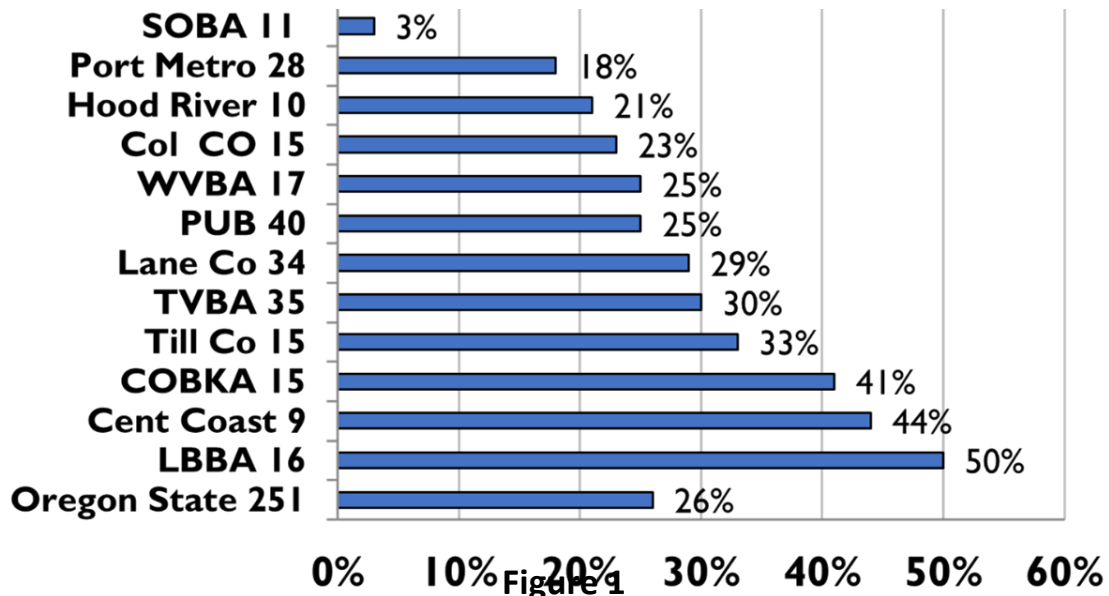


2024-25 Columbia County Winter Loss by Dewey M. Caron

For the past 16 years, PNW winter colony losses and several managements related to bee health were solicited with an electronic honey bee survey instrument developed within the PUB bee group www.pnwhoneybeesurvey.com. A total of 250 responses were received from Oregon beekeepers. In addition, 130 Washington respondents completed ag survey Oregon average loss was 20% and Washington average loss was 34%. During the 2024-25 overwintering period, 15 Columbia County member surveys were returned, slightly above the previous 5-year average of 13.6. **Lost level was 23%**, 2 ½ percentage points below the statewide level.



Columbia respondents, reporting on 90 fall hives, said they lost a single 8-frame Langstroth hive (4% loss level) but 10-frame Langstroth hive owners did not do as well. Seventeen of 56 10-frame hives did not survive, a 30% loss. The single nuc colony did not survive, all 3 Top Bar hives survived, one of two Warre hives did not survive and all 3 “other” hive types, 2 long and one tree hive, survived.

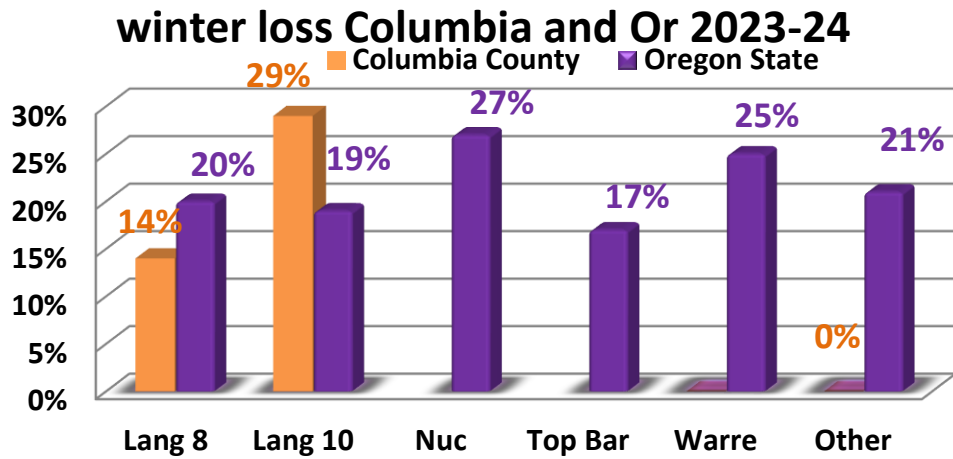
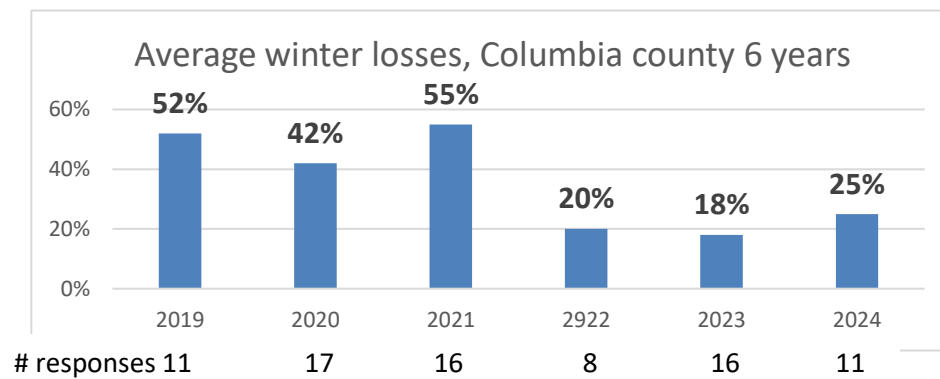


