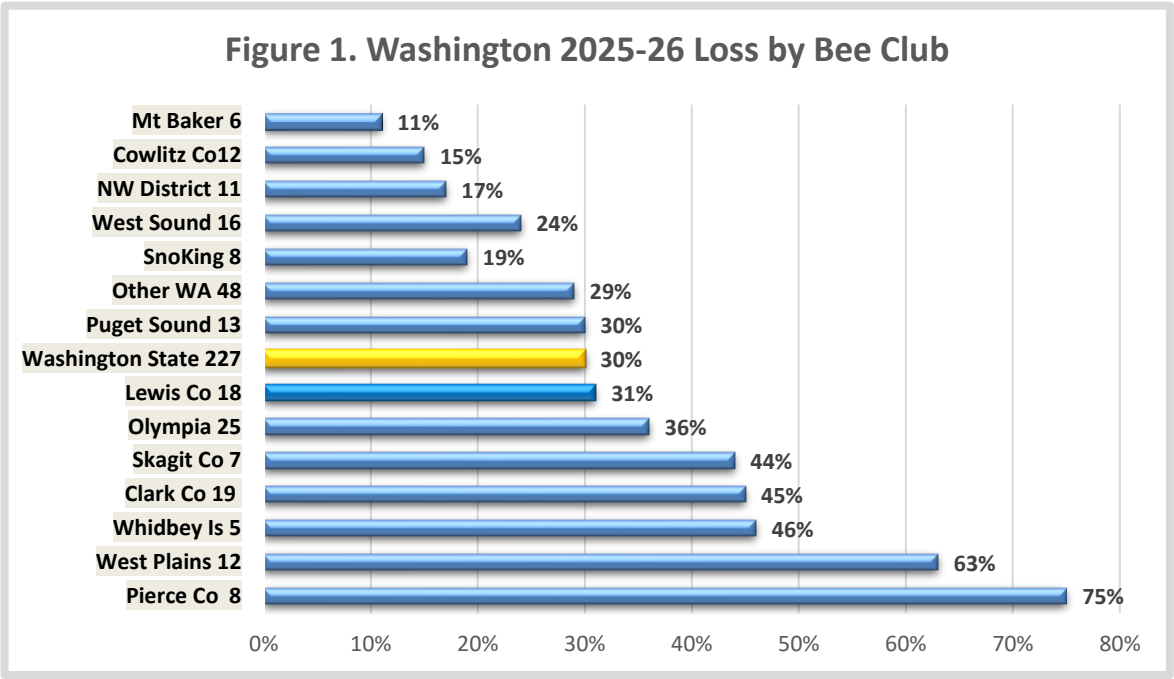
Winter Bee Losses of Washington Backyard Beekeepers for 2025-2026

by Dewey M. Caron

Overwintering losses of small-scale Washington backyard beekeepers = 30% a decrease of four percentage points from last year, 14 percentage points below the 10-year loss average. Two hundred twenty-seven Washington beekeepers, 97 more than last year, completed a survey; respondent number was 106 above the 120.8 average respondent rate for the last seven years. Individuals maintained 547 fall colonies. Information on winter losses and several managements related to bee health is on the website www.pnwhoneybeesurvey.com.

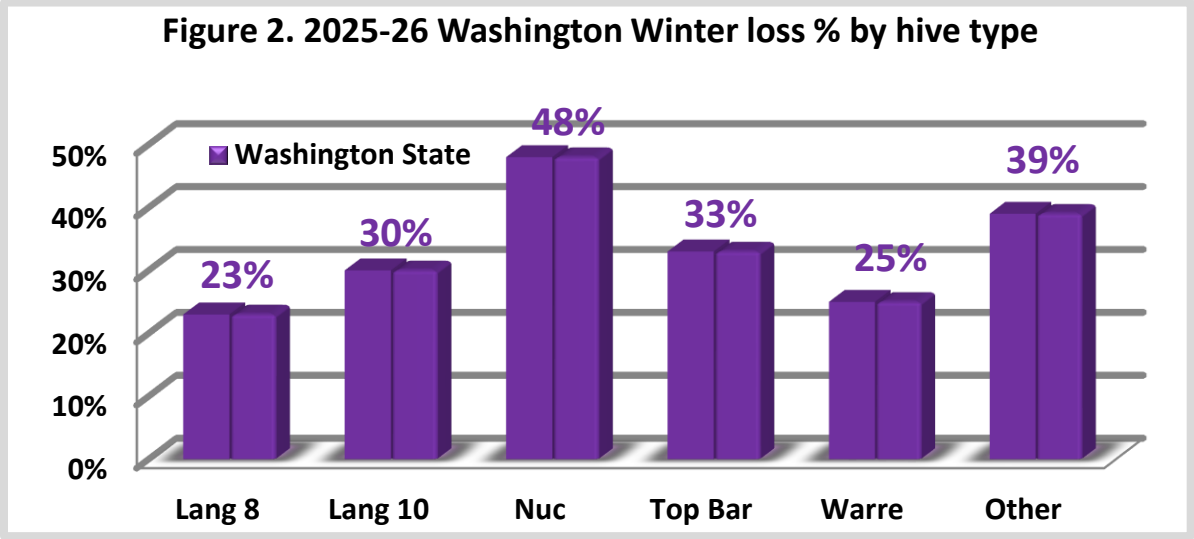


Response by local Washington (WA) association members varied as indicated by numbers adjacent to club name. Losses of those club individuals are shown in blue bars in Figure 1. The other category included clubs with fewer than 5 responses and other respondents who did not indicate a club membership. Statewide loss level was 30%. The survey included 1547 fall Washington beekeeper colonies (871 more than last year). Thank you for the great returns.

