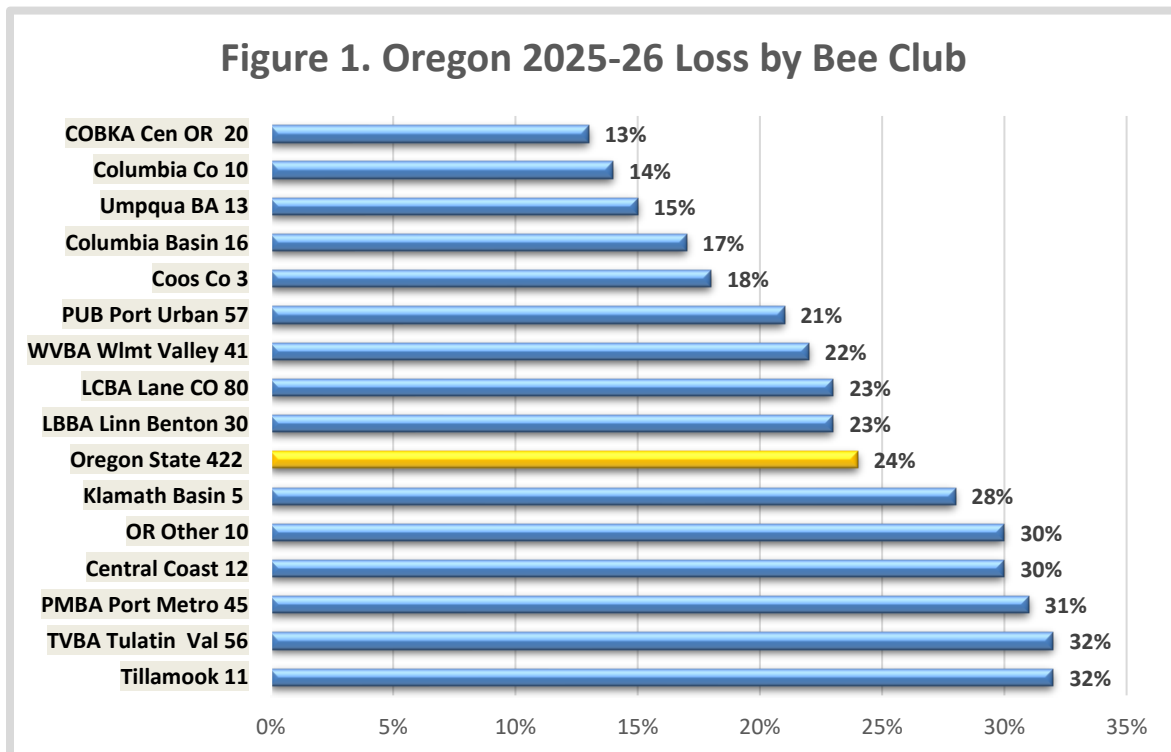


Winter Bee Losses of Oregon Backyard Beekeepers for 2025-2026

by Dewey M. Caron

Overwintering losses of small-scale Oregon backyard beekeepers remained low this season, 1.1 percentage points below the previous winter of Oregon hobbyist/backyard beekeeper surveys. - www.pnwhoneybeesurvey.com. Herein we discuss the data provided by 422 Oregon beekeepers, an increase of 170 from the previous year and 147 above the 10-year average response rate of 275 (range 171-416) respondents. **Overall loss rate was 24.4%**. Results of the 226 Washington respondents completing surveys (more than 100 above the average response rate of the last 6 years of 120) are included in a separate loss report. The Washington average loss was 28.8%, 5.2 percentage points below loss rate last year. It was a record year for returns. Thank you.



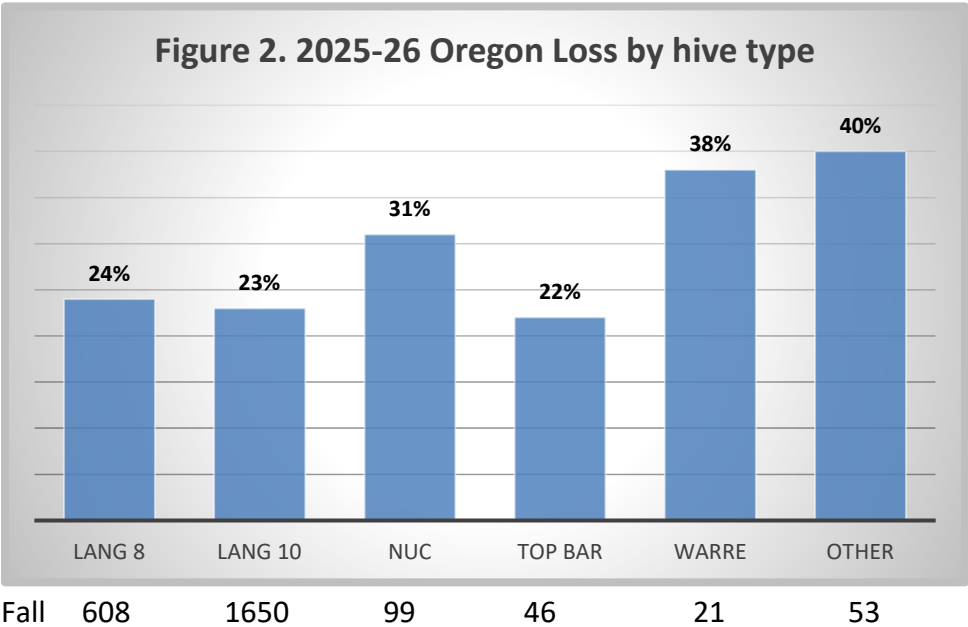
State/Club Losses

The Bee Club results of 15 local Oregon associations are shown in Figure 1 above. Individual colony numbers ranged from 1 to 45 colonies in Oregon (average 5.9 colonies, 0.2 percent higher than last year; medium number = 4 colonies, same as last year). The number of respondent individuals are listed following association name on Y axis. The bar length on x axis is the average club loss percentage for the year. Bars to left of 24% are losses below the statewide average while those above 24% had heavier losses.

Overwinter losses of members of the 15 clubs varied from a low of 12.8 for SOBA (16 respondents) to 32% for Tillamook (11 respondents). There were 10 respondents, two from coast and remainder in eastern Oregon, which had a 29.5% loss level. The 2.5X range (13 to 32%) loss of the fifteen clubs is one-half the range last year. Approximately 80% of respondents are along the I-5 corridor between California and Washington.

2025-2026 Overwinter Losses by Hive Type

The loss statistic was developed by asking number of fall colonies and surviving number in the spring by hive type. Respondents had 2485 fall hives (the highest number of past 10 survey years) of which 1879 survived to spring (606 lost), equating to a 24.4% loss (75.6% survival rate). This was a 1.1 percentage point improved survival compared to the previous winter loss rate. It was lower than the 16-year average loss rate of 36% by 12.4 percentage points.



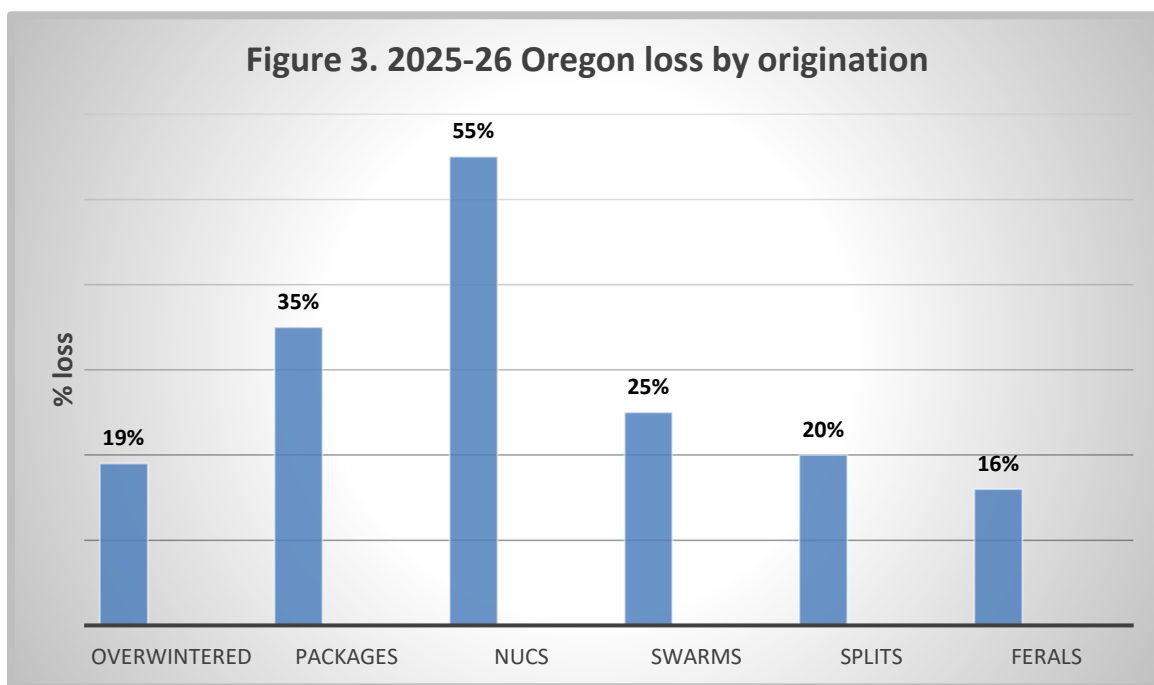
There were 608 fall 8-frame hives (loss rate 24%), 1650 10-frame Langstroth hives (loss rate 23.3%) , 99 nucs (loss rate 31.3%) and for “other” hive types 16 individuals keeping 20 long hives (loss rate 35%), 10 individuals with 11 Layens hives (loss rate 36.5%) and a single individual had a Ukrainian hive (it survived) . Among non-traditional hive types were 32 individuals with 46-top bar hives (22% loss), 13 individuals keeping 21 Warré hives (31.3% loss) and 22 “Other” hive types not identified with 45.5% loss rate - some could have been movable frame hives.

