

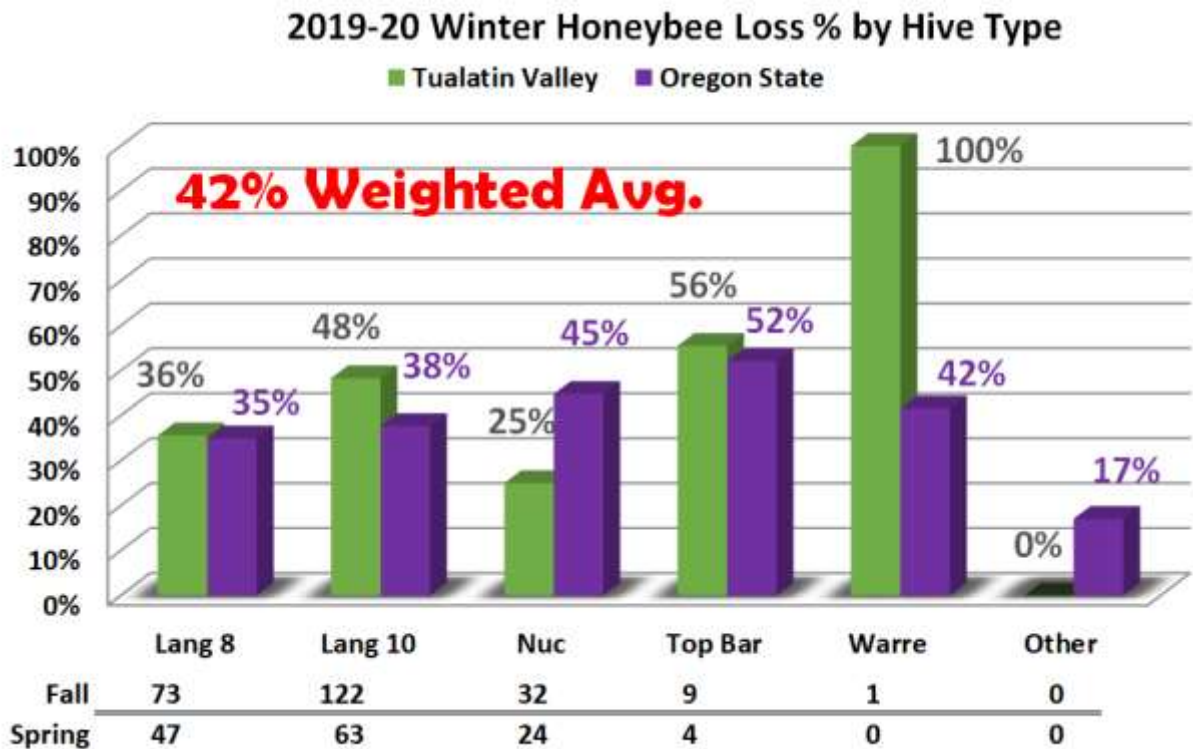
# 2020 Tualatin Valley (TVBA) Winter Loss

by Dewey M. Caron

At the March TVBA Zoom meeting I encouraged TVBA members to participate in the 2019-2020 PNW overwintering loss survey. Members were directed to the online survey at [www.pnwhoneybeesurvey.com](http://www.pnwhoneybeesurvey.com), an 11 year continuing effort to define overwintering success of beekeepers in the Pacific Northwest. Statewide Oregon (and Washington) reports, along with individual club reports, are posted on the PNW website [www.pnwhoneybbesurvey.com](http://www.pnwhoneybbesurvey.com).

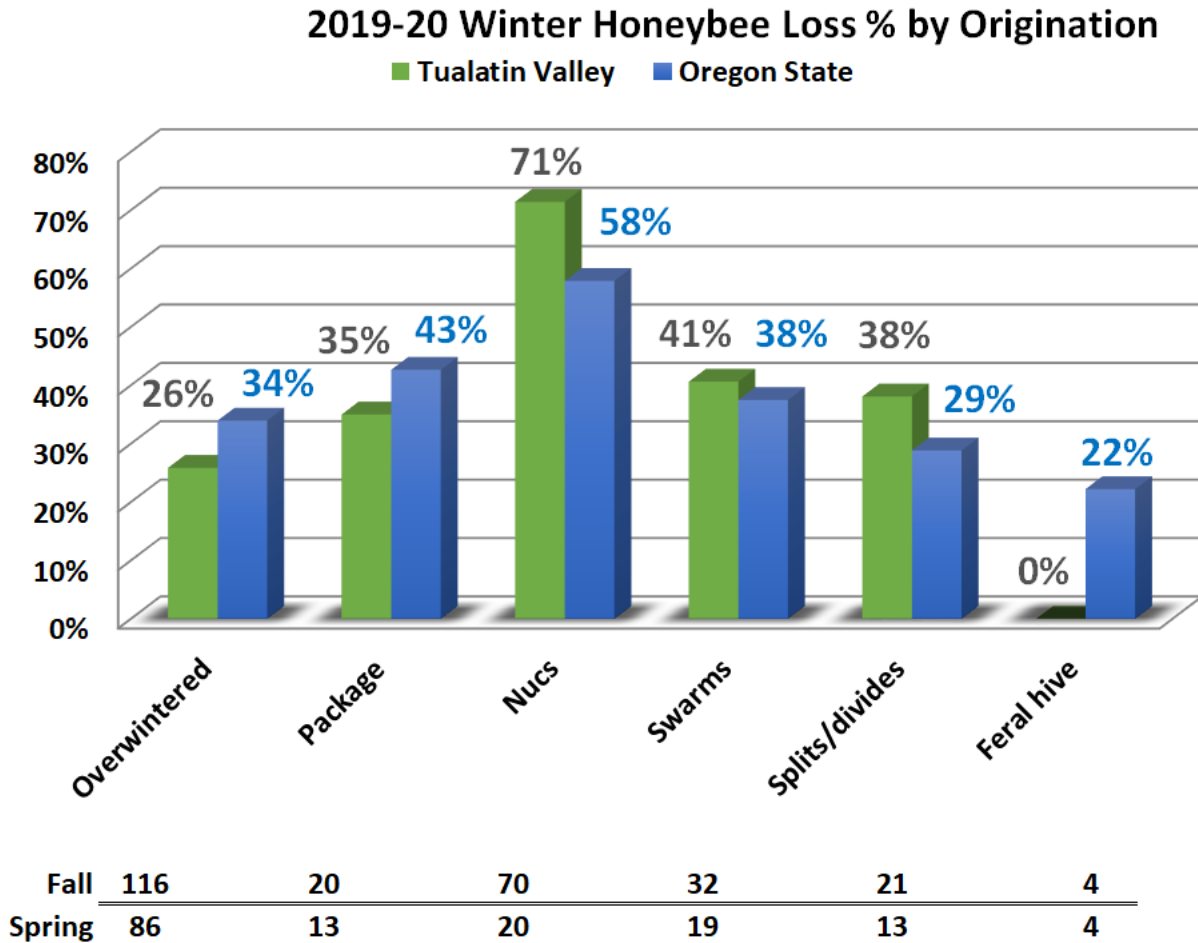
I received 302 survey responses from Oregon backyarders, and an additional 133 from Washington beekeepers. Tualatin Valley members sent in 53 surveys, 4 fewer than last year, providing information on 237 fall colonies, 65 fewer than past year. **Total overwintering losses of TVBA respondents was 99 colonies = 42% weighted loss rate.** This loss level is four percentage points above the statewide OR beekeeper loss rate.

Loss rate was determined by hive type. TVBA members started winter with 122 Langstroth 10-frame hives (51½% of total), 73 Langstroth 8-frame hives, 32 5-frame nucs, 9 Top bar colonies and 1 Warré hive plus 3 other, identified as mating nucs. The 10 Top Bar and Warré non-removable frame hives constituted 4% of total TVBA hives. Figure 1 shows percent TVBA loss for each hive type compared with statewide Oregon beekeeper data. Nuc hive overwintering was much improved over statewide.



