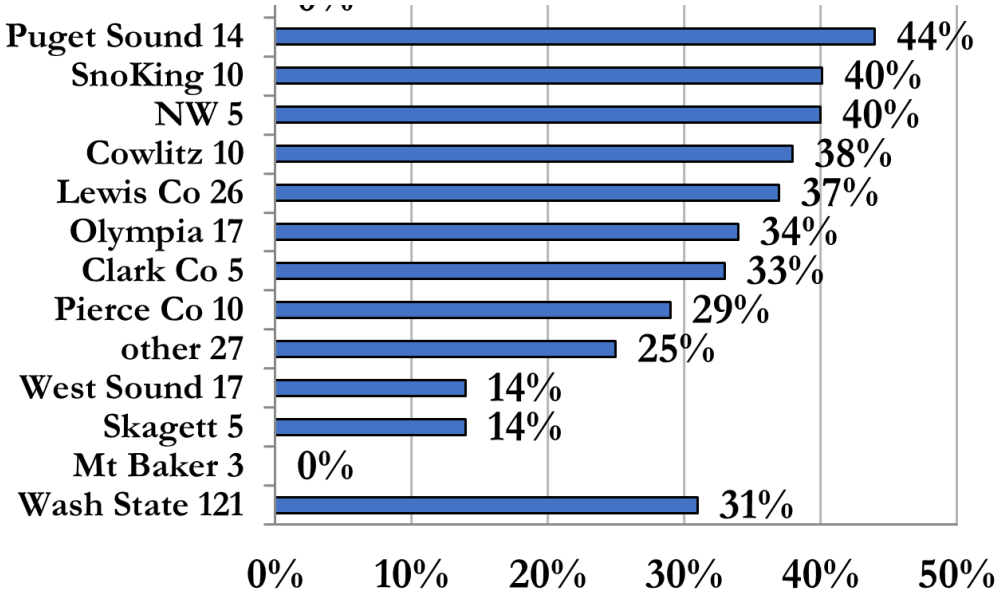
Winter Bee Losses of Washington Backyard Beekeepers for 2023-2024

by Dewey M. Caron

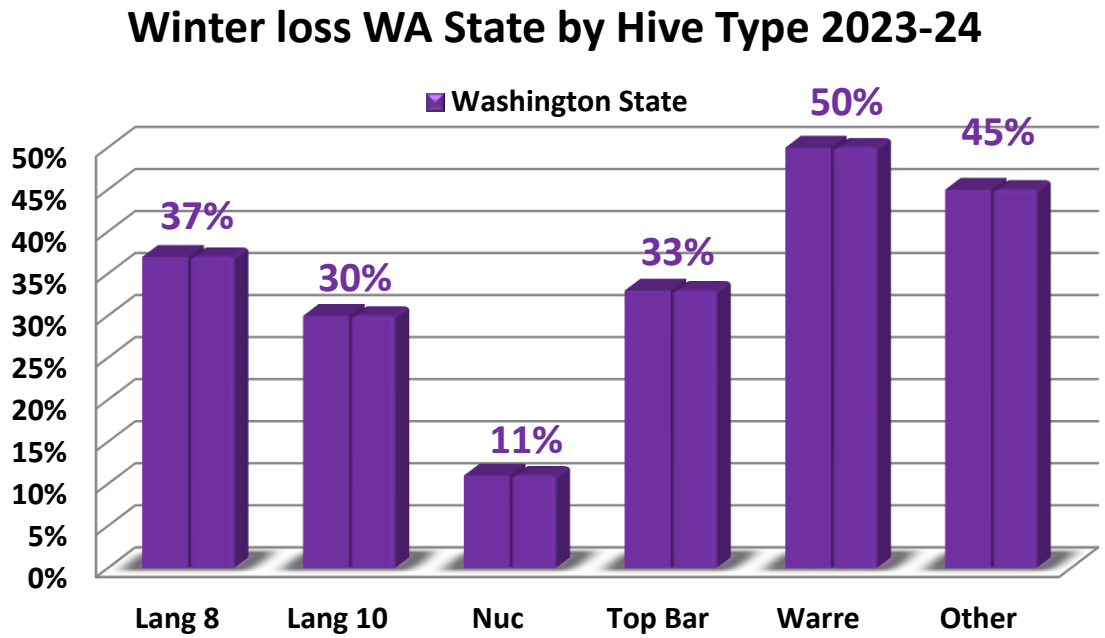
Overwintering losses of small-scale Washington backyard beekeepers=31%, a decrease of five percentage points from last year, 14 percentage points below the 9-year loss average. One hundred twenty-one Washington respondents completed a survey, one more than last year and two above the 119 average respondent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



