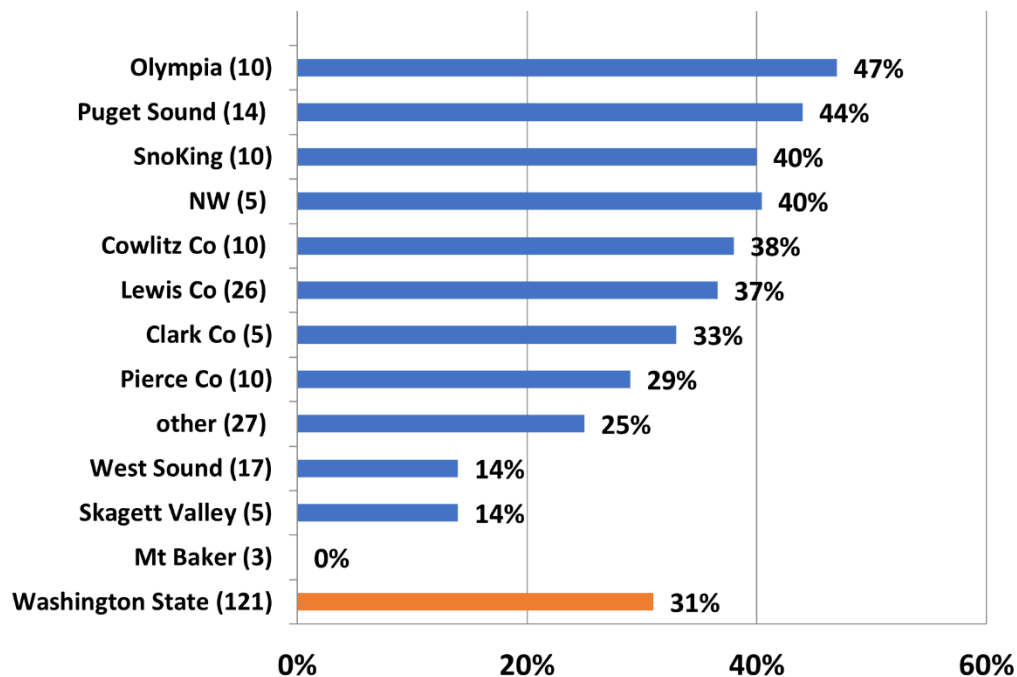


# Winter Bee Losses of Washington Backyard Beekeepers for 2023-2024

by Dewey M. Caron

Overwintering losses of small-scale Washington backyard beekeepers=31%, a decrease of five percentage points from last year, 14 percentage points below the 9-year loss average. One hundred twenty-one Washington respondents completed a survey, one more than last year and two above the 119 average respondent rate of last five years. Information on winter losses and several managements related to bee health was included on the electronic honey bee survey instrument [www.pnwhoneybeesurvey.com](http://www.pnwhoneybeesurvey.com).

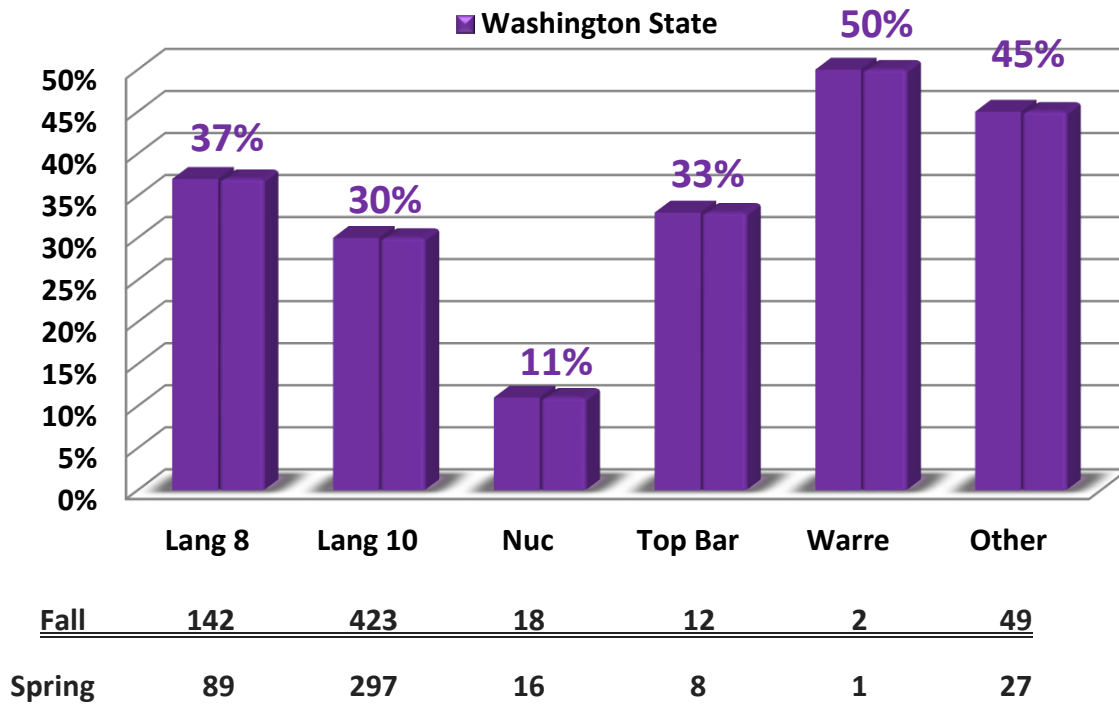


Response by local Washington (WA) association members varied as indicated by numbers adjacent to club name. Losses of those club individuals are shown in blue bars in Figure 1. Statewide loss level was 31%. Survey included 693 fall Washington beekeeper colonies (4 more than last year). This report for Clark Co references statewide response with Clark Co added as narrative.

