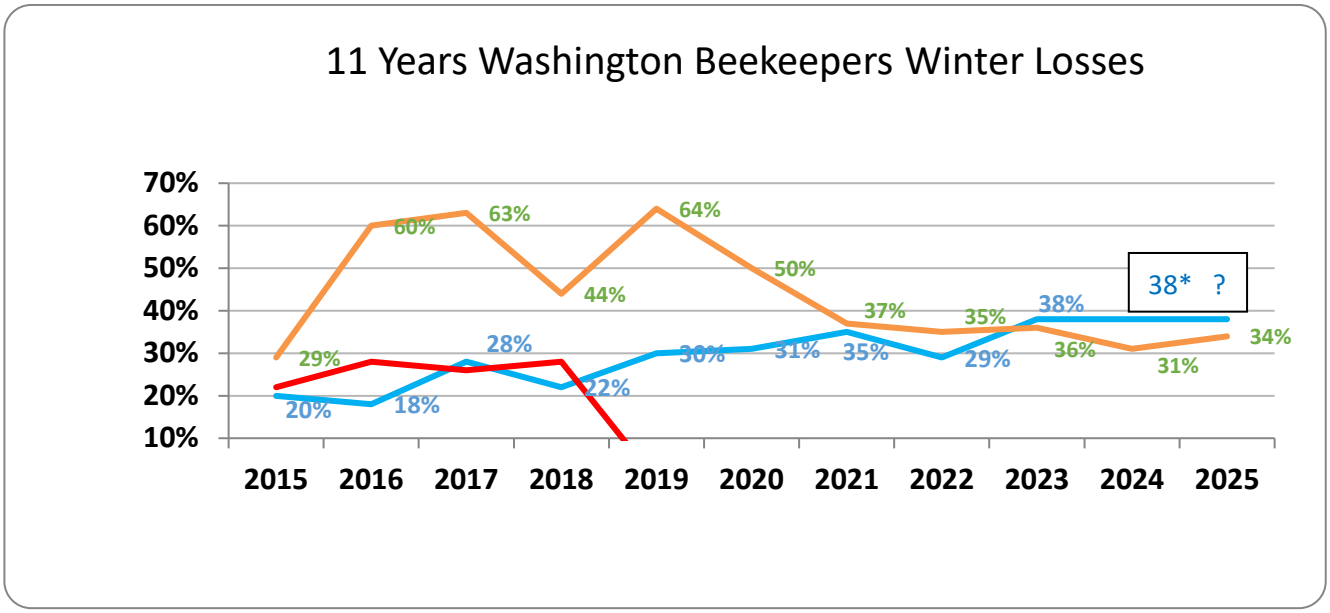
Comparison to Larger-Scale Beekeeper Losses

A different (paper) survey instrument was mailed to Pacific Northwest (PNW) semi-commercial (50-500 colonies) and commercial beekeepers (500+) from OSU asking about their overwintering losses. Response rate was reasonable until 2018 then the response became limited to only three individuals, and this was not considered representative of the larger scale beekeepers of Washington. Numbers are shown in red only for the 4 years 2015-2018 in Figure 5 below.

The BeeInformed.org (BIP) losses for Washington beekeepers for 2015 to 2023, the last year of the BIP survey, are representative of the larger scale beekeepers and are shown in **blue** in Figure 7 (ignore the 0 in 2024). Losses of backyard beekeepers from this survey are shown in orange line with black loss numbers. The response number was 130 for 2025. Average BIP loss (9 years) =27.9% and average WA backyarder loss (10 years) = 44.7%. In 2023 the larger-scale beekeeper loss exceeded losses of backyarders. The numbers included in the survey are shown below the figure.

In 2024 a new National survey was started by the group Apiary Inspectors of America, Auburn University and Oregon State University. Overwintering losses in this initial survey was 37.7. This is represented by an X in the chart. This survey was continued in 2024-25 season.

Figure 5



YEAR	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
#Comm hives	~40,000	33,200	16,604	29,015							
#backyarders	31	52	101	104	98	133	163	80	120	121	130
BIP (# hives)	113,237	32,184	83,000	52,500	48.600	48,000	33,300	72,700	50,145		

The reasons backyarders have had higher losses are several. Commercial and semi-commercial beekeepers examine colonies more frequently and they examine them first thing in the spring as they move virtually all their colonies to pollinate almonds in February. They also are more likely to take losses in the fall and are more pro-active in varroa mite control management.

The PNW survey was conducted in part to "ground truth" the annual BeeInformed Survey (BIP) also conducted during April. The BIP survey includes a mailed survey to larger-scale beekeepers and an electronic survey to which any Washington beekeeper can submit their data. Losses reported include colonies of migratory beekeepers who reported WA as one of their yearly locations. The BIP survey for the 2015-23 annual surveys reports receiving responses from 90 to 95% of respondents exclusive to Washington but they managed less than 5% of total colony count – thus, we can conclude the BIP tally is primarily of commercial beekeepers. They have large numbers of colonies in survey data, so the BIP losses reflect commercial losses not losses of backyarders. See https://research.beeinformed.org/loss-map/