The loss rates of Langstroth 8 and 10 frame hives over the past 10 years have averaged 34.3% for 8-frame Langstroth hives and 38.7% loss for 10-frame hives respectively. This season there was only 0.7 percentage point difference, with 10 frame hives with slightly lower loss level. Nuc losses are typically higher than losses of 8 or 10-frame Langstroth hives as occurred this year. The Nuc 10-year

average loss is 41.7%. This year's Top Bar hive loss of ten colonies (22%) is below the 10-year average top bar hive loss of 46%. The 2026 Warré hive loss rate of 33 % is below the 10-year average of 38.6%.

2025-2026 Loses Based on Hive Origination

The survey asked respondents to characterize their loss by hive origination. This year respondents could FAST TRACK and 65% of respondents did not respond to this survey question. The results of respondents who did respond are graphically presented below. Overwintered colonies obviously had the best survival (19%) as is normally the case; it was 10.3 percentage points below the 29.3% average overwinter loss average for the past 8 years, 138 individual respondents. Packages also had excellent survival, 12% loss with 30 respondents. Nuc losses of 37% were below the 8-year average of 50.7% C. Swarms and splits had good survival (25% and 20% loss rates respectively, with 98 and 65 respondents). Only 19 feral colonies were reported by 11 individuals and they had 16% loss.

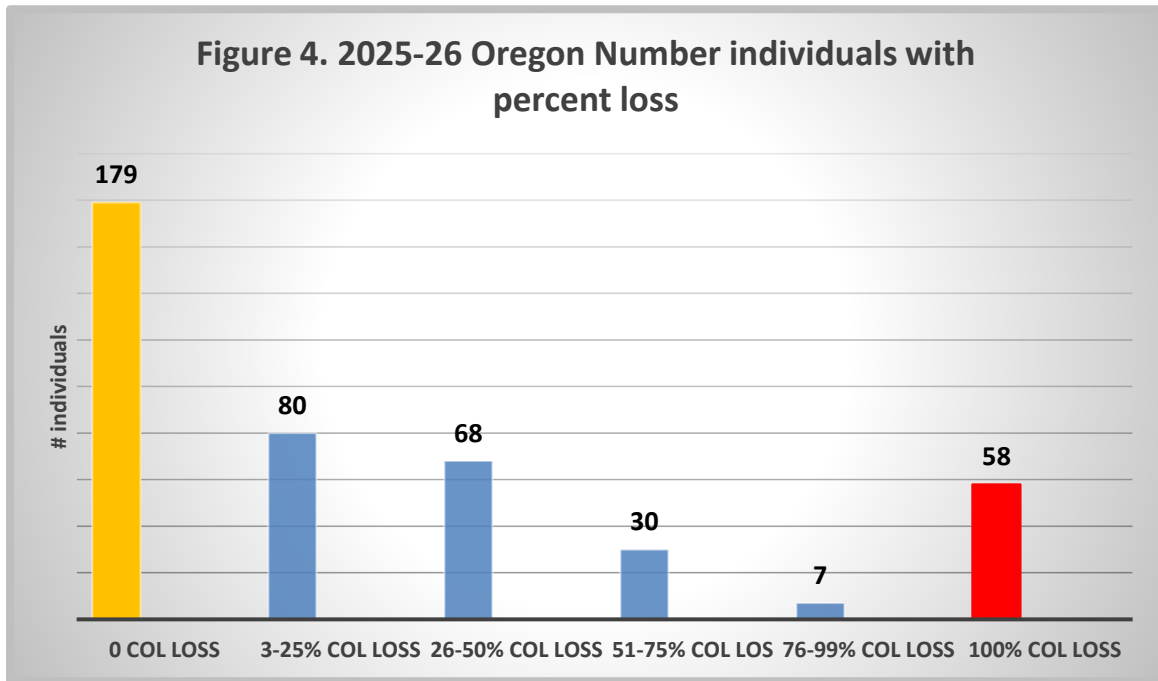


Fall #	528	46	85	235	209	19

2025 -26 Individual Hive Losses

Forty and a half percent (179 individuals) of Oregon respondents had NO LOSS overwinter (total of 671 colonies, range 1 to 18 colonies), the same percentage compared to last year. Thirteen percent (58 individuals – 133 colonies, range 1-6 colonies) lost 100% of fall colonies. Figure 4 below shows loss by individuals relative to percent loss. The loss of a single colony (by 96 individuals) represents 35.5% of total individuals reporting loss. Six individuals (2%) lost ten or more colonies. The highest loss by a single beekeeper was 16 colonies. Numbers shown in Figure 4. Loss numbers are reflective of the fact that the median number of bee colonies of backyarders was four colonies.

Figure 4. 2025-26 Oregon Number individuals with percent loss



Individuals with 1, 2 or 3 colonies, 190 individuals, lost 130 colonies = 21.5% of total 606 colony loss in 2025-26 winter period. The 119 individuals with 4 to 6 colonies, 574 total colonies, lost 29.5% of total colonies. The 34 individuals who lost 7-9 colonies lost 24.5% of total yearly loss. Those with 10-19 colonies (45 individuals – 619 fall colonies) lost 20% and the 16 individuals with 20+ colonies lost 16%. This relationship of individuals with increasing colony numbers having, on average, lower losses has been constant every survey year.

Survey respondents are primarily small colony number beekeepers but years experience varied widely. The 190 of the 442 survey respondents (43%) that had 1, 2 or 3 colonies (16% of total colonies) had an average of 7.7 years of experience (range 1-48 years). The 119 Individuals with 4-6 colonies had 9.1 years experience (range 1-40 years). There were 34 Individuals with 7 to 9 colonies - they had 11 years average experience (range 1-60 years) while the 61 individuals with 10+ fall colonies had 11.7 years experience (range 1-50 years).

Number bee colonies	Number individuals	Percent loss level
1-3 colonies	190	34%
4-6 colonies	119	29.5%
7-9 colonies	49	24.5%
10+ colonies	61	20%

By years of experience, the 95 individuals who had 1 to 3 years bee experience (21.5% of total respondents) had 23% colony loss level, the 124 individuals with 4-6 years experience (28% of survey takers) had a 26.5% loss level, the 55 individuals with 7-9 years experience, 17.5% of total respondent number, had 23% loss level. There were 148 individuals with 10 or more years experience (33.5% of total respondents) lost 22% of their colonies. Lowest was the 18 individuals with 30-60 years experience (186 total colonies) who had a 14.5% loss level. There is no correlation - losses did not decrease as years of experience increased.