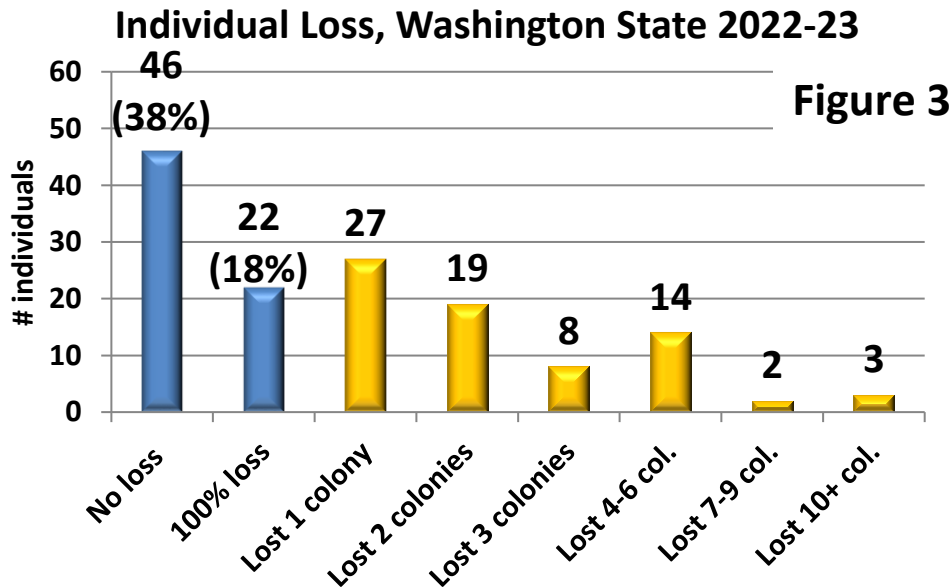
## 2023-2024 Overwinter Losses by Hive Type

The Washington survey overwintering loss statistic was developed by subtracting number of spring surviving colonies from fall colony number supplied by respondents by hive type. Results, shown in Figure 2 bar graph, illustrate overwintering losses of 121 total WA beekeeper respondents =31%. Langstroth 8 frame beehives had higher average losses (37%) than Langstroth 10 frames hives. Only two nucs of 18 in the fall failed to survive. Top Bar hive survival rate was similar to the Langstroth hives. One of two Warré hives survived. Of the 18 individuals listing another hive type, 9 were IDed as AZ (only 1/3<sup>rd</sup> survived), 4 as Layens (all survived) and 13 as long hives (9 survived =31% Loss). The remaining 21 were not identified. (NOTE: Hive type of 47 Fall colonies not captured).

## Winter loss WA State by Hive Type 2023-24



Forty-six individuals had no loss (38%) = 217 colonies while ½ that number (22) 18% had total loss = 68 colonies. Greatest loss was one colony. Heaviest loss was 14 colonies. See Figure 3 graph.



The WA respondents to the electronic survey managed up to 26 fall colonies. Fourteen individuals had a single colony (and had colony loss of 43%), 30 respondents had two colonies (the greatest number) with 33% loss and seven individuals had three colonies (48% loss). Typical of previous surveys, fifty-one individuals (42% of respondents) had 1, 2 or 3 fall colonies (loss level of

41%). Thirty-five individuals had 4 to 6 fall colonies and had loss level of 43%. Five was median number. Eighteen individuals had 7 to 9 colonies, they had loss level of 19%. Ten individuals had 10-19 colonies with loss level of 30%, 6 individuals with 20-26 colonies had loss level of 23% The 16 individuals with 10+ colonies lost 27%.

Thirty-six respondents (31% of total) had 1, 2 or 3 years of experience; they had a 30% loss level the 12 individuals with one year experience had heaviest loss of 38%. Forty-two individuals (36% of total respondents) had 4 – 6 years’ experience (medium number = 5 years’ experience) with a 42% loss, 14 individuals had 7-9 years’ experience (loss level 41%), 17 had 10-19 years keeping bees and 18% loss level and nine had 20+ years’ experience (64 was maximum) and they had a 26% loss level. Examining the relationship of colony numbers and years’ experience related to loss shows that loss of colonies decreases by about 1/3<sup>rd</sup> with the greater number of colonies and/or years of experience.

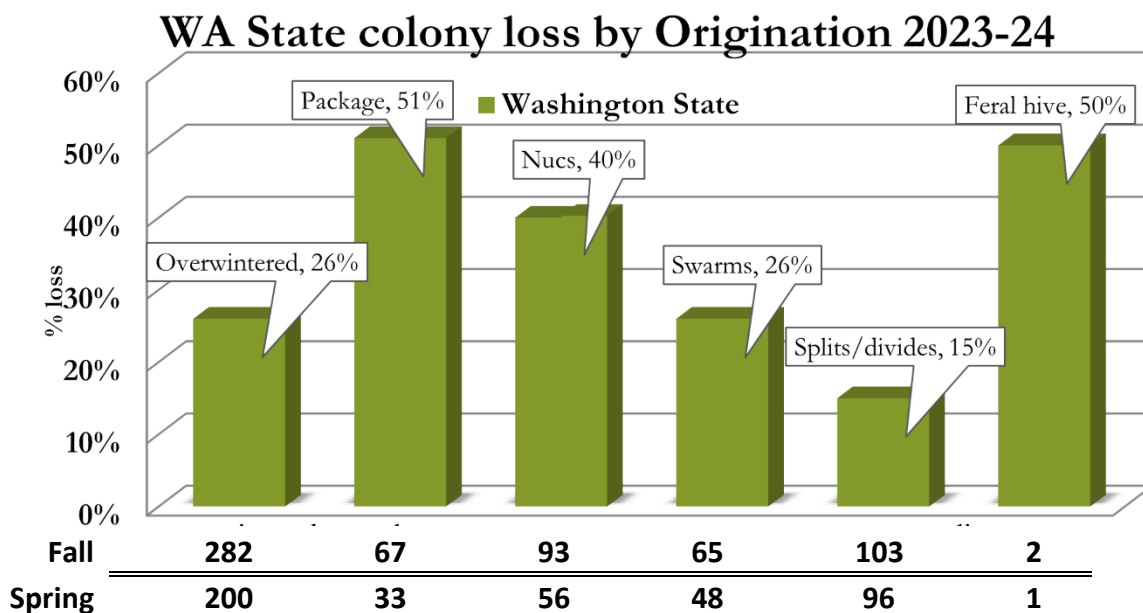
**Summary Statewide WA**

1-3 colonies	41% loss	10+ colonies	27% loss
1-3 years’ experience	30% loss	10+ years’ experience	20% loss

Eighty-eight (75%) WA beekeepers had an experienced beekeeping mentor available as they were learning beekeeping. This percentage was three percentage points higher than last year, same as 5-year average.