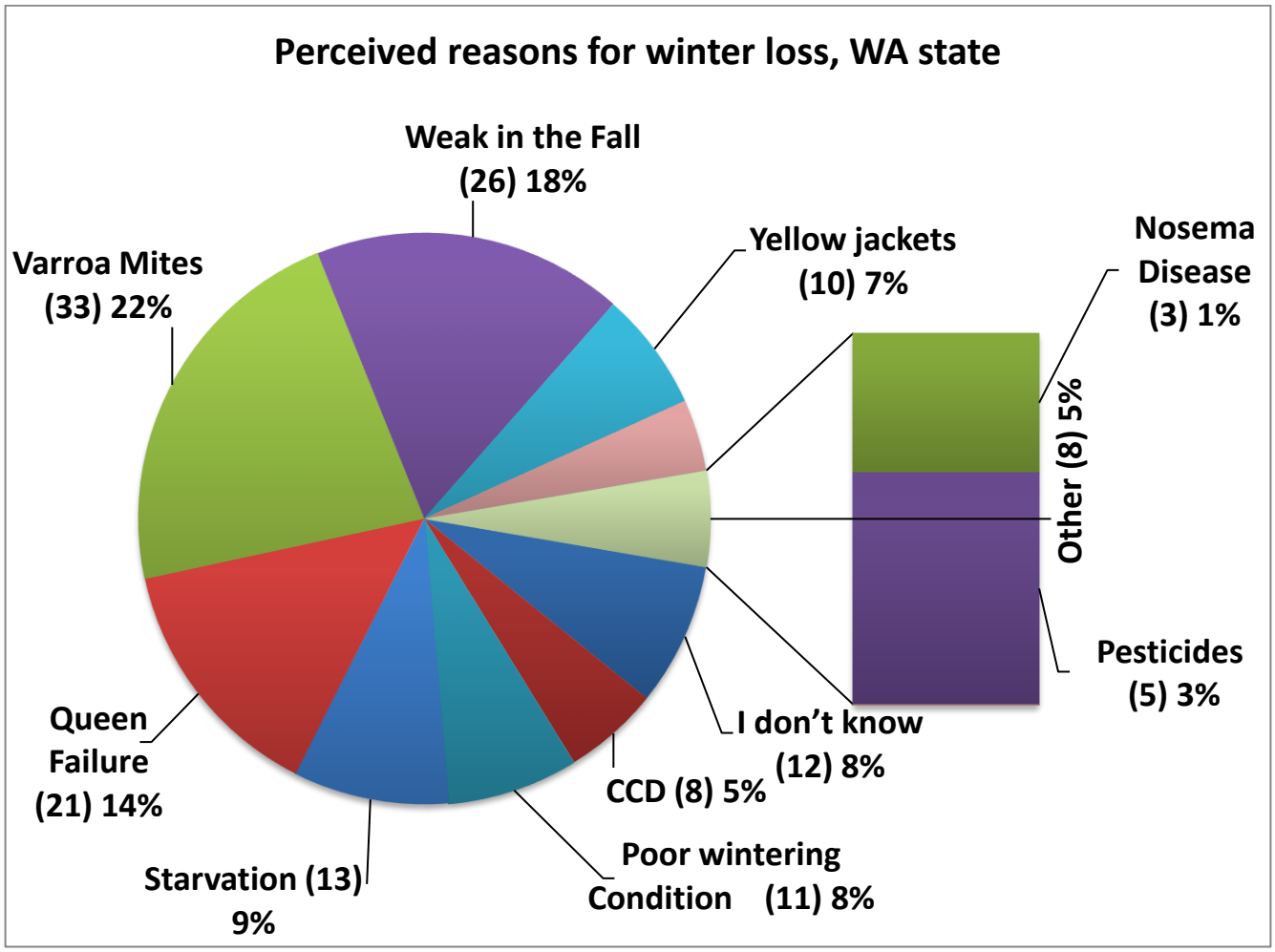
Apiary sites and moves

Fifteen survey respondents had bees at more than a single apiary. Loss levels were similar or better at 9 of the original sites and better at 4 of the 2nd sites. Four had bees at a third site and losses were higher at one of the 3rd sites. Seven individuals moved bees. One moved for pollination, one moved for better site, one moved due to yellow jacket predation and the other four moved for reasons due to loss of site.

Colony death perceived reason and acceptable loss level

We asked survey takers who had winter losses for the "reason" for their losses. More than one selection could be chosen. In all there were 115 WA selections (1.85/individual) provided. Varroa mites (33 individuals, 22% of total selections) was the most common choice. Queen failure was 14%. Weak in the fall, starvation and poor wintering were also common choices, followed by yellow jackets and don't know. The eight "other" listings were absconding, moisture, virus, EFB, late split and beekeeping error. Figure 6 below shows the number and percent of factor selections.

Figure 6



Acceptable loss: Survey respondents were asked the reason for loss. Nineteen (15%) indicated zero (no loss). Thirty-four percent of individuals indicated 10% or less. Twenty percent was medium choice. Nineteen percent said 50%+ was an acceptable loss level. See the table below.

Acceptable Overwinter Loss, WA											
Loss level	**5%**	**10%**	**15 %**	**20%**	**25%**	**33%**	**50 %**	**75 %**	**100 %**	**None**	**IDK**
#	5	19	4	16	27	11	21	3	0	19	1
%	4%	15%	3%	13%	22%	9%	17 %	2%	0	15%	<1 %

Why do colonies die?

There is no straightforward way to verify reason(s) for colony loss. Colonies in the same apiary may die for several 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. A dead colony necropsy can be of use. Opinions vary 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. Individual choices varied from zero to 100%, with a medium of 20%.

Major factors in colony loss are thought to be mites and their enhancement of viruses especially DWV (deformed wing virus), VDV (Varroa destructor Virus (also termed DWV B) and Israeli and chronic paralysis virus. But we do not have a test for these viruses. It was interesting that queen problems were the most frequently indicated as were weak in the fall as leading reasons for loss.

Declining nutritional adequacy/forage and diseases, especially at certain apiary sites, are additional factors resulting in poor bee health. 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 them, 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 our honey bees face in the environment. It was encouraging to see from survey responses that losses this past year, 34% were still at a low level. More attention to colony strength and the possibility of mitigating winter

starvation will help reduce some of the losses. Effectively controlling varroa mites will help reduce losses.