# years experience	Number individuals (# colonies)	Percent loss level
1-3 years	95 - (327 colonies)	23%
4-6 years	124 - (754 colonies)	26.5%
7-9 years	55 - (320 colonies)	28%
10+ years	148 - (1094 colonies)	22%

Summary Statewide

	<u>1-3 colonies</u>	<u>10+ colonies</u>
Statewide	34% loss (199 Indiv)	20% loss (70 indiv)

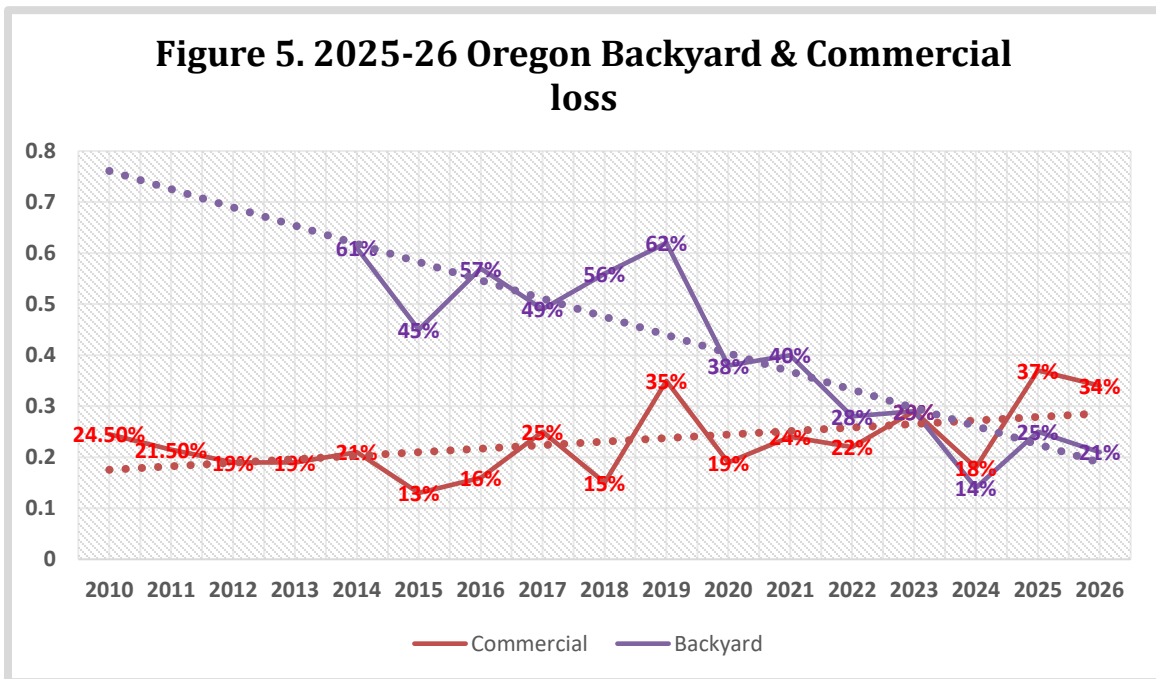
	<u>1-3 years' experience</u>	<u>10+ years' experience</u>
Statewide	37.5% loss (61 indiv)	28% loss (60 indiv)

Overwinter Losses the Past 17 Seasons

Comparison of the annual losses of backyarders with commercials is shown in Figure 5. A relatively small number of commercial beekeepers (individuals with 50 or more colonies) complete the electronic survey. Therefore, the number of commercial respondents (4 commercial and 5 sideliners) is preliminary as of May 1; reported losses on only 9082 colonies (which is 12% of NASS estimated colony number in Oregon, 76,000 colonies). Their preliminary loss rate is 33.5%. The national survey of Auburn and OSU will have a better estimate, and the commercial loss rate will be determined with this result.

Average backyard losses =36.3% loss and 15-year commercial/semi-commercial loss = 21.4%. The Beelformed Partnership (BIP) average (14 years) =25.4%; in 2024 the national survey was

discontinued by BIP. Since then, a consortium of Apiary Inspectors of America, Auburn University and Oregon State University have conducted a national loss survey. The 2024-25 winter loss was 37.7%.



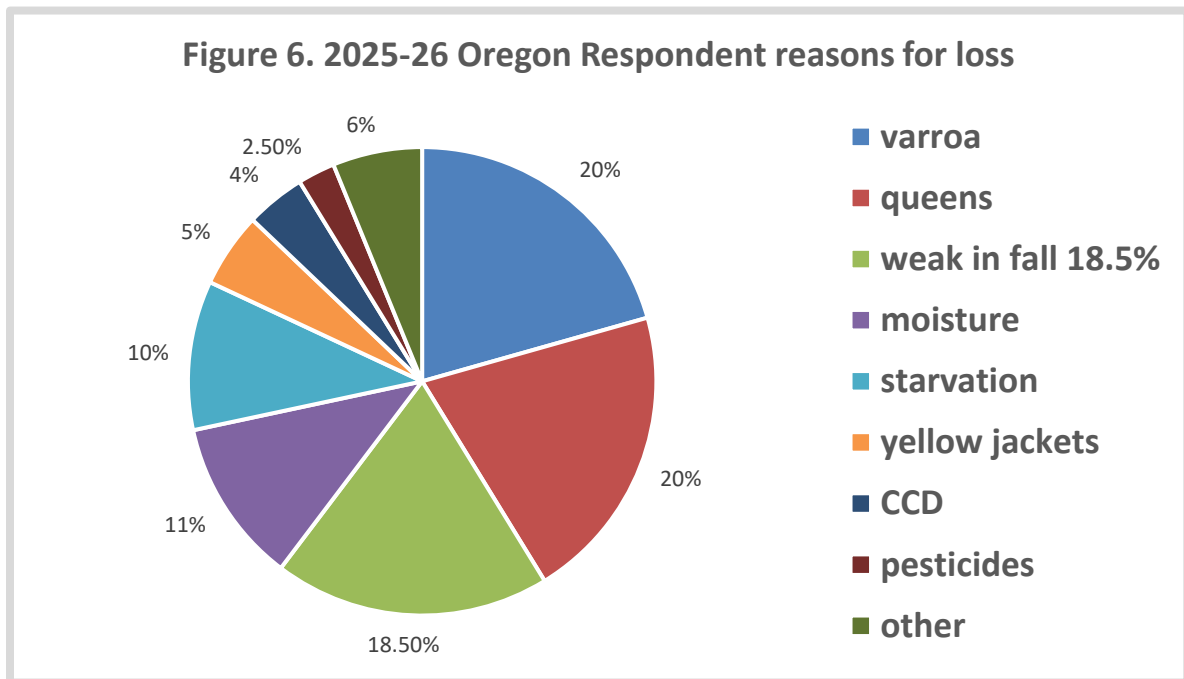
Some Other Numbers

Fifty-four individuals (12%), same percentage as last year, had more than a single apiary location. The loss level at 2nd apiary was same in 20 locations, had improved losses in 21 instances and in 13 survival was poorer. Six individuals had a 3rd apiary site with 2 reporting the same survival, 3 better and 1 poorer. Fourteen of these 2nd sites had one colony and 13 more had 2 colonies at 2nd apiary site. The colony average at 2nd apiary was 7.3 colonies (highest number was 20) with the medium number of 2. Sixteen individuals had a third apiary and 4 had yet another apiary. Average colony number at 3rd apiary site was 3.7 colonies (highest number 10) with medium of 3.5 colonies.

Three hundred twenty-three individuals (76.5%) said they had a mentor available as they were learning beekeeping. This was 1.2 % less than last year. Thirty-one percent of individuals, same as last year, had more than one hive type. And, finally, 30, nearly 7 % of respondents – last year it was 12 individuals (5%) - moved their bees. Distance moved included a few feet, several yards or miles away (greatest distance was 21.5 miles for a “location change”). Two moves were for sale/gifting of hives, one was due to owner move, 3 were for pollination, at least 7 were to seek a better honey site, at least 4 were swarm related, 1 was for better winter site, and 3 involved new locations of beekeeper.

Perceived Colony Death Reason and Acceptable Level

The survey asked individuals that had colony loss (179 individuals listed no loss) to estimate what the reason might have been for their loss (multiple responses were permitted). Fifty individuals listed don't know. There were 400 total listings (excepting the don't know response), almost 2 per individual (1.9/individual). Varroa (80 individuals), Queen issues (79 individuals – both 20% of reason listed) plus weak in the fall (74 individuals – 18.5% of reasons listed) were most common. Moisture (44 individuals -11%) and starvation (39 individuals – 10%) were next, followed by yellow jackets (20 individuals), CCD (17 responses), pesticides (10 selections) and poor wintering (11 individuals). Among 25 other suggested reasons for winter loss were swarming/absconding/bees left (11 individuals), mite treatment (3 individuals), and bears + late fall hive (2 individuals each). Single listing of nosema, mice, wax moth, skunks, robbing, and lack of beekeeper experience. See Figure 6 graph below.



Acceptable loss: Survey respondents were asked the reason for loss. Seventy-eight respondents (18%) indicated zero (no loss). Twenty percent was the medium and most common choice (outside of zero) choice, as has been the case for several years. Fifteen percent said 50% or greater was an acceptable loss level; five said 75% and 8 said 100% loss levels acceptable. See Table below.