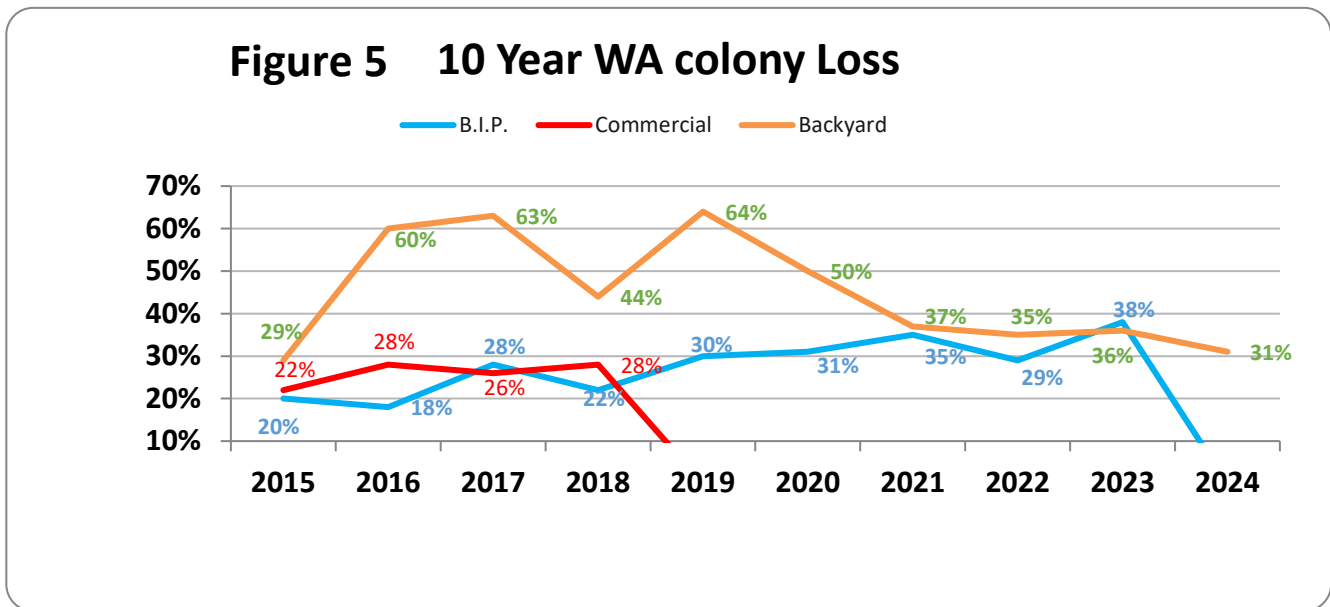
**Survival Based on Hive Origination**

We also asked about hive loss by origination. Data shown in Figure 4 below. Best survival was Splits/divides (15%) with swarms and previously overwintered both at 26% loss rate. Package bee losses were over 50% and nucs were 40%.



**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 BeelInformed.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. Losses of backyard beekeepers from this survey are shown in orange line with black loss numbers. 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 survey are shown below the figure.



YEAR	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
#Comm hives	~40,000	33,200	16,604	29,015	0					
#backyarders	31	52	101	104	98	133	163	80	120	121
BIP (# hives)	113,237	32,184	83,000	52,500	48,600	48,000	33,300	72,700	50,145	0

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 BeelInformed 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

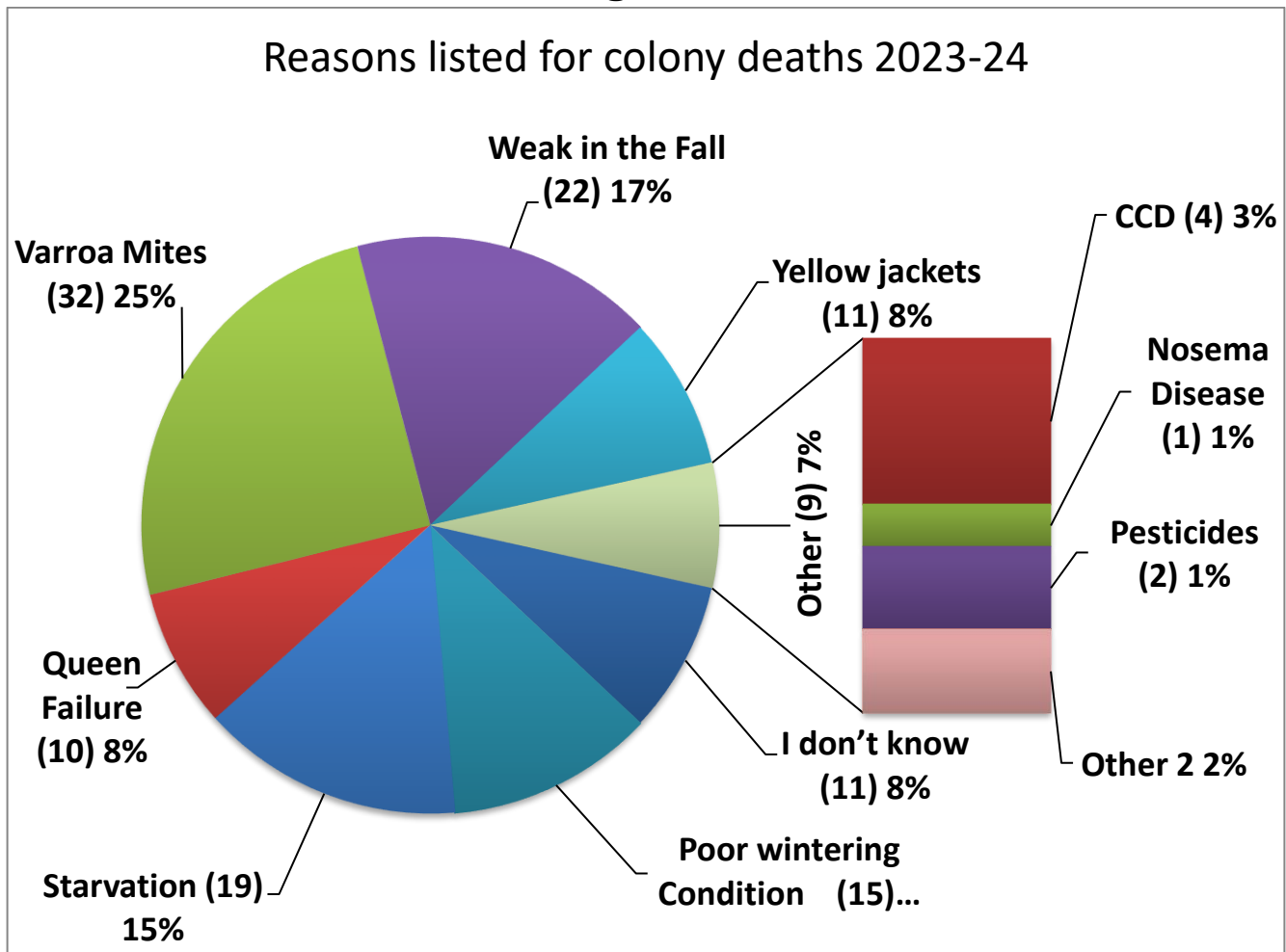
exclusive to Washington but they managed less than 5% of total colony count - the BIP tally is primarily of commercial beekeepers. They have large numbers of colonies in survey data, so the BIP losses reflect commercial losses not losses of backyarders. See <https://research.beeinformed.org/loss-map/>

