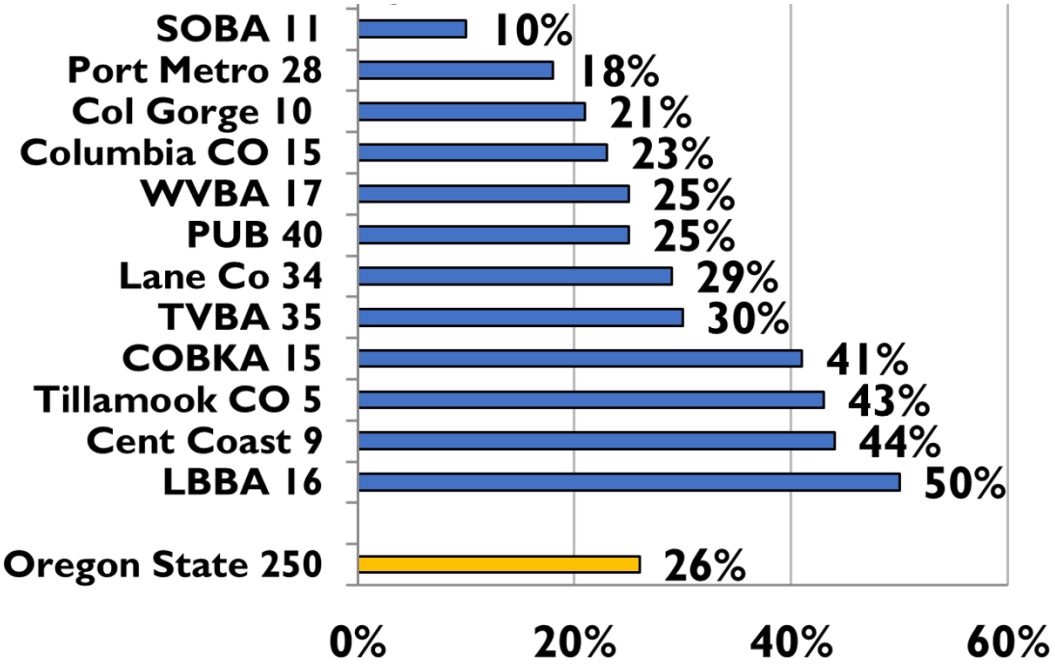
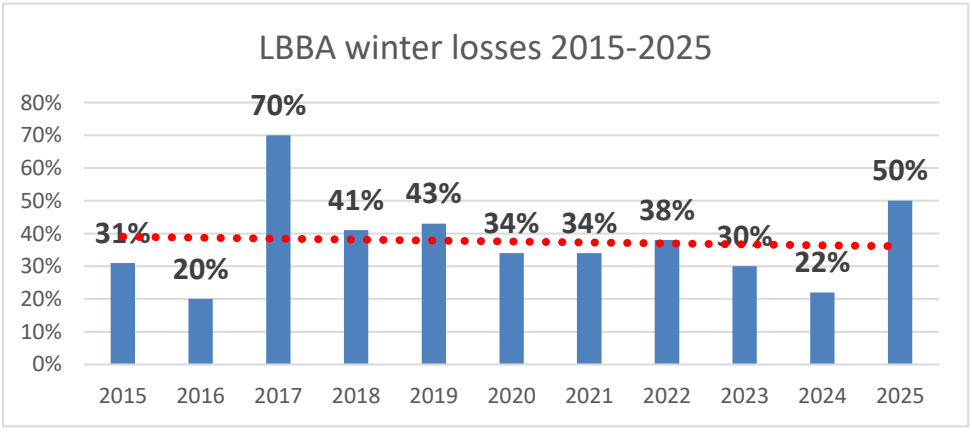
2024-2025 LBBA Winter Loss Report by Dewey M. Caron

Linn Benton Beekeepers were encouraged to complete a web-based survey document in a continuing effort to define overwintering losses/successes of backyard beekeepers in Oregon and Washington. This was the 16th year of such survey activity. I received 250 responses from OR backyarders, keeping anywhere from 1 to 49 colonies; LBBA members sent in 16 surveys, 6 more than last year, reporting on 53 fall colonies.