2025-2026 Overwinter Losses by Hive Type

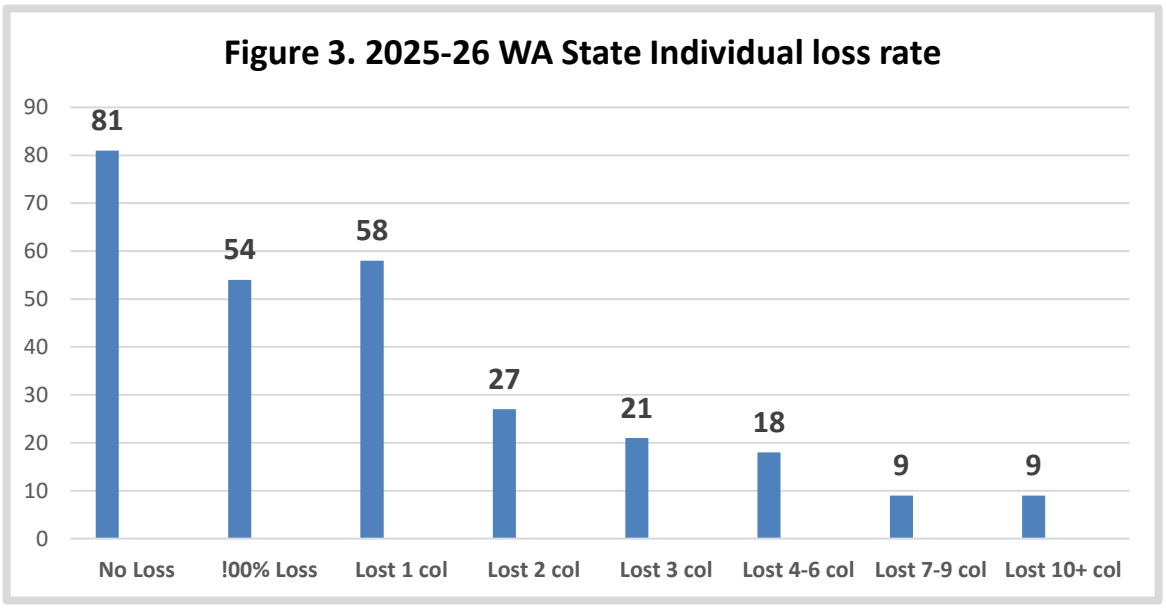
The Washington survey overwintering loss statistic was developed by subtracting the number of spring surviving colonies from fall colony numbers supplied by respondents by hive type. Results, shown in Figure 2 bar graph, illustrate overwintering **losses of 227 total WA beekeeper respondents.** Langstroth 8-frame beehives had lower average losses (23%) compared to Langstroth 10-frames hives (30%). Nucs losses were 47.5%. There were 21 Top Bar hives with 1/3rd lost. There were only 4 Warré hives and 3 survived. Of the 103 colonies listed under “other” hive type, 4 individuals had 13 AZ

(Slovenian) hives (8 survived), 2 had Apimaye hives (1 survived), the single Layens hive survived, of 2 flow hives 1 survived (these 3 hive types all owned by one individual each), 8 individuals had 23 long/horizontal hives with 16 surviving, 6 individuals had 25 IQ hives with only 4 lost overwinter and there were 37 hives not identified to type (10 individuals – 37 fall and 17 in spring).



	Lang 8	Lang 10	Nuc	Top Bar	Warre	Other
Fall	354	987	78	21	4	103
Spring	722	688	41	14	3	63

Eighty-one individuals had no loss (329 colonies, range 1-20) while 36 beekeepers lost 100% (84 colonies, range 1-10). The greatest loss was 22 colonies. See Figure 3 graph. Thirty-six individuals (16%) lost between 2-25% of their colonies (12% loss rate), 47 individuals (21%) lost between 29-59% of their colonies (loss rate 38.5%), 19 individuals lost between 53-75% of their colonies (60% loss rate) and 8 individuals lost between 80-98% of their colonies (loss rate 84.5%).



The WA respondents to the electronic survey managed up to 49 fall colonies. Thirty-one individuals had a single colony. The 31 individuals lost 13 (a 42% loss). Individuals with 1 to 3 fall colonies (108 individuals) lost 41%, fifty-one individuals had 4 to 6 fall colonies with loss level of 30% (four was the median number, average colony number = 6.8 colonies), the 26 individuals with 7 to 9 colonies lost 27%, the 23 individuals with 10-19 colonies lost 37% and the 19 individuals with 20-49 colonies lost 23.5%.

Fifteen individuals (6.5% of total Washington respondents) had a single year of experience – they lost 20 of their colonies =37.5% loss. Sixty-one respondents (37.5% of total) had 1, 2 or 3 years of experience; they had a 37% loss level. Seventy-six individuals (27% of total respondents) had 4 – 6 years' experience (medium number = 5 years' experience) with a 33.5% loss, 30 individuals had 7-9 years' experience (loss level 29%), 45 had 10-18 years keeping bees and 39% loss level and the 15 individuals with 20 to 64 years' experience lost 24% (7 individuals with 31-64 years' experience, the maximum beekeeper experience years) had a 17% loss level.

Examining the relationship of colony numbers and years' experience related to loss shows that loss of colonies decreases by about 1/2 and with a greater number of colonies while loss by years of experience also shows a slightly lower decrease in loss percentage.

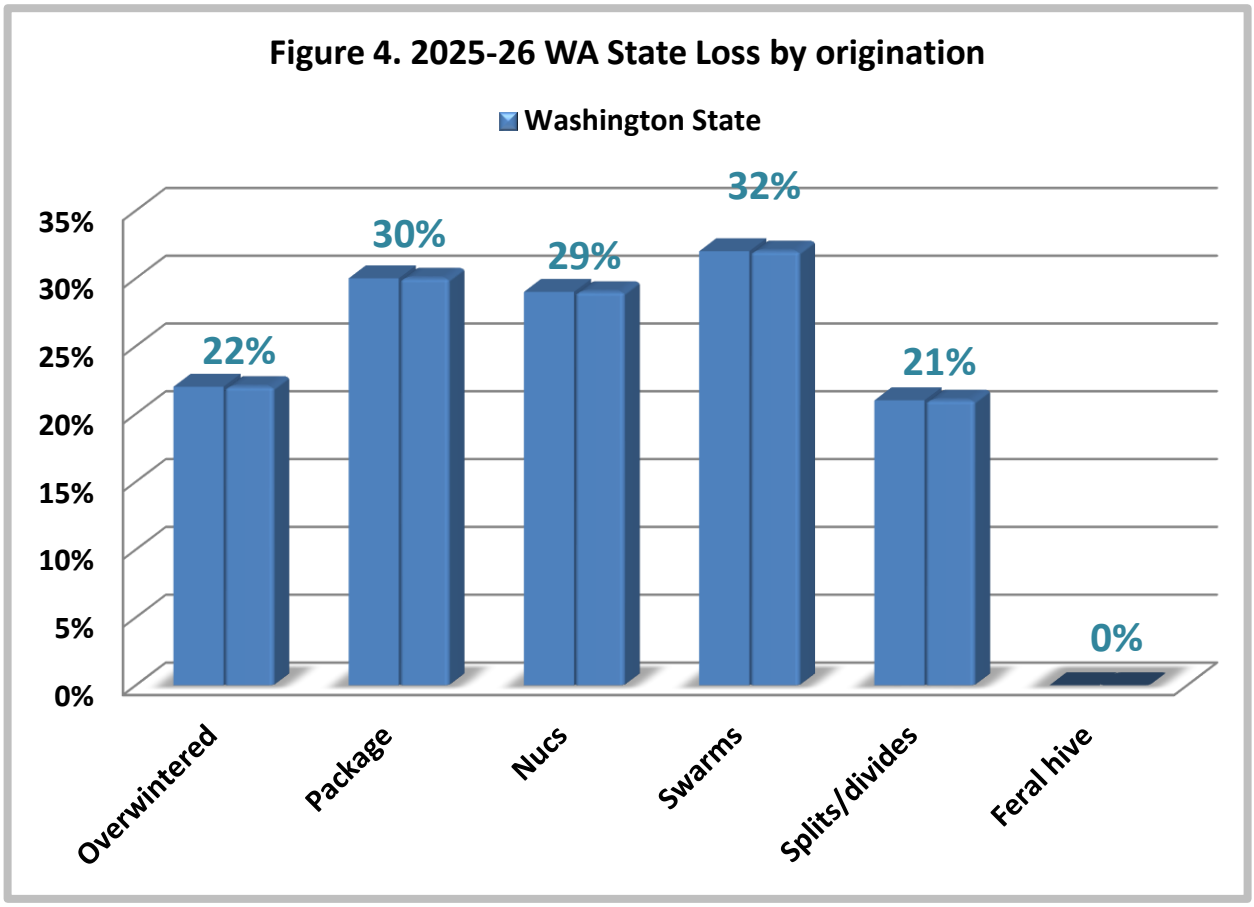
Summary Statewide WA

1-3 colonies	41% loss	10+ colonies	28% loss
1-3 years' experience	37.5% loss	10+ years' experience	28% loss

One hundred sixty-three (72%) WA beekeepers had an experienced beekeeping mentor available as they were learning beekeeping. This percentage was nine percentage points lower than last year, and five percentage points lower than the 10-year average.