Figure 2

Figure 3 shows losses for Columbia County in the last 6 years. A bit of caution – I have had relatively few responses – the respondent numbers shown below years.

Figure 3



The survey also asked for **loss by hive origination**. Overwintered colonies (12 lost of 38 fall colonies) did not have the best survival in Columbia County respondents (34%) compared to statewide (13%). Swarm originated colonies did better (2 of 14 lost). There were no packages. Of the four nucs two were lost (50%) and of 19 splits eight were lost (42%) higher. Single feral transfer survived.

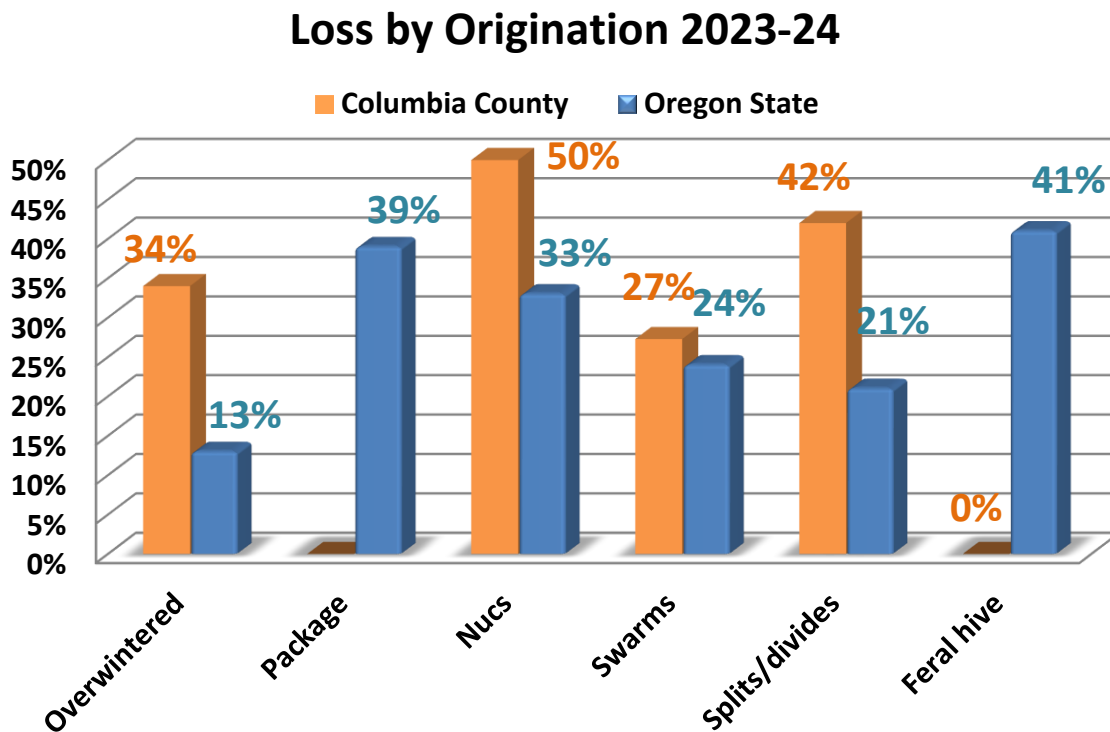
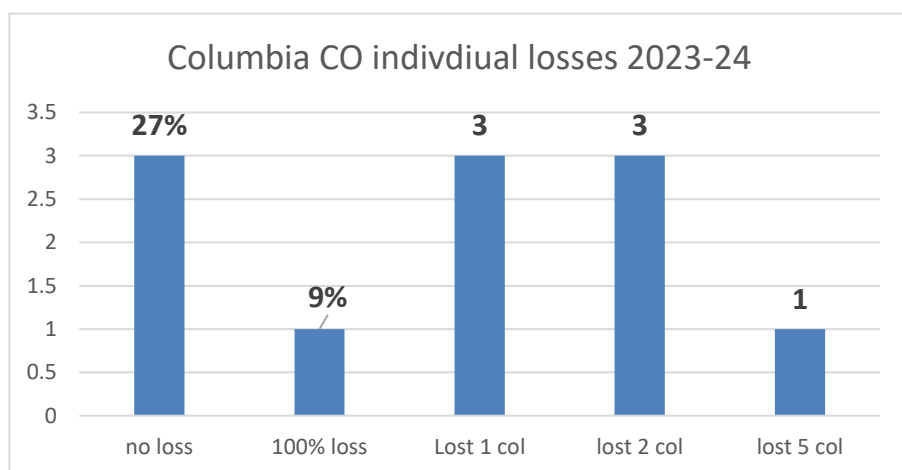