Overwintering losses of LBBA respondents = 50%. This was the highest loss of 12 bee clubs, and the highest loss of LBBA members for all but one year. Losses were 14 percentage points higher than the previous 10 winters (36.3% average). It was also the lowest response rate of the past 10 years. The trend in loss, shown in Figure 2, is almost flat; the number of responses is shown below in the graphic.

Figure 2



#respondents	17	14	23	11	22	36	26	12	18	16

Percent losses were determined by hive types were 76% loss of Langstroth 8-frame (16 of 21

all colonies did not survive) and 33% for Langstroth 10-frame hives (24 of 36 fall colonies survived the winter). The single "other" colony, not specified to type, also did not survive.

Statewide 51% of survey respondents had 1 to 3 colonies. For LCBA, one had a single colony, one had three and 7 had 2 colonies (total 1-3 colonies = 9 individuals); they had a 75% loss. Four individuals with 4 - 6 colonies had a 68.5% loss. Three individuals had 7 colonies each, the greatest number, and they had a 24% loss level. Statewide as colony numbers increased, the loss rate decreased. There is a statewide relationship with lower percentage loss with increasing colony numbers which has been consistent over the past 10 years.

Three individuals had no loss (5 colonies total). Six individuals had total loss (14 colonies). Two individuals lost one colony (22% loss level) and seven lost two colonies (75% loss level). Two individuals lost four colonies but lost all their colonies, 100% loss. One individual lost 5 colonies, an 83% loss level.

The three LBBA members with 1 or 2 years beekeeping experience (5 fall colonies) had no winter loss, three individuals had 5 to 7 years' experience (16 colonies) also had a 37.5% loss, the 8 individuals with 10-15 years' experience had71.5% loss and the two individuals with 20 and 31 years' experience (9 colonies total) had a 33% loss. The relationship of lower losses with increasing years' experience has been the statewide pattern for the last 10 years.

The survey also asked about loss by colony origination. Nine LBBA individuals responded rather than FAST TRACKING. For previously overwintered colonies, 7 of 22 colonies did not survive 32% loss). 5 of 7 packages did not survive 71% loss, 1 nuc did not survive of 3 (33% loss), loss of swarms hived was 75% and splits had a 50% loss (2 of 4 did not survive)>

No members had 2 apiaries. One moved colonies in year when it was sold.

Reasons for Loss/Acceptable loss

The survey asked individuals that had colony loss to estimate what the likely reason(s) might have been, Multiple responses were permitted. There were 20 listings for 12 individuals. Don't know was the most common choice – 5 individuals, followed by varroa, 4 responses and queen issues with 3 selections, Weak in the fall also had 3 selections. Yellow jackets were selected by 2 individuals and pesticide kill, poor wintering and starvation each had a single selection. Survey individuals are asked to indicate what might be an acceptable loss level. Three individuals listed none, three 5%, one each 10% and 15% (median – statewide medium is 20%), one each 20% and 25%, three selected 33% and 2 said 50% loss was an acceptable level of loss.

Why do colonies die? There is no straightforward way to verify reason(s) for colony loss. Colonies in the same apiary may die for distinct 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. 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. LBBA individual choices varied from zero to 50%. Statewide the 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. Pesticide 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 facing honey bees in the current environment.**

Management Selections and Losses

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. Twelve of 16 individuals (75%), slightly higher compared to statewide (69%), did supply management information. The survey asked 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.

With respondent number low, check out the 23-24 statewide management details or details from last year's LBBA report.