**Figure 1**

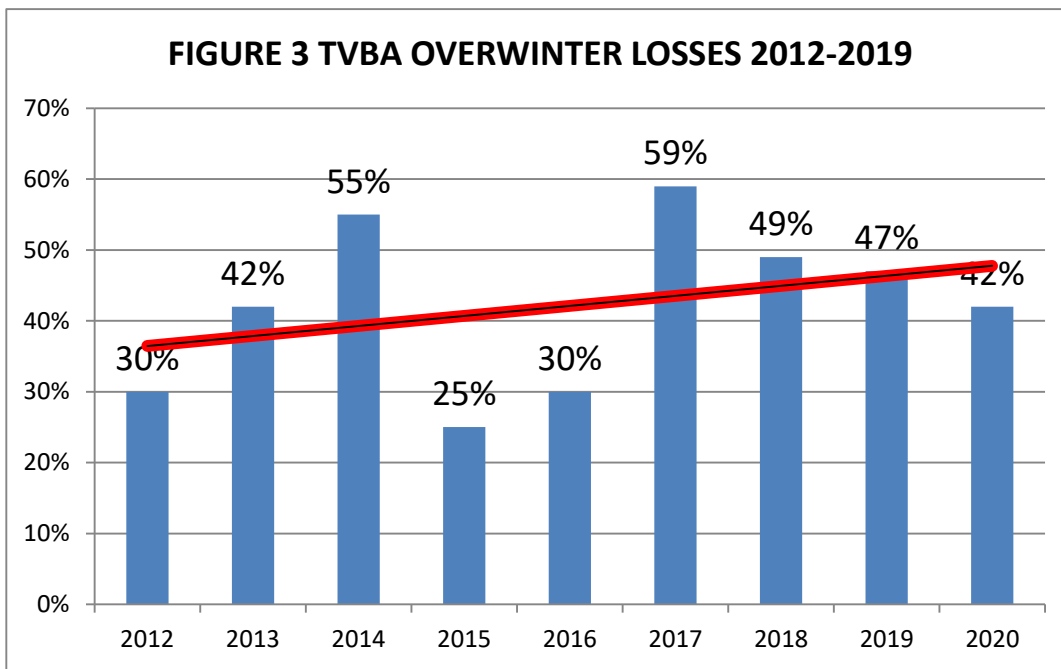
Losses by hive origination were also tallied. The data for TVBA and statewide are shown in Figure 2. Overwintered hives and packages of TVBA members had better survival than statewide.



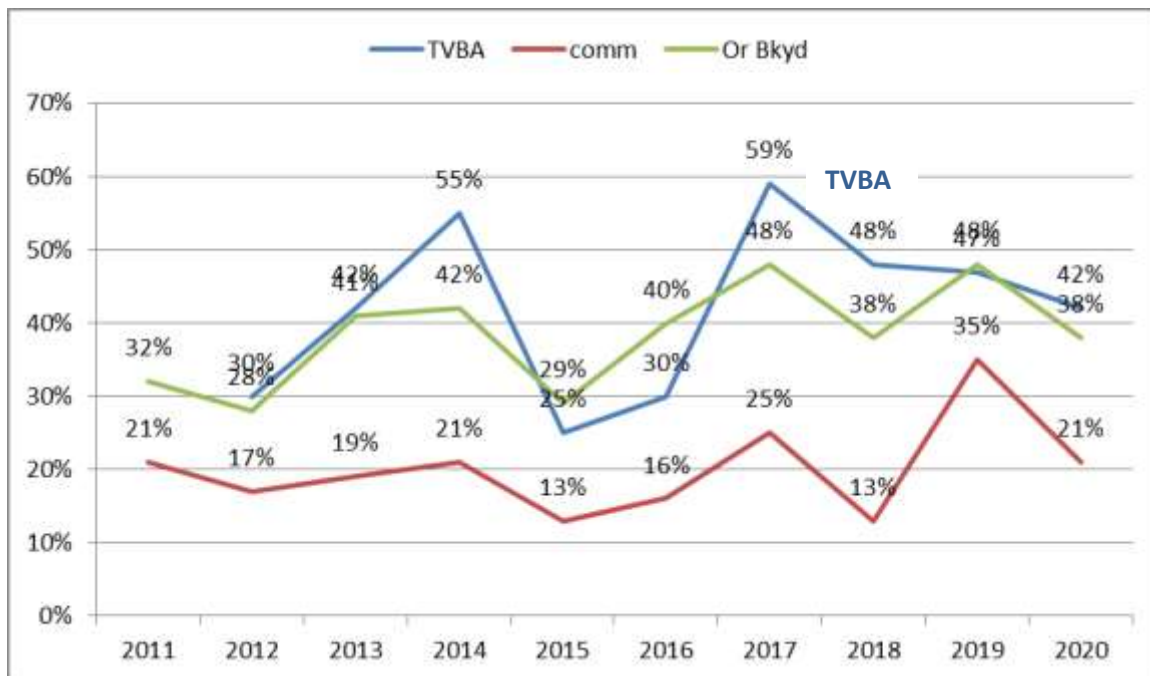
*Figure 2*

Losses this past winter were lower than the last three years and equaled the TVBA loss average of the previous 7 seasons. Trend line (in red) however is, still not heading in the right direction. The past 8 years of tallies of TVBA survey returns shown in Figure 3.

*Figure 3*

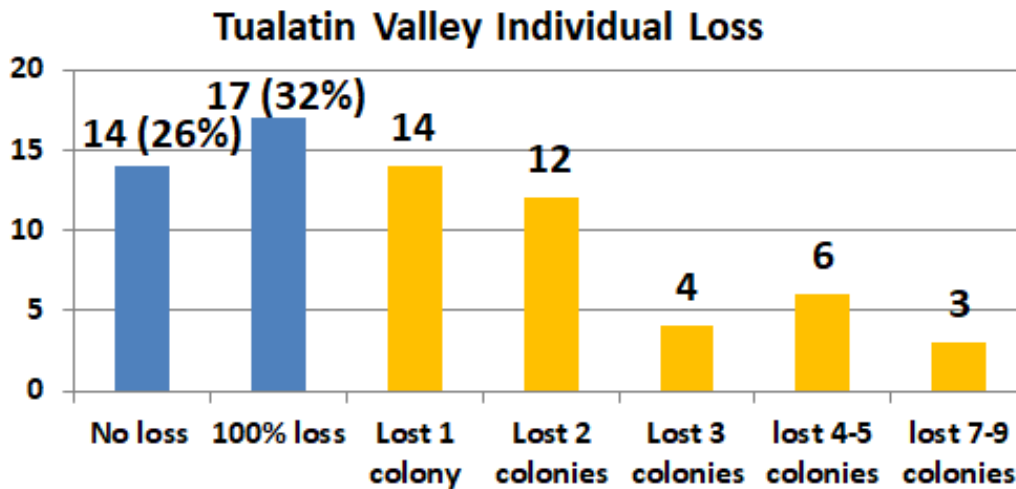


Comparison of losses of TVBA (blue line) and Backyard (green line) shows similar fluctuations. Commercial beekeepers in Oregon (red line) has the same general pattern but at lower loss level.



**Figure 4** ↑

Not everyone had loss. **Fourteen individuals (26%) reported total winter survival.** Unfortunately 17 individuals (32%) lost 100% of their colonies. Fourteen individuals lost 1 colony (the heaviest loss), 12 individuals lost 2. Greatest number lost was 9 colonies. See figure 5. The four TVBA individuals with 10 or more colonies had loss rate (25%) about one half the loss rate of those individuals who owned 1, 2 or 3 colonies (47½%).