Figure 4

Not all individuals had a loss. Three individuals (15 colonies) had total survival, i.e., no colonies lost. One individual had a 100% loss (2 total colonies). Three individuals lost one colony and three lost two colonies with a single individual losing five colonies (heaviest loss).

Figure 5

Typical
the statewide
the Columbia
County
respondents
largely
beekeepers
few colonies.
individuals had



of
data,
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with
Five
two

colonies (60% loss), and one had three colonies with one loss (33%). So, the loss of individuals with three or fewer colonies was 50%. One individual had five colonies with no loss and two individuals had 8 and 9 colonies with two lost (12%). Two individuals had 15 colonies with 23% loss. Statewide, as individuals manage more colonies the loss percentage is reduced.

Four Columbia respondents had a one to three years' experience; their loss was 75%. The 3 respondents with 3 years' experience (total 7 colonies), lost 2 for 28.5% loss level, the four individuals listing 5 or 6 years of bee experience lost 4 of 40 colonies – 10% loss level, the two individuals with 7 or 8 years of experience has 14 colonies but lost 5 for 36% loss level and those four individuals with 10+ years' experience (highest number was 45 years' experience) had an 18% loss level (7 of 39 colonies didn't survive). Statewide, as years of experience increase generally per cent loss level is lowered; this relationship is not evident for Columbia County respondents due to small sample size.

Twelve of sixteen CC respondents (75%) said they had a mentor available as they were learning beekeeping; state level was 74%. Four individuals had two apiary sites. Two said they moved hives during the year.

Reasons for Colony Loss/Acceptable loss

We asked individuals that had colony loss to estimate what the reason might have been for their loss (multiple responses were permitted. A total of eight choices were listed. The highest two was varroa; there were one each of CCD, Pesticides, poor wintering, weak in fall, starvation and wintering.

When asked about an acceptable loss, one said none, three said 10%, and three said 25% (median number), three said 33% and 1 said 50%.

Why do colonies die?

There is no easy way to verify reason(s) for colony loss. Colonies in the same apiary may die for different reasons. Examination of dead colonies is often confusing, some options may be ruled out, we are often left with two or more possible reasons for losses. There is a good deal of variance in opinion as to what might be an acceptable loss level. We are dealing with living animals which are constantly exposed to many different challenges, both in the natural environment and the beekeeper's apiary. Our acceptable loss level has crept upwards over time.

Major factors in colony loss are thought to be mites and their enhancement of viruses, especially DWV (deformed wing virus, plus declining nutritional adequacy/forage and diseases. Pesticides in the agricultural environment weakens colonies. Yellow jacket predation is a constant challenge 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 it, 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 currently facing honey bees. Varroa mites and the viruses they transmit are considered a major factor why colonies are not as healthy as they should be.

Colony Managements

We asked in the survey for information about some managements practiced by respondents. This year individuals could FAST TRACK through the electronic survey and not answer the questions on management. Nine of 15 individuals (60%), slightly lower compared to statewide (69%), did supply management information. 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. The report seeks to compare responses of the current winter season with previous survey years.

For **feeding**, 5 individuals indicated feeding of frames of honey, 4 fed protein patties, 8 (of 9) individuals fed sugar syrup (this was the most heavily utilized management statewide as well) and for dry sugar, 2 fed dry sugar, 5 fondant sugar and 2 candy boards. Statewide, individuals feeding protein 100 individuals (60% of respondents), had an overall survival rate of 23%. Pollen patty feeders (92 individuals, 55% of total respondents, along with 9 feeding dry pollen reported a 20.5% loss (best survival of the 3 methods of feeding protein). There were 200 instances of feeding non-liquid sugar. The best survival rates statewide were the 47 candy

feeders, only 15% loss. Dry sugar feeders had slightly better or equal survival 7 of 8 past winters statewide; this year they had an 18% loss. The 53 fondant feeders did the poorest of the group, 28% loss level. Recall that statewide loss level was 25.5%.