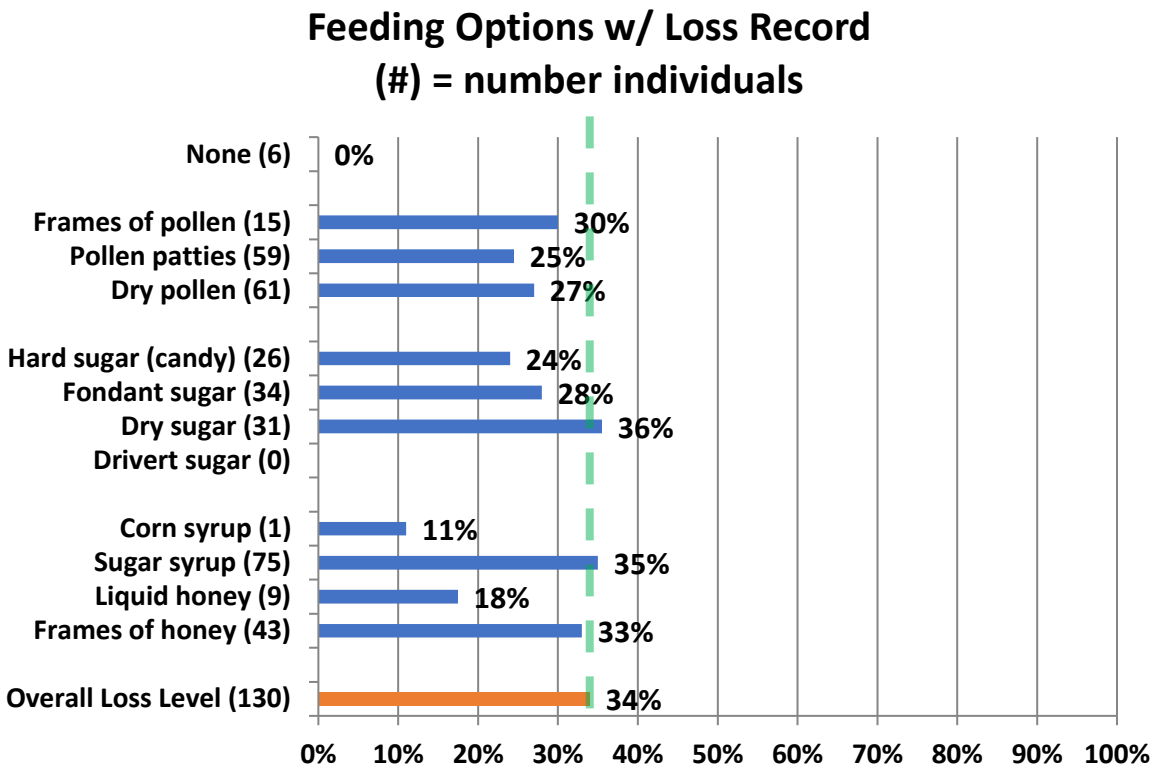
Colony Managements

Most Washington beekeepers do not perform just one management to their colony (ies) toward improving colony health and overwintering success. This analysis compares a single factor equated with loss level. Such an analysis is correlative and doing a similar management as fellow beekeepers does not necessarily mean you too will improve success. Individuals could FAST TRACK in their survey responses this year. For these first managements 91 individuals (70%) supplied management information.

FEEDING: Washington survey respondents checked 310 feeding options = 3.4/individual (last year it was 3.1/individual). Two individuals made no selections – they had 6 colonies and all survived. Seven respondents indicated a single choice but lost 25 of 36 colonies for 72% loss. The most favorable outcomes were 3, 4 or 5 feeding managements. The table illustrates the relationship of number of selections to percent making selection (median was 3) and percent loss of those individuals.

# selections	# indiv (%)	% loss
1	7 (8%)	72%
2	17 (19%)	43.5%
3	22 (25%)	23%
4	23 (26%)	29.5%
5	12(14%)	26.5%
6&7	6 (7%)	26%

Figure 7



The choices, with number of individuals making that selection, is in ( ), bar length indicates loss level of individuals doing this management (Figure 7). Those bar lengths to left of 34% (**green dashed line**) had better survival while those to right had greater loss level.

Feeding sugar syrup (75 individuals) and pollen patties (59 individuals) were the most common feeding option of respondents. Syrup feeders had a loss rate similar to overall loss rate (35% while the pollen patty feeders with 27% loss rate had a 6-percentage point better survival. They had a 24% loss rate, 9 percentage points better than the overall average. The Dry sugar feeders (75 individuals) also had an advantage over overall loss rate with a 28% loss rate, due to hard sugar candy feeders (24% loss rate, 26 individuals) and the 34 fondant feeders with a 28% loss rate. The 3 who checked "other" practices, feeding hive alive, showed good survival, 7 of 41 colonies did not survive =17% loss and the one using microbials had a 25% loss.

For the last 6 years of survey losses statewide, individuals doing no feeding had poorer survival in 6 of the 7 years, but numbers of individuals/colonies involved were generally low - this year two individuals with 6 colonies had total survival. Individuals that fed sugar syrup had marginally lower loss level in four of seven years (but not this year). The 9 liquid honey feeders had the best survival with only a 17.5% loss rate.

Individuals feeding non–liquid sugar in the form of hard candy likewise had lower losses in 5 of 7 years; this year 10 percentage points better survival. One individual who fed corn syrup had only an 11% loss). For individuals feeding protein, protein patty users showed slightly better survival in 4 of 7 years (this year 9 percentage points poorer survival); dry pollen feeders had better survival in five of the past six years; this year also.

WINTERING PRACTICES: We received 262 responses (2.9/individual compared with 2.7/individual last year) reporting WA beekeeper wintering management practices (more than one option could be chosen). Two individuals indicated doing none of the several listed wintering practices; they lost 1 of 3 colonies for 33% loss. The 6 and 7 selections by 6 individuals also had a 33% loss rate. Information on selections and loss rate in table.