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

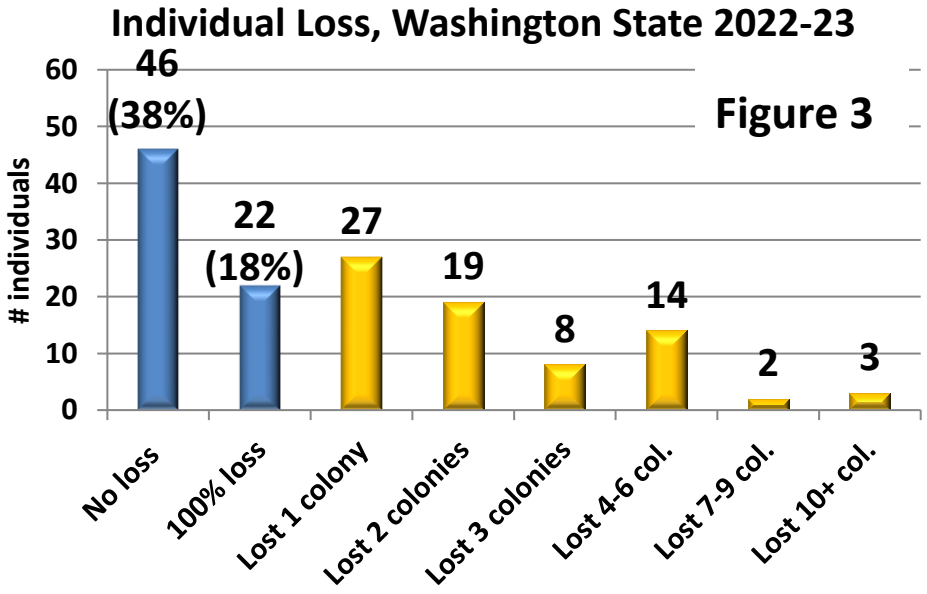
2023-2024 Overwinter Losses by Hive Type

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



	Lang 8	Lang 10	Nuc	Top Bar	Warre	Other
Fall	142	423	18	12	2	49
Spring	89	297	16	8	1	27