For **Winterizing**, 2 individuals used upper entrances, 3 said they used the ventilated top board, 6 (of the 9 Columbia County respondents) insulated the top (also the major selection statewide), 1 wrapped and 1 said they did wind/water protection. Individuals statewide using the insulated top management had a 21% survival level, 4.5 percentage points better than the average. Equalizing colonies in the fall had the best loss level of 18% (36 individuals statewide). Venting the upper box (83 individuals, 27.5% loss) and sheltering colonies from wind/water (50 individuals, 30% loss) were the two managements that were less successful for improving overwintering success. Only equalizing (along with insulated top) improved winter survival as winterizing managements statewide.

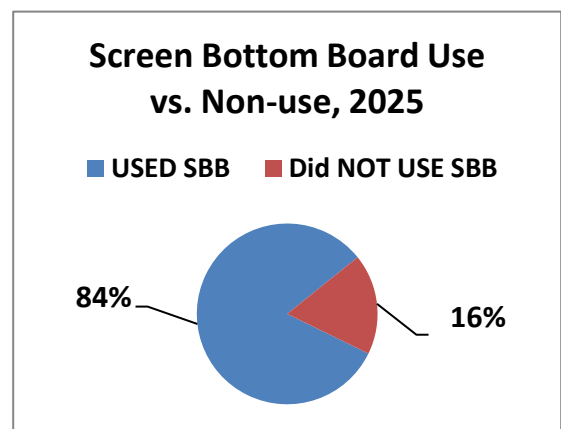
For **Sanitation**, 2 individuals said they minimized inspections. This option, however, has not improved winter survival; the loss rate for this group statewide the past 7 years was 44%, 10.3 percentage points above the average 7-year loss of 33.7%. This year the 74 individuals who checked this management had a 27% loss rate (overall loss rate was 25.5%). Three Columbia County individuals said they used distinctive colors and 2 others said they did other measures to reduce drifting. Three individuals said they avoided moving, 2 indicated regular cleaning of their hive tool and 2 said they took measures to reduce drifting.

Statewide, the best improvement this year was to paint hive bodies in different colors (66 individuals with 16% loss rate) and doing other managements to avoid drifting (29 individuals, 12% loss rate). Avoiding moving frames and reducing drifting have been the two sanitation choices that have demonstrated better average survival the past seven years statewide – 7-year loss rate was 32% for not moving frames which is 1.7 percentage points better survival and 28.6% for reducing drifting, a 5.1 percentage point improvement in survival. This year avoiding moving frames (72 individuals), had slightly poorer survival with 31% loss rate while reducing drifting had a 4 percent point improvement – 21.5% loss rate by 33 individuals. Overall sanitation appears to be relatively minor toward improving survival.

Screen Bottom Boards

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 29 individuals (17%) said they did not use screen bottom boards - 25% said they used sometime. Average non-use for the last eight years is 16%, vs 84% use, on some or all colonies. Figure right. For Columbia County 8 individuals used on all or some and 1 individual did not use SBB.

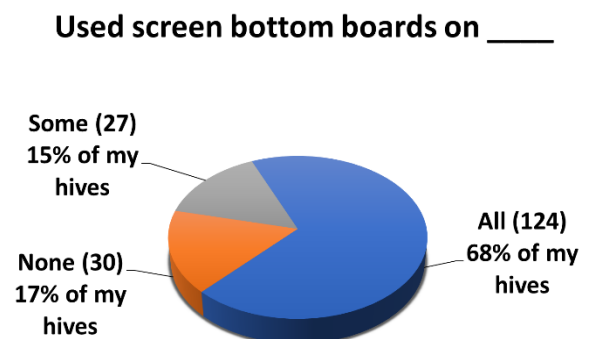


This past overwintering season, the 29 non-SBB statewide users had winter losses of 43 colonies, a 27.5% loss. Examining the eight-year average of SBB use, loss level of the 84% using SBB on all or some of their colonies was 32.2% loss level whereas the 16% not using SBB had loss rate of 35.2%, a 3-percent-point positive survival gain for those using SBB versus those not using them. This year, those using screen bottom boards had a 21.5% winter loss versus those not using them having a 27.5 % loss, a survival advantage of 6 percentage points, a minor improvement for overwinter survival.