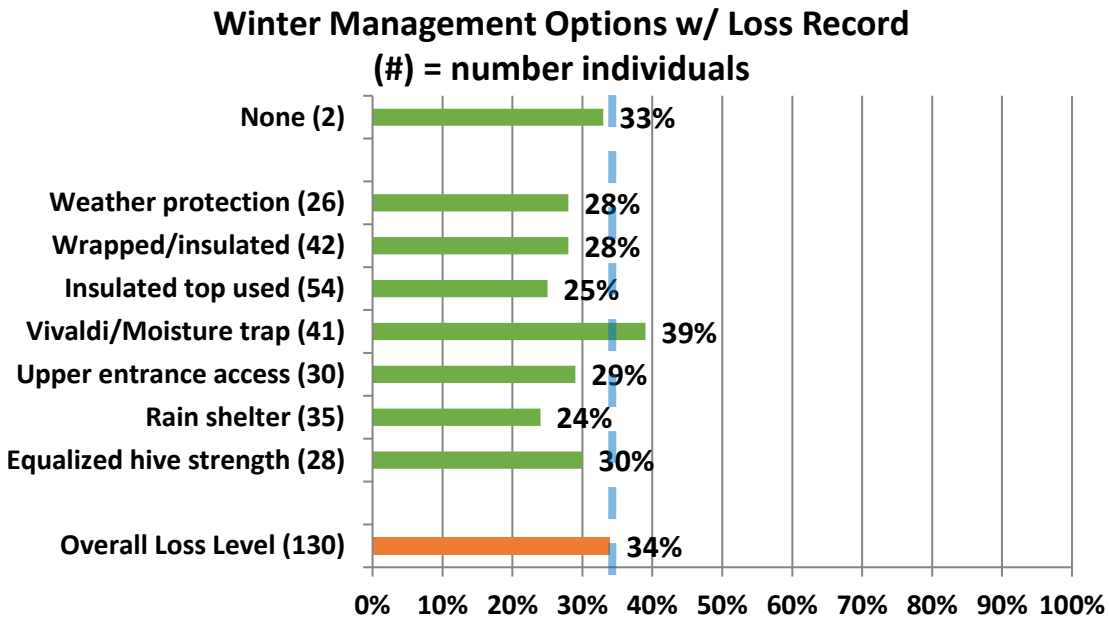
For those indicating some management, 17 did one single thing and had 47% loss level. The best survival was those with three, four and five selections. Information presented in table to right.

# selections	# indiv (%)	% loss
1	17 (19%)	47%
2	19 (21%)	38%
3	23 (26%)	24%
4	20 (22.5%)	27.5%
5	4 (4.5%)	11%
6	6 (7%)	33%

The managements selected that improved survival were rain shelter (35 individuals, 24% loss) and Insulated top (25 individuals, 25% loss). Figure 8 shows the number of individual choices and percentage of each selection. Bar length below 34% (**blue dashed line**) had better than average winter survival.

Over the past 6 years a couple of winterizing managements have shown improved survival. Those doing no winterizing had higher losses 6 of 7 years; this year 2 individual had a 33% loss but it was based on only 3 colonies. Equalizing hive strength in the fall demonstrated lower loss levels in all seven recent winter period (as in this one) and top insulation has demonstrated lower loss in five of seven winters – this winter a 9-percentage point advantage. Ventilation above the colony (Vivaldi Board/quilt box) demonstrated improved survival four of the seven winters, this year loss level was higher by 5 percentage points compared to overall loss. The 30% of individuals who did the FAST TRACK and did not indicate any managements had a 46% overwinter loss rate.

Figure 8



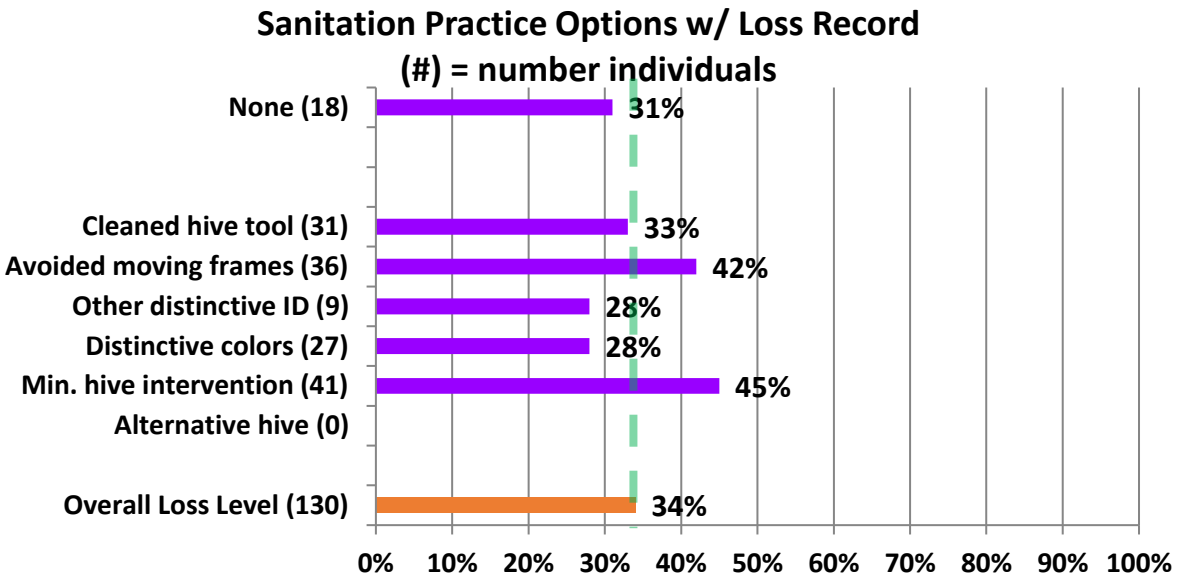
SANITATION PRACTICES: It is critical that we practice some basic bee sanitation (some prefer use of term bee biosecurity) in our bee care to help ensure healthy bees. We received 164 responses for this survey question 2.3/individual (last year it was 1.8/individual). Twenty-one individuals (29%) said they did not practice any of the six offered alternatives; they had a loss rate of 26%, 8 percentage points higher than the statewide average.