Acceptable Loss % 2025-26											
Loss level	5%	10%	15%	20%	25%	33%	50%	75%	100%	None	Other
#	15	59	27	64	79	29	50	5	8	78	7
%	3.5%	14%	6%	15%	18%	6%	12%	1%	2%	18%	

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 acceptable choices varied from zero to 100%, with a medium of 20%. Note that some "reasons" are not likely to be the actual reason for loss but secondary factors, such as mice, skunks and wax moths, except for unusual circumstances.

The major factor in colony loss is 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 weak in the fall and queen problems were also the most frequently indicated reasons along with varroa mites as leading reasons for loss.

Declining nutritional adequacy/forage and diseases, especially at certain apiary sites, are additional factors that result 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 overall losses this past year, 24.4%, were still at a low level. More attention to colony strength and the possibility to mitigate colony weakness in the fall may help reduce some of the losses. Effectively controlling varroa mites will definitely help reduce losses as fewer mites will result in less virus damage.

Colony Managements

The survey asked for information about management practiced by respondents. This year individuals could FAST TRACK through the electronic survey and not answer questions on management. The survey inquired about feeding practices, wintering preparations, sanitation measures utilized, screen bottom board usage, and mite monitoring. Fewer individuals (114) skipped both non-chemical and chemical mite control techniques; 158 opted out of answering the section on

queens. Respondents could select multiple options and there was always a none and other selection possible.

FEEDING: Oregon survey respondents checked 708 feeding options = 2.8/individual, (0.6 less than last year). Forty-five individuals (17.5%), other than the 17 who indicated no feeding, selected a single choice and had 18.5% loss. Fourteen used sugar syrup, 9 hard sugar, 9 fed frames of honey, 1 each liquid honey, fondant and Hive Alive. Seventy-one (28% of respondents) indicated 2 choices (24% loss), 72 (the greatest number and medium) indicated 3 choices (they had 20.5% loss), 44 individuals (17.5%) had 4 choices with 21% loss, 18 (7%) had 5 choices (25 % loss), and 5 individuals (3%) had 6 and 2 had 7 choices and collectively they had a 21% loss. There was relatively little difference - doing more feeding managements did not measurably improve survival.



The managements with number of individuals making that selection are in () in Figure 7; bar length indicates loss level of individuals doing this management. Those bar lengths to left of 24%, the average state survival, the **green dashed** marker, had better survival, while those to right had greater loss level.

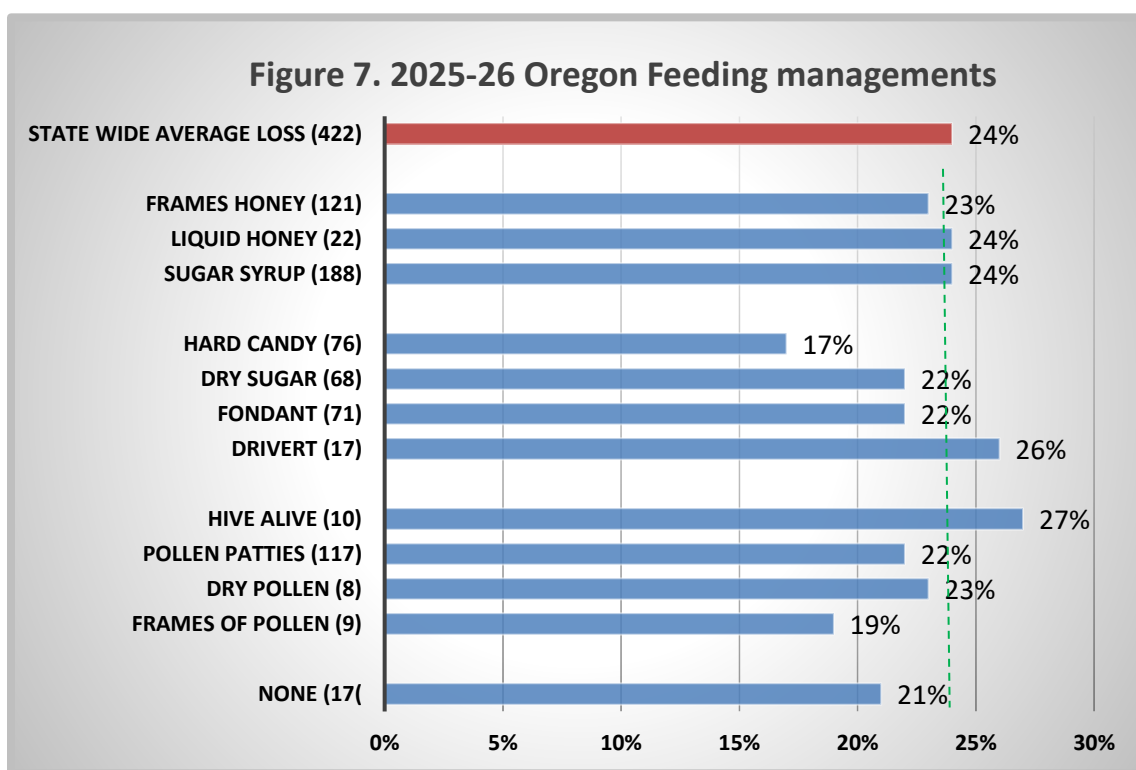
Seventeen individuals (11 more than the previous year) said they did NO FEEDING. They had 55 fall colonies, lost only fifteen for a 27% loss, which was 3 percentage points higher loss compared to the average statewide colony loss. Feeding sugar syrup was the most common feeding option of respondents (188 individuals, 73% of respondents) who indicated feeding management. Their loss rate was 23.5%, slightly below the overall average. Interestingly, the 68 individuals who did not feed sugar syrup had only a 20% loss. I have no explanation for this difference.

Individuals feeding protein 125 individuals (49% of respondents) had an overall survival rate of 22.5%. Those feeding frames of pollen, only 9 individuals, had the best survival of all protein feeders at 19%. The individuals feeding dry pollen had a 22.5% loss – last year they had the best survival of the 3 methods of feeding protein. There were 129 instances of feeding non-liquid sugar. The best survival rates were the 78 candy feeders, only 17% loss; last year the candy feeders also had the best survival.

Summary: Statewide for the last 9 years, individuals who did no feeding had only a 3.2 percentage point higher loss (average 38.2%) i.e. poorer survival, compared to the average loss rate of 35%. This year, the 17 individuals doing NO FEEDING had 21% loss which is 3 percentage points better than average survival (24%). The average percent doing no feeding = 6.1% of individuals the past 9 years – this year it was 6.2% of responding individuals. Feeding is basic management – I do not know why individuals doing no feeding had better than the average survival.

Individuals statewide that fed sugar syrup had a 0.5 percentage point lower loss level average for the last 10 years; this year it was again the same - 0.5 percentage point better survival. Those feeding honey (as frames or liquid) had lower loss only during three of the past 10 years. This year loss level was the same as statewide average for those feeding liquid honey and 1.5 percentage points better survival for those 121 individuals who fed frames of honey.

Individuals feeding non-liquid sugar (in any form) had lower losses eight of past ten past winter seasons. Dry sugar feeders had slightly better or equal survival 9 of 10 past winters and this year, with 22% loss, did better as well; hard candy feeders had improved survival 9 of 10 past winters, including this past winter, with the best survival of all for dry sugar feeders at 17%. Only drivert feeders, 17 individuals, had poorer survival this year than statewide average.



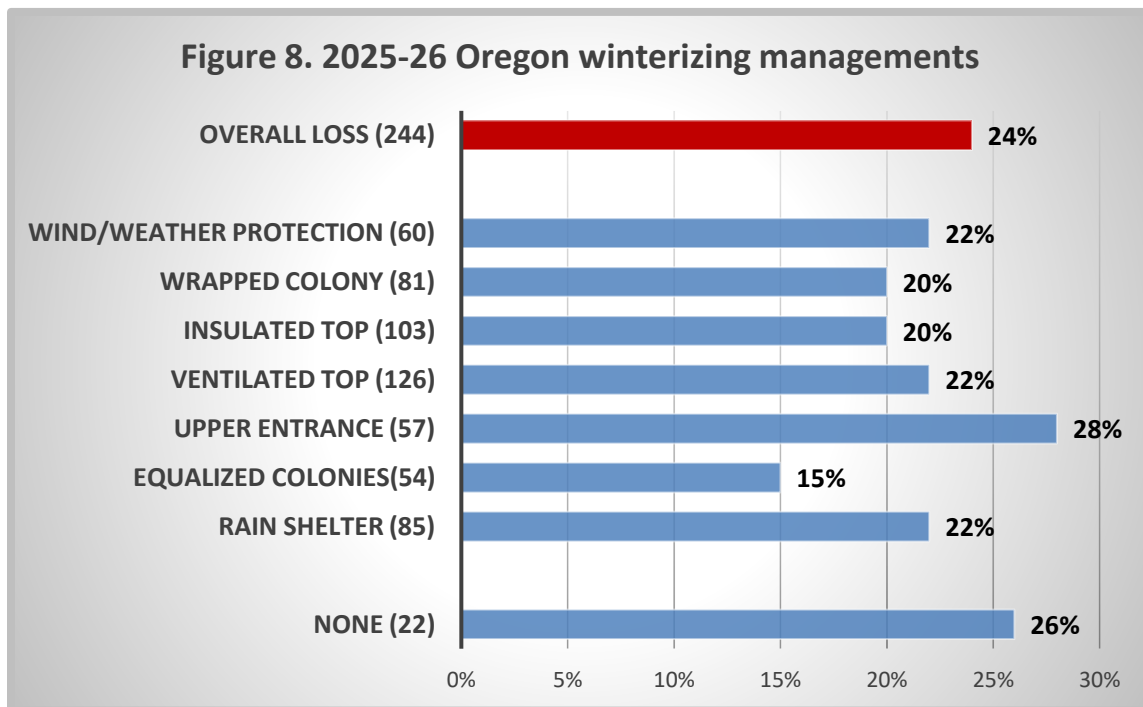
For individuals feeding protein, the protein patty users have had better survival 7 of 10 years (this year losses were 0.5 percentage points better than average); dry pollen feeders had better survival in four of the past 10 years and this year had a 22.5% survival which was 1.5 percentage points better than average.