**Figure 5**

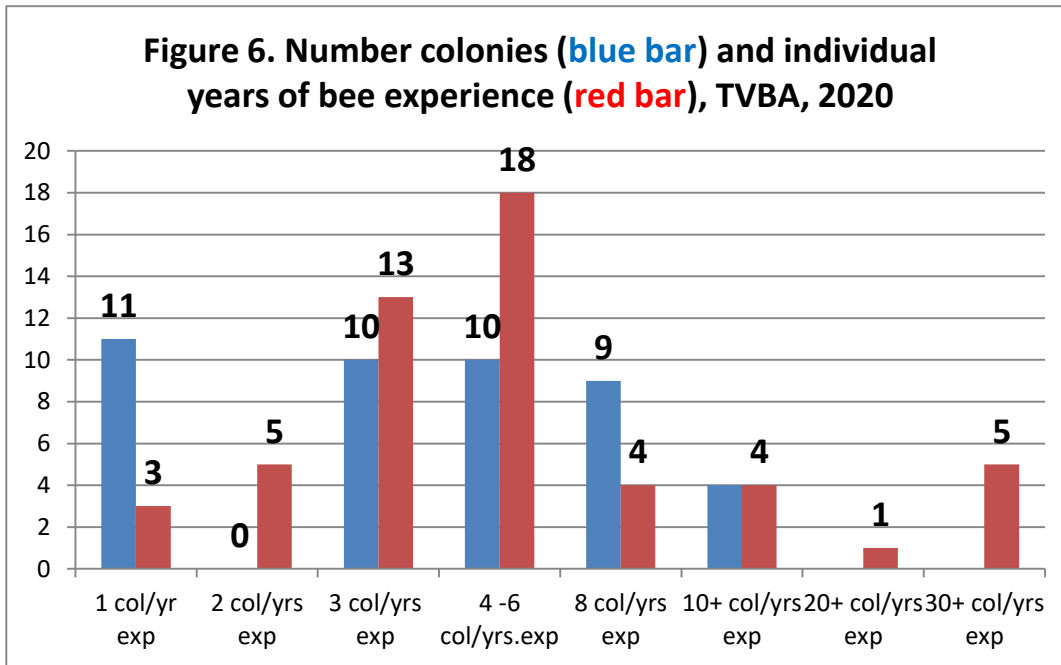
Four individuals had 2 apiaries and 1 had 3. Loss Survival at 2<sup>nd</sup> and 3<sup>rd</sup> apiary sites (70.5%) was almost 3 times as great as at the home apiary (26.5%) for these 4 individuals. Five TVBA individuals moved bees during the year, one from another state and one to better place in the apiary. The remaining three moved 3-5 miles, one to avoid pesticide spray.

### **Who is Responding to Survey?**

OF the 53 respondents, the vast majority (31 individuals - 58%) had 1 to 3 fall colonies (greatest number was 11 individuals with one colony); these individuals had a 47½% winter loss. There were 10 individual respondents keeping 4 to 6 colonies and 9 individuals keeping 7– 9 colonies; they had 51% and 46% colony loss respectively. Four individuals had 10+ colonies (maximum number was 17); they experienced the greatest survival of colonies - their loss rate was 25%.

Typical of the statewide data, the TVBA respondents are a mix of new beekeepers with those with more beekeeping experience. Twenty one individuals had 1-3 years of beekeeping; they had 38% winter loss. Eighteen individuals had 4-7 Colonies and this group had the heaviest level of losses - 50% of fall colonies did not survive winter. Ten individuals had 10+ years experience (52 was the highest number); this group had the

lowest losses – 34½%. Figure 6 shows number of colonies per individual (blue bar); red bar illustrates the number years beekeeping.



### 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). There were 74 total listings for TVBA, 1.9/individual. Twenty TVBA individuals listed varroa (50% of respondent choices), followed by weak in the fall (37½%), queen failure and starvation (20% each); 7 individuals chose don't know and one had no opinion. For other there were 3 who said pesticides plus one indicated bear attack. Table compares TVBA with statewide percent response; both varroa and weak in fall indications were double for TVBA beekeepers compared to statewide responses.

	Varroa mites	Poor wintering conditions	Weak in fall	Queen failure	Starvation	CCD	Yellow jackets	Other
TVBA (#)	20	3	15	8	8	3	6	4
(%)	(50%)	(7.5 %)	(37.5%)	(20%)	(20%)	(7.5%)	(15%)	(10%)
Statewide %	24%	3%	15%	16%	11%	4%	6%	14%

Survey individuals were asked to indicate what might be an acceptable loss level. Nine chose zero (same percent as statewide- 17.5%). The median (middle) selection was 20%. TVBA responses of 15% or less = 47%. Eight individuals answered 50%. Selection percentages were nearly identical with the selections last year. Data in table shows number of individual choices.

DK	Zero	5%loss	10%loss	15%loss	<b>20%loss</b>	25%loss	33%loss	50%loss	75%loss	100%loss
0	9	1	10	4	<b>4</b>	10	6	8	0	0

## Why 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, 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. TVBA individual choices varied from zero to 50%, with medium of 20%. This acceptable loss level has been consistent for last few survey years but once again actual losses were double the "acceptable" level

Major factors in colony loss are thought to be mites and their enhancement of viruses especially DWV (deformed wing virus) and declining nutritional adequacy/forage and diseases. Pesticide in the agricultural environment weakens colonies. 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. Colonies too weak may starve and in some winters starvation is a significant factor in colony loss. 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.

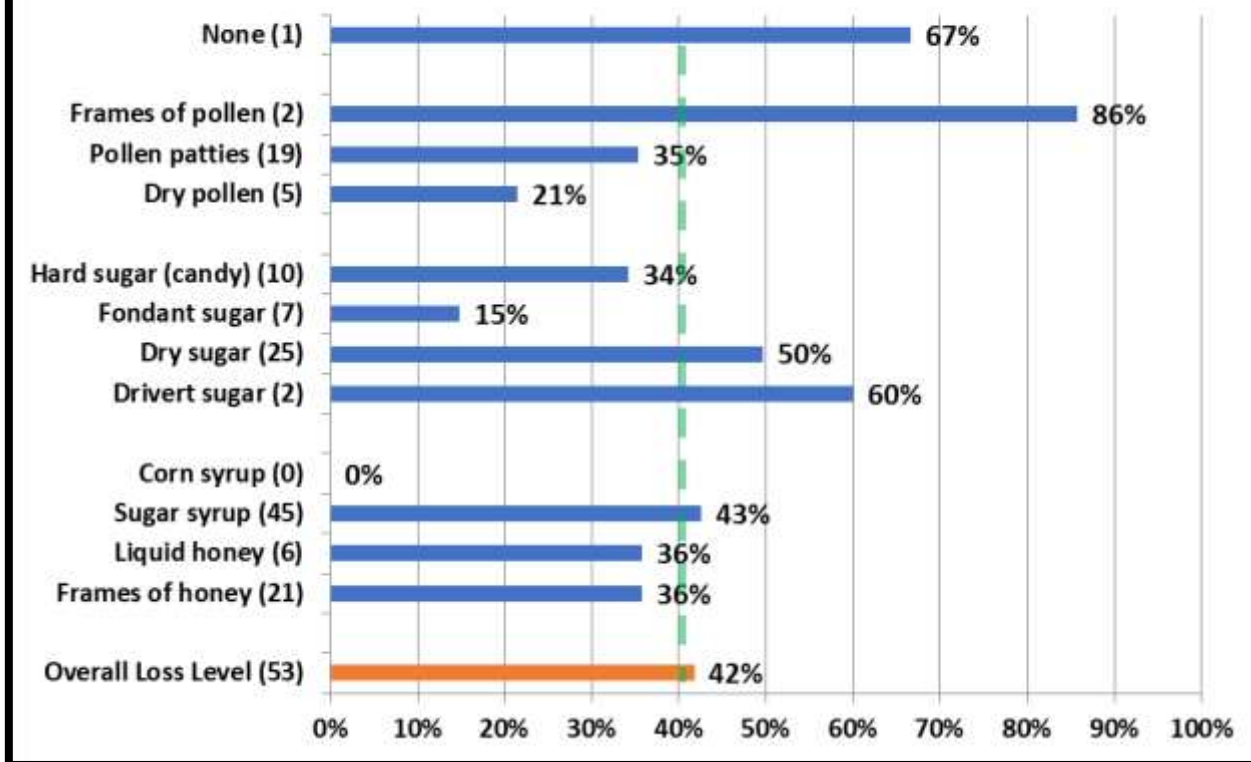
**There is no simple answer to explain the levels of current losses nor is it possible to demonstrate that they are necessarily excessive for all the issues facing honey bees in the current environment. Varroa mites and the viruses they transmit are considered a major factor, but by no means the only reason colonies are not as healthy as they should be.**

## Management Selections and Losses

The survey inquired about feeding practices, wintering preparations, sanitation measures utilized, screen bottom board usage, queens, mite monitoring and both non-chemical mite control techniques (such as screen bottom board use, drone brood removal efforts, etc.) and chemical mite controls utilized. Individuals could check none or more than one response; many TVBA and OR beekeepers often do not do just one thing/management to their colony (ies) to control mites toward improving overwintering success. This analysis however is of a single factor equated with loss level. Such analysis is correlative and doing a similar management as fellow beekeepers do does not necessarily mean you too will improve success.