Survival Based on Hive Origination

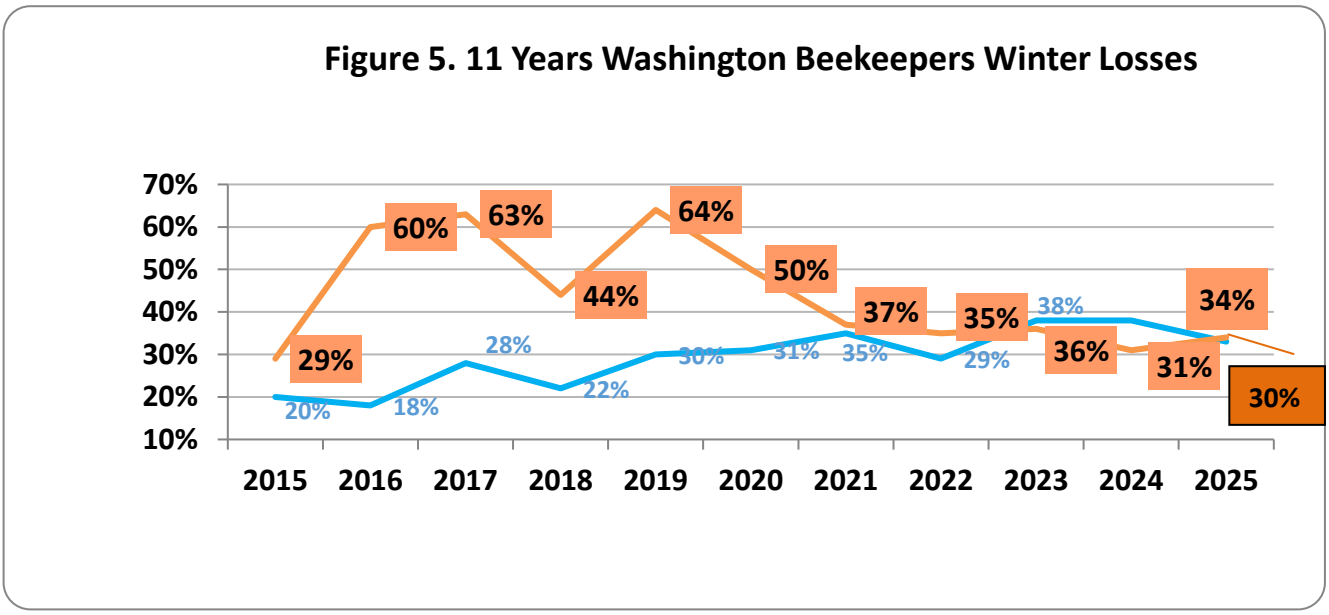
We also asked about hive loss by origination. This year individuals could FAST TRACK the survey and bypass this question. Fifty percent, 113 individuals, did answer. Data shown in Figure 4 below. The best survival was previously overwintered, with a 22% loss rate, 80 individuals. Packages overwintered by 28 individuals had 30% loss Overwintered Nucs, 86 fall colonies, had 29% loss. There were 45 individuals overwintering swarms, 72 colonies, they had 32% loss. Forty-five individuals overwintered splits, 127 total and they had 21% loss. The one overwintered feral transfer survived.



Fall	**285**	**60**	**86**	**72**	**127**	**1**
Spring	**223**	**42**	**61**	**49**	**100**	**1**

Comparison to Larger-Scale Beekeeper Losses

The BeeInformed.org (BIP) losses for Washington beekeepers from 2015 to 2023, the last year of the BIP survey, are representative of the larger scale beekeepers and are shown in **blue** in Figure 5. 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 year were 37.7%. Losses of backyard beekeepers from this survey are shown in **orange line** with black loss numbers. The 30% current wintering period loss is added at end. The response number is shown below the graphic. Average BIP loss (9 years) =27.9% and average WA backyarder loss (12 years) = 42.8%. In 2023 the larger-scale beekeeper loss exceeded losses of backyarders. The numbers included in the survey are shown below the figure.



YEAR	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
#backyarders	31	52	101	104	98	133	163	80	120	121	130 227
BIP (# hives)	113,237	32,184	83,000	52,500	48.600	48,000	33,300	72,700	50,145		

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.

Apiary sites and moves

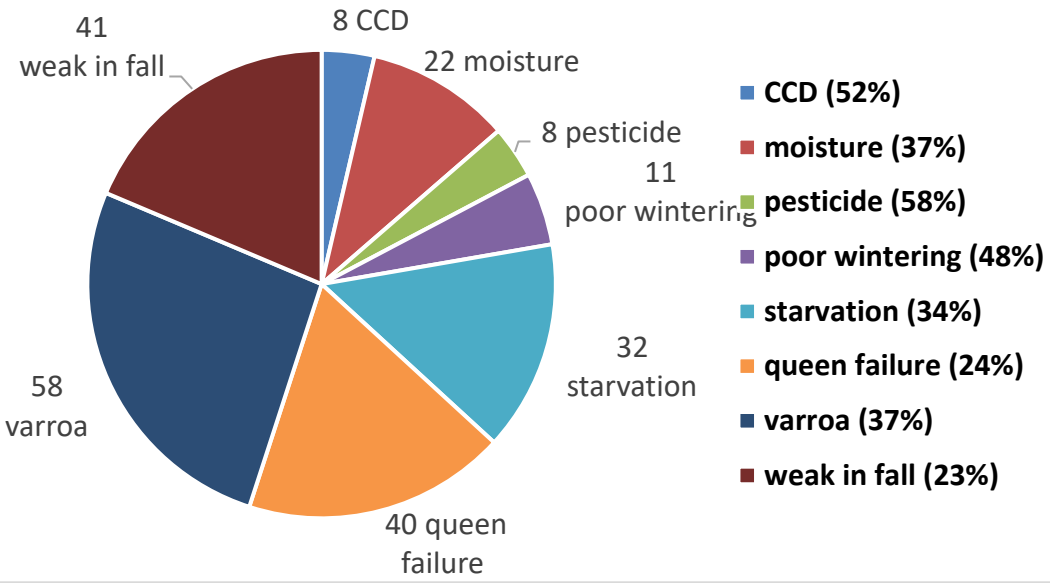
Fifteen survey respondents had bees at more than a single apiary. Loss levels were similar or better at 9 of the original sites and better at 4 of the 2nd sites. Four had bees at a third site and losses were higher at one of the 3rd sites. Seven individuals moved bees. One moved for pollination, one 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 242 WA selections (1.2/individual) provided. Twenty-two individuals didn't know – they had a51.5% loss level. Varroa mites (58 individuals, 28% of total