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



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

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

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

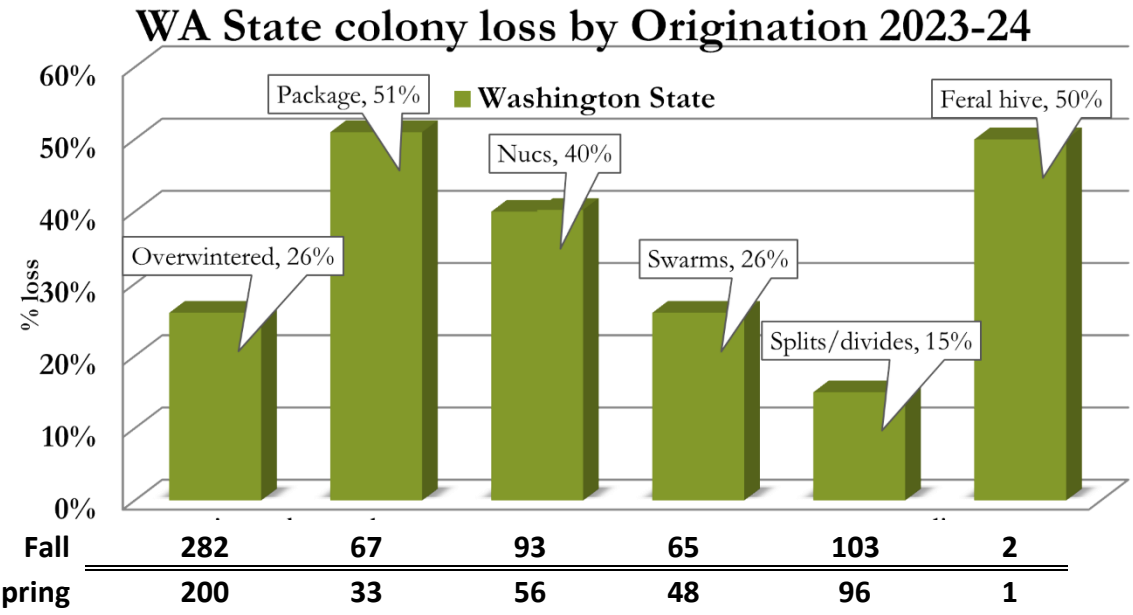
Summary

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

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

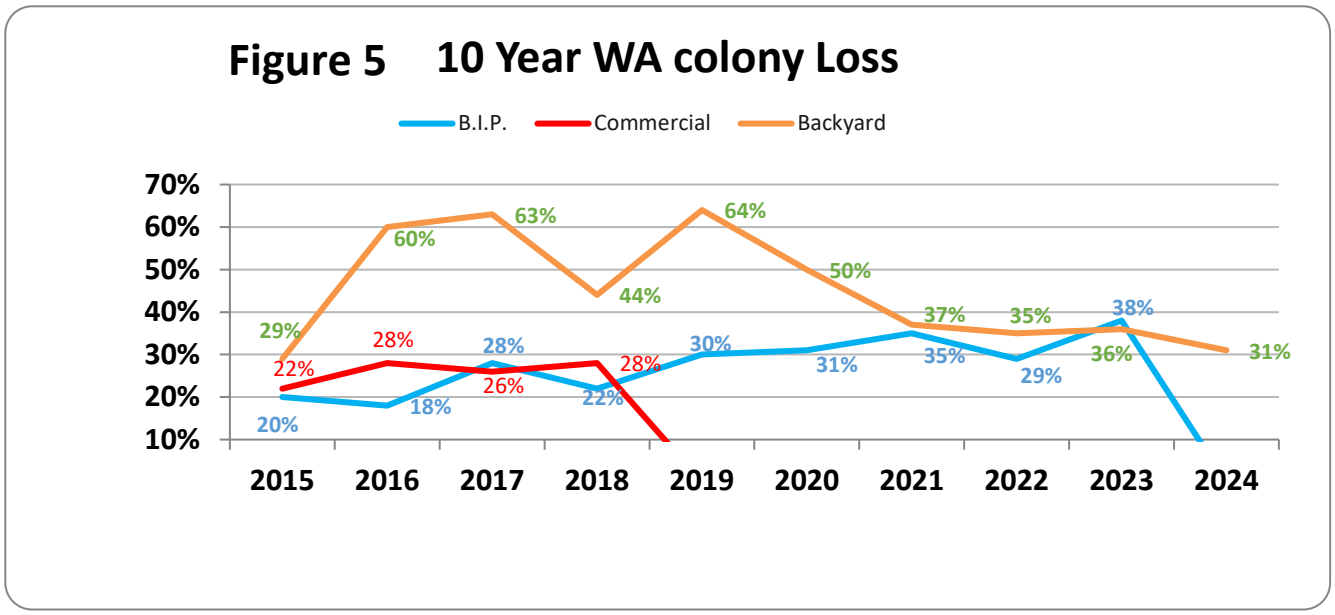
Survival Based on Hive Origination

We also asked about hive loss by origination. Data shown in Figure 4 below. Best survival was Splits/divides (15%) with swarms and previously overwintered both at 16% loss rate. previously overwintered colonies and splits/divides. Package bee losses were over 50%. Both nucs 40% and packages had heaviest losses.



Comparison to Larger-Scale Beekeeper Losses

A different (paper) survey instrument was mailed to Pacific Northwest (PNW) semi-commercial (50-500 colonies) and commercial beekeepers (500+) from OSU asking about their overwintering losses. Response rate was reasonable until 2018 then the response became limited to only three individuals and this was not considered representative of the larger scale beekeepers of Washington. Numbers are shown in red only for the 4 years 2015-2018 in Figure 5 below. The BeeInformed.org (BIP) losses for Washington beekeepers for 2015 to 2023, the last year of the BIP survey, are representative of the larger scale beekeepers and are shown in **blue** in Figure 7. Losses of backyard beekeepers from this survey are shown in orange line with black loss numbers. Average BIP loss (9 years) =27.9% and average WA backyarder loss (10 years) =44.7%. In 2023 the larger-scale beekeeper loss exceeded losses of backyarders. The numbers included in survey are shown below the figure.