# selections	# indiv (%)	% loss
1	21 (29%)	26%
2	25 (34.5%)	28.5%
3	15 (21%)	42.5%
4	9 (12.5%)	5%
5&7	2 (3%)	39%

It is clear that none of the measures are robust enough to make a difference by itself in reducing winter loss. Figure 9 shows the number of individual choices and percentage of each selection. Bar length below 34% (**green dashed line**) had better than average winter survival.

In all six years doing none of these managements resulted in anything approaching better than average survival; this was the case this past winter when the 18 individuals doing nothing had average statewide losses. The managements of reducing colony drift, providing hives with distinctive color/distinctive hive ID measures are helpful managements but they do not measurably improve overwintering success.

Figure 9



SCREEN BOTTOM BOARDS (SBB)

Although many beekeepers use SBB to control varroa mites, BIP and PNW surveys clearly point out they are not or at best not a very effective varroa mite control tool. In this recent survey 17 Washington individuals (16%) said they did not use screen bottom boards; they lost 26.5% of their colonies. Those 21 beekeepers using SBB on some of their colonies lost 36% and the 53 individuals (%) using SBB on all of their colonies had 29.5% loss.

In eight survey years 19% of Washington beekeepers said they did not use SBB and 81% did use SBB on some or all of their colonies, see Figure 10.

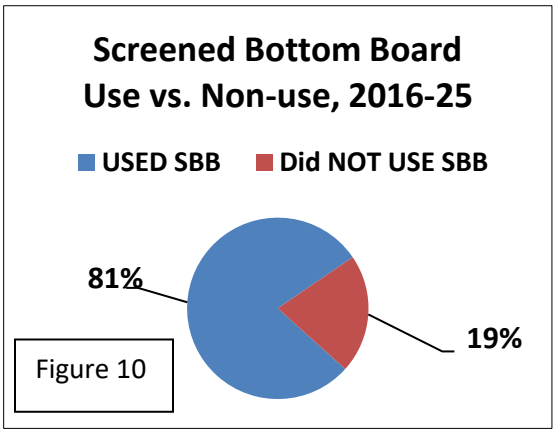


Figure 10

Examining the seven-year average of SBB use, those using SBB on all or some of their colonies had a 40% loss level whereas for those not using SBB the loss rate was 40.9%, <1% positive

survival gain for those using SBB versus those not using them). SBB are a very minor aid in improving overwinter survival for Washington beekeepers.

We asked if the SBB was left open (always response) or blocked during winter season. Fifty-four individuals (63.5%) said they always blocked SBB during winter. They had a 34% loss rate. Twenty individuals (13%) said they never blocked SBB and had a loss rate of 32%. Eleven individuals (8%) blocked them on some of their colonies. Their loss rate was 32%. So, the 65 individuals that blocked or sometimes blocked screen boards had 33% loss vs those who didn't block had 30.5% loss. Over the past six years those closing have nearly an 8-percentage point advantage when the SBB is closed during the winter (although it was the opposite this season). 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. 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.

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 option, nor do they necessarily do the same thing to all the colonies in their care. We do know moisture kills bees, so we recommend hives be located in the sun out of the wind. If exposed, providing some extra wind/weather protection might improve survival. Early spring pollen is important so locations where bees have access to anything that may be flowering on sunny winter days is also good management.

Feeding, a common management, appears to be of some help in reducing losses. Feeding hard sugar candy or fondant during the winter meant lower loss levels. Providing honey or sugar syrup, the most common selection, did not mean lower winter losses (liquid honey seemed better option) but these basic managements are useful in other ways such as for spring development and/or development of new/weaker colonies besides insuring better winter survival.

Feeding protein in any form does seem to slightly improve survival. The supplemental feeding of protein (pollen patties) might be of assistance earlier in the spring season has been demonstrated to help bees build strong colonies, but this may lead to greater swarming.

Winterizing measures that apparently helped lower losses for some beekeepers were top insulation and a rain shelter Spreading colonies out in the apiary and painting distinctive colors or doing other measures to reduce drifting also are of some value in reducing winter losses.

It is clear that doing nothing for feeding or winterizing resulted in the heaviest overwinter losses in the past but with few individuals and small colony numbers this was not indicted this year.

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

Mite monitoring/sampling and control management

We asked the percentage of Washington hives monitored for mites during the 2023 year and/or overwinter 2023-24, whether sampling was pre- or post-treatment or both and, of the five possible mite sampling methods, what method was used and when it was employed. Seventy-one percent of Washington respondents provided a response and did not FAST TRACK for this section. Sixty individual respondents (65% - a decrease of 3 percentage points from last year) said they monitored all their hives. Losses of those individuals monitoring was 30.5%. Fourteen (15%) reported no monitoring; they had a higher loss rate of 23%. Eighteen individuals monitored some with a loss rate of 34%.

In order of popularity of use, 43 individuals used sticky boards, 63% total of 78 individuals who did some or all monitoring of colonies, same percentage as last year. Looking on adults was indicated by 38 individuals (49%) who did some or all colony monitoring followed by 36 individuals (46% of individuals doing monitoring, an increase of five percentage points from last year) that used alcohol wash. Twenty-eight individuals used drone brood monitoring and 10 used powder sugar to monitor. The sticky board users had 29% loss, alcohol washers had 26% and the 10 powder sugar users had 30% loss. Heavier losses were experienced by those looking on drones (35%) and on adults (45%).

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.

The most common sampling of respondents in 2024-25 was sampling both pre and post (27 individuals 40% of responses); they had 35% loss, just a single percentage point higher than overall lost rate for Washington beekeepers. Those 15 sampling pre had a more favorable loss rate (26%) while those 8 only sampling post treatment had a 43% loss. The 17 individuals who treated without sampling nor treating had 47.5% loss. The one individual that sampled but did not treat lost both their colonies.