selections) was the most common choice; they had a 37% loss. Queen failure (40 individuals, 20% of selectors had a 24% loss rate. Weak in the fall (41 individuals, 20% of selections, with 23% loss), starvation, 32 individuals, and poor wintering, 11 individuals were also common choices. Six listed absconding (69% loss), 3 said robbing (9% winter loss) and one listing each for wax moth, blocked bottom board, small population, poor hive design, late freeze, lack of attention. And bear attack. Figure 6 below shows the number and percent of factor selections. Not illustrated is yellow jackets, 22 selections with a 62% loss.

Figure 6. 2025-26 WA State Reasons for loss



Acceptable loss: Survey respondents were asked the reason for loss. Thirty (14%) indicated zero (no loss). Thirty-four percent of individuals indicated 10% or less. Twenty percent was medium choice. Thirty-two said 50%+ was an acceptable loss level and another 4 said 75% was acceptable. See the table below.

Acceptable Overwinter Loss, WA

Loss level	5%	10%	15%	20%	25%	33%	50%	75%	100%	None	IDK
#	14	32	17	38	42	14	32	4	0	30	1
%	6%	14%	8%	17%	19%	6%	14%	2%	0	14%	<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 75%, 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 viruses. 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 after varroa 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 the possibility of mitigating winter starvation will help reduce some of the losses. Effectively controlling varroa mites will help reduce losses.

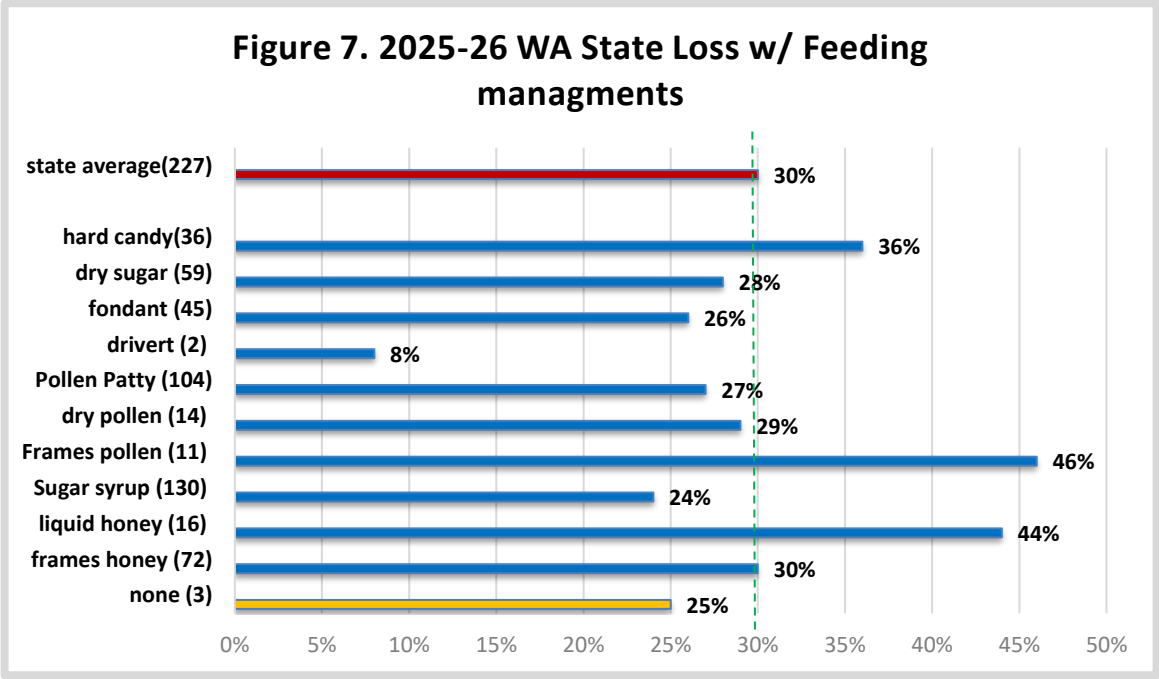
Colony Managements

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 performed by another beekeeper does not necessarily mean you too will improve success. Individuals could FAST TRACK in their survey responses this year. Last year, for these first managements, 91 individuals (70%) supplied management information; for the current survey respondents, 161 (71%) supplied management information.

FEEDING: Washington survey respondents checked feeding options = 3.15/individual (last year it was 3.4/individual). T66 individuals that fast tracked had a 37% loss. Three individuals made no

selections – they had 46 colonies and all but one survived (25% loss). Twenty respondents indicated a single choice but lost 36 of 100 colonies for 36% loss.
The most favorable outcome was two feeding managements. The table illustrates the relationship of number of selections to percent making selection (median was 3) and percent loss of those individuals. May not =100% due to rounding.

# selections	# indiv (%)	% loss
1	20 (12%)	36%
2	27 (17%)	21%
3	54 (34%)	26%
4	38 (24%)	26%
5	15(9%)	26%
6&7	7(4%)	27%



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 30% (**green dashed line**) had better survival while those to right had greater loss level.

Feeding sugar syrup (130 individuals) and pollen patties (104 individuals) were the most common feeding options of respondents. Syrup feeders had a six-percentage point better survival while the pollen patty feeders with 27% loss rate had a 3-percentage point better survival. The Dry sugar feeders (59 individuals) also had a two-percentage point improvement over overall loss rate. The 3 who checked "other" practices, feeding hive alive, showed good survival, 25% loss.