We asked if the SBB was left open (always response) or blocked during winter. Columbia County responses were 3 covered always, 3 some and 3 never covered. This past season, 71%, 115 individuals statewide, said they always blocked SBB during winter; 16 individuals statewide said they blocked some of the SBBs. Statewide those who blocked always or sometimes had 818 colonies in the fall and lost 176, a 21.5% loss rate. Those 30 who never blocked had a 27.5% winter loss, a 6-point percentage difference. As in past years, there was a slight advantage **in favor of closing the SBB over the winter period to improve survival.**

Mite monitoring/Sampling and Control Management

We asked the percentage of Oregon hives monitored for mites during the year 2024 and/or overwinter 2024-25, whether sampling was pre-/post-treatment or both and, of the five possible mite sampling methods, what method was used and when it was employed. Seventy-two respondents (11 from COBKA) did response to this and not FAST TRACK around the question. Statewide 124 individual respondents (68.5%), said they monitored all their hives; 7 of 15 Columbia County did as well. The losses of those statewide individuals monitoring were 23 %. Thirty individuals (16.5%) reported no monitoring; they had essentially the same rate of 22% loss. 27 individuals reported monitoring some of their colonies; they had a 25% loss.



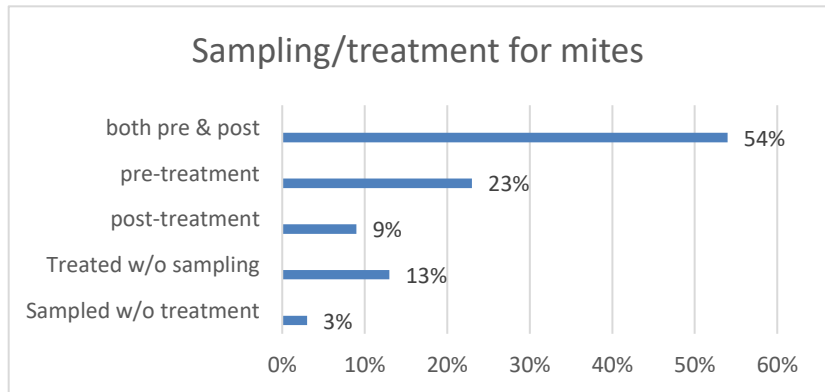
Monitoring alone is a means towards improved winter survival. The table below compares % individuals and % winter loss for individuals statewide who monitored all colonies compared with those who monitored none. The nine-year difference is eight percentage point better survival monitoring all colonies. The loss rate of 16-26% who monitored some colonies was variable, averaging one percentage point higher than those monitoring all colonies.

	ALL Colonies Monitored % individuals	% Loss	SOME Colonies Monitored % individuals	% loss	No colonies Monitored % individuals	% loss
2025	ALL 69%	23%	Some 15%	25%	None 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		32%		33%		40%

Individuals indicated use of 1.6 monitoring techniques on average. For Columbia County the 7 individuals responding to this series of questions used 8 choices; 4 Alcohol wash, 2 drone and 2 adult inspections. In total choices statewide, in order of popularity of use, 85 individuals used alcohol wash (their loss level was 19%), 80 individuals used Sticky boards (22.5% loss level, 57 looked on adult bees for mites (loss level 32%), 51 looked on drone rood for mites (20% loss level) and 24 individuals used a sticky (debris) board to look for mites – they had 31% loss level. In the past 5 years, the use of sticky boards has decreased in use and alcohol wash has increased in use. This was the third-year alcohol use monitoring was the major monitoring technique and also with the lowest loss level.

The most common sampling of respondents stateside is both pre- and post-treatment (54% average). The sampling pre-treatment percentage has been decreasing while post treatment sampling has slowly been increasing. It is important to know if the treatment works so post treatment should not be avoided. For Columbia County 1 treated without sampling, 1 indicated pre-treatment and 3 said both. Treatment without sampling was 13%, (same as last year). Figure 13 is statewide results.

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 if cells had mites.

See ***Tools for Varroa Monitoring Guide*** www.honeybeehealthcoalition.org/varroa on the Honey Bee Health Coalition website. The Tools guide suggested mite level to use to base control decisions based on the adult bee sampling. A colony is holding its own against mites if the mite sample is below 2%. It is critical to not allow mite levels to exceed 2-3% during the fall months when bees are rearing the fat fall bees that will overwinter. It is also the most challenging time to select a control method (if one is deemed needed) as potential treatment harm may negatively impact the colony. We see more colonies suddenly disappear (abscond?) during the fall, which may be related to the treatment itself.

