

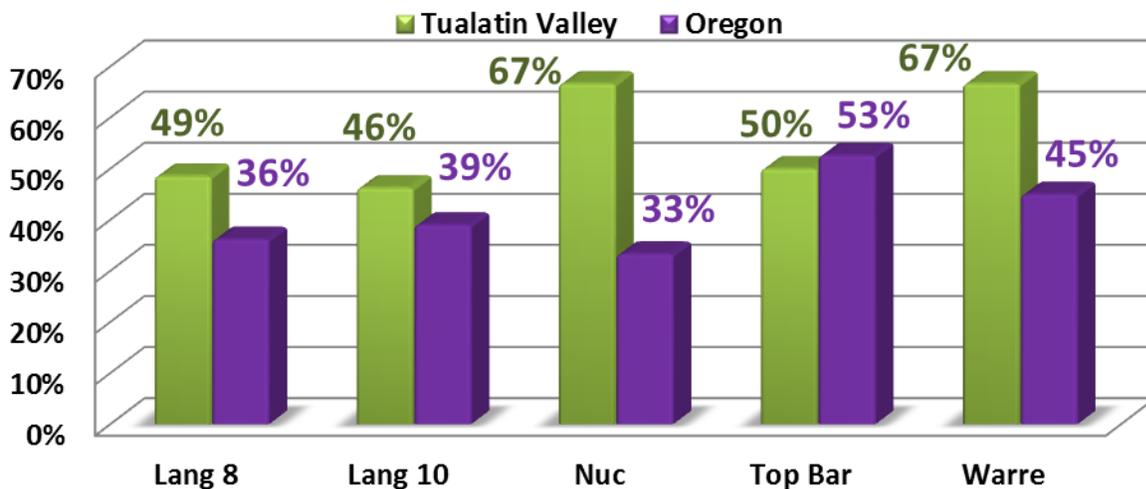
2018 Tualatin Valley (TVBA) Winter Loss by Dewey M. Caron

At the March and April TVBA meetings I encouraged TVBA members to participate in the 2017-2018 PNW overwintering loss survey. Members were directed to the online survey at www.pnwhoneybeesurvey.com, a continuing effort to define overwintering success of beekeepers in the Pacific Northwest. A statewide Oregon (and Washington) report, along with individual club reports, are posted on the PNW website www.pnwhoneybbesurvey.com.

I received 303 responses from Oregon backyarders, and an additional 104 from Washington beekeepers. Tualatin Valley members sent in 49 surveys, providing information on 174 fall colonies. This survey return was 11 more respondents than last year. **Total overwintering losses of the 49 TVBA respondents was 91 colonies = 48% weighted loss rate.** This loss level is ten percentage points higher than the statewide OR beekeeper loss rate and 2nd highest of all OR clubs in 2018.

Loss rate was determined by hive type. TVBA members started winter with 134 Langstroth 10-frame hives (71% of total), 35 Langstroth 8-frame hives, 12 5-frame nucs, 4 Top bar colonies, and 3 Warré hives. The accompanying Figure 1 shows percent loss for each hive type compared with statewide Oregon beekeeper data base (303 individuals, 1277 fall colonies). TVBA hive losses were all higher than statewide except for top bar hives but only 4 of 38 TB hives were reported by TVBA.

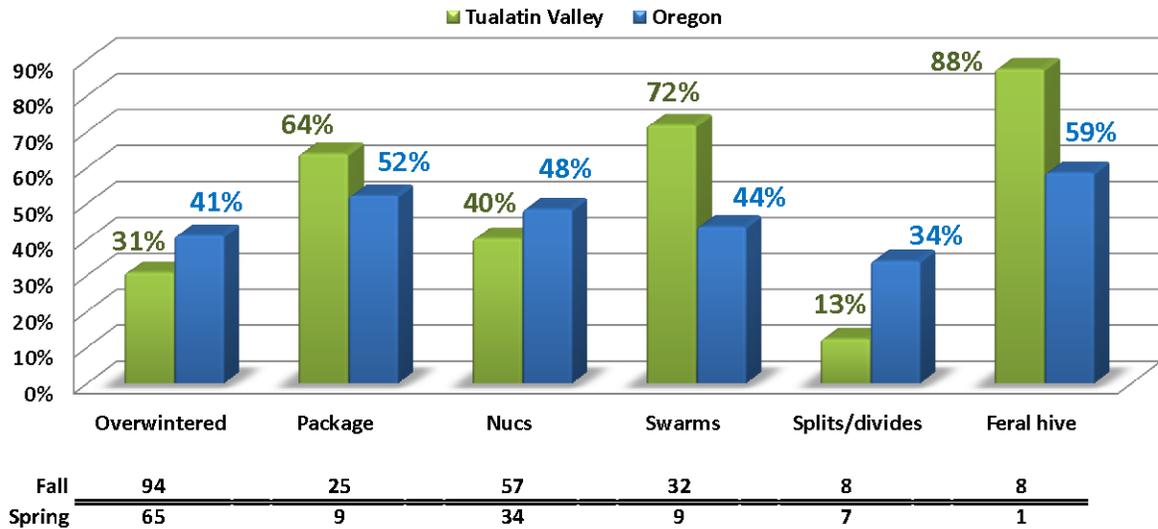
2017-18 Winter Honeybee Loss % by Hive Type