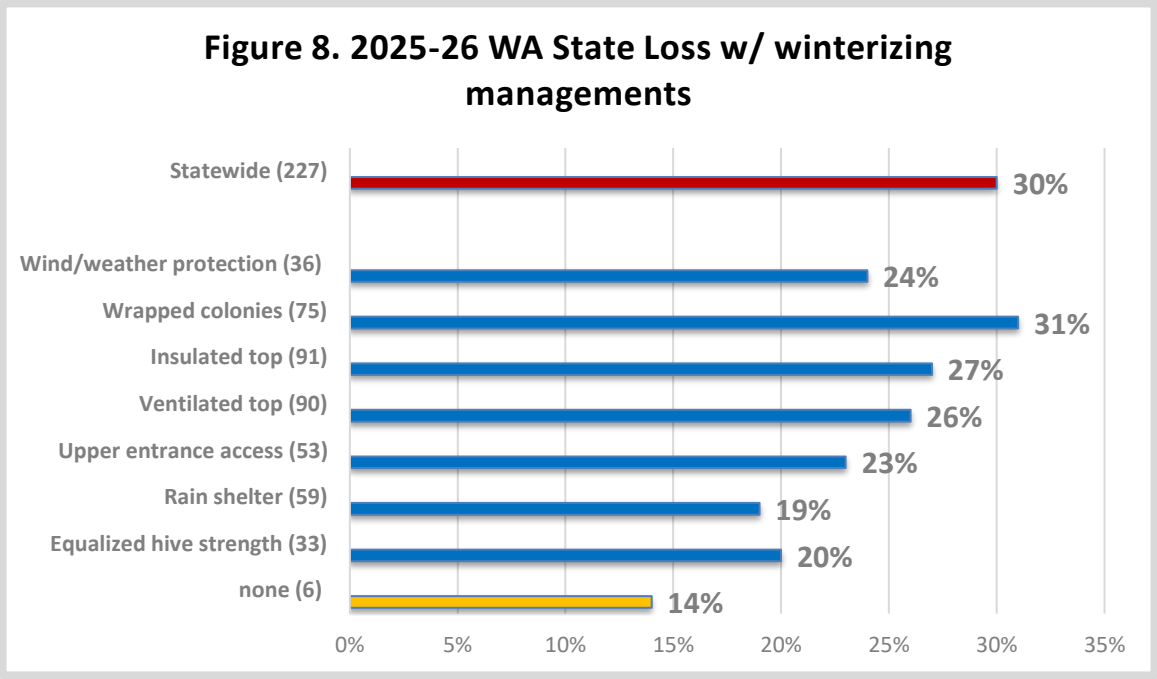
For the last 6 years of survey losses statewide, individuals doing no feeding had poorer survival in 6 of the 8 years, but numbers of individuals/colonies involved were generally low - this year three individuals with 4 colonies had 25% loss. Individuals that fed sugar syrup had lower loss level in five of eight years (including this year).

Individuals feeding non–liquid sugar in the form of hard candy had lower losses in 5 of 8 years; this year 6-percentage points lower survival. For 111 individuals feeding protein showed slightly better survival in 5 of 8 years (this year 2-percentage points better survival).

WINTERING PRACTICES: We received 460 responses (2.9/individual) same as last year for responding WA beekeeper wintering management practices (more than one option could be chosen). Sixty-six individuals fast tracked and didn't respond; they had a loss level of 37%. Six individuals said they did none; they lost only 3 of 21 fall colonies for 14% loss. The greater the number of selections the better the survival. Information on selections and loss rate in table.

# selections	# indiv (%)	% loss
1	26 (16%)	37%
2	38 (24%)	29%
3	35 (22%)	27.5%
4	40 (25%)	22.5%
5	10 (6%)	11%
6	6 (4%)	18%

The managements selected that improved survival were rain shelter (59 individuals, 18.5% loss) and equalized hive strength (33 individuals, 20% loss). Most popular choices were top insulation (91 individuals 91 individuals 27% loss) and ventilated top (90 individuals 25.5% loss). Figure 8 shows the number of individual choices and percentage of each selection. All choices improved over average loss (30%) except for wrapping colonies, which was only a ½ percentage point poorer - 30.5% loss. Among other selections were three individuals with IQ hives - they had a 40% loss (statewide IQ hives did much better – 16% loss, only ½ the statewide level), protection by vegetation, sunny location, cleaned bottom board mid-winter and crush and strain so bees bult new comb.



Over the past 7 years a couple of winterizing managements have shown improved survival. Those doing no winterizing had higher losses 7 of 9 years; this year the six individuals with 21 colonies

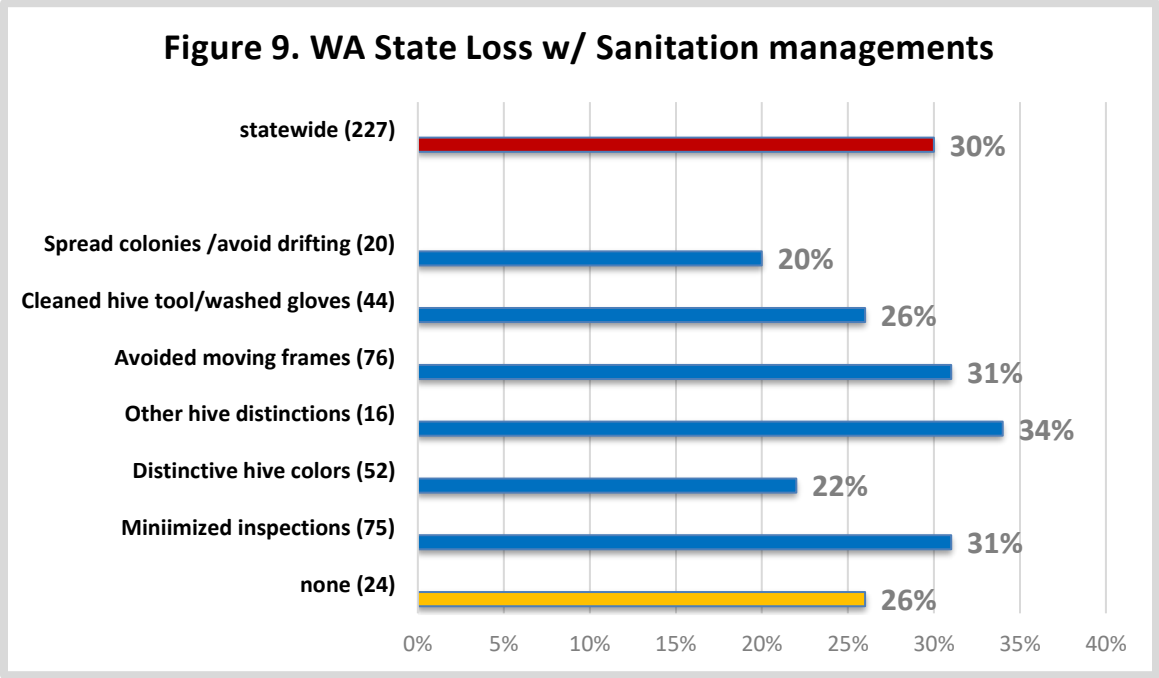
lost only 3 for a 14% loss and last year the two 2 individuals had a 33% loss (last year's average loss statewide was 34%) but it was based on only 3 colonies. Equalizing hive strength in the fall demonstrated lower loss levels in all eight recent winter periods (as in this one) and top insulation has demonstrated lower loss in six of eight winters – this winter a 3-percentage point advantage. Ventilation above the colony (Vivaldi Board/quilt box) demonstrated improved survival five of the eight winters; last year loss level was higher by 5 percentage points compared to overall loss and this year by 4.5 percentage points. The 29% of individuals (66) who did the FAST TRACK and did not indicate any managements had a 37% overwinter loss rate. Last year it was 30% of respondents and they had a 46% loss level, 12 percentage points higher than statewide average of 34%.

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 311 responses for this survey question 2.3/individual for those selecting other than none, same as last year). Twenty-four individuals (15%) said they did not practice any of the six offered alternatives; they had a loss rate of 26%, four percentage points lower than the statewide average. The 66 individuals who used Fast Track (no response) had a 37% loss.