For **feeding**, 6 individuals (of 12 LBBA respondents), indicated feeding of frames of honey, and 2 said they f3d liquid honey. Ten of 12 4 fed protein patties, and all 12 individuals fed sugar syrup (this was the most heavily utilized management statewide as well). For dry sugar feeding, 2 fed dry, 2 fondant sugar and 4 candy boards. One individual added peppermint candy after Christmas. 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 equalized, 5 rain shelter, 2 used upper entrances, 7 said they used the ventilated top board, 8 (of the 12 LBBA respondents) insulated the top (also the major selection statewide),

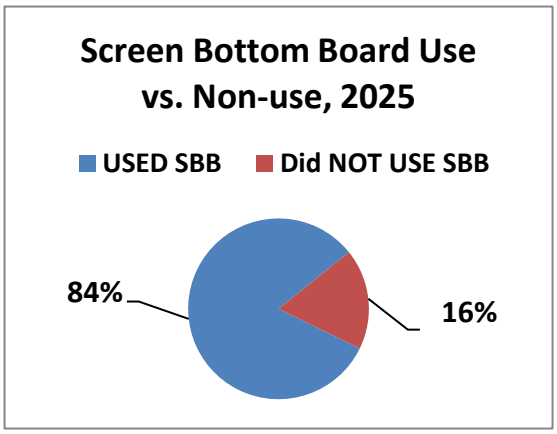
wrapped and 5 said they did wind/water protection. Individuals statewide using the insulated top management had a 21% survival level, 4.5 percentage points better than the average. Equalizing colonies in the fall had the best loss level of 18% (36 individuals statewide). Venting the upper box (83 individuals, 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 insulted top) improved winter survival as winterizing managements statewide.

For **Sanitation**, one individual said they did none of the selections; 5 overwintered colonies survived with no loss. 5 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 statewide who checked this management had a 27% loss rate (overall loss rate was 25.5%). Two LBBA individuals said they used distinctive colors, and 1 other said they did other measures to reduce drifting. Six individuals said they avoided moving, 3 indicated regular cleaning of their hive tool and 4 said they took measures to reduce drifting.

Statewide, the best improvement this year was to paint hive bodies in unusual 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 is 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 LBBA 10 individuals used on all and 2 individuals did not use SBB.

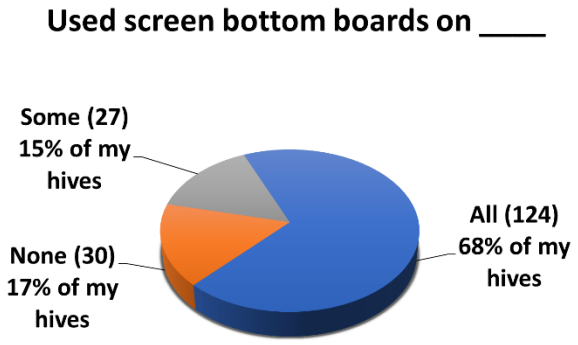


This past overwintering season, the 29 non-SBB statewide users had winter losses of 43 colonies, a 27.5% loss. Examining the eight-year average of SBB use, loss level of the 84% using SBB on all or some of their colonies was 32.2% loss level whereas the 16% not using SBB had loss rate of 35.2%, a 3-percent-point 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, and a minor improvement for overwinter survival.

We asked if the SBB was left open (always response) or blocked during winter. LBBA responses were 9 covered always 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 (13 from LBBA) did response to this and did not FAST TRACK around the question. Statewide 124 individual respondents (68.5%), said they monitored all their hives; 11 of 13 LBBA 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.