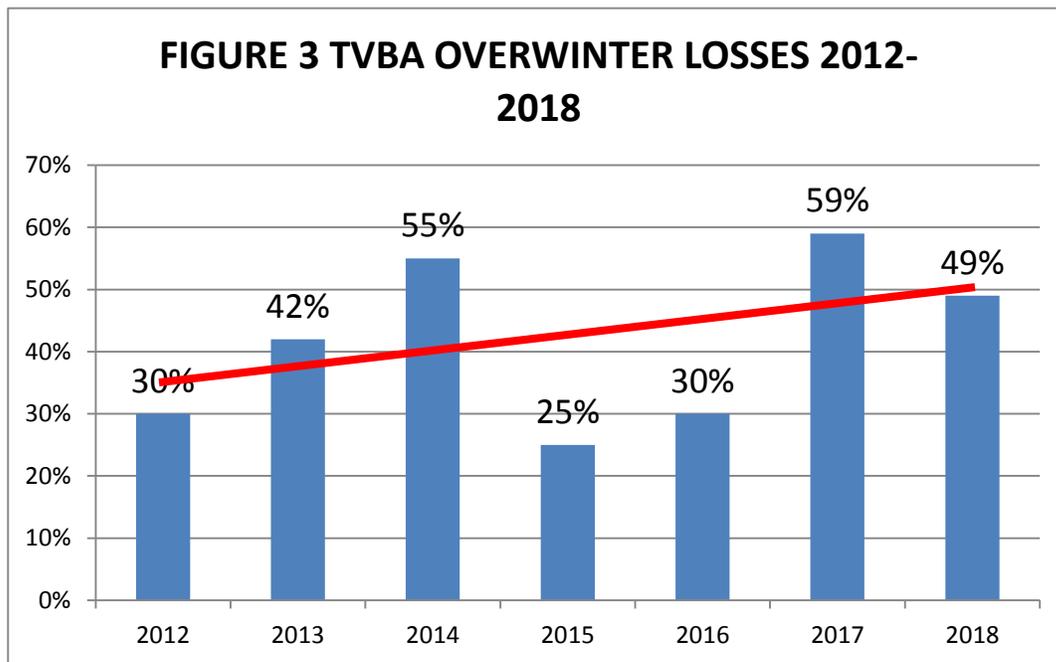
Fall Col #	35	134	12	4	3
Spring Col #	18	72	4	2	1

Losses by hive origination were also tallied. The data for TVBA and state wide are shown in Figure 2. Overwintered, nucs and splits both had lower loss rates than did statewide beekeepers.

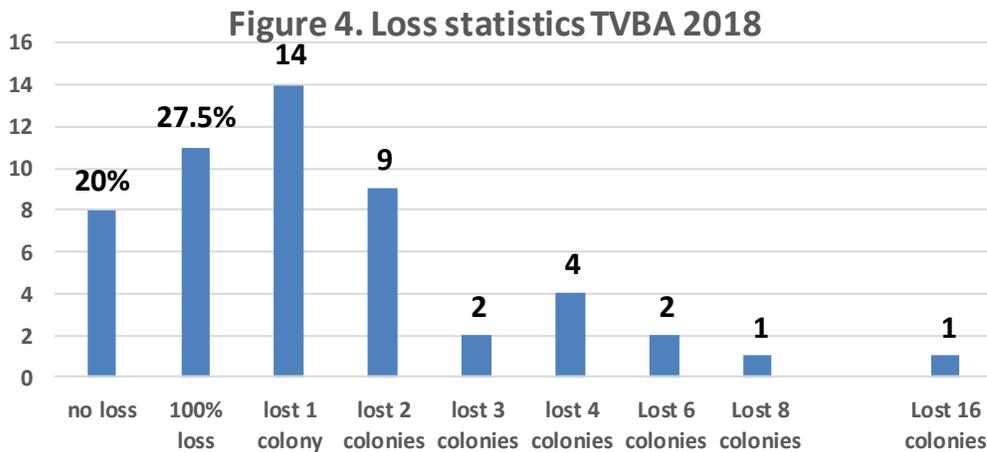
2017-18 Winter Honeybee Loss % by Origination



Losses this past winter were 10 percentage points lower than the terribly elevated losses of the 2017 winter but 9 percentage points above the 40% TVBA loss average of the previous 6 seasons. Trend line however is for increasingly heavier losses. See Figure 3.