# selections	# indiv (%)	% loss
1	46 (34%)	33.5%
2	53 (39%)	26%
3	24 (18%)	29%
4	8 (6%)	47%
5	6 (5%)	5.5%

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 less than 30% had better than average winter survival.

In all seven years doing none of these managements resulted in anything approaching better than average survival; last year the 18 individuals doing nothing had average statewide losses, this year the 24 individuals had a 26% loss, four percentage points better than statewide average. The managements of reducing colony drift by spreading colonies and providing hives with distinctive colors were managements most helpful by 10 percentage points and 8 percentage points respectfully for improving overwintering success.



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. Those 66 individuals who used Fast track (no response) had a 37% loss. The 25 Washington individuals (15.5%) who said they did not use screen bottom boards lost 32.5% of their colonies. Those 31 beekeepers using SBB on some of their colonies lost 22.5% and the 105 individuals (65%) using SBB on all of their colonies had 27.5% loss.

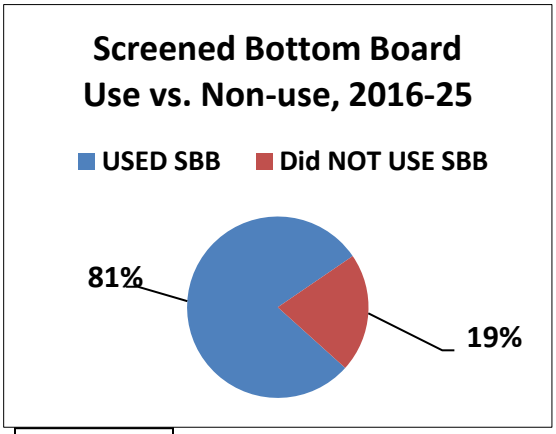


Figure 10

In nine 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 eight-year average 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 is 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. Eighty-three individuals (59%) said they always blocked SBB during winter. They had a 25.5% loss rate. Forty-five individuals (32%), a surprisingly sizable percentage, said they never blocked SBB and had a loss rate of 26%. Twelve individuals (8.5%) blocked them on some of their colonies. Their loss rate was 33%. So, the 65 individuals that blocked or sometimes blocked screen boards had 33% loss. Over the past seven 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, does not usually mean lower winter losses (but sugar syrup feeders did better this year). 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 dry or as pollen patty does seem to slightly improve survival. The supplemental feeding of protein (pollen patties) might be of assistance earlier in the spring season as it has been demonstrated to help bees build strong colonies, but this may lead to greater swarming.

Winterizing measures apparently help lower losses for beekeepers. Rain shelter and top insulation, spreading colonies out in the apiary and painting distinctive colors or doing other measures to reduce drifting are of value in reducing winter 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 the percentage of Washington hives monitored for mites during the 2025 year and/or overwinter 2025-26, 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. Fifty-three

Washington respondents did not provide a response and did FAST TRACK for this section. They had a 52% loss. One hundred and nine (60.5% - a decrease of 4.5 percentage points from last year) said they monitored all their hives. Losses of those individuals monitoring was 22%. Thirty-four (19%) reported no monitoring; they had a higher loss rate of 25.5%. Thirty-seven individuals monitored some with a loss rate of 34%.

In order of popularity of use, 86 individuals used sticky boards (27.5% loss), 79 used alcohol wash (26%), 69 examined worker adults (28.5% loss), 59 looked on drones or drone brood, 26% loss and 17 used powder sugar, 27% loss. Monitoring helps as management to reduce losses.

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 2025-26 was sampling both pre and post (56 individuals 59% of responses); they had 21% loss, nine percentage points lower than overall lost rate for Washington beekeepers. Those 28 sampling pre had a higher loss rate (35%) while those 11 only sampling post treatment had a 21% loss. The 26 individuals who treated without sampling had a 21% loss. The three individuals that sampled but did not treat lost 55% of their colonies.

It is important to KNOW mite numbers. Mite monitoring methods did not vary. Sticky (detritus) boards below the colony can be a challenge (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 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

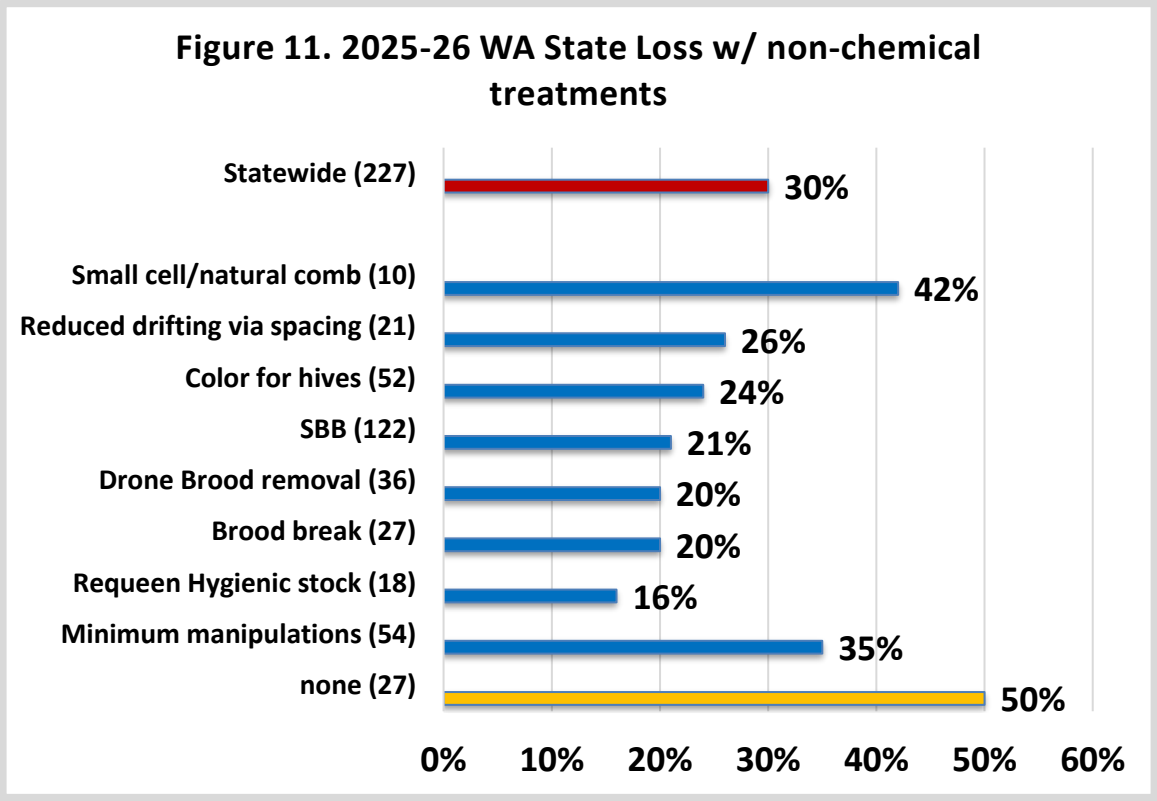
The survey asked about non-chemical mite treatments and also about the use of chemicals for mite control. A total of 172 answered this question for non-chemicals, with the remainder electing to

FAST TRACK – those 55 not responding to non-chemical treatment had a 50% loss and the 63 non-respondents for chemical use had a 48% loss. Twenty-seven individuals (15.5%), 1.5 percentage points greater than last year, of respondents said they did not employ a non-chemical mite control. Five respondents (3%) did not use a chemical control. Those 27 individuals who did not use a non-chemical treatment reported a 63% winter loss and the 5 not using a chemical control had a 49% loss. 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), three hundred seventy-eight selections were indicated 2.2 (up from 1.7/person last year but same as year before 2.2/individual). The 54 individuals who FAST Tracked and did not respond had a 50% loss level. Thirty-eight individuals used one method and had an 18% loss, 51 used two (21.5% loss level), 31 used three (24% loss), 14 used four (13.5% loss) and 12 used 5 or 6 and had a 29.5% loss. There is no correlation that with increased number of selections that loss level will decrease.