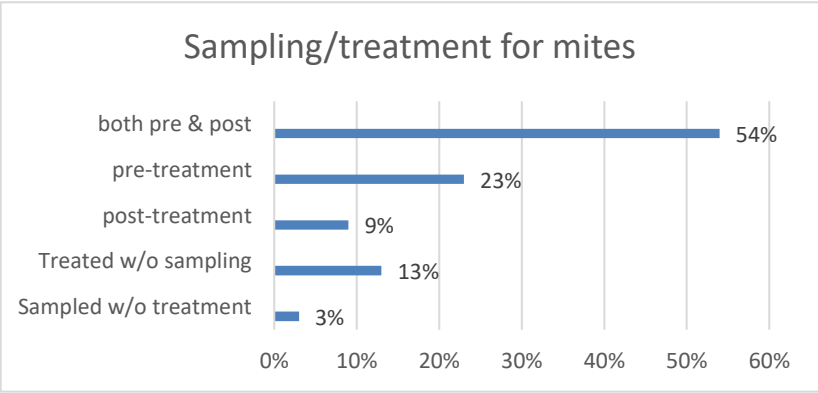
	ALL Colonies Monitored % individuals	% Loss	SOME Colonies Monitored % individuals	% loss	No colonies Monitored % individuals	% loss
2025	ALL		Some		None	
	69%	23%	15%	25%	17%	22%
2024	64%	21%	17%	28%	17%	15%
2023	68%	29%	16%	27%	16%	36%
2022	66%	37%	15%	27%	18%	42%
2021	73%	34 %	11%	36%	17%	36%
2020	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		32%		33%		40%

Individuals indicated use of 1.6 monitoring techniques on average. For LBBA the 13 individuals responding to this series of questions used 21 choices; 7 used alcohol wash, the most common selection, 6 used sticky boards, 1 powdered sugar, 2 looked on drone and 4 did 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 LBBA, 5 indicated pre-treatment, 1 post-treatment and 5 said both. 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 ls 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

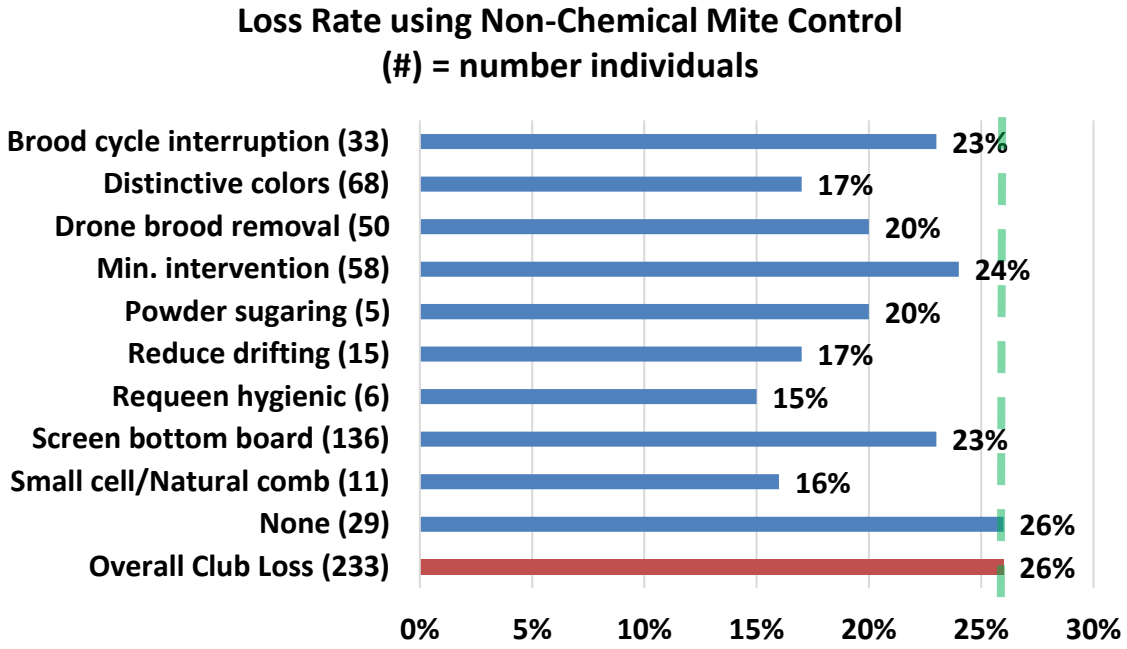
The survey asked about non-chemical mite treatments and also about the use of chemicals for mite control. Twenty-nine individuals statewide (15.5%) said they did not employ a non-chemical mite control and 6 said they did not use a chemical control. Those 29 individuals who did not use a non-chemical 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 LBBA, all 13 respondents (of 16) did not select none for either non-chemical or chemical 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 Linn Benton beekeepers, 5 indicated minimized colony inspection, 2 said requeening with hygienic stock, 2 said they used brood interruption, 4 used drone brood removal,11 (of 13) individuals used SBB, 4 said they spread colonies out to reduce drifting and 2 used hive colors to reduce drifting.