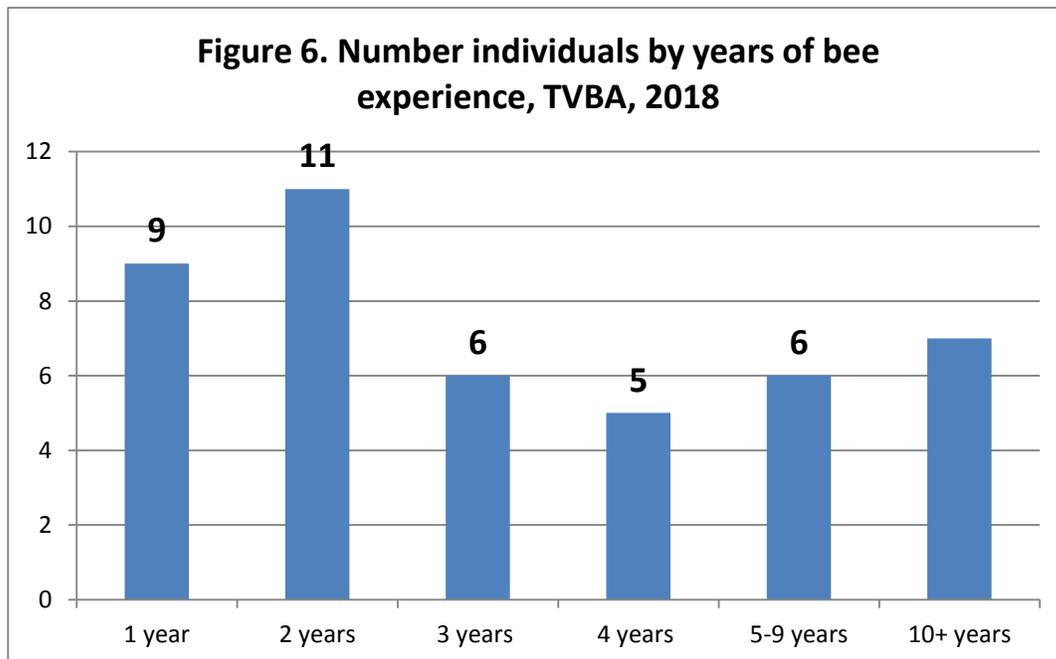


Not everyone had loss. Eight individuals (20%) reported total winter survival. Eleven individuals (27.5%) lost 100% of their colonies. Fourteen individuals lost 1 colony, 9 individuals loss 2, 2 lost 3, 4 lost 4 colonies and 2 individuals lost 6 colonies. Also 1 individual lost 8 (of 12 fall colonies = 67% loss level) and another lost 16 colonies (this individual lost 57% of their colonies). Three other individuals started fall with 10 or more colonies and they had loss rates of 15%, 27%, and 40%, all below the average TVBA loss level. See Figure 4.



Two individuals had 2 apiaries and 1 had 3. Survival at 2nd and 3rd apiary sites (60%) was better than the home apiary (46%). Four TVBA individuals moved bees during the year, two for better forage, one to avoid pesticides and the 4th was a move within the apiary.

Typical of the statewide data, the TVBA respondents are largely new beekeepers. 46% of TVBA respondents had 1 or 2 colonies and another 27% had 3 or 4 colonies, 12% had 4 to 7 colonies and 15% had 9+ colonies, largest number was 28.



TVBA survey respondents reported a wide range of beekeeping experience. Seven individuals (16%) had 10 years or more of bee experience, with the highest 50 years; 26 individuals (59%) had 1,

2 or 3 years of experience. Twenty-six individuals (53%) said they had a mentor available when they started keeping bees compared to 69% statewide.

Reasons for/acceptable loss level

We asked of individuals that had colony loss to estimate what the reason(s) for loss might have been. Multiple responses were permitted. Twelve TVBA beekeepers listed poor wintering conditions, 11 listed weak in the fall and 10 listed varroa mites. Queen failure and don't know was listed by 8 individuals each, 6 said yellow jackets, 3 listed CCD and 3 also indicated pesticides. Starvation, skunks, wax moth and too much moisture were other listings. Comparison of individual listing and statewide percentages is shown in Table below. Statewide Varroa and queen failure were the most commonly listed choices

When asked for an acceptable loss level 8 individuals said zero, 16 additional said up to 15%, the medium. Seven listed both 20% and 25% while 4 listed 33% and 3 listed 50%. Statewide medium was 15%, same as for TVBA members.