Use of screened bottom board was listed by 122 individuals (83.5% of individuals selecting other than none). They had a 20.5% loss level. The best survival choices were requeening with hygienic stock by 18 individuals (16% loss), and brood cycle interruption (27 individuals had a 19.5% loss) and drone brood removal (36 individuals) also a 19.5% loss rate. The use of the remaining seven selections is shown in Figure 11; number of individuals in ( ), bar length represents average loss level of those individuals using each method.

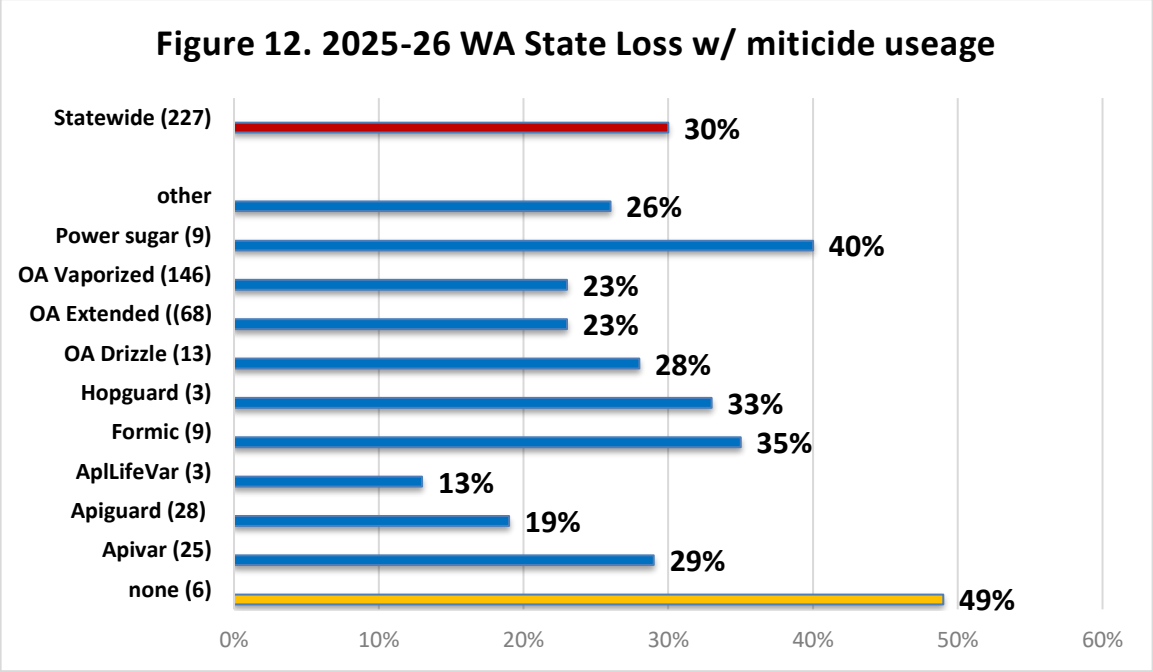
Three of the non-chemical alternatives – drone brood removal (36 individuals, 20% loss), brood cycle interruptions (27 individuals, 20% loss) and requeening with hygienic stock (18 individuals, 16% loss) have also been the most useful in previous year surveys in reducing winter losses. Painting hives with distinctive colors has resulted in better survival in each of the past five years, as it did this year (24%). Minimum intervention (35% loss) and small cell/natural comb (42%) showed the worst survival.



Chemical Control: For mite chemical control, five individuals (3% of total respondents) used NO chemical treatment; these five individuals (53 colonies) had a 59% loss level (the last three years those doing no treatments lost 100%, 61% and 67% but colony number lost (average 8) was not extensive- this year it was a 10 colony average). Those using chemicals used at rate of 1.7 /individual (last year 2.1/individual). Eighty-one individuals (58%) used one chemical and had 32% loss, 57 used two and had a 46.5% loss, 22 used 3 (7% loss), 4 used 4, (8%). Figure 12 illustrates the number of uses ( ) and bar length indicates the loss rate for those using that chemical.

Apivar: One-time users (17 individuals) had a loss rate of 34%, while 7 individuals using it twice the loss rate dropped to 30%. One individual used it three times (7 colonies, no loss). The 25 users of Apivar (15.7% of total respondents using a chemical) had a 28.5% loss. This is a mere 1.4 percentage points better than state average.

Apiguard: The 14 individuals that used it once had 12% loss, the 11 individuals who used it twice had a 39% loss. Two individuals used it three times lost 3 of 45 colonies (6.5% loss), and the one who used it 4 times lost one of 3 colonies (33% loss). The overall loss rate for 28 users of Apiguard (17.5% of users of chemicals) illustrated that it is helpful for survival – overall 19% loss rate, but this was largely due to one individual with large colony numbers and effectiveness of one-time users.



ApiLifeVar: Although there were only 3 individuals who used the essential oil material ApiLifeVar (all three used it once) their survival rate was outstanding. The 3 had a loss of only 3 of 23 colonies - an 11% loss rate. Other herbals indicated in the other category lost 5 of 14 colonies for a 35% loss.

Hopguard: three individuals used Hopguard, an acid. One used it once and 2 used it twice. Overall loss rate 33%.

Powder sugar: Nine individuals used powder sugar. Their loss was 40%.

Narroa: Two individuals said they used this new dsRNAi product – they had 32% loss.

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 for an extended time, even when supers 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. NOTE: Oxalic acid in one of the three forms was used by all but 19 Individuals who did not Fast Track.

OAD: Thirteen individuals used OAD. Three used it 3 times with 46.5% loss of fall colonies, three others used it twice for 89% loss and the 17 one-time users had a 175 loss. Overall loss rate= 28% for OAD, mainly from the one-time users.

OAE: Use of Oxalic acid in an extended manner has increased dramatically. Absorbent pads may last 4-6 weeks and then be replaced. Ten users of OAE indicated use 6+ times and lost only 9 of

83 so treated colonies for loss rate of 11%. Two individuals used it 5 times and had a 18.5% loss, the four individuals that used it 4 times for some reason had a heavy 355 loss, five individuals used it 3 times (2% loss), 18 individuals used it twice for 18% loss and 23 individuals used it once for 36% loss The overall loss rate for OAE was 22.5%. The two who indicated using VarroxSan the commercially available OAE, had a 67% loss.