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 efficacy of a treatment when inserted post treatment. Visual sampling is not accurate: most mites are not on the adult bees, they are 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 not to 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 the use of chemicals for mite control. A total of 97 answered this question with the remainder electing to FAST TRACK – those responding had 31.5% loss while those not providing management information had a 50% loss. Ten individuals (14%), eight fewer individuals than last year, said they did not employ a non-chemical mite control and a single individual (1%) did not use a chemical control. Those 10 individuals who did not use a non-chemical treatment reported a 36% winter loss, while those two who did not use a chemical control lost one of 4 colonies. The 33 individuals not providing information had a 45% loss level. The individual options chosen for non-chemical and chemical control are discussed below.

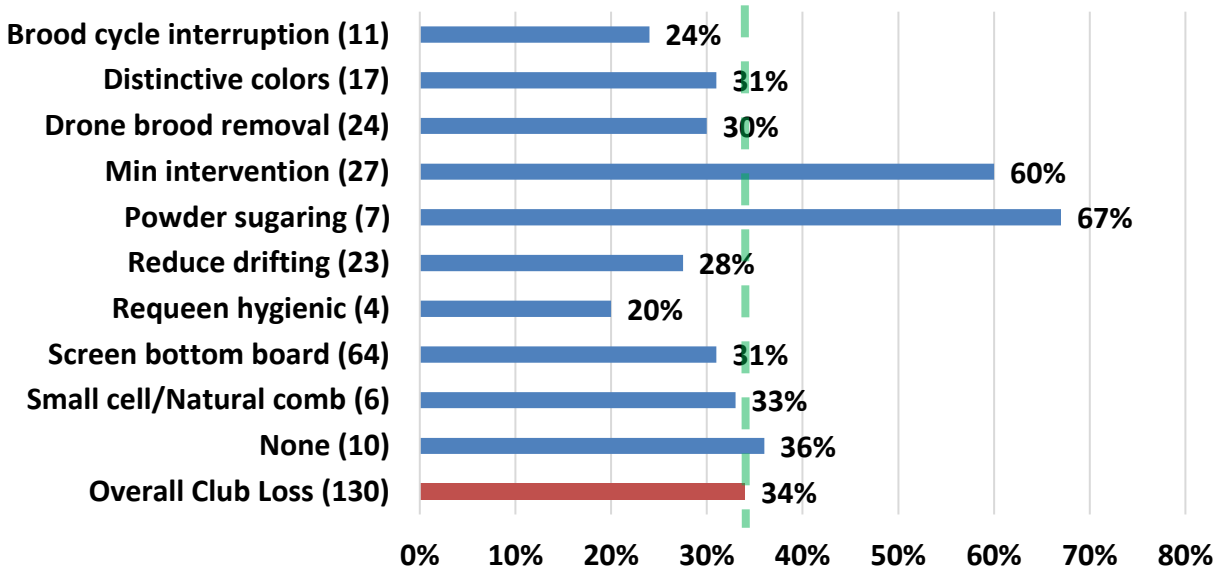
Non-Chemical Mite Control: Of nine non-chemical alternatives offered on the survey (+ other category), 185 selections were indicated 1.9/person (last year 2.2/individual). Twenty-eight individuals used one method and had a 36% loss, thirty-two used two (32% loss level), nineteen used three (30% loss) and 9 used four (34.5% loss).

Use of screened bottom board was listed by 64 individuals (79% of individuals selecting other than none). They had a 33% loss level. The best survival choices were requeening with hygienic stock by 4 individuals (20% loss) and brood cycle interruption (11 individuals had a 24% loss). The use of the remaining seven selections are shown in Figure 11; number of individuals in ( ), bar length represents average loss level of those individuals using each method. Those to left of **the green dashed line** had better than average survival.

Two of the non-chemical alternatives – drone brood removal (24 individuals, 30% loss) and brood cycle interruptions (11 individuals, 24% loss) have also been the most useful in previous year surveys in reducing winter losses in some of past 7 years but not all. Painting hives with distinctive colors has resulted in better survival in each of the past four of the past five survey years, as it did this year (31%). Minimum intervention (60% loss) and powder sugaring (67 percent loss by 7 individuals with 18 hives) showed the worst survival.

Figure 11

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



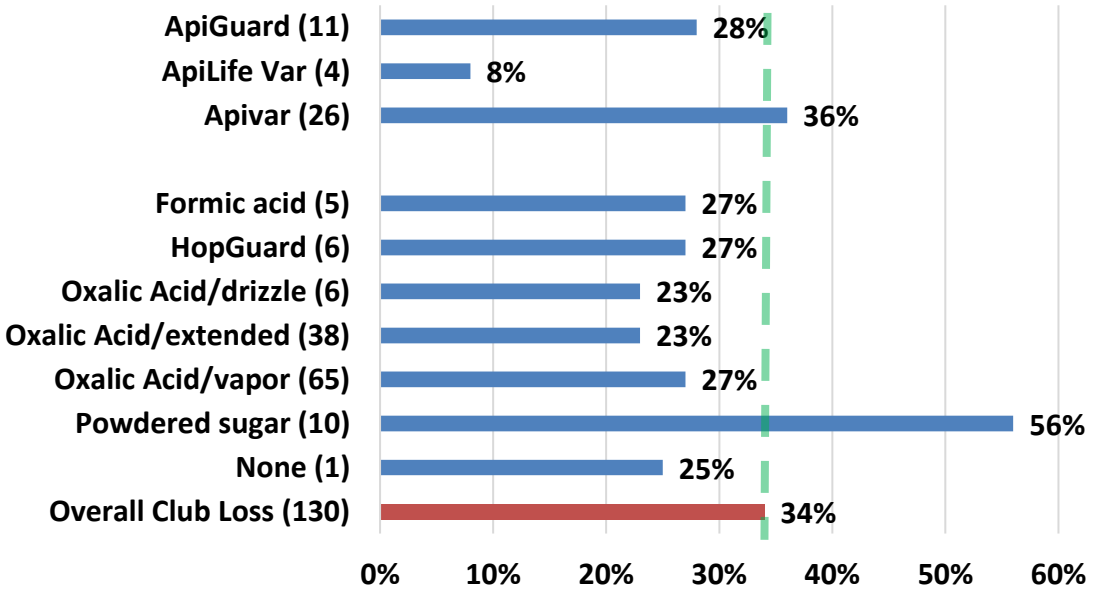
Chemical Control: For mite chemical control, one individual (1% of total respondents) used NO chemical treatment; this individual had a 25% loss level (the last three years those doing no treatments lost 100%, 61% and 67% but colony number lost (average 8) was not extensive). Those using chemicals used at rate of 1.6 /individual (last year 2.1/individual). Fifty-four individuals (58%) used one chemical and had 37% loss, 31 used two and had 24% loss, 4 used 3 (10% loss), 2 used 5 22% loss and one individual used 10 (lost 2 colonies of 9 and had a 22% loss level). Figure 12 illustrates the number of uses ( ) and bar length indicates the loss rate for those using that chemical.