It is clear that feeding, while a beneficial management, does not, by itself, significantly improve overwintering success.

WINTERING PRACTICES: We received 663 responses (2.65/individual) about Oregon beekeeper wintering management practices (more than one option could be selected). Twenty-two individuals, (9%) of the respondents. indicated doing none of the several listed wintering practices; two years ago, 6% of individuals had an elevated 44% winter loss, more than double overall loss, but last year only a single colony of 35 in the fall died of individuals doing no winterizing – a 3% loss, 97 % survival rate. This year, of 146 colonies of the 22 individuals, loss was 26% - 5 percentage points above the average state loss. For those indicating some managements, 74 individuals (29.5%) did one single thing, (27% loss), 80 respondents (32%) made two choices (21% loss), the median choice, 73 individuals selected three of the winter managements (19% loss), 26 (10.5% of respondents) did 4 (26% loss), 15 did 5 (11% loss) and 4 did 5 and one 6 with 35% loss. Doing more did not ensure overwintering success.



The most common wintering management selected, 126 individuals, 60% of responses, was venting the upper box (21% loss). Next most selected management was using an insulated top (103 individuals, 41% of respondents (they had a 19.5% survival level). Equalizing colonies in the fall had the lowest loss level of 15% (54 individuals) both this year and last year. Wrapping colonies (81 individuals) had slightly lower loss than sheltering colonies from wind/water (60 individuals, 22% loss). Figure 8 shows per cent of individual choices and bar length shows percent winter loss of each selection. Bars to left of 24% line means better survival than overall. Most managements helped reduce losses.



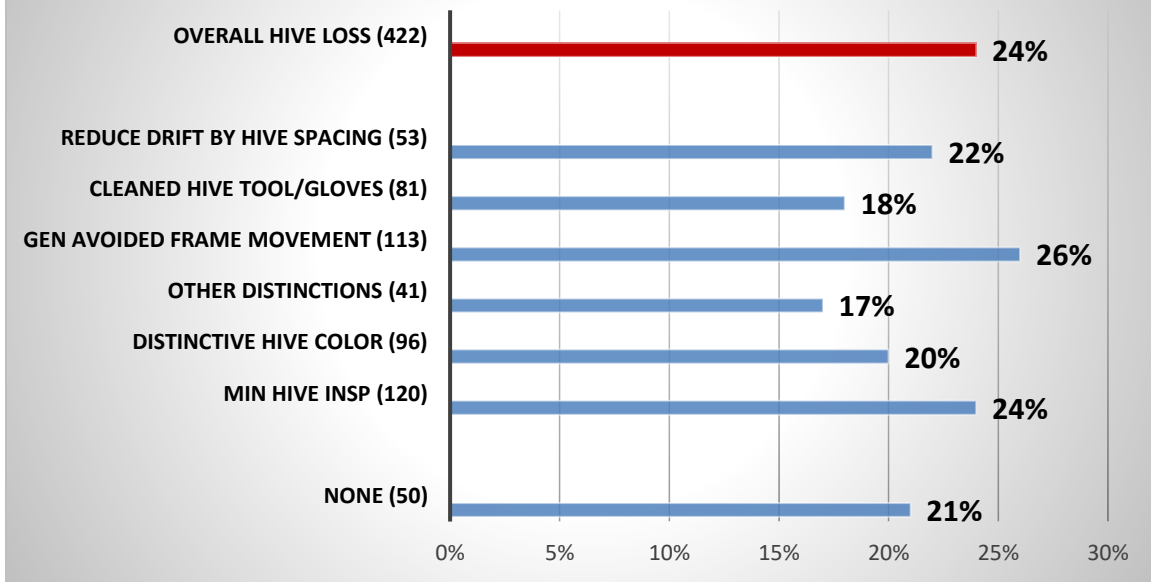
Summary: Over the past eight years individuals that did no winterizing practice (average 10% of individuals –this year the 22 individuals were 8% of respondents) but recall that 38% of total OR respondents did not respond to wintering management questions when they did FAST TRACK, averaged 6.5 percentage point poorer survival rate – this year it was a 4 percentage difference. The 22 individuals doing NO Winterizing lost 38 of 146 fall colonies.

The winterizing management that had the best survival was equalizing colonies (54 individuals, 15% loss), as it was last year. Use of an insulated top winter management has improved survival 7 of 8 years (8-year average a 6.3-percentage point improvement); this year it was 2nd most common winterizing management (103 individuals), and they had a 4-percentage point improvement in survival. Also, a 4-percentage point better survival was realized by the 81 individuals who wrapped colonies. Vivaldi/quilt box, wind/weather protection and a rain shelter all showed a two percent better survival. Like feeding, winterizing efforts, while useful for some individuals, is not by itself a means to significantly improve wintering success. Other measures included modifications to top of hives for additional insulation, closing bottom entrance or the screen bottom board and moving to a more favorable site.

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 510 responses for this survey question 2.3/individual, which was 1.2 percentage points greater than last year. Fifty individuals said they did not use any of the six offered alternatives; they had a loss rate of 21% compared to the overall rate of 24%. Over a five-year period before FAST TRACK those indicating doing nothing had a 37.9% percent loss rate, four percentage points higher than the average loss rate of 33.9% over the same time period. This year with 3.4% better survival and last year with a 3.5 percentage point better survival is a different relationship without the FAST TRACK respondents.

For the 224 respondents (minus the 50 respondents who selected none) 73 individuals (32.5 %) had 1 selection with 25.5% loss, 71 made 2 choices (the median number) with 20% loss level, 40 selected 3 managements (21% loss level), 28 had 4 (23.5% loss level), and 12 made 5 or 6 selections with 13.5% loss level, the lowest loss level for the sanitation selections.

Figure 9. 2025-26 Oregon Sanitation Management

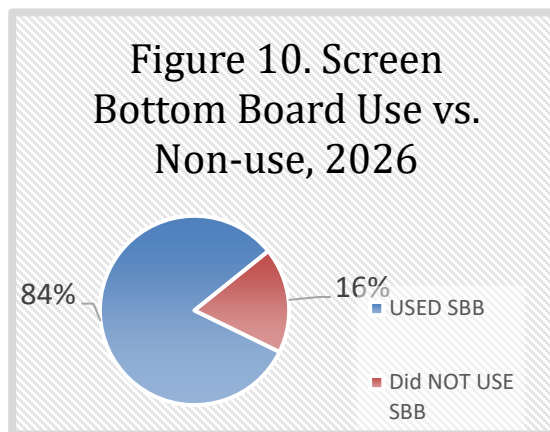


Minimal hive intervention (120 individuals) was the most common option selected, as it has been for the last 5 years. It could be argued that less intervention might mean reduced opportunity to compromise bee sanitation efforts of the bees themselves and that excessive inspections/ manipulations can potentially interfere with what the bees are doing to stay healthy. This option, however, has not improved winter survival; the loss rate for this group the past 8 years was 42%, 10.3 percentage points above the average 8-year loss rate. This year the 50 individuals had a 21% loss rate, 3 percentage points below the average. Cleaning hive tools and gloves and, particularly, measures to make colonies distinctive had the best survival but also the fewest participants. Other sanitation measures listed included using one hive tool for one hive, placing deadout frames in freezer before reusing and lowering colony number to fit the land carrying capacity.