### Apiary sites and moves

Nine survey respondents had bees at more than a single apiary. Loss levels were similar or better at four of the original sites and better at five of the 2<sup>nd</sup> sites. Three had bees at a third site and losses were higher at two of the 3<sup>rd</sup> sites. Six individuals moved bees. One moved for pollination, one moved for construction, two moved due to bear attack and two moved for better site (more sun, lower elevation for wintering).

### Colony death perceived reason and acceptable loss level

Figure 6



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 (32 individuals, 25% of total selections) was the most common choices. Weak in the fall, starvation and poor wintering were next most common followed by yellow jackets and don’t know. Ten individuals only listed queen issues. The two “other” listings were absconding and too small a winter cluster. Figure below shows the number and percent of factor selections.

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

Acceptable Overwinter Loss per 77 Beekeepers in Washington State during 2023-24											
Loss level	5%	10%	15%	20%	25%	33%	50%	75%	100%	None	IDK
#	10	11	6	21	17	9	17	5	2	17	0
%	9%	9%	5%	18%	15%	9%	15%	5%	2%	15%	0%

### Why do colonies die?

There is no easy 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 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 in 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 30% were still at a low level. More attention to colony strength and possibility of mitigating winter starvation will help reduce some of the losses. Effectively controlling varroa mites will help reduce losses.

## Colony 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 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 analysis is correlative and doing a similar management as fellow beekeepers does not necessarily mean you too will improve success.

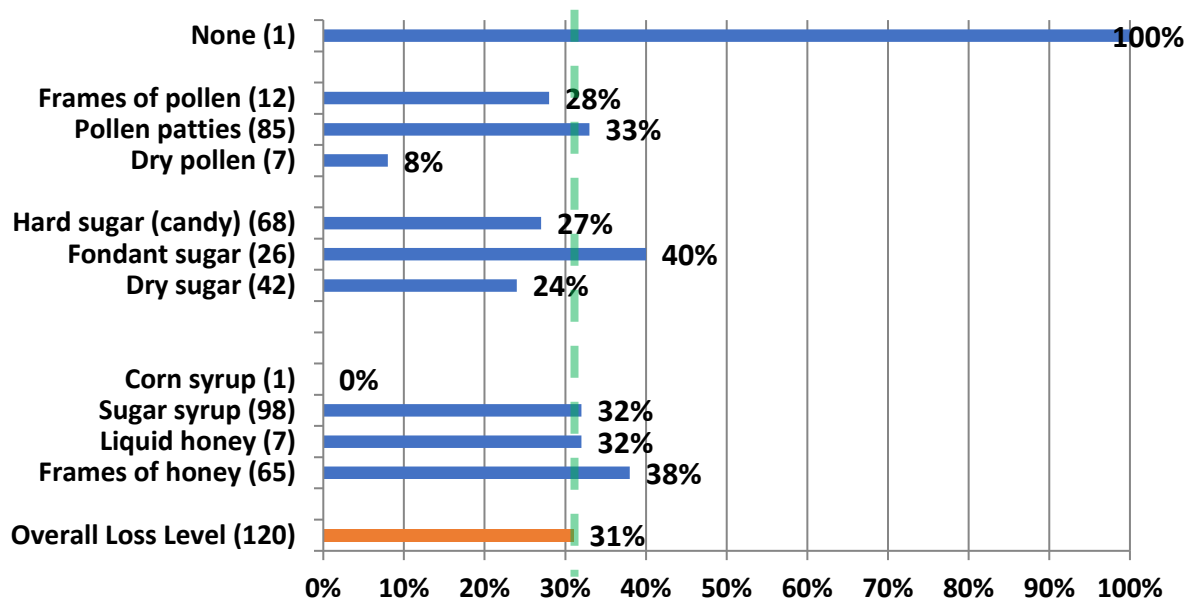
**FEEDING:** Washington survey respondents checked 396 feeding options = 3.1/individual. One individual made no selections – they had two colonies and lost both (100% loss). One respondent indicated a single choice (feed frame of honey) and lost one of their two colonies 50% loss level. One individual with eight colonies made eight selections and all 8 survived. The best survival results were 2 or 6+ selections. Table illustrates the relationship of number of selections to percent making selection (median was 3) and percent loss of those individuals.

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 31% (**green dashed line**) had better survival while those to right had greater loss level.

# selections	# indiv (%)	% loss
1	1 (<1%)	50%
2	22 (18%)	25%
3	46 (38%)	38%
4	35 (29%)	39%
5	5 (4%)	53%
6	6 (5%)	23%

Figure 7

### Feeding Options w/ Loss Record (#) = number individuals



Feeding sugar syrup (98 individuals) and pollen patties (85 individuals) were the most common feeding option of respondents. Both had loss rates similar to overall loss rate (32 and 33% respectively). The loss rate of the seven dry pollen feeders was only 8 percent while 42 dry sugar feeders had a 24% loss level.

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 one individual lost their two colonies. Individuals that fed sugar syrup had marginal lower loss level in four of seven years (but not this year) as did those using frames of honey to feed bees (this year 7 percentage point greater loss). Individuals feeding non-liquid sugar in the form of hard candy likewise had lower losses in 5 of 7 years; this year 4 percentage points better survival. Dry sugar feeders had bet survival of those feeding carbohydrate (except one individual fed corn syrup and both of their colonies survived).For individuals feeding protein, protein patty users showed slightly better survival in 4 of 7 years (this year 2 percentage points poorer survival); dry pollen feeders had significantly better survival in five of the past six years but number of individual respondents doing this management is not very large.