**FEEDING:** TVBA survey respondents checked 142 feeding options = 2.5/individual (statewide it was 2.9/individual). Ten individuals selected a single choice (they had a 31% loss), 13 chose 2 (50% loss), 15 had 3 choices (greatest number and medium – 32% loss), 9 individuals indicated 4 choices (53% loss) and 5 individuals had 5 selections – they had a 24% loss level.

**Figure 7 Feeding Options w/ Loss Record (#) = number individuals**



Percent colony losses are presented for feeding options with numbers of TVBA members indicating doing the management in ( ). Bar lengths of left of 42% indicate better than average survival while those to right had heavier than average losses. Nineteen individuals feeding Pollen patties, and five feeding dry pollen had better survival than overall for TVBA respondents. Likewise individuals feeding non-liquid sugar as hard candy or fondant (10 and 7 individuals respectively) had improved survival. Feeders of honey had 6 percentage point improvement in survival.

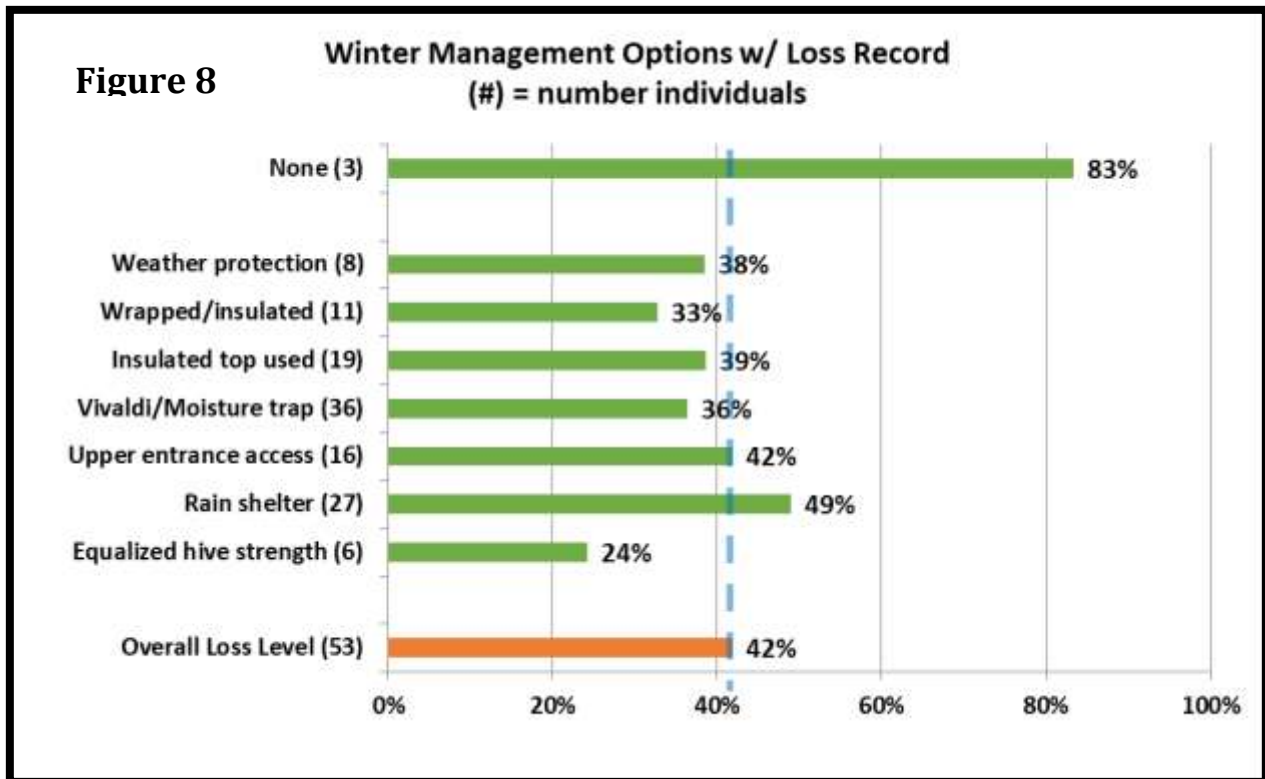
Summary statewide: For the last 4 years (average loss rate=43% average losses), **individuals doing no feeding had annual losses 12.6 percentage points higher than average overall losses.**

Individuals statewide that fed sugar syrup had a 7¼% lower loss level (average for the 4 years). Those feeding honey (as frames or liquid) had lower loss only during the 2018 and this past winter overwinter period. Individuals feeding non-liquid sugar (in any of the forms) had lower losses all four past winter seasons, with 5 or 6 percentage point improvement from overall losses. Dry sugar feeders had slightly better survival all 4 winters (average of 4 winters 39 ¼%) while hard candy feeders had a much improved survival all 4 winters (31% average survival). Fondant feeders had better survival 3 of the 4 winters (37¾%).

For individuals feeding protein, only protein patty users showed better survival all 4 years; dry pollen feeders had much better survival in two of the four years with losses the remaining two close to the overall yearly average.

**WINTERING PRACTICES:** Three TVBA individuals (5%) reported doing no winterizing; they had loss level of 83%; statewide these 3 were among 37 individuals (12½% of overall statewide respondents) that indicated none of the several listed wintering practices; statewide losses were 50% for those doing no winterizing managements, 12 percentage points higher loss than overall state loss of 38%. Multiple selections were possible and in fact the 54 TVBA members averaged 2.3/individual. Thirteen individuals chose a single management and had a 48% loss level, 18 chose 2 (47%) loss, 10 had 3 selections (33% loss), five had 4 (40%) while the five individuals checking 5 (4 individuals) and 6 (1 person) of the options had a 31% loss level.

The two most common wintering managements selected were use of a rain shelter (117 individuals statewide (47%) and similar usage by TVBA - 27 individual TVBA (50%) respondents and use of a quilt box (Vivaldi board) at colony top (175 individuals statewide (71% of total respondents) 36 TVBA members (also 67%). Figure 8 shows number of individual choices for TVBA members in ( ) and percent loss of each selection. The six TVBA individuals who equalized hive strength had the best survival (76% - 24% loss rate) but stateside 36 total individuals (including the 6 TVBA members) had the lowest survival rate of 87%.





Over the past three years individuals that did no winterizing practice (average 13 1/3% of individuals) averaged 48% loss compared to 41% overall average loss of last 3 years, a 7 percentage point poorer survival rate. The 2 doing none among TVBA lost all their colonies. Only 2 winterizing managements improved survival all 3 years – these were wrapping (30 % lost rate, an 11 percentage point improvement – which also showed better survival for the 11 TVBA members doing this management - 33% compared to 42% overall for members) and top insulation (32 % survival average over 3 years, a 9 percentage point improvement – for 19 TVBA members this also resulted in slightly better survival of 39% this past winter). Vivaldi (38 % loss rate over 3 years), upper entrance also 38% (most Vivaldi boards have an upper entrance built into the equipment) and Wind/weather protection (also 38%) had only slightly improved survival rates statewide over the past 3 years– 3 percentage points. For TVBA, Vivaldi boards used by 36 members showed 6 percentage point better survival.