DK= don't know	Varroa mites	Poor wintering conditions	Weak in fall	Queen failure	Starvation	pesticides	Yellow jackets	Other
TVBA # indiv DK= 8 indiv	10	12	11	8	1	3	6	3
Statewide % DK = 9%	23%	10%	14%	17%	5%	3%	6%	9%

Why do colonies die? There is no easy way to verify reason(s) for colony loss, nor a consensus of an acceptable level. Colonies in the same apiary might die for different reasons. Major factors in colony loss are thought to be mites, pesticides, declining nutritional adequacy/forage and diseases, especially viruses and Nosema. **Doing a dead hive examination (necropsy) is the first step in seeking to solve a heavy loss problem. See report of workshop mid-April at Zenger Farm apiary on dead colony examinations posted on the PNW website. More attention to colony strength and possibility of winter starvation will help reduce some of the losses. Control of varroa mites will also help toward loss reduction.**

As beekeepers we are dealing with living animals which are constantly exposed to many different challenges, both in the natural environment and the beekeeper's apiary. Management, especially learning proper bee care in the first years of beekeeping, remains a factor in losses. What effects our changing environment of things 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.

Langstroth a hundred and sixty years ago wrote about the importance of taking losses in fall management, saying if the beekeeper neglects such attention to his/her colonies 45% loss levels may

occur, depending upon winter weather conditions. It can be argued that losses of 30, 40, 50% or more might be the new “normal.” Older, more experienced beekeepers recall when loss levels were 15% or less. Larger-scale beekeepers have issues with replacing losses about 15% while smaller-scale backyard beekeepers either replace their losses or simply give up after losing their colony (ies). Honey production fluctuates each year but once again seems to be declining on average. Stress of movement of colonies to pollination rentals and finding suitable “clean” forage sites for both larger and smaller scale beekeepers is a challenge. Numbers of U.S. bee colonies have declined since the 1940s, returning to numbers of 100 years ago, while worldwide numbers of bee colonies are steadily increasing.

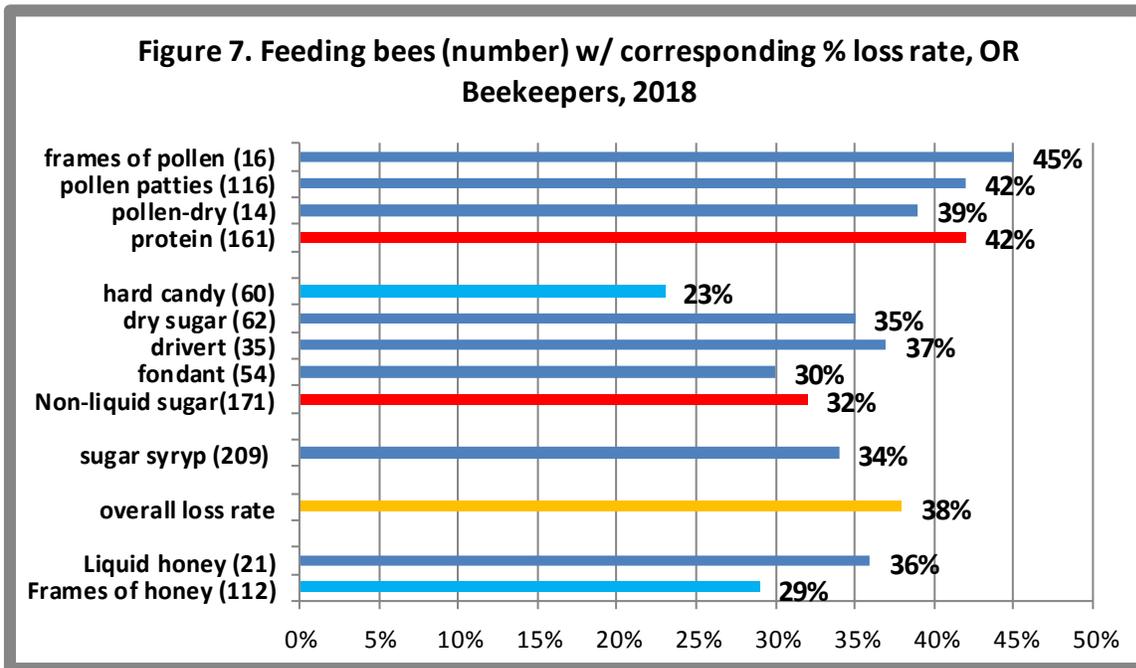
There is no simple explanation to explain the levels of current losses nor is it possible to demonstrate that they are necessarily excessive for all the issues facing honey bees in the current environment. Varroa mites and the virus they transmit are considered a major factor, but by no means the only 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 techniques (such as screen bottom board use, drone brood removal efforts, etc.) and chemical mite controls used. Individuals could check none or more than one response; most TVBA and OR beekeepers most often do not do just one thing/management to their colony (ies) to control mites toward improving overwintering success.