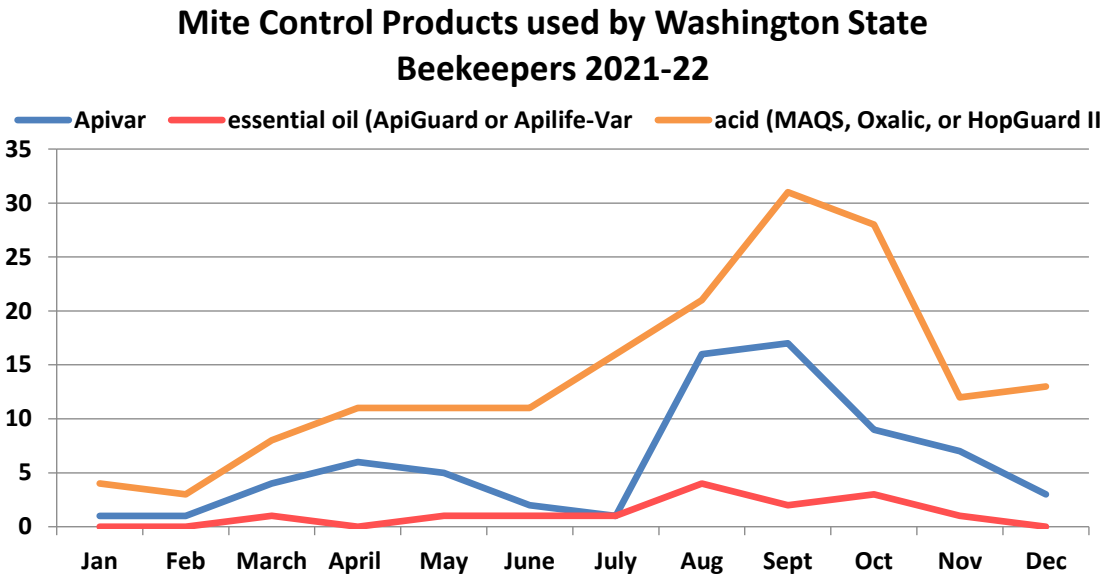
OAV: This chemical mite treatment was by far the most popular, used on 865 colonies (compared to 646 colonies treated with OAE). Both formulations had better than average survival – 22.5% for OAE and 21% for OAV, 7 and 9 percentage point improvements respectively over statewide survival. One hundred and fifteen individuals said they used OAV. The number of individuals, their fall colony number and loss are shown is table below. It is clear that OAV needs repeated use to be effective.

1X	11 indiv	41 fall col	39% loss
2X	16	51	20%
3X	16	156	37%
4X	14	127	28%
5X	11	122	18%
6+	50	368	18%
Total	115	865	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 19% and 13% loss. Apivar, the synthetic amitraz, has demonstrated better survival over the past 7 of 8 years but this year by only a single percentage point las year it was 2 percentage points poorer in survival.

Oxalic acid vaporization over the past 6 years has a 14% better survival (the survey did not differentiate Oxalic vaporization from drizzle prior before); this year a 9-percentage point better survival difference. Formic acid use is declining, 9 individuals indicated using it this year, and it seems not to be very effective – a 5-percentage point poorer survival this year.

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.



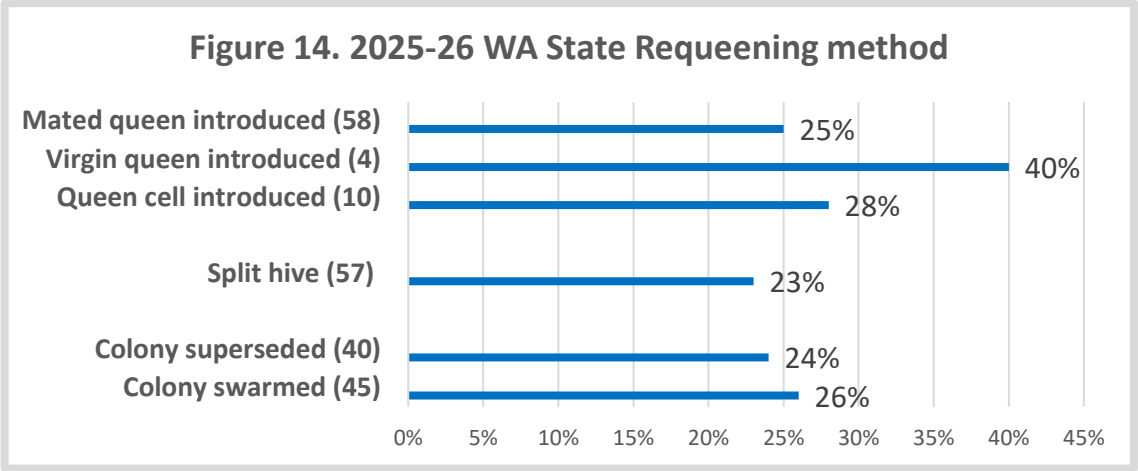
Antibiotic use

One individual with 32 fall colonies reported using Terramycin; the loss level was 53%. One individual (43 fall colonies) indicated use of Tymol, they had a 53% loss. Four individuals indicated the use of Fumagillin (Fumidil-B) for Nosema control; their loss rate was 10% (40 fall colonies). The four Nosevet users lost only 3 fall colonies of 79 total = 4% loss.

Queens

We hear lots of issues related to queen "problems." Twenty-four percent of 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. Seventy individuals FAST Tracked and did not respond to the section on queens; they had loss level of 51%. We asked if you had marked queens in your hives. Eighty individuals said yes (loss level 25%), and 77 individuals said no (loss level 26.5%.) The related question then was 'were your hives requeened in any form?' to which 80% (124 individuals) said yes (loss 25%); nearly equal numbers said no or 'not that that I am aware of.' Loss level of no was 35%, and 23% for 'not aware of' responders.

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). Fifty-eight individuals indicated they requeened with a mated queen, and they had a 24.5% loss level, four used a virgin queen (40% loss) and 10 used a queen cell (27.5% loss). Fifty-seven said they split their hive(s) 23% loss, 45 indicated their colonies swarmed 25.5% loss and 40 said supersedure occurred – they had a 24% loss. Loss levels of colonies that did it themselves via supersedure and swarming were not very difference compared to those whose queen replacement was managed by the beekeeper via mated queen or queen cell. Splitting hive was slightly lower loss.



Closing comments

I intend to continue to refine this instrument each season and hope you will join in response next march/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

I whole heartedly thank Jenai Fitzpatrick, who has been an invaluable assistant through the years with the data and to Bill Cauterall who has been our webmaster for PUB and who has graciously continued with the loss survey. For different reasons, neither individual now keeps honey bees, so for both this is a labor of love. Both say it is payback to those years they had bees and the wonderful friendships developed among the beekeepers.

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 2026