**WINTERING PRACTICES:** We received 330 responses (2.7/individual compared with 2.9/individual last year) reporting WA beekeeper wintering management practices (more than one option could be chosen). One individual indicated doing none of the several listed wintering practices (same individual that did no feeding – the two colonies reported lost were one 10-frame and one 8-frame colony. Ne individual doing seven selections lost 2 of 3 colonies.



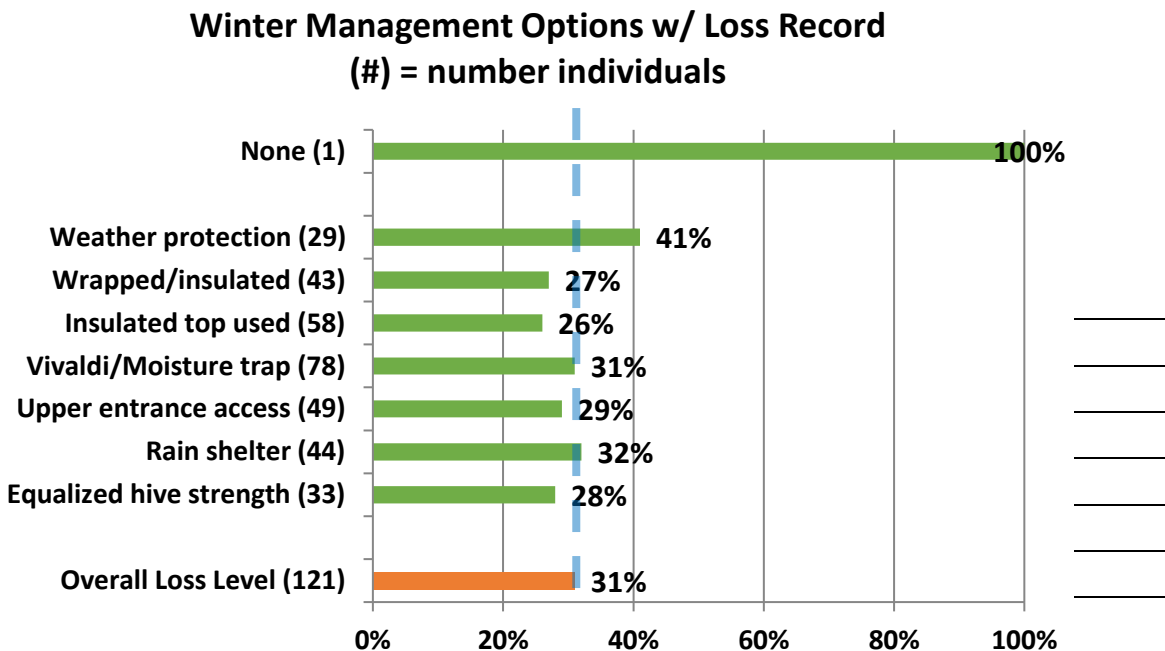
For those indicating some management, 24 did one single thing and had 53% loss level. The best survival was those with three selections. Information presented in table to right.

# selections	# indiv (%)	% loss
1	24 (19%)	53%
2	32 (26%)	27%
3	29 (23%)	23%
4	24 (19%)	26%
5	10 (8%)	29%
6	4 (3%)	60%

The managements selected that improved survival were wrapping/using colony insulation (30 individuals – 30% loss level), use of Vivaldi/moisture trap (87 individuals, 32% loss) and equalizing hive strength (25 individuals, also 32% loss level). Figure 10 shows the number of individual choices and percent of each selection. Bar length below 36% (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 all 6 of 7 years. Equalizing hive strength in the fall demonstrated lower loss levels in all seven recent winter periods and top insulation has demonstrated lower loss in five of seven winters. In the most recent winter 58 individuals had a five-percentage point lower survival. Ventilation above the colony (Vivaldi Board/quilt box) demonstrated improved survival four of the seen winters, this year loss level was same as overall loss.

**Figure 8**



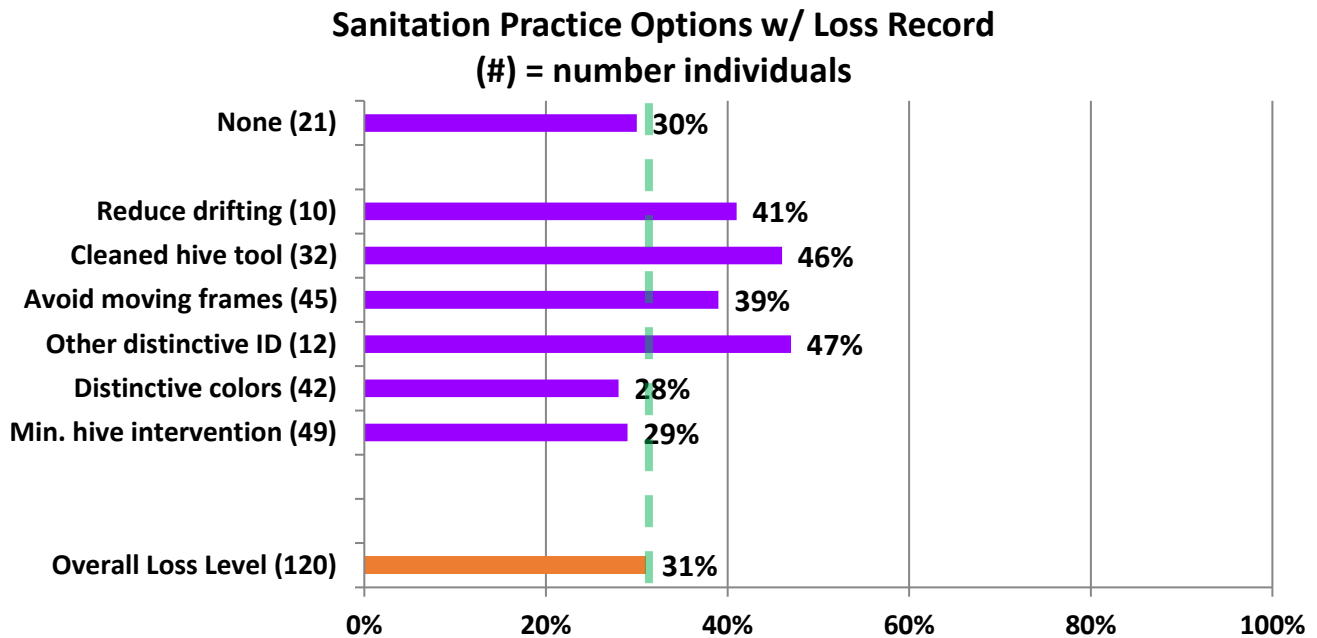
**SANITATION PRACTICES:** It is critical that we practice some basic bee sanitation (some prefer use of term bee biosecurity) in our bee care to help insure healthy bees. We received 214

responses for this survey question 1.8/individual (last year it was 2.7/individual). Twenty-one individuals (18%) said they did not practice any of the six offered alternatives; they had a loss rate of 30%, 1 percentage point lower than the statewide average.