The best management for several years was to paint hive bodies assorted colors (96 individuals with 20% loss rate) and doing other managements to avoid drifting (41 individuals, 16.5% loss rate). Reducing drifting has been a sanitation choice that has demonstrated better average survival the past eight years – 2.5 percentage point improvement this year. This year and last, generally avoiding moving frames had slightly poorer survival – 2 percentage points poorer this year. Overall, sanitation appears to be relatively minor toward improving survival.

SCREEN BOTTOM BOARDS (SBB)

Although many beekeepers use SBB to control varroa, BIP and PNW surveys clearly point out they are not a highly effective varroa mite control tool. In this recent survey, statewide 35 of the 224 individuals responding (15.5%) said they did not use screen bottom boards - 25% said they used sometime. Average non-use for the last ten years is 16%, vs 84% use, on some or all colonies. Figure 10 right.



This past overwintering season, the 35 non-SBB users had winter losses of 50 colonies, a 19.5% loss. Examining the ten-year average of SBB use, loss level of the 84% using SBB on all or some of their colonies was 32.2% loss level whereas the 16% not using SBB had loss rate of 35.2%, a 3-percent point positive survival gain for those using SBB versus those not using them. This year Those using screen bottom boards had a 22.5% winter loss versus those not using them having a 19.5 % loss.



We asked if the SBB was left open (always response) or blocked during winter. This past season, 84.5%, 187 individuals, said they always or sometimes blocked SBB during winter. Statewide those who blocked always or sometimes had 1081 colonies in the fall and lost 207, a 19% loss rate. Those 37 who never blocked had a 32.5% winter loss, a 13.5-point percent difference; last year it was a 6-percent point difference. As in past years, there is an advantage **in favor of closing the SBB over the winter period to improve survival.**

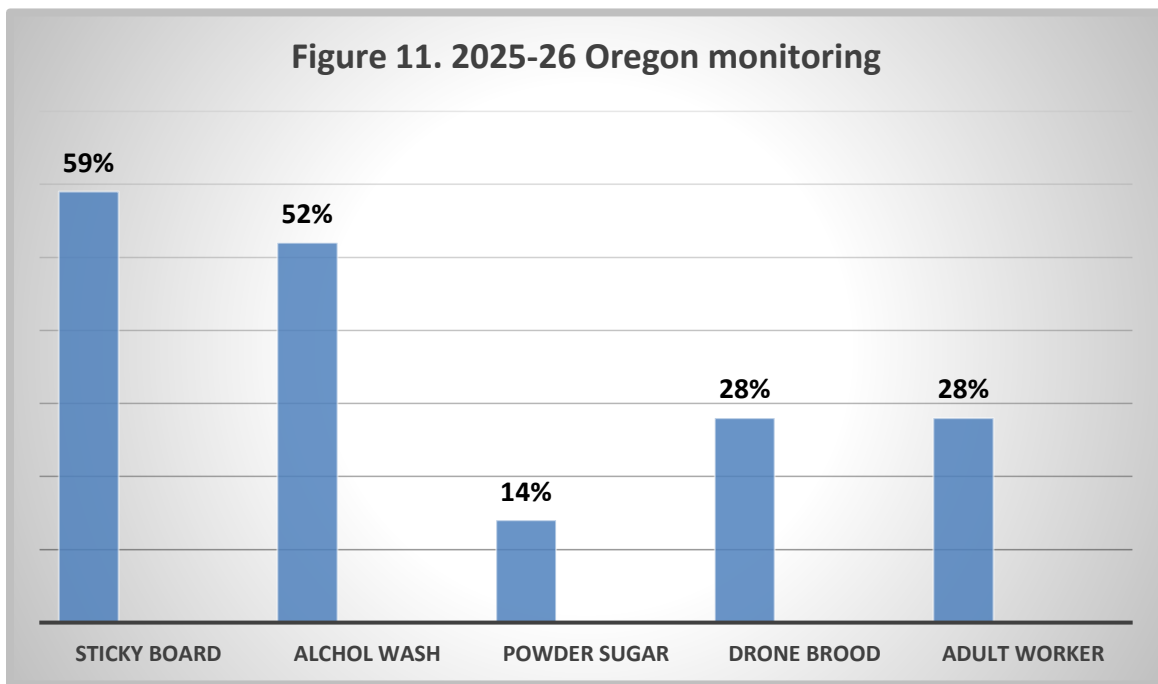
Mite monitoring/Sampling and Control Management

On hundred twenty-four respondents (64.5%), said they monitored all their hives. The losses of those individuals monitoring were 19%. Thirty-six individuals (17%) reported no monitoring; they had 28% loss. Thirty-two individuals reported monitoring some of their colonies; they had a 25.5% loss. Data for last 9 years in table below.

	ALL Colonies Monitored % individuals	% Loss	SOME Colonies Monitored % individuals	% loss	No colonies Monitored % individuals	% loss
2026	64.5%	19%	19%	25.5%	17%	28%
2025	69%	23%	15%	25%	17%	22%
2024	64%	21%	17%	28%	17%	15%
2023	68%	29%	16%	27%	16%	36%
2022	66%	37%	15%	27%	18%	42%

2021	73%	34 %	11%	36%	17%	36%
2020	67%	33%	13%	16%	20%	49%
2019	67%	51%	15%	50%	18%	59%
2018	63%	38%	14%	26%	26%	49%
2017	63%	43%	15%	60%	22%	48%
8-year loss avg		36%		35.5%		42.5%

Individuals indicated use of 2 monitoring techniques on average. In total choices, in order of popularity of use, 95 individuals used sticky boards, 83 used alcohol wash, 36 used powdered sugar, 57 looked on adult bees for mites and 56 looked on drone brood for mites. In the past 5 years, the use of sticky boards has decreased, and alcohol washing has increased in use. This year sticky board percentage exceeded alcohol – the previous three years alcohol use monitoring was the major monitoring technique. Figure 11 below illustrates percent using the five monitoring methods.



Whatever technique used, most sampling to monitor mites was done in July – September, as might be expected since mite numbers change most quickly during these months and sampling results can be used to key control decisions. Figure 12 illustrates, from a previous season, monthly sampling with five methods.

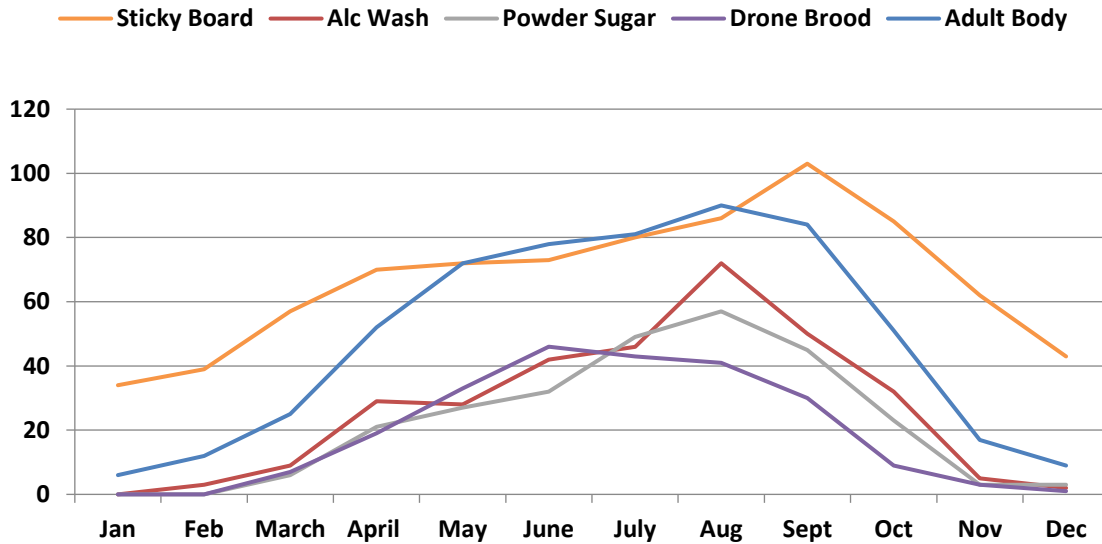
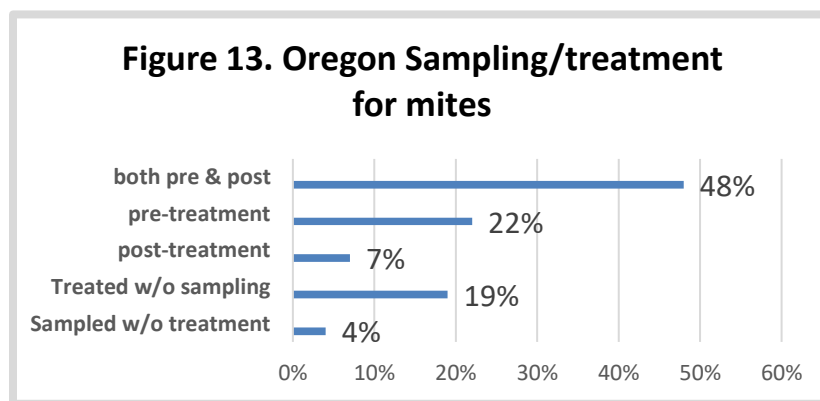


Figure 12

There were 144 responses to when sampling was conducted. The most common sampling of respondents is both pre- and post-treatment (48% average) followed by sampling pre-treatment (22%). It is important to know if the treatment works so post treatment should not be avoided. Treatment without sampling was 19%, an increase of six percentage points over the last two years. Figure 13.