YEAR	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
#Comm hives	~40,000	33,200	16,604	29,015	0					
#backyarders	31	52	101	104	98	133	163	80	120	121
BIP (# hives)	113,237	32,184	83,000	52,500	48.600	48,000	33,300	72,700	50,145	0

The reasons backyarders have had higher losses are several. Commercial and semi-commercial beekeepers examine colonies more frequently and they examine them first thing in the spring as they move virtually all their colonies to pollinate almonds in February. They also are more likely to take losses in the fall and are more pro-active in varroa mite control management.

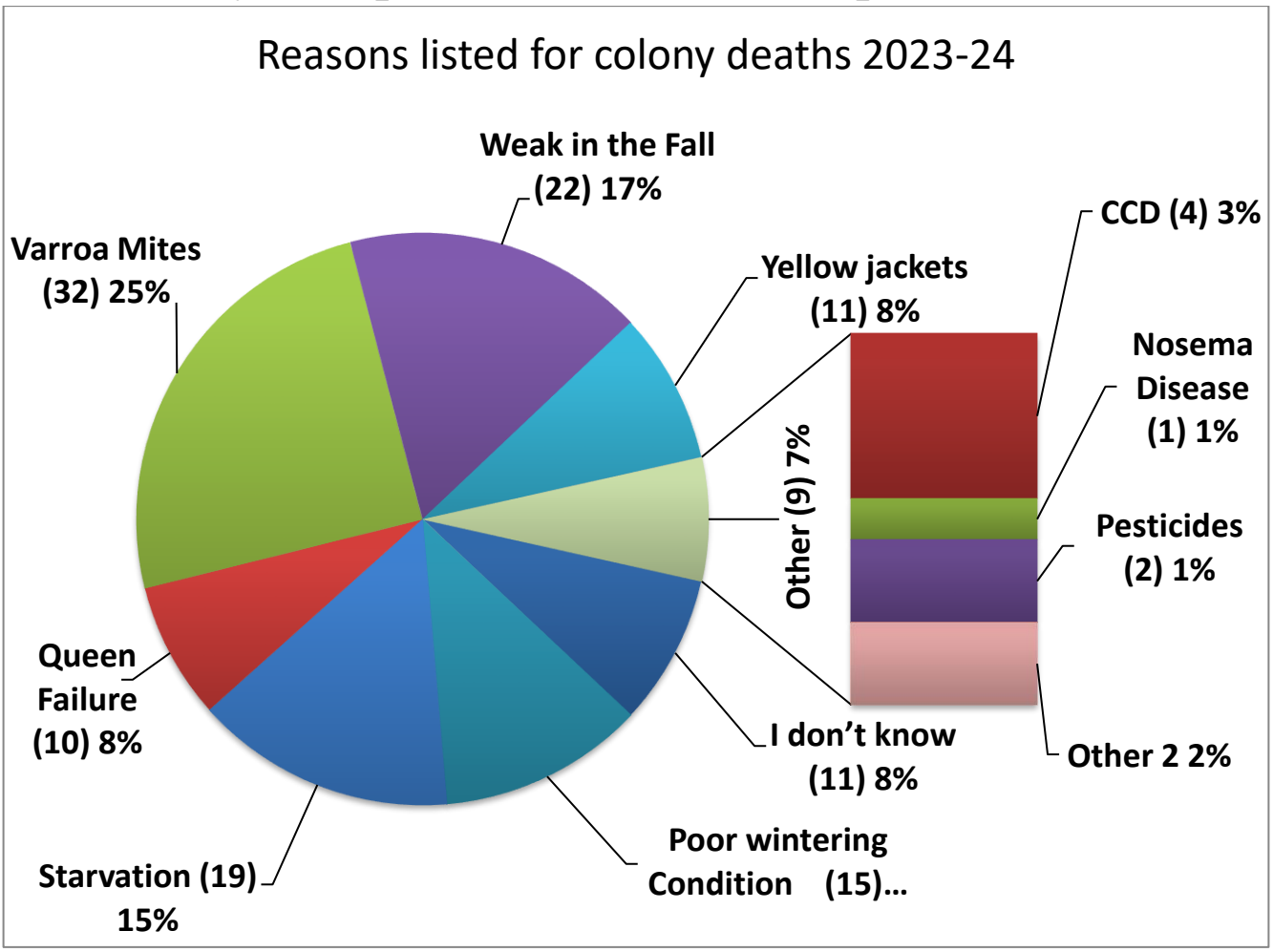
The PNW survey was conducted in part to "ground truth" the annual BeeInformed Survey (BIP) also conducted during April. The BIP survey includes a mailed survey to larger-scale beekeepers and an electronic survey to which any Washington beekeeper can submit their data. Losses reported