TVBA survey respondents checked 96 feeding options = 2.5/individual, same ratio per individual as statewide. Eight individuals (21%) selected a single choice (compared to 50% statewide having a single choice), 13 individuals had 2 choices, (the medium number), 5 had 3 choices and 8 individuals used 4 choices. Three individuals (8%, same percentage as statewide respondents), indicated 5 choices (those 8 individuals had a 22% loss level). Four individuals said they did NO FEEDING. They had a 48% loss level.

The results of statewide feeding compared to loss level is shown in Figure 7. Statewide, 209 individuals said they used sugar syrup. They had a 34% loss rate, slightly lower than the overall average of Oregon backyard beekeeper losses of 38%. All but 5 TVBA individuals indicated they fed sugar syrup, one of which indicated use of commercial syrup (which is a high fructose syrup). Slightly more than ½ this number of statewide respondents (112 individuals), said they fed frames of honey – their lost level (29%) was 9 percentage points better than the overall loss rate; 12 TVBA individuals fed frames of honey. The 21 individuals who fed liquid honey, 2 of them TVBA beekeepers, had 36% loss level, similar to overall losses.



Statewide Individuals that fed non-liquid sugar collectively had a lower loss level of 32%. Most useful would appear to be hard candy (60 individuals said they supplied their bees with hard candy and had 23% winter losses) and feeding of fondant sugar (54 individuals feeding fondant had a 30% loss level). In TVBA 7 individuals used hard candy and 3 used fondant.

Feeding of protein did not seem to help lower winter survival this past season (but there might be other good reasons for supplementing protein in bee colonies). All options exhibited losses higher than overall losses.

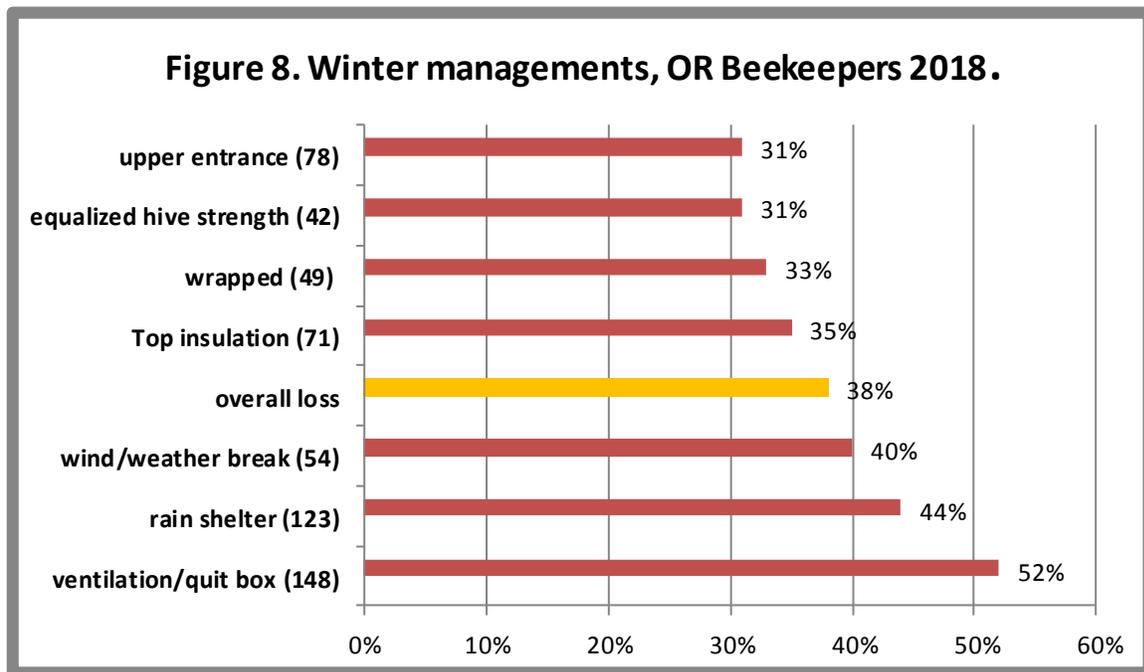
WINTERING PRACTICES: Eight TVBA individuals (20%) were among the thirty seven (15%) individual statewide respondents indicating none of the wintering practices was done; Statewide individuals doing none of the winterizing managements had a 43.5% winter loss compared to overall of 38% while the 8 TVBA members had 50% winter loss.

Statewide there were 588 responses from OR beekeepers on wintering management practices (more than one option could be chosen). TVBA beekeepers had 88 choices (2.7/individual). For those TVBA beekeepers indicating some managements, 6 did one single thing, 10 did 2, 5 did three and 7 did 4. Four individuals (12%), slightly more than double the percentage statewide, did 5 or more (3 did 5, and 1 used 6 choices). Those indicating 5+ had 44% loss level.