Mite Control Treatments

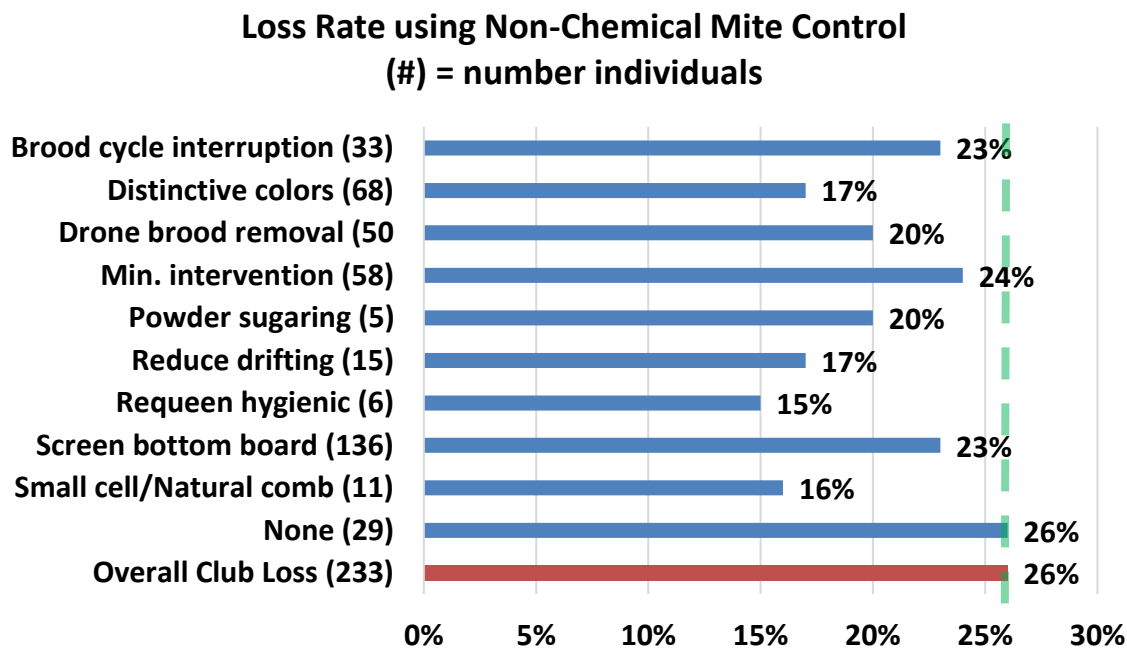
The survey asked about non-chemical mite treatments and also about the use of chemicals for mite control. Twenty-nine individuals (15.5%) said they did not employ a non-chemical mite control and 6 said they did not use a chemical control. Those 29 individuals who did not use a non-chemical treatment reported a 26% winter loss, a half percentage point higher than overall, while those 6 who did not use a chemical control lost 23% of their colonies, two and half percentage points lower than the overall average. For Columbia County, 2 individuals of 9 who responded to this series of survey questions (22%) did not use a non-chemical while 1 of 9 (11%) said they did not use a chemical in their mite control.

Non-Chemical Mite Control: Of nine non-chemical alternatives offered on the survey (+ other category,) statewide 38 individuals (20.5%) used one method, 54 used two, 42 used three, 17 used 4, 7 used 5 and 4 individuals used 6 or 8. Individuals using a single method had 36% loss rate, those using two had a 22% loss rate, those with three similarly had a 22% loss, the 17 using 4 had loss level of 14%, the 7 using 5 had 9% loss and the 4 using the greatest number of options had a 30.5% loss. The individuals doing none (29 individuals) had 26% loss. Clearly using more than one method/tool (within a limit) improves success.

For Columbia Conty response, 3 indicated minimized colony inspection, 1 said they used brood interruption, 2 used drone brood removal, 7 individuals used SBB, 2 said they reduced drifting and 2 requeened with hygienic queen stock.

Statewide, 136 individuals (73% of total respondents – 6 percentage points higher than last year) listed use of screened bottom board. The next most common selection was distinctive colors (63 individuals= 34% of respondents). 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.

Figure 15



Two of the non-chemical alternatives have demonstrated reduced losses over the past 7 years. Reducing drifting such as spreading colonies (28 % loss average for 6 years – question not asked in 2016-17 survey) and brood cycle break (31.3.% average) have consistently year after year demonstrated somewhat better survival than average loss (33 % average loss last 6 years and 35.4 % loss last 7 years respectively). Different colony colors in apiary (17%) and drone brood removal (20% loss) were helpful this year and barely better in 6-year loss average. Small

cell/Natural comb and requeen, managements of only a few individuals showed better survival this year.