**SANITATION PRACTICES:** It is critical that we practice some basic bee sanitation (some prefer use of term bee biosecurity) in our bee care to insure healthy bees. TVBA beekeepers had 122 responses 2.3/individual. Sixteen percent statewide and 5 TVBA individuals (9%) said they did not practice any of the 6 offered alternatives. Loss rate statewide was 52%, four percentage points higher than the overall loss rate of 48%; for TVBA the 5 individuals had a 72% loss rate, 30 percentage points greater than overall TVBA average loss of 42%. Eleven TVBA members had 1 selection (loss rate 27%), 13 made 2 choices (also 27% loss), 17 made 3 choices (50% loss); two individuals had 4, four had 5 and 1 had 6 selections; they had a 42% lose rate.

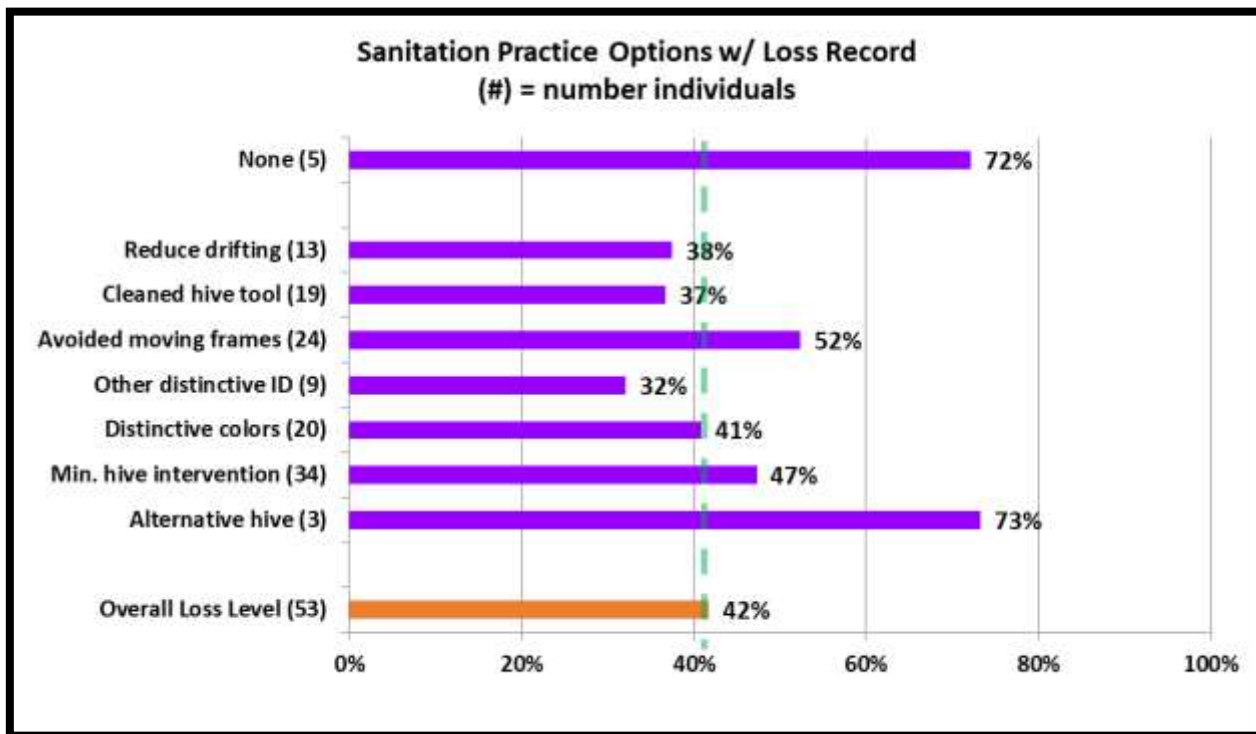


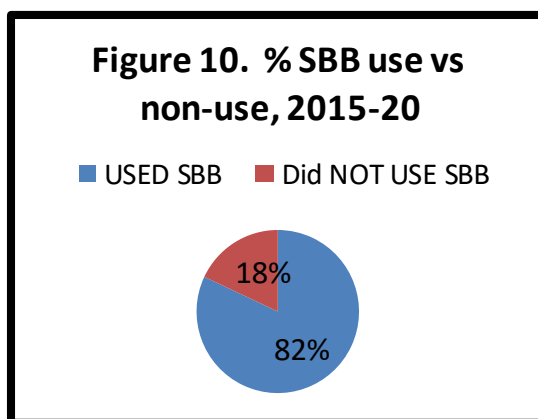
Figure 9

Minimal hive intervention (209 individuals, 34 of them TVBA beekeepers) was the most common option selected along with generally avoid moving frames (24 TVBA members). The two sanitation choices that did seem to improve survival statewide was reduce drifting by spreading colonies out and providing hives with distinctive ID /doing other hive ID measures; for TVBA members these two provided better survival but only 22 respondents made these managements. Cleaning hive tool (19 individuals) and reduce drifting (13 individuals) managements also had slightly better survival for TVBA members.

Statewide avoiding moving frames and reducing drifting were the two sanitation choice that demonstrated better average survival the past three years – 4 year loss rate was 35% for frame moving and 37½% for reducing drifting compared to overall rate of 41%,, both relatively minor 6 and 3 ½ percentage point difference. Distinctive hive address via painting (40% this year which was also 3 year average) had but a single percentage point advantage over average loss rate (41%) of last 3 years.

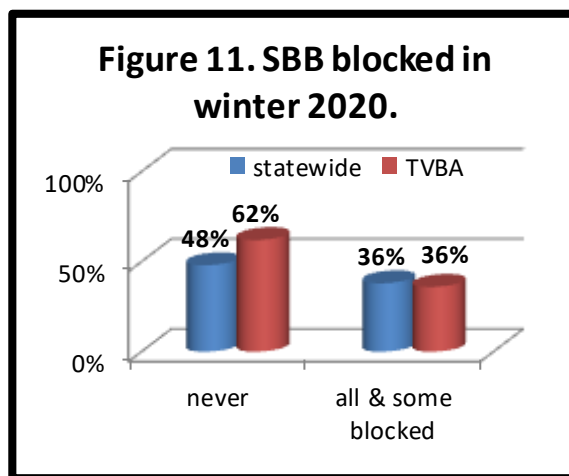
### SCREEN BOTTOM BOARDS (SBB)

Although many beekeepers use SBB to control varroa, BIP and PNW surveys clearly point out they are not a very effective varroa mite control tool. In the recent survey 30 individuals statewide (10%) and 6 in TVBA (11%) said they did not use screen bottom boards. This was the lowest percent of respondent non-use of SBB in last 6 years. Average non-use is 18% vs 82% use on some or all colonies over the 6 year period. Figure 10 shows 6-year data.



This past overwintering season, the 30 statewide non-SBB users (10% of respondents) had 222 fall colonies of which they lost 120 for 54% loss. The 220 beekeepers using SBB on all of their colonies had 37% loss. This was the greatest difference between non-users and users in past 5 years. **Examining the five year average of SBB use, loss level of those using SBB on all or some of their colonies had a 41% loss level whereas those not using SBB had loss rate of 36% (a 5 percentage point positive survival gain for those using SBB versus those not using them). They are very minor in improving overwinter survival.**

We asked if the SBB was left open (always response) or blocked during winter. This past season 31 TVBA respondents (63%) always or sometimes blocked their SBBs. Those who said they never blocked (13 individuals in TVBA) had a 62% winter loss, a 26 percentage point difference. **Comparing the always and sometimes left open with the closed in winter (all closed + some closed) response reveals an 12 percentage point difference in favor of closing**



**the SBB statewide over the winter period to improve survival** See Figure 11.

Summary: Screen bottom board use has a slight survival advantage. For those using SBB, the advantage appears to be to close, partially or completely the open screen bottom over the winter period.

**Things that seem to improve winter success:** It should be emphasized that these comparisons are correlations not causation. They are single comparisons of one item with loss numbers. TVBA beekeepers do not do only one management nor do they necessarily do the same thing to all the colonies in their care. We do know moisture kills bees, not cold, so we recommend hives be located in the sun out of the wind. If exposed, providing some extra wind/weather protection might improve survival.