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 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 Linn Benton response, 5 indicated use of Apivar, 4 used it twice and one used it a single time, 2 used Apiguard, one twice and one once, 1 used Hopguard once, 3 used formic acid (1 twice and 2 one time) 2 said they used Oxalic acid extended (OAE) one used 3 times and the other 6+ times, and finally 11 individuals vaporized, 3 vaporized once, two vaporized twice, one vaporized 3 times and two vaporized 4 times plus one used it 6+ 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 survived, 0% loss. Two individuals using it twice had 0 loss (6 colonies total) and the 12individuals 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+ tomes 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 a 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.

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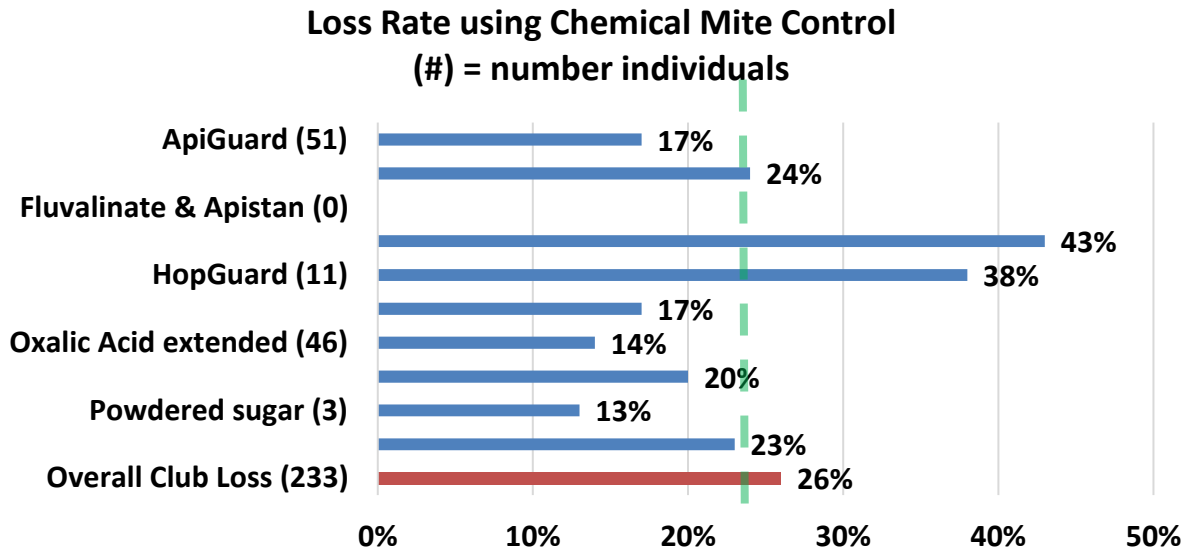

Antibiotic use

No individuals used Terramycin or Tylosin for bacterial diseases and none indicated the use of fumagillian 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-tree percent elected to FAST Track and did not respond to this final set of questions. Twelve of 16 LBBA individuals provided information. Nine 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 Linn Benton 8 responding said yes, their colony replaced their queen, 3 said no and 1 was unsure. 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 LBBA 6 replaced a queen with a mated queen, and three used a queen cell. No colonies superseded their queen, 3 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 BeeInformed 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