Chemical control: For mite chemical control, 6 individuals (3% of total respondents) used NO chemical treatment. They had a loss level of 23%. The one individual in Columbia who didn't use a chemical control lost 2 of 3 colonies. The 30% (74 individuals) who used FAST TRACK and did not supply information had a loss level of 35.5%. Those using chemicals used at a rate of 0.94/individual down from 2.3/individual last year and the previous year when it was 3.3/individual. Eighty-four individuals using a chemical (48%) used one chemical. Overall, these individuals had a 29% loss level. Individuals who used 2 chemicals (70 individuals -40% of respondents) had 17.5% loss. The three individuals that used 4 chemicals did even better – no loss of 13 total colonies. The individuals using 3 chemicals (18 individuals) had a 31% loss. The biggest use was oxalic acid – 145 individuals (83 of chemical users) – they had loss level of 21%.

For Columbia County response, 2 indicated use of Apivar a single time, 2 used Apiguard twice, 1 used Hopguard once, 2 said they used Oxalic acid drizzle (OAD) one time. 3 used the extended oxalic acid pad (AOE) once, one used it twice and 1 individual used it 6+ times and finally 2 individuals vaporized 3 times and one vaporized 4 times.

Here are the statewide results of chemical usage.

Apivar: The number of times a chemical was used was captured in the survey. For example, there were 42 individuals who used Apivar, the synthetic miticide with amitraz. One used it once – 1 of 4 colonies did not survive=25% loss, 11 individuals used it twice and had 20% loss and the 30 individuals who used Apivar a single time had a 26% loss level. Overall, for the 42 Apivar users 24% loss. That is what is graphed in Figure 16.

Essential Oils: Apiguard, the essential oil gel, had a very decent survival level. It was used four times by one individual - 1 of 3 colonies survived for a 67% loss, the single individual who used it three times had all 4 colonies survive 0% loss, 17 individuals who used Apiguard twice had 14% loss and the 32 individuals using it once had 18% survival. Overall Apiguard users (51 individuals) had a 17% loss rate. There were 16 individuals who used APiLifeVar, also an essential oil miticide. The single individual who used it once lost all 3 colonies, 100% loss, whereas the one individual using it 3 times had all 3 colonies survive, 0% loss. Two individuals using it twice had 0 loss (6 colonies total) and the 12 individuals using APiLifeVar one time lost 16 of 66 fall colonies = 24% loss. Overall loss=24% for this miticide.

Formic Acid: Formic acid is a powerful acid capable of causing collateral damage to the bee brood and is sometimes a queen killer. Three individuals used it one and lost 3 of 5 colonies – 6% loss, ten individuals used it twice and lost 12 of 37 colonies – 32.5% loss and those using it once (11 individuals) lost half of their colonies – 50% loss. Overall, the 22 formic acid users did not do very well with mite control - they had a 43% loss.

Hopguard: this is another acid miticide. It too did not promote good survival. Two individuals using it 3 times didn't lose any colonies (5 total); the 3 individuals using it twice lost 55.5% and the 6 individuals using it once lost 38.5%. Overall loss level was 38%.

Oxalic acid: the vast majority of individual treating for mites chemically used oxalic acid in one of three ways, as drizzle (OAD), and vaporization (sublimation) OAV and oxalic acid in absorbent pads meant to keep oxalic acid in the hive for an extended period OAE. There is a new approved product VarroXSan on the market but it was not available for use until after this year, so users followed a recipe and made their own absorbent pads. Overall 145 users of oxalic acid had a 21% loss.

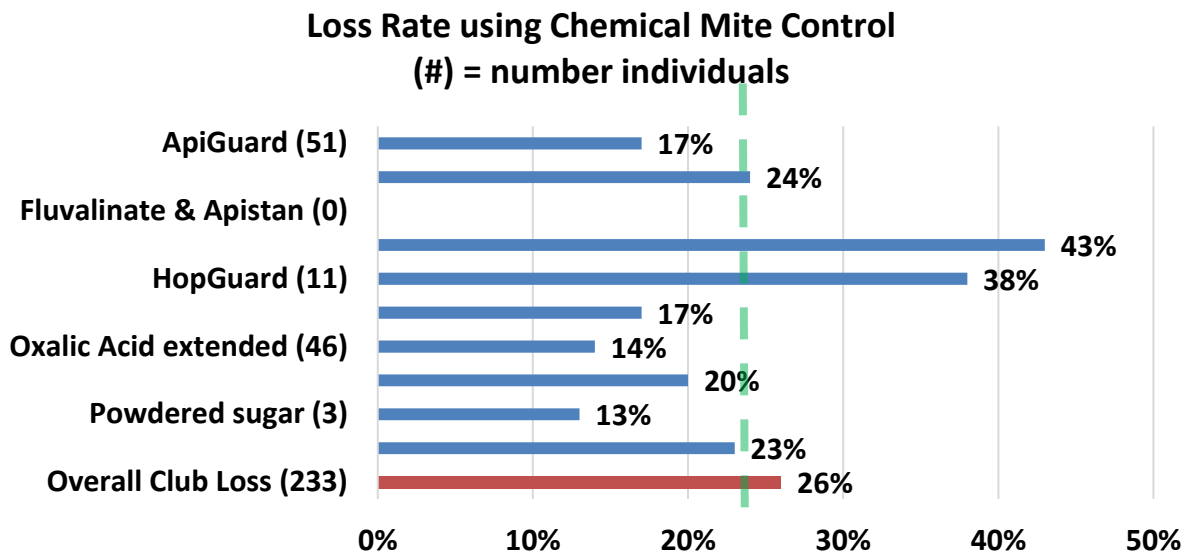
QAD: One individual drizzle 6+ times and lost 1 of 3 colonies 33% loss, 1 individual used it three times and lost both colonies overwinter - 100% loss, the three individuals who used it twice also had a 33% loss level while those using it once lost only 5 of 53 colonies for a 9.5% loss level – Overall 16 users had a 16.5% loss level.