Apivar: One-time users (14 individuals) had a loss rate of 41.5%, while 7 individuals using it twice the loss rate dropped to 38.5%. Five individuals used it more than twice. For example, the 2 individuals who used it 3 times didn't lose any of their 5 colonies, but the 2 individuals who used it 4 times lost 5 of 8 colonies (=62.5% loss) and the one individual who used it 5 times experienced a 13% loss. The 26 users of Apivar had a 36% loss.

Apiguard: The 13 individuals that used it once had 34% loss, the 4 individuals who used it twice had a 10-percentage point improvement – only a 24% loss. Two individuals used it twice and lost 2 of 4 colonies (50% loss), the two who used it4 times had even poorer survival they lost 9 of 10 colonies (90% loss). Two individuals said they used it 6+ times and lost 3 of 35 colonies – an 8.5% loss rate. The overall loss rate for users of Apiguard illustrated that it is helpful for survival – overall 28% loss rate., a 6-percentage point improvement to overall loss of Washington beekeepers of 34%.

Figure 12

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



ApiLifeVar: Although there were only 4 individuals who used the essential oil material ApiLifeVar (one individual used it 3 times and the other 3 used it once – I am not sure that the individual indicating use 3 times was not actual use of 3 strips one week apart?) their survival rate was outstanding. The 4 had a loss of only 2 of 26 colonies - an 8% loss rate. Other herbals used had loss of 5 colonies for a 17% loss.

Hopguard: Six individuals used Hopguard, an acid. On used it once, 2 used it twice and 1 used it 4 and another 5 times. Overall loss rate 27%.

One individual used 10 different materials. This individual had 9 fall colonies and lost 2 for loss rate of 22%. Materials used included Fluvalinate, Coumaphos, Mita-a-thol and with another individual Mineral oil. Also used was powdered sugar, with 8 additional users – they had 44% loss level.

Oxalic acid. Oxalic acid is being extensively used, and it is proving to be effective in reducing overwintering loss. It can be mixed into sugar syrup and applied as a dribble between frames (often during winter). For convenience it is simply termed OAD. It can be absorbed into a pad and used between brood boxes, even when supes are in place (OAE) and finally it may be cooked with a vaporizer and used as gas - OAV. And it may be used many times. All three variations were used 6+ times by individuals for a total of 35 times.

OAD: Six individuals used OAD. One used it 6+ times not loss of 4 colonies, another used it 3 times and didn't lose 2 colonies, 2 used it twice for 33% loss and 2 used it once and had a 28.5% loss. Overall loss rate= 23% for OAD.

OAE: Use of Oxalic acid in an extended manner has increased dramatically. Absorbent pads may last 4-8 weeks and then be replaced. Seven users of OAE indicated use 6+ times and lost only 7 of 60 so treated colonies for loss rate of 11.5%. One individual used it 5 times and had a 40% loss, 2 individuals used it 4 times and had a 43% loss. The 6 individuals using it 3 times fared better – they had a 26% loss, the 11 individuals using it twice did just as well with 27% loss rate and finally, individuals using it just once (11 individuals had a loss of 25.5%. The overall loss rate for OAE was 23%.

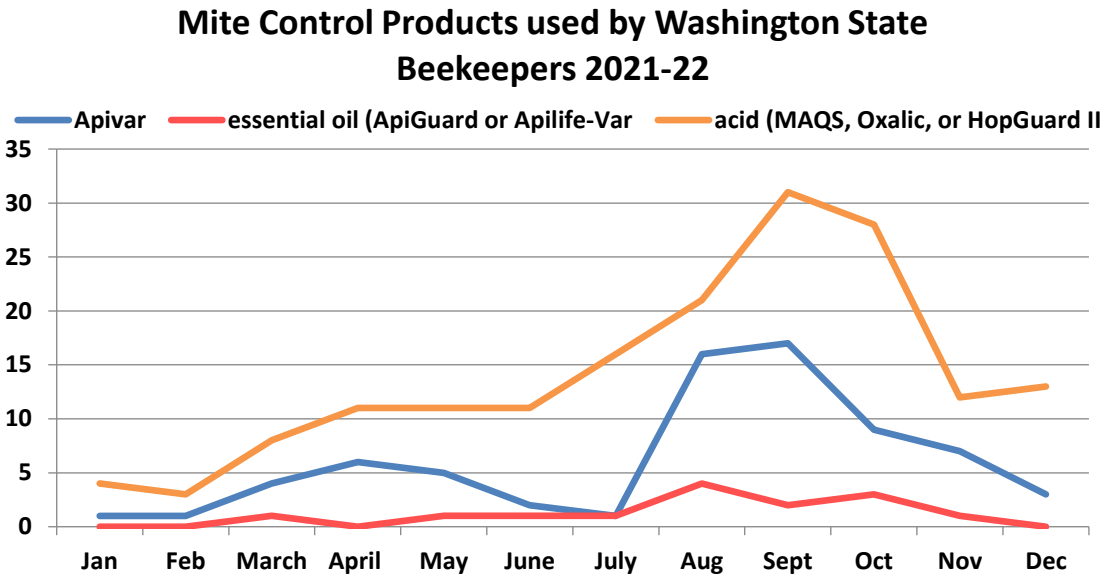
OAV: This chemical mite treatment was by far the most popular. Although it had the poorest survival rate for methods of oxalic acid use, a 27% loss rate, this was still 6 percentage points better survival than overall. Sixty-five individuals said they used OAV. The number of individuals, their fall colony number and loss is shown is table below.