Thirty-seven individuals had one selection and had 26% loss average. 37 made 2 choices with 38% loss. The 13 individuals with three selectins had best wintering survival (20% loss), while those 11 with four had 36% loss. It is clear that none of the measures is robust enough to make a difference by itself in reducing winter loss. Figure 9 shows the number of individual choices and percent of each selection. Bar length below 31% (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 21 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 improve overwintering success.

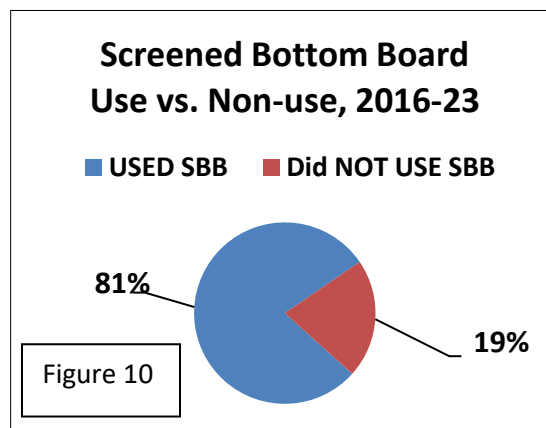
**Figure 9**



**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 30% of their colonies. Those 18 beekeepers using SBB on some of their colonies lost 39% and the 83 individuals (%) using SBB on all of their colonies had 29% 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.



**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% (a 0.1% 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. Seventy-three individuals (69%) said they always blocked SBB during winter. They had a 32% loss rate. Twenty-five individuals (24%) said they never blocked SBB and had loss rate of 33%. Eight individuals (8%) blocked them on some of their colonies. Their loss rate was 23%. So the 81 individuals that blocked or sometimes blocked screen boards had 32% loss vs those who didn't block had 33% loss, a 1 percentage point difference in favor of closing the SBB over the winter period. 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 only a single percentage point difference 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 dry sugar or fondant during the winter meant lower loss levels. Providing honey or sugar syrup, the most

common selection, did not mean lower winter losses 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 was equalizing strength, providing a moisture trap (Vivaldi board or quilt box) and some attention to adding protection against the elements. 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.

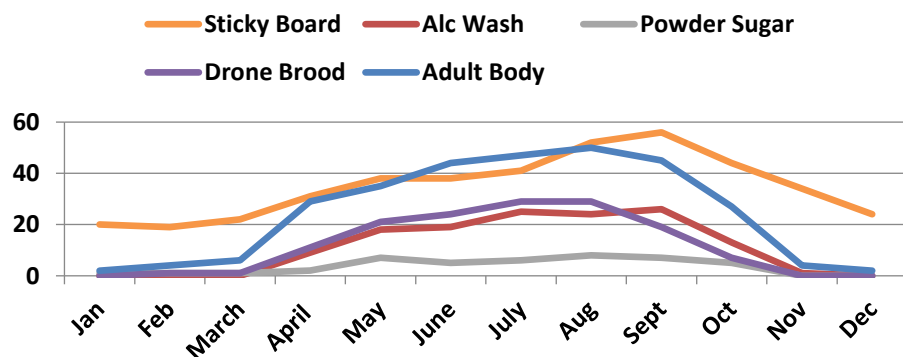
Replacing standard bottom boards for screened bottoms only marginally improved winter survival. It is apparently advantageous to close the bottom screens during winter.

## Mite monitoring/sampling and control management

We asked 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. Eighty-one individual respondents (68% - an increase of 0.9 percentage points from last year) said they monitored all their hives. Losses of those individuals monitoring was 31%. Twenty-two (18.6%), reported no monitoring; they had a higher loss rate of 35%. Fifteen individuals monitored some with loss rate of 29%.

In order of popularity of use, 67 individuals used sticky boards, 65% total of 103 individuals who did some or all monitoring of colonies, same percentage as last year. Looking on adults was indicated by 50 individuals (49%) who did some or all colony monitoring followed by 47 individuals (41% of individuals doing monitoring, an increase of four percentage points from last year) that used alcohol wash. Thirty-one individuals used drone

**Monthly Monitoring of Washington State Beekeepers 2022-23**



brood monitoring and 12 used powder sugar to monitor. The sticky board users had 30% loss, alcohol washers had 29%, as did those looking a drone brood, worker inspection had 41% and powdered sugar users had the highest loss level at 57%.

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. Figure 11 above shows data from an earlier year.

The most common sampling of respondents in 2023-24 was sampling both pre and post (41 individuals 43% of respondents); they had 34.5% loss, average for the 95 Washington beekeepers responding to this survey question. Those 29 sampling pre had a slightly better 30% loss while those 3 only sampling posts had a 57% loss. The 20 individuals who treated without sampling nor treating had 29.5% loss. The two individuals that sampled but did not treat lost all 7 of 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 usefulness of a treatment when inserted post treatment. Visual sampling is not accurate: most mites are not on the adult bees, but in the brood. Unfortunately looking for mites on drone brood is also not effective as a predictive number but can be used as an early warning that mites are present; if done, look at what percentage of drone cells had mites.