OAE: This is a relatively “easy” way to use oxalic acid. Forty-six individuals used it to control mites and had only a 14% loss. Four individuals used it 6+ times and had a 14% loss, the 4 individuals using it 4 times did even better – they had a 6% loss. Five individuals used it 3 times with a 23% loss (3 of 13 colonies did not survive), six individuals used it twice with an 18% loss and those 27 individuals using OAV once had a 14% loss.

OAV: A total of 136 individuals used oxalic acid vaporization to control mites. They did this on 927 colonies, 71 survived for a 20% loss level. Twenty individuals used OAV 6+ times and had a 15.5% loss, sixteen individuals used it 5 times with a 30% loss and 19 individuals used it four times with a 31% loss. It is unclear why only 4 or 5 uses would not perform better. The 26 individuals using it 3 times had 21.5% loss, the 25 individuals using it twice had a 13.5% loss and those 30 individuals using it a single time had a 24% loss.

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 8 years, four different chemicals have helped beekeepers improve survival. These were essential oils Apiguard (average 8-year loss level 27.6%), Apivar (29.9% average 8-year loss level), ApiLifeVar (29% average loss level over last eight years) and Oxalic acid vaporization (also 29% average loss level over last 8 years). The average loss level has been 35.7% in the last 8 years. Formic acid too has done better than average in the last 7 years but the product has changed from MAGS to Formic Pro so I cannot be sure what Formic acid product was used by the 107 respondents who reported using it. Oxalic acid drizzle did well this year (16% loss level) - average for the last 8 years is 33.7%. The extended OAE (absorbing oxalic acid and glycerin into sponges) did very well in promoting better than average survival in the past two years and its use has increased dramatically. It was the best product for OR beekeepers this year – 46 users had a 14% loss, 11.5 improvement over average loss.



Antibiotic use

No individuals used Terramycin or Tylosin for bacterial diseases and none indicated the use of fumagillan for Nosema.

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. Thirty-three percent elected to FAST Track and did not respond to this final set of questions. Six Columbia County individuals provided information. Three individuals said they used marked queens. Eighty of the 168 respondents statewide (47.5%) who responded to this question said they had marked queens. This is 7 ½ percentage points greater than last year.

The related question then was ‘were your hives requeened in any form?’, to which 80 (115 individuals) said yes (16 percentage points higher than last year). For Columbia County all 6 responding said yes, their colony replaced their queen. When asked how colonies were requeened (multiple answers were possible) 54 statewide said their colonies swarmed and 27 of their colonies superseded. Fifty colonies were split (and they raised an emergency queen presumably). A total of 64 said they introduced a mated queen, 9 introduced a virgin queen and 31 said they introduced a queen cell. For Columbia County, one replaced a queen with a mated queen, 2 used virgin queens and one used a queen cell. One colony superseded their queen, 4 swarmed and 3 colonies were split to raise emergency queens.

Closing comments

This survey was originally designed to 'ground truth' the larger, national Bee Informed loss survey. Unfortunately, the national BIP survey was discontinued after 2023. A new national survey administered by Apiary Inspectors of America, Auburn University and by Natalie Steinhauer, a research associate at Oregon State University has continued a national survey but response has not been as large. The BeelInformed survey measured larger scale OR beekeepers, not backyarders. Loss rates are of total colony number and more representative of commercial scale beekeeping. Reports for individual bee groups are customized and only available from the PNW website; they are posted for previous years.

I intend to continue to refine this instrument each season and hope you will join in response next April. If you would like a reminder when survey is open please email us at info@pnwhoneybeesurvey.com with "REMINDER" in the subject line. I have a blog on the pnwhoneybeesurvey.com and will respond to any questions or concerns you might have. Email me directly for quicker response. dmcaron@udel.edu

Thank You to all who participated. If you find any of this information of value, please consider adding your voice to the survey in a subsequent season. Dewey Caron May 2025