include colonies of migratory beekeepers who reported WA as one of their yearly locations. The BIP survey for the 2015-23 annual surveys reports receiving responses from 90 to 95% of respondents exclusive to Washington but they managed less than 5% of total colony count - the BIP tally is primarily of commercial beekeepers. They have large numbers of colonies in survey data, so the BIP losses reflect commercial losses not losses of backyarders. See https://research.beeinformed.org/loss-map/

Apiary sites and moves

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

Colony death perceived reason and acceptable loss level



We asked survey takers who had winter losses for the "reason" for their losses. More than one selection could be chosen. In all there were 115 WA selections (1.85/individual) provided. Varroa mites (32 individuals, 25% of total selections) was the most common choices. Weak in the fall, starvation and poor wintering were next most common followed by yellow jackets and don't know. Ten individuals only listed queen issues. The two "other" listings were absconding and too small a winter cluster. Figure below shows the number and percent of factor selections.

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

Acceptable Overwinter Loss per 77 Beekeepers in Washington State during 2023-24

Loss level	5%	10%	15%	20%	25%	33%	50%	75%	100%	None	IDK
#	10	11	6	21	17	9	17	5	2	17	0
%	9%	9%	5%	18%	15%	9%	15%	5%	2%	15%	0%

Why do colonies die?

There is no easy way to verify reason(s) for colony loss. Colonies in the same apiary may die for several reasons. Examination of dead colonies is at best confusing and, although some options may be ruled out, we are often left with two or more possible reasons for losses. A dead colony necropsy can be of use. Opinions vary as to what might be an acceptable loss level. We are dealing with living animals which are constantly exposed to many different challenges, both in the natural environment and the beekeeper's apiary. Individual choices varied from zero to 100%, with medium of 20%.

Major factors in colony loss are thought to be mites and their enhancement of viruses especially DWV (deformed wing virus), VDV (Varroa destructor Virus (also termed DWV B) and Israeli and chronic paralysis virus. But we do not have a test for these viruses. It was interesting in that queen problems were the most frequently indicated as were weak in the fall as leading reasons for loss.

Declining nutritional adequacy/forage and diseases, especially at certain apiary sites, are additional factors resulting in poor bee health. Yellow jacket predation is a constant danger to weaker fall colonies. Management, especially learning proper bee care in the first years of beekeeping, remains a factor in losses. What effects our changing environment such as global warming, contrails, electromagnetic forces, including human disruption of them, human alteration to the bee's natural environment and other factors play in colony losses are not at all clear.

There is no simple answer to explain the levels of current losses nor is it possible to demonstrate that they are necessarily excessive for all the issues our honey bees face in the

environment. It was encouraging to see from survey responses that losses this past year 30% were still at a low level. More attention to colony strength and possibility of mitigating winter starvation will help reduce some of the losses. Effectively controlling varroa mites will help reduce losses.

Colony Managements

We asked in the survey for information about some managements practiced by respondents. The survey inquired about feeding practices, wintering preparations, sanitation measures utilized, screen bottom board usage, mite monitoring, both non-chemical and chemical mite control techniques and queens. Respondents could select multiple options and there was always a none and other selection possible. This analysis seeks to compare responses of this past season to previous survey years.

TO BE CONTINUED: It will take longer to do this analysis. Results will be posted as soon as possible.

Closing comments

This survey was originally designed to 'ground truth' the larger, national Bee Informed loss survey. See statewide PNW reports for WA for this comparison (figure 5). The numbers while slightly different do in fact track well. Unfortunately, the national BIP survey was discontinued after 2023. See the BeeInformed website www.beeinformed.org for additional information and to examine that data base as well. The BeeInformed survey is measuring the larger scale WA beekeepers not the backyarders as loss rates are of total colony number. I have discontinued recording WA commercial/ sideliner numbers as I receive too few responses to be representative of them. Reports for individual bee groups are customized and only available from the PNW website; they are posted for previous years.

I intend to continue to refine this instrument each season and hope you will join in response next April. If you would like a reminder when survey is open please email us at info@pnwhoneybeesurvey.com 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 2024