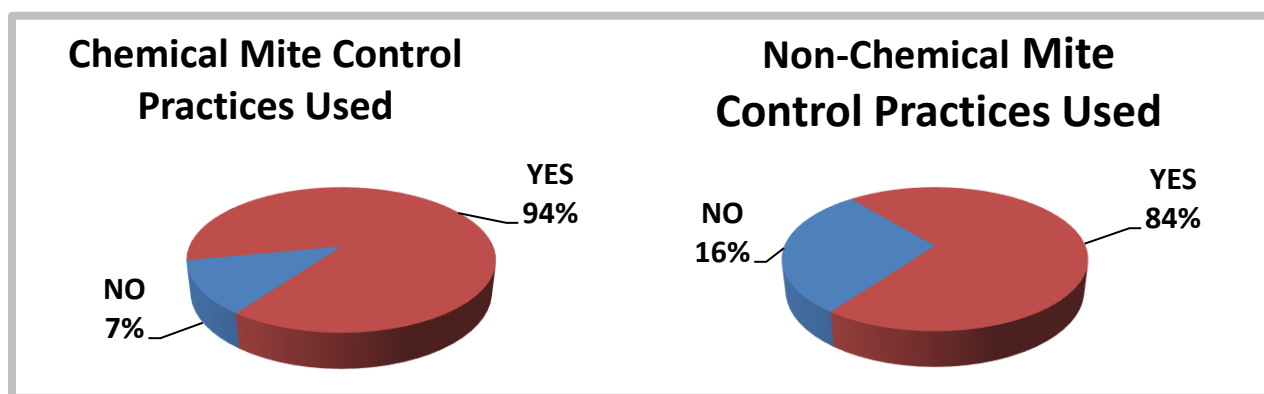
It is important to KNOW mite numbers. Less effective mite monitoring methods include sticky (detritus) boards below the colony and powdered sugar. Often so much detritus drops onto a sticky board that counting the mites can be hard, especially for new beekeepers. Sticky boards used for a

single day pre- and post-treatment can help confirm the effectiveness of a treatment, if numbers drop post treatment. Visual sampling is not accurate: most mites are not on the adult bees, but in the brood, especially when there is a lot of brood. Additionally, adult mites are NOT on the adult body where they can be observed (over 90% are on the lower abdomen, tucked within the overlapping bee sternites). Sampling for mites in drone brood needs to be refined as a predictive number; they can be used as an early warning of the numbers of mites reproducing in drone cells.

See **Tools for Varroa Monitoring Guide** www.honeybeehealthcoalition.org/varroa on the Honey Bee Health Coalition website. The Tools guide suggests 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 see more colonies suddenly disappear (abscond?) during the fall, which may be related to the treatment itself or bees suffering for mite transmission of viruses.

Mite Control Treatments

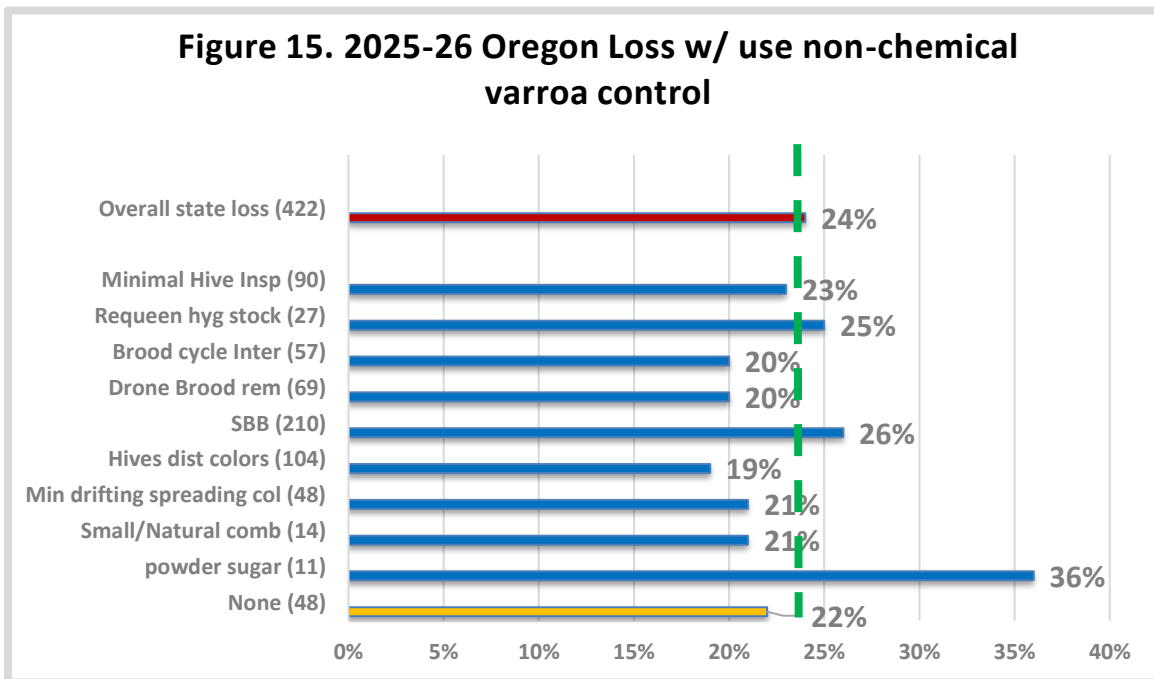
The survey asked about non-chemical mite treatments and about the use of chemicals for mite control. Twenty-seven percent of respondents did not respond to the varroa mite control questions (they lost 141 colonies of 464 fall hives- a 30.5 loss level)– 309 individuals did complete this part of the survey. Forty-eight individuals (15.5%) said they did not employ a non-chemical mite control. Those 48 individuals reported a 30.5% winter loss, six percentage points poorer survival than overall. Twenty-one individuals (7%) did not do a chemical mite control - they had a 45% loss level, a 20-point poorer survival. The individual options chosen for non-chemical control and chemical are discussed below.



Non-Chemical Mite Control: Individuals selected 639 total treatments. 2.4/individual. Of nine non-chemical alternatives offered on the survey (+ other category,) 69 individuals (26.5% of respondents excluding the 48 individuals who selected none) used one method (and had a 26% loss level), 88 (33.5%) used two (24.5% loss), 48 used three (22% loss), 38 (14.5%) used 4 (17.5% loss), 13

(5%) used 5 (30% loss) and 5 individuals used 6 (loss level 12%). Clearly using more than one method/tool (with the unique exception of the 5% with 5 selections) improves success.

Two hundred-ten individuals (80% of total respondents – 6 percentage points higher than last year) listed use of screened bottom board. They had 25.5% loss, one percentage point higher than average. The next most common selection was distinctive colors (104 individuals= 40% of respondents); they had a 19% loss, 5 percentage points better than statewide average. The use of the remaining selections is shown in Figure 15; number of individuals in (), the bar length represents the average loss level of those individuals using each method. Those left of **green dashed** line had improved survival.



Two of the non-chemical alternatives have demonstrated reduced losses over the past several survey years. Reducing drifting such as spreading colonies for past 7 years – question not asked in 2016-17 survey, and brood cycle interruption have consistently, year after year, demonstrated somewhat better survival than average loss (21% and 20% respectively this year). Different colony colors in apiary (19%) and drone brood removal (20% loss) were helpful managements also this year. Among other non-chemical treatments, one person said they used the Bee Gym device to help promote hygienic behaviors, but they lost 2 of 4 colonies.

Chemical control: For mite control via use of chemicals, 21 individuals (7% of total respondents not using Fast track) used NO chemical treatment. They had a loss level of 45%. The 148 individuals who used FAST TRACK and did not supply information had a loss level of 29%. Those using chemicals used at a rate of 2.3/individual last year, same as in the previous year. One hundred three individuals using a chemical (43%) used one chemical. Overall, these individuals had a 30% loss level. Individuals who used 2 chemicals (80 individuals - 33% of respondents, had 22% loss. The forty-six individuals that

used 3 chemicals did even better – 18% loss, while the 10 individuals using 4 or 5 chemicals had a 7% loss. It is clear that use of chemicals improves survival. For this data different oxalic use was counted as a separate use. Figure 16 shows usage and loss levels.

Apivar: The number of times a chemical was used was captured in the survey. For example, of the 58 individuals who used Apivar, the synthetic miticide amitraz, one respondent reported using it 6+ times (30% loss), two used it three times (24% loss), 13 individuals used it twice (27% loss) and 40 individuals used it once and reported 11.5% loss. Legally it is permitted to be used twice per year. Overall, for the 58 Apivar users, there was 15% loss. It continues to provide excellent varroa mite control for Oregon backyarders. Overall loss rate is shown in Figure 16.

Essential Oils: Apiguard, the essential oil gel, had a very decent modest gain of 2 percentage points over statewide average - 22% survival level. It was used four times by two individuals, they had 8% loss, four individuals used it 3 times (14% loss), 15 individuals used it twice, 35% loss and the 47 individuals using it once had a 20.5% loss level. There were only 6 individuals who used APiLifeVar, also an essential oil miticide. Overall loss=55% for this miticide. In previous years, losses were below the statewide average.

Formic Acid: Formic acid is a powerful acid capable of causing collateral damage to the bee brood and is sometimes a queen killer. Two individuals used it three times with only a single colony of 8 fall colonies surviving for 87.5% loss level. The nine individuals who used it twice had a 40% loss while the 16 individuals who employed it once for varroa control had an acceptable loss level of 23%. Overall, the 27 formic acid users did not do very well with mite control - they had a 32% loss.

Hopguard: this is another miticide acid. Only ten individuals used it. The single individual using it twice lost 6 of 8 colonies while the nine individuals who used it once lost 6 colonies of 56 fall hives. Overall loss level was 19%.

Oxalic acid: the vast majority of individuals treating for mites chemically used oxalic acid in one of three ways, as drizzle (OAD), vaporization (sublimation) OAV and oxalic acid in absorbent pads meant to keep oxalic acid in the hive for an extended period (OAE), available for the first time late in the year as VarroxSan. Eleven individuals did indicate VarroxSan use – they had a 27% loss level. Overall, oxalic acid was used on 2411 fall colonies and had a 19% loss level.

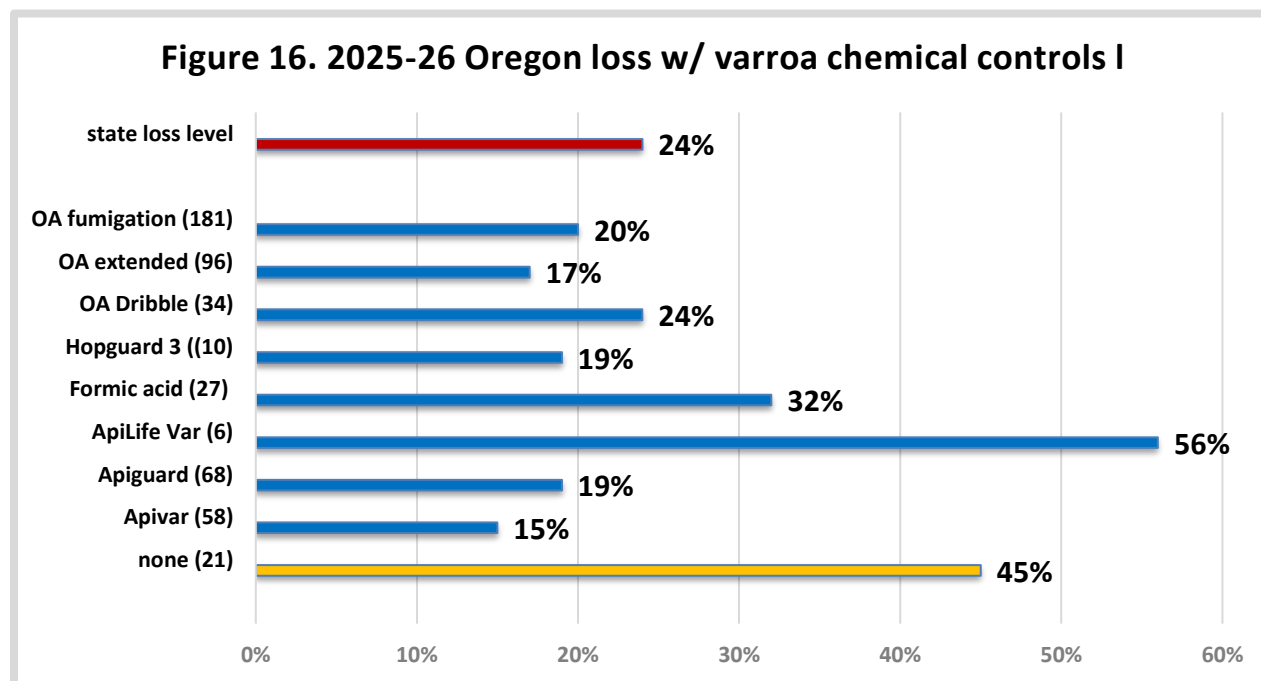
QAD: One individual drizzled 6+ times and didn't lose any of their 4 colonies and the individual that used it 5 times had similar full survival on their 5 colonies. Four individuals used it three times (35% loss), two individuals used it twice (7% loss) and the 26 individuals that used OAD once had a 20% loss. Overall, the 34 individuals using OAD had a 24% loss level.

OAE: This is a relatively “easy” way to use oxalic acid. Ninety-six individuals used it to control mites and collectively had only a 17% loss. Six individuals used it 6+ times and had a 26% loss, the three individuals using it 5 times had a 41.5% loss. Three individuals used it four times with an 18% loss, 9 individuals used it three times with a 26% loss, the 28 respondents using it twice had 18.5% loss and the 47 individuals that used it once had a 10% loss.

OAV: A total of 181 individuals used oxalic acid vaporization to control mites. They did this on 1379 colonies, 1101 survived for a 20% loss level. Forty-two individuals used OAV 6+ times and had a 25% loss, nine individuals used it 5 times with a 12.5% loss and 20 individuals used it four times with a 24% loss. It is unclear why use five times would perform better than 4 or 6+ times? The 30 individuals using it 3 times had a 17.5% loss, the 40 individuals using it twice had a 22% loss and those 40 individuals using it a single time had a 15.5% loss. Why might one use do a better job of varroa control compared to use twice? Of course, we do not know what else was used or when the sole use beekeepers used it compared to those using it twice.

Other chemicals used included mineral oil - the single user lost 2 of 8 colonies = 25% loss and use of oregano oil, again a single user, but in this instance all 3 colonies survived (0% loss) and finally the 3 powdered sugar users lost 1 of 8 colonies = 12.5% loss.

Consistently, over the last 9 years, four different chemicals have helped beekeepers improve survival. These were the synthetic Apivar, essential oils Apiguard and ApiLifeVar and Oxalic acid vaporization. This season, ApiLifeVar did not provide adequate control for the 6 individuals using it. The average loss level has been 35.7% in the last 8 years. Formic acid too has done better than average in the last 9 years, but the product has changed from MAGS to Formic Pro so I cannot be sure what Formic acid product was used by the 27 respondents who reported using it. Oxalic acid drizzle did not do as well this year (24% loss level), but OAE did very well in promoting better than average survival (17%) and the substantial number of users of OAV (181 individuals) had very favorable result at 19.5% loss level. For most chemicals used more than once, the results are not illustrative of what number of times is most useful, but numbers are small for most.



Antibiotic use

Five individuals (less than 1 percent) used Fumagillin (for Nosema control) and had a 20% loss rate. Three individuals indicated use of Terramycin, they had 35% winter loss.

Queens

We hear lots of issues related to queen “problems”. Queen events can be a significant factor contributing to a colony not performing as expected. One hundred ninety-nine elected to FAST Track and did not respond to this final set of questions. They had loss level of 27%. The 243 who responded had same as average loss level of 24%. One hundred respondents said they had marked queens; they lost 21%; no responders had a 26% loss level. The related question then was ‘were your hives requeened in any form?’, to which 164 individuals) said yes (22%loss). When asked how colonies were requeened (multiple answers were possible) 76 said their colonies swarmed and 48 said their colonies superseded. Twenty-seven said they split colonies, and they raised an emergency queen presumably. A total of 77 said they introduced a mated queen (19% loss), 10 introduced a virgin queen and 33 said they introduced a queen cell; they had an 18% 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