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

## **Mite Control Treatments**

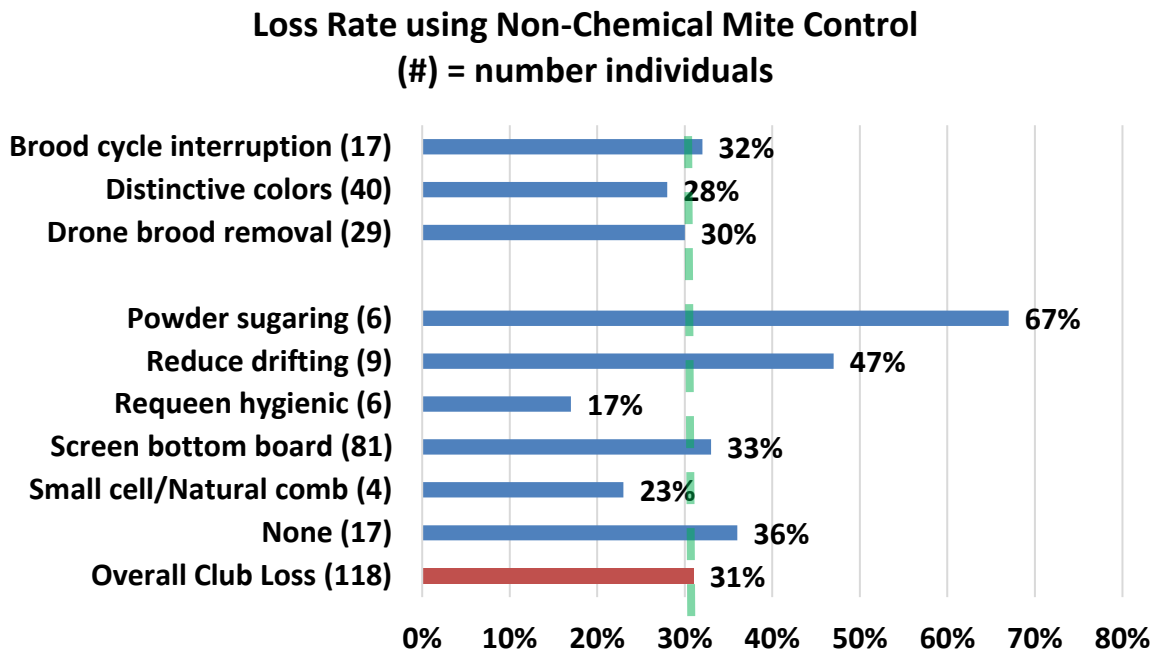
The survey asked about non-chemical mite treatments and also about use of chemicals for mite control. Seventeen individuals (14%), eight percentage points greater than last year, said they did not employ a non-chemical mite control and two individuals (1.7%), one less than last year, did not use a chemical control. Those 173 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 all eight 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,) 220 selections were indicated 2.2/person (last year 2.1/individual). Thirty-five individuals used one method and had a 23% loss, thirty-two used two (39% loss level), eighteen used three (31% loss), fourteen used four (32.5% loss) and one used 5 (6 colonies, no loss) and one indicated six choices, losing one of seven colonies.

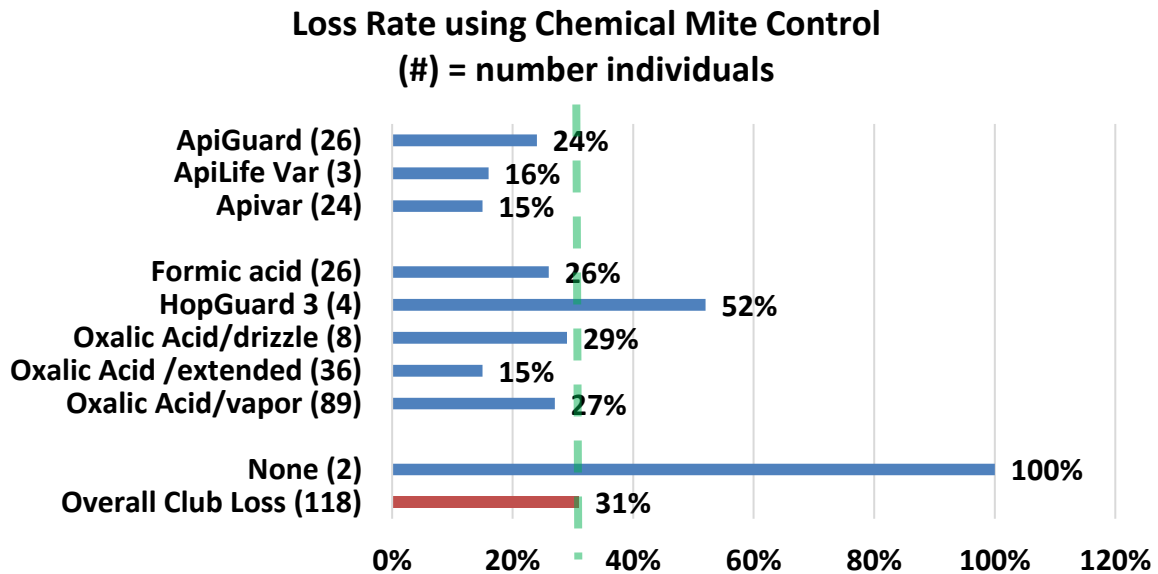
Use of screened bottom board was listed by 81 individuals (80% of individuals selecting other than none). They had a 33% loss level. The best survival choices were requeening with hygienic stock (17%) and small cell/natural comb (23% loss level, four individuals with 13 fall colonies). The use of the remaining seven selections are shown in Figure 12; 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 (29 individuals, 29.5% loss) and brood cycle interruptions (17 individuals, 32%) 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. Small cell/natural comb had not been demonstrating better survival but did the last two years, each year by four individuals with small number of colonies (10 of 13 survived this past winter).

**Figure 12**



**Chemical Control:** For mite chemical control, two individuals (1.7% of total respondents) used NO chemical treatment; these individuals had a 100% 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 2.1/individual (last year 1.9/individual). Thirty-nine individuals (46%) used one chemical and had 46% loss, 44 used two and had 30% loss, 18 used 3 (23% loss), 11 used four and had 6% loss while the two using five had an 8% loss level. Figure 13 illustrates the number of uses ( ) and bar length indicates the loss rate for those using that chemical.



**Figure 13**

Within those numbers there are some other patterns. For those using one chemical, the use of OAV (oxalic vaporization) by 28 individuals had a 40% loss, those using OAV + another chemical had a 25% loss. For Apivar one-time users (17 individuals) loss rate was 14% but for the seven two-time users their loss rate was 17%. Fifteen users of Apiguard once had 19.5% loss but 11 individuals who used it twice experienced a 30% loss. Twenty single formic acid users had a 19% loss, the five who used it twice had 70% loss, yet the one individual (only two colonies) who used it three times had no loss.

Oxalic acid was used by a large number of individuals. Single OAD (drizzle) oxalic users four individuals) had 1.5% loss, those four individuals using it twice had 44% loss – overall loss was 29%. OAE (extended) users using it once had a 12.5% loss (20 individuals), the 11 using it twice had a 20% loss. Two responders said they used it three times lost 2 of 3 colonies (67%) and the three respondents using it four times (13 colonies – lost 2) had a 15% loss rate.

Individuals indicating use of OAV (vaporization of the acid) reported use once to 6+ times (6+ was the highest checkbox entry on survey). The chart shows number of times reported used, number of individuals, number of fall colony number and loss rate:

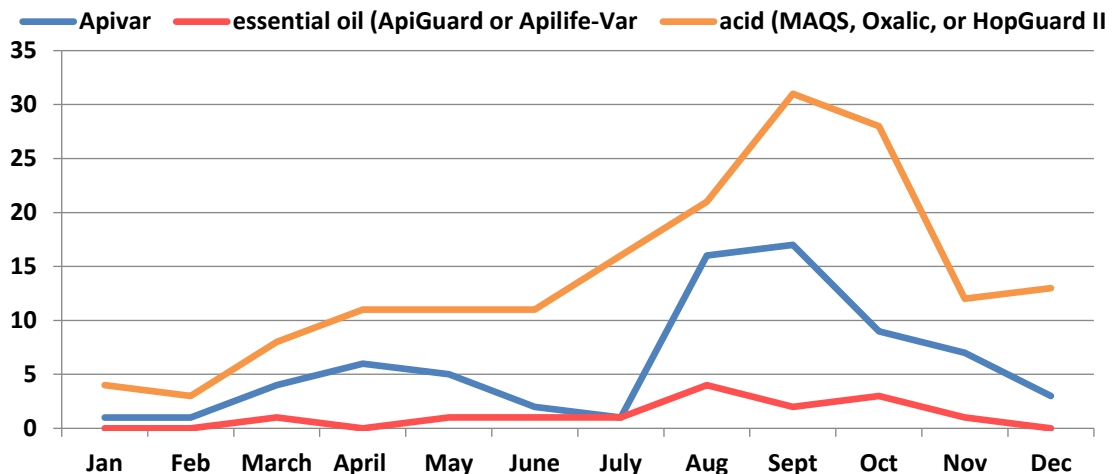
1X	16 indiv	90 col	17.8%
2X	15	91	26.4%
3X	7	36	58.3%
4X	8	35	14.3%
5X	6	48	18.4%
6+	37	225	28.4%
Total	89	525	26.5%

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 24% and 16% loss. Over the last seven years Apiguard users had a total 32% better survival rate. Apivar, the synthetic (amitraz), has demonstrated a 34.3% total better survival over past 7 years; this year 16 percentage point better survival but last year it was nine percentage points poorer survival.

Oxalic acid vaporization over past 5 years has a 15.3% better survival (the survey did not differentiate Oxalic vaporization from drizzle prior before); this year a 4-percentage point difference. Formic acid also normally provides better survival - this year a 4-percentage point better survival.

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

### Mite Control Products used by Washington State Beekeepers 2021-22

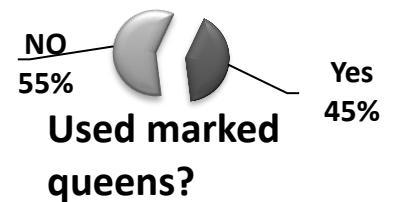


### Antibiotic use



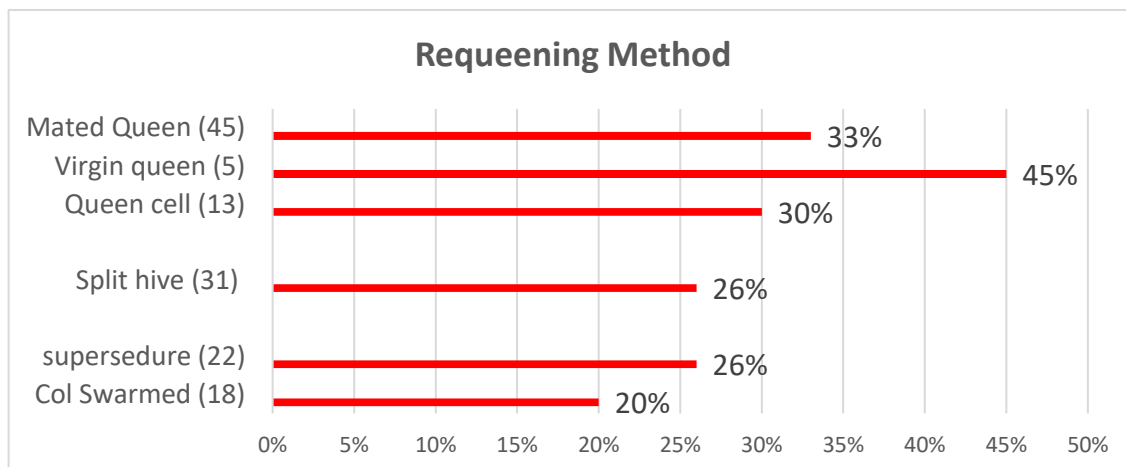
One individual reported used Terramycin and all eight colonies survived. Three individuals indicated the use of Fumagillin (Fumidil-B) for Nosema control; their loss rate was 23.5%. Three Nosevet users had a 17.4 loss rate.

## Queens



We hear lots of issues related to queen “problems.” Ten 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-three individuals (45%) said yes. The related question then was ‘were your hives requeened in any form?’ to which 54% (64 individuals) said yes; equal numbers said no (23%) or ‘not that that I am aware of.’ Loss level of yes was 33%, of the nos 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. See the BeelInformed website [www.beeinformed.org](http://www.beeinformed.org) for additional information and to examine that data base as well. The BeelInformed survey is measuring the larger scale WA beekeepers not the backyarders as loss rates are of total colony number. I have discontinued recording WA commercial/sideline 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](mailto:info@pnwhoneybeesurvey.com) with "REMINDER" in the subject line. I have a blog on the [pnwhoneybeesurvey.com](http://pnwhoneybeesurvey.com) and will respond to any questions or concerns you might have. Email me directly for quicker response. [dmcaron@udel.edu](mailto: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 June 2024