The most common wintering management selected (148 individuals statewide and 21 TVBA) was ventilation/use of a quilt box at colony top, followed by rain shelter (123 individuals statewide, and 17 TVBA respondents). Figure 8 shows number of individual choices and percent of each selection statewide. Upper entrance and equalizing hive strength were the 2 selections that had lowest losses and those who wrapped also showed higher survivorship (33%) compared to overall

loss rate. For TVBA individuals, 8 used upper entrance, 3 equalized hive strength and 6 indicated they wrapped colonies

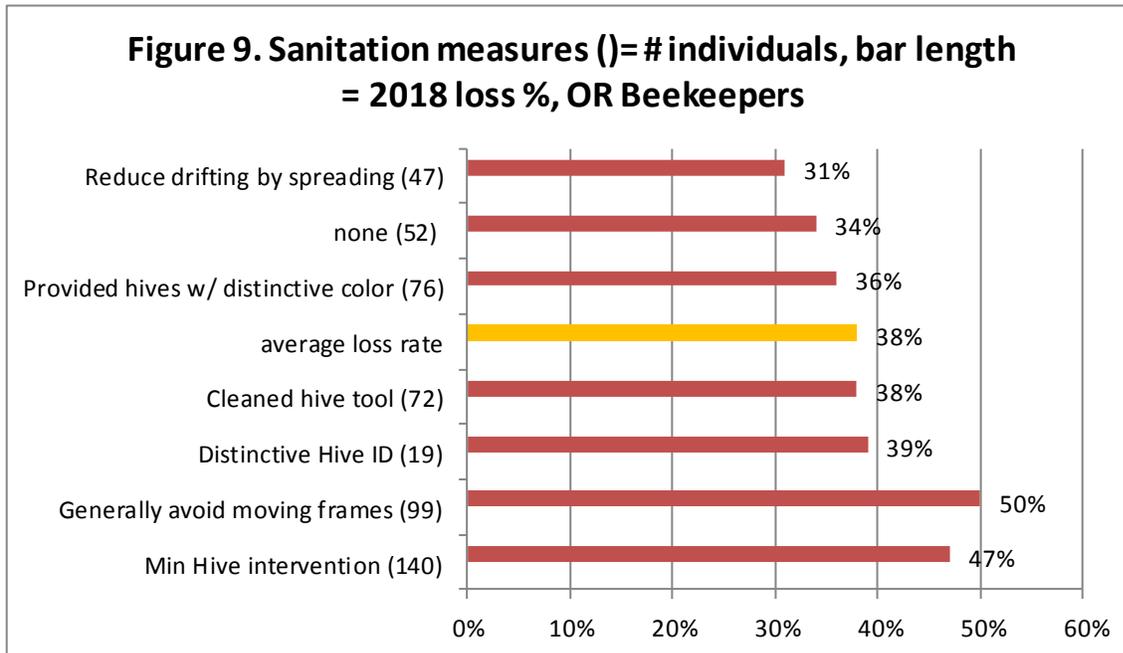
Combining an upper entrance, insulation at top and a ventilation board (alone or in combinations with other managements) did have a slightly lower winter loss rate last year. The variety of indicated choices of these wintering selections demonstrates that OR and TVBA backyard beekeepers are taking extra measures to help colonies survive winter conditions.



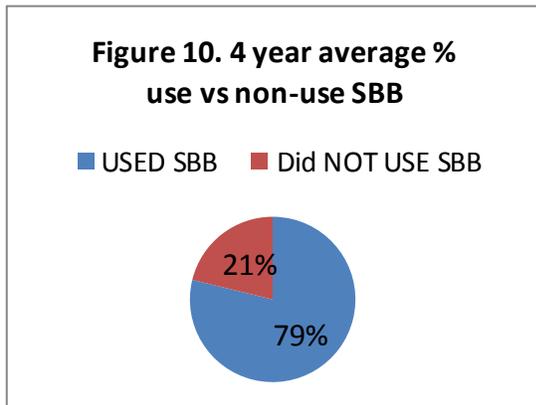
SANITATION PRACTICES: It is critical that we practice some basic sanitation (some prefer use of term bee biosecurity) in our bee care. We can do more basic sanitary practices to help insure healthy bees. We received 525 responses for this survey question statewide, XX were TVBA member responses. Fifty two individuals statewide (22%) and 3 among TVBA (7%) said they did not practice any of the 6 offered alternatives but loss rate statewide (34%) was slightly less than the overall loss rate of 38%. Thirteen TVBA members had 1 selection, 14 made 2 choices, 8 selected 3 managements and 4 had 4 choices. There were 2.1 selections per individual.

Minimal hive intervention (138 individuals, 23 of them TVBA beekeepers) was the most common option selected. It could be argued that less intervention might mean reduced opportunity to compromise bee sanitation efforts of the bees themselves and that excessive inspections/manipulations can potentially interfere with what the bees are doing to stay healthy. This option however did not improve winter survival, the loss rate for this group was 47%. Last year it also did not show better survival. The management of generally avoiding moving frames also did not seem to reduce losses and in fact showed the highest loss rate statewide at 50%; 17 TVBA individuals indicated this management.