1X	9 indiv	32 fall col	28% loss
2X	9	75	27%
3X	8	24	50%
4X	9	73	30%
5X	3	23	17%
6+	27	224	23%
Total	65	451	27%

Consistently, the last seven years five different chemicals have helped beekeepers realize better survival. The essential oils Apiguard and ApiLifeVar have consistently demonstrated the lowest loss level; this year 28% and 8% loss. Apivar, the synthetic (amitraz), has demonstrated better survival over the past 7 years but this year the 36% loss rate was 2 percentage points over the overall state loss rate.

Oxalic acid vaporization over the past 5 years has a 15.3% better survival (the survey did not differentiate Oxalic vaporization from drizzle prior before); this year a 6-percentage point better survival difference. Formic acid also normally provides better survival - this year a 6-percentage point better survival although use has declined.

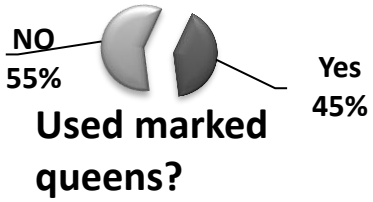
The monthly use of Apivar (blue line), essential oil (red line) or an acid (green line) is shown in Figure 13 for winter of 2021-22. Further review is needed to determine if the timing of treatments was more effective than at other times for the various chemicals.



Antibiotic use

Four individuals, all with larger colony numbers (81 fall colonies), reported using Terramycin; the loss level was 23.5%. One individual indicated use of Tylosin - they had an 18.5% loss. Five individuals indicated the use of Fumagillin (Fumidil-B) for Nosema control; their loss rate was 34% (70 fall colonies). The single Nosevet user lost all 4 of managed colonies.

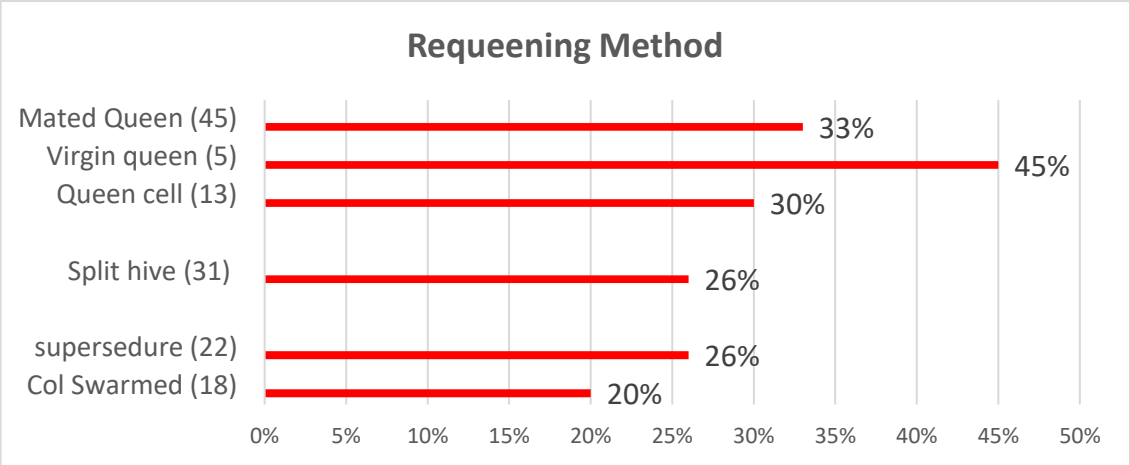
Queens



We hear lots of issues related to queen "problems." Twenty-one individuals indicated queen problems as reason for loss in earlier part of survey (Figure 6). 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. Fifty individuals (57.5%) said yes. The related question then was 'were your hives requeened in any form?' to which 54% (60 individuals) said yes; equal numbers said no (23%) or 'not that that I am aware of.' Loss level of yes was 33%, of the no 32% and 'not aware of' was 30%.

One technique to reduce mite buildup in a colony is to requeen/break the brood cycle. The question "How did bees/you requeen" received 120 responses, 2/individual (more than one option could be checked). Thirty-three individuals indicated they requeened with a mated queen and they had a 33% loss level, five used a virgin queen (45% loss) and 13 used a queen cell (30% loss). Thirty-one said they split their hive(s) 26% loss, 18 indicated their colonies swarmed 20% loss and 22 said supersedure occurred – they had a 26% loss. Loss levels of colonies that did it themselves via supersedure and swarming (40 instances) were more favorable (23%) compared to those whose

queen replacement was managed by the beekeeper via queen or queen cell (51 instances, 33% loss). Splitting colonies (31 instances) had a 26% loss rate.



Closing comments

This survey was originally designed to 'ground truth' the larger, national Bee Informed loss survey. The numbers while slightly different do in fact track well. Unfortunately, my commercial survey response decreased and in 2023 the national BIP survey was discontinued. The BeeInformed survey measures the larger scale WA beekeepers not the backyarders as loss rates are of total colony number. I have discontinued recording WA commercial/ sideliner numbers as I receive too few responses to be representative of them. Reports for individual bee groups are customized and only available from the PNW website; they are posted for previous years.

I 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. I have a blog on the pnwhoneybeesurvey.com and will respond to any questions or concerns you might have. Email me directly for quicker response. dmcaron@udel.edu

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 May 2025