Feeding, a common management appears to be of some help for beekeepers statewide in reducing losses. Feeding fondant sugar, a hard sugar candy or dry sugar during the winter means lower loss levels. Providing frames of honey and feeding sugar syrup also meant lower losses for some individuals and such feeding management is of great value for the spring development and/or development of new/weaker colonies. Feeding protein in form of dry pollen and pollen patties did slightly improve survival. The supplemental feeding of protein (pollen patties), might be of assistance earlier in the season to build strong colonies and in the fall to build the fat bee population needed for successful overwintering.

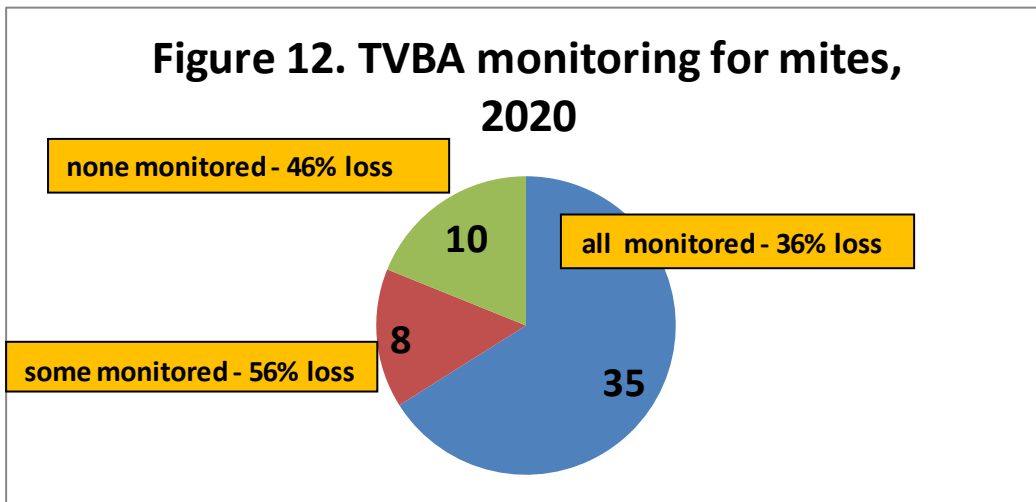
Winterizing measures that apparently helped lower losses for some statewide beekeepers was, a moisture trap (Vivaldi board or quilt box) and upper insulation, plus wrapping the colonies (or otherwise adding some insulation to provide added protection against the elements). Spreading colonies out in the apiary and doing other measures to reduce drifting also appeared to be of some value in reducing winter losses. Avoiding movement of frames from one colony to another might also improve survival but the gain over what this interchange might accomplish to bolster weak colonies and start new divides might be greater than a minor advantage in survival.

It is clear that doing no feeding or winterizing or sanitation resulted in the heaviest overwinter losses.

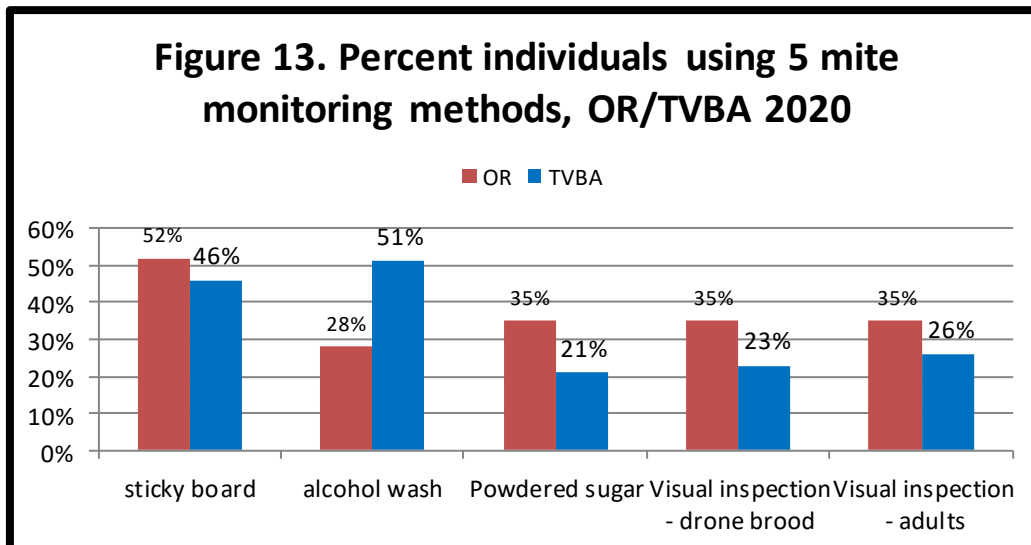
Replacing standard bottom boards for screened bottoms marginally improved winter survival. It is apparently advantageous to close the bottom screens during winter.

## **Mite Monitoring/Sampling and Control Management**

We asked percentage of Oregon hives monitored for mites during the 2019 year and/or overwinter 2019-20, whether sampling was pre- or post-treatment or both and, of the 5 possible mite sampling methods, what method was used and when it was employed. Among TVBA, 35 individuals (66%) monitored all colonies; they had 36% loss. Eight individuals monitored some colonies; they had a 56% loss level. Ten individuals (19%) did no monitoring and they had a 46% loss. Statewide 82% said they monitored all or some of their hives (losses =51%); 18% reported no monitoring (loss rate = 59% loss). See Figure 12.



In order of popularity of use, sticky boards were used by 46% of total TVBA respondents (of those 81% who monitored (as shown above, 19% did no monitoring), 51% of individuals used alcohol monitoring and only 21% used powdered sugar monitoring; these two were considerably different from statewide as were visual inspection of drones and adults. In past 5 years, the use of sticky boards has decreased in use statewide and both alcohol wash and powdered sugar shake have increased in use. Figure 13 red bars are statewide responses and blue is TVBA for 2020.

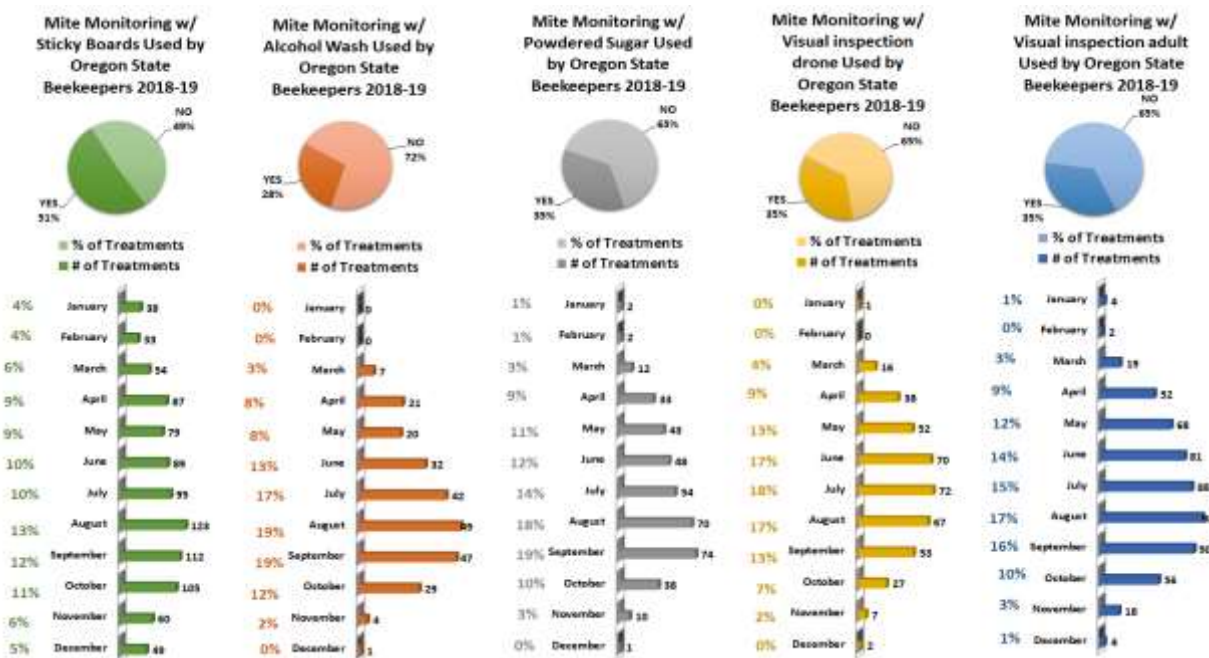


It is obvious that monitoring alone is a means towards improved winter survival. The table below compares per cent individuals and per cent winter loss for individuals statewide who monitored all colonies compared with those who monitored none. The 14-15% who monitored some colonies was variable but 3 year average mirrors those who monitored all colonies.