The two sanitation choices that did seem to improve survival was reduce drifting by spreading colonies out and providing hives with distinctive ID /doing other hive ID measures. For TVBA respondents, 6 did managements to reduce drifting and 2 did something to provide distinctive ID. Last year providing hives with distinctive colors showed slightly lower loss rate. See Figure 9.



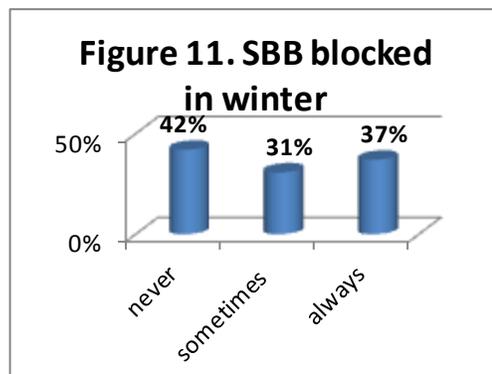
SCREEN BOTTOM BOARDS: Although many beekeepers use SBB to control varroa, BIP and



PNW surveys clearly point out they are not a very effective varroa mite control tool. In this recent survey 63 individuals (20%) statewide said they did not use screen bottom boards of which 4 (8%) were TVBA members. In 4 PNW survey years, 21% said they did not use SBB and 79% did use SBB on some or all of their colonies. See Figure to left. The loss rate for the 80% who used SBB on some or all of their colonies, was 38% statewide, one percentage point better than the non-users (39%). Figure 11.

This one percentage point difference means that in the PNW surveys there have been differences of 1, 2 and 13.4 percentage points larger (3 of 4 years) i.e. better survival, and for the fourth year 8 percentage points lower survival. **The four year average of SBB use, 41.3% loss level of those using SBB on all or some of their colonies and 43.4% for those not using SBB (a 5% positive gain), illustrates how they are very minor in improving overwinter survival.**

The survey asked if the SBB was left open (always response) or blocked during winter. This past season 23% of individuals statewide (TVBA 26%) said they always blocked SBB during winter. They had a 37% loss rate. One hundred fourteen individuals statewide (44%) did not block them during winter (never response), of which 21 individuals (55% of TVBA response rate) were TVBA members. They had a 42% loss rate, 4 percentage points lower than the average of three previous years. Forty



four individuals (17%, 18% TVBA) blocked them on some of their colonies. Their loss rate statewide was 30.7% which was 10.2 percentage points higher than the three year average. **Comparing the always and sometimes left open with the closed in winter response reveals a 10 percentage point difference in favor of closing the SBB over the winter period for OR beekeepers.** See Figure 11.

There is no good science on whether open or closed bottoms make a difference in overwinter but some beekeepers “feel” bees do better with it closed overwinter. Four years of comparison shows those closing the screen during winter did have a 10 percentage point improvement in colony survival. An open bottom, at least during the active brood rearing season, can assist the bees in keeping their hive cleaner.

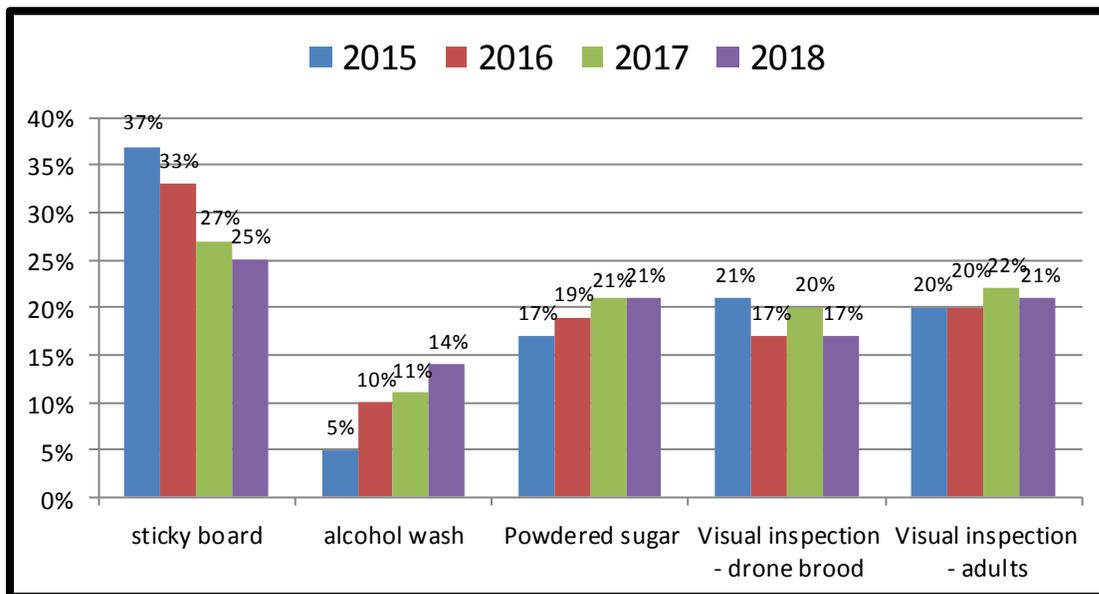
Mite monitoring/sampling and control management

We asked percentage of Oregon hives monitored for mites during the 2017 year and/or overwinter, 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. Statewide, 184 individual respondents (63%) said they monitored all their hives. For TVBA members, 23 individuals (48%) monitored all their hives. Losses of those individuals monitoring was 38% statewide and 51% for TVBA members. Seventy seven individuals (22%) statewide and 17 TVBA members reported no monitoring; statewide there was a higher loss rate, 49% and for TVBA members a 57% loss. 33 individuals statewide monitored some of their colonies; they had a 26% loss; for the 8 TVBA individuals monitoring some of their colonies the loss rate was 42%. See Table below.

	ALL colonies monitored	SOME colonies monitored	NO colonies monitored
Statewide	43% loss	26% loss	49% loss
TVBA	51% loss (23 indiv)	42% loss (8 indiv)	57% loss (17 indiv)

The previous year those individuals monitoring all colonies (178 individuals) had a 43% loss while those 62 individuals not monitoring had a 48% loss. Thus for past 2 survey years there was an average advantage with monitoring of 8 percentage point lower losses (48.5% no monitoring vs 40.5% loss total monitoring), This means there is a 20% advantage (lower losses) to those monitoring.

In order of popularity of use statewide, Sticky boards were used by 110 individuals (25%), which has continued to decrease in use popularity, followed by 95 individuals using powdered sugar monitoring (21%), and visual inspection of adults, both 21%. Visual inspection of drone brood was done by 72 individuals=17% and alcohol wash was reported by 61 individuals - 14%. Figure 13.



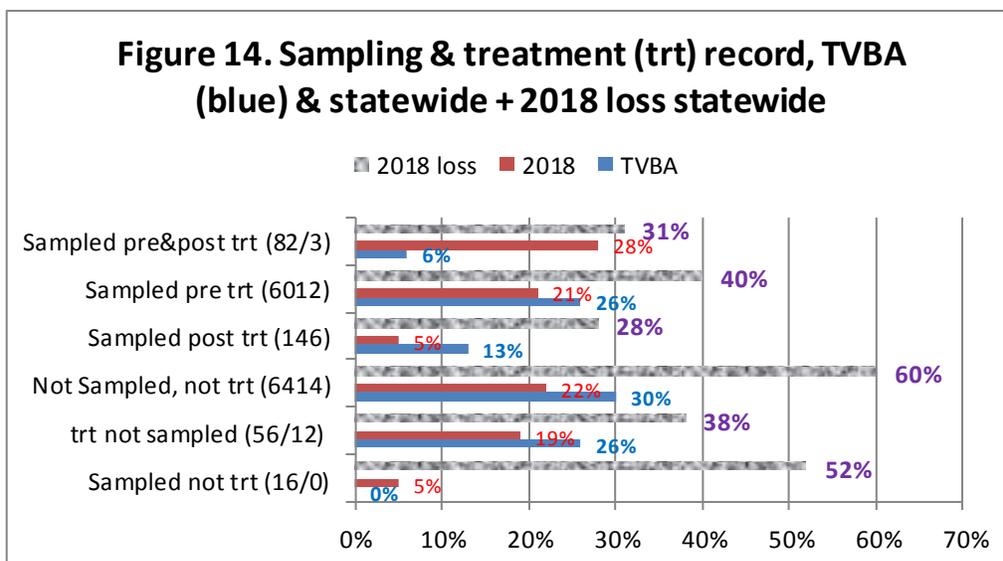
Statewide 68% of individuals used more than one monitoring method. 32% of individuals used a single monitoring method (23 individuals used alcohol wash, 19 sticky board and 18 powder sugar), 39% used 2 methods, 24% used 3, 5% (10 individuals) used 4 and 1 individual used all 5. for TVBA members 4 used only Sticky boards and 4 used only alcohol wash = 8,, 14 used 2 sampling methods and 5 used 3 methods.

Powdered sugar shake and alcohol wash are both increasingly being used; they are the preferred monitoring methods that best estimate the size of the mite population. Sticky boards are useful to check the treatment efficacy when used post treatment. Among TVBA members 14 individuals (45%) used Sticky boards, 7 (23%) used alcohol wash, 11 individuals (36%) used powdered sugar, 6 (19%) used