	ALL Colonies Monitored % individuals	% loss	SOME Colonies Monitored % individuals	% loss	No colonies Monitored % individuals	% loss
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%
3 year loss age		41%		38%		51%

Most sampling to monitor mites was done in July – September, as might be expected since mite numbers change most quickly during these months and results of sampling can most readily be used for control decisions. See Figure 14 below for number of months each of the 5 sampling methods were used.

Figure 14



It is important to KNOW mite numbers. Less effective mite monitoring methods include sticky (detritus) boards below the colony (often so much detritus drops onto a sticky board that picking out the mites can be hard, especially for new beekeepers); sticky boards can help confirm the

usefulness of a treatment when inserted post treatment. Visual sampling is not accurate: most mites are not on the adult bees, but in the brood. Unfortunately looking for mites on drone brood is also not effective as a predictive number but can be used as an early warning that mites are present; if done, look at what percentage of drone cells had mites.

See **Tools for Varroa Monitoring Guide** [www.honeybeehealthcoalition.org/varroa](http://www.honeybeehealthcoalition.org/varroa) on the Honey Bee Health Coalition website for a description of and to view videos demonstrating how best to do sugar shake or alcohol wash sampling. The Tools guide also includes suggested mite level to use to base control decisions based on the adult bee sampling. A colony is holding its own against mites if the mite sample is below 2%. It is critical to not 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 difficult time to select a control method (if one is deemed needed) as potential treatment harm may negatively impact the colony. We are seeing more colonies suddenly disappear (abscond?) during the fall, which may be related to the treatment itself.

## Mite Control Treatments

The survey asked about non-chemical mite treatments and also about use of chemicals for mite control. Three individuals (6%, ½ the statewide percentage 12%) said they did not employ a non-chemical mite control and 9 individuals (17%), did not use a chemical control (statewide=24%). Those TVBA individuals who did not use a non-chemical treatment had a 20% loss; statewide reported a 50% winter loss. Nine TVBA members (17%) not using a chemical control had a loss rate of 59½%; statewide lost rate=69% of their colonies. The individual options chosen for non-chemical and chemical control are discussed below

**Non-Chemical Mite Control:** Of nine non-chemical alternatives offered on the survey (+ other category,) 3 individuals selected none – they had 20% loss. The thirteen individuals listing one method had a 51% loss, 14 individuals selected 2 choices (loss rate=39½%), 12 individuals had 3 (40% loss) and 11 made 4 (8 individuals) or 5 (3 individuals) choices – they had 39% loss rate. TVBA respondents made 2/3 choices/individual.

Use of screened bottom board and minimal hive inspection (42 and 28 individuals respectively among TVBA respondents) were most commonly selected. Neither management improved survival rate. The use of the remaining 7 selections are shown in Figure 15; number of individuals in ( ), bar length represents average loss level of those individuals using each method. The one individual that requeened with hygienic bees (3 colonies) and small cell/natural comb (2 individuals, 22 colonies) showed the best survival. Neither do so statewide.

Three of the non-chemical alternatives have demonstrated reduced losses for statewide beekeepers over past 4 years. Reducing drifting such as spreading colonies (35% loss average for 3 years – question not asked in 2016-17 survey), brood cycle break (39% average over 4 years only 4 percentage point better survival) and different colony colors in apiary (42% average loss last four years –only one percentage point difference) have demonstrated better survival. Drone brood removal average loss for 4 year is the same as average loss for the four years (43%). Some non-

chemical control alternatives demonstrate an advantage on one or two years but overall no improvement.

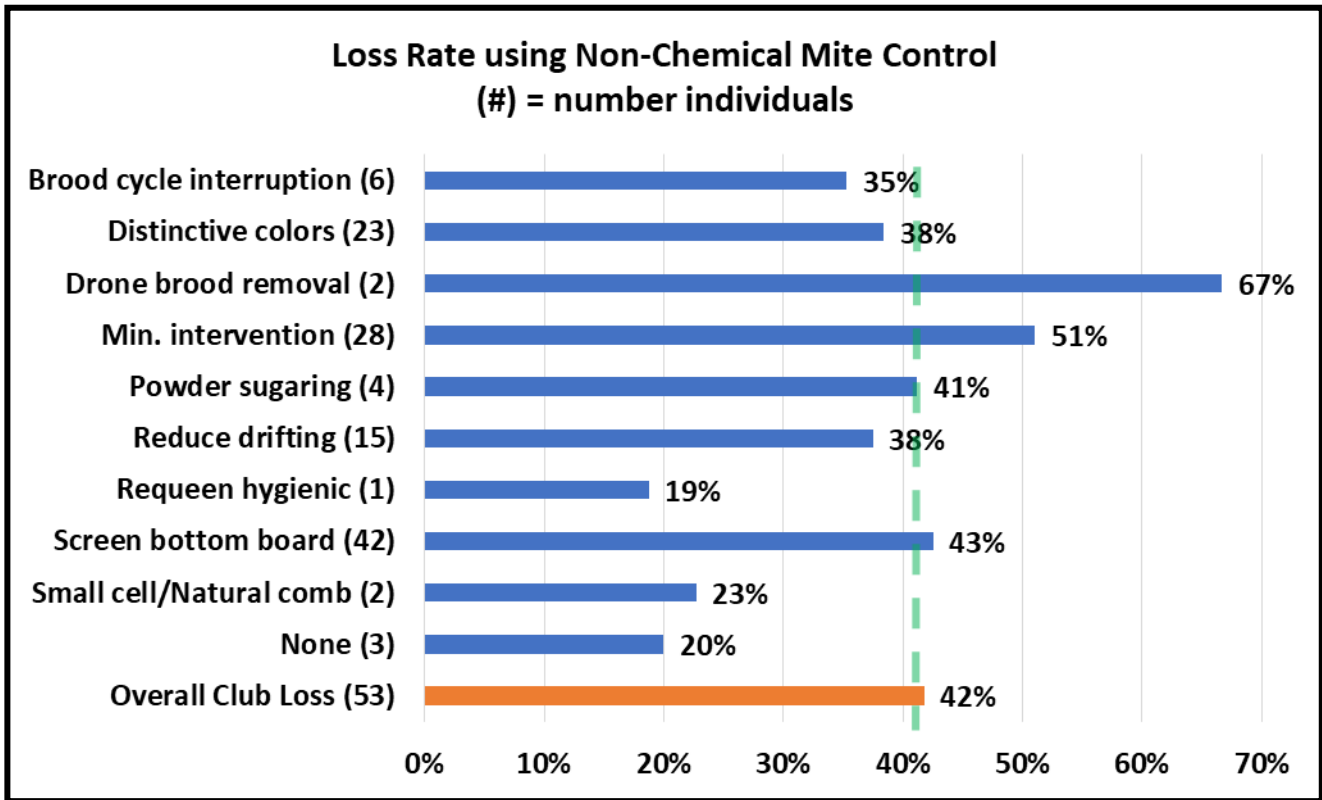


Figure 15

**Chemical Control:** For mite chemical control, 60 individuals (20% of total respondents) used NO chemical treatment Statewide. Nine TVBA members (16%) used no chemical treatments. Statewide loss rate was 57% and for TVBA loss rate was 59%. Those TVBA using chemicals used at rate of 1.5/individual (statewide rate was 1.8/individual). Seventeen TVBA members used one chemical (loss rate 47%, another 17 used 2 (18% loss rate and 10 individuals used 3 (7 members), 4 (one individual) or 5 (2 individuals) chemicals and had losses of 58%. Clearly one chemical doesn't improve survival nor using many but 2 seems to be of benefit.

One hundred thirty OR Beekeepers indicated use of MAQS, formic acid, plus an additional 13 used Formic Pro; only the Formic Pro use improved survival. The same holds for TVBA formic acid users; sixteen TVBA members indicated use of MAQS and 6 used Formic Pro (21% survival). Figure 16 illustrates number of uses ( ) and bar length indicates the loss rate for those using that chemical. Only Oxalic acid vaporization (besides Formic Pro) use showed better survival for TVBA members in sharp contrast to statewide respondent results.

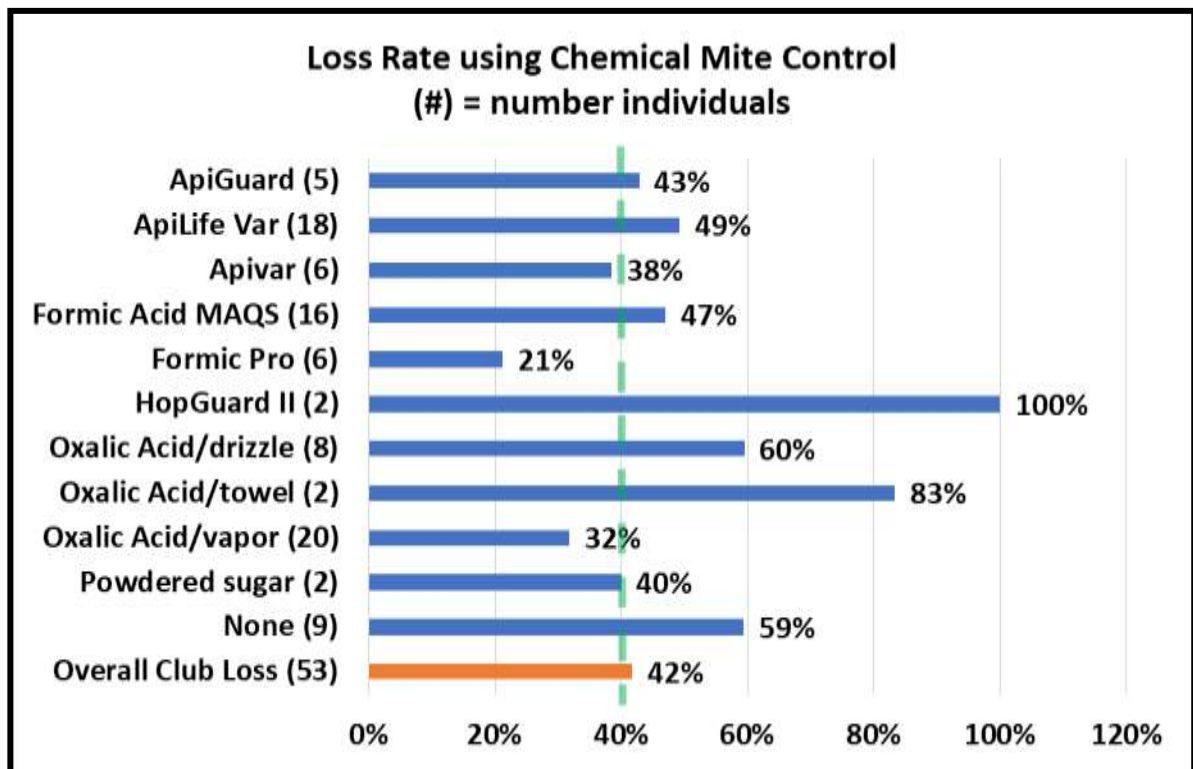
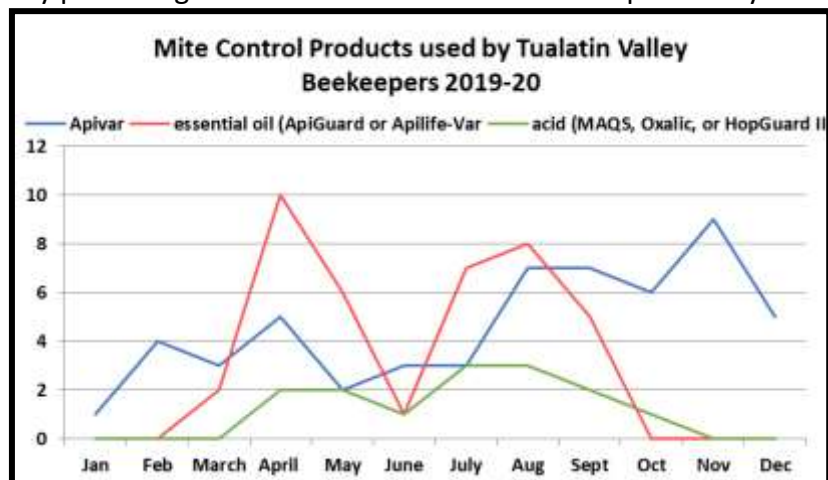


Figure 16

Consistently the last 4 years five different chemicals have helped beekeepers improve survival. The essential oils Apiguard (average 4 year loss level 32%), Apivar (32.5% average 4 year loss level), Oxalic acid vaporization (33.5% average loss level over last 4 years – in contrast the oxalic acid drizzle average of last 3 years is 41% loss level - those who mix formic into shop towels have heavier losses – 83%) and ApiLifeVar (36% average loss level over last four years) have been consistent in improving survival. The formic acid MAGS formulation has same as average loss level (43%). Formic Pro has increased in use – it looks very promising at a 26% loss level statewide the past two years (when average loss was 43%).

The monthly use of Apivar (blue line), essential oil (red line) or an acid (green line) is shown in Figure 23 for 2019-20 season. Further





review is needed to determine if the timing of treatments was more effective than at other times for the various chemicals.

## Queens

We hear lots of issues related to queen “problems”. Eighteen TVBA individuals (35%) said they did not have any queen issues and 13 (26%) said they didn’t know. Seven individuals of the 21 individuals (40%) who said they did have queen issues checked 10-30% and another 7 checked 75-100%. Four said 30-50% and 3 50-75%. Statewide 50% said none and 19% said they didn’t know.

Queen events can be a significant factor contributing to a colony not performing as expected. We asked if you had marked queens in your hives. Ten individuals said yes (19%) and 42 said no. Statewide 31% said yes. The related question then was did you or your bees replace their colony queen? Twenty five (47%) said Yes. 9 did not know and 19 (36%) said no; statewide 45% said yes, 33% said no.

One technique to reduce mite buildup in a colony is to requeen/break the brood cycle. Responses to the question “How did bees/you requeen” included nine individuals who used a mated queen and 4 who used queen cells (33%). The remainder requeened naturally via supersedure (6 individuals), split and raised their own queens (7 individuals) and 13 said their colonies swarmed as queen replacement method. Statewide one-third of respondents indicated their bees were requeened with a mated queen and 58% indicated it was the bees that requeened via swarming (22%), supersedure (16%) or emergency rearing (20%). That means too few were seeking to use this valuable tool for mite control.

## Closing Comments

This survey is designed to ‘ground truth’ the larger, national Bee Informed loss survey. Some similar information is additionally available on the BeelInformed website [www.beeinformed.org](http://www.beeinformed.org) and individuals are encouraged to examine that data base as well. Recall that the BeelInformed survey is measuring the larger scale OR beekeepers not the backyarders (figure 6 of OR state loss report.) Reports for individual bee groups are customized and posted to the PNW website.

We 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](mailto:info@pnwhoneybeesurvey.com) with “REMINDER” in the subject line. We have a blog on the [pnwhoneybeesurvey.com](http://pnwhoneybeesurvey.com) and will respond to any questions or concerns you might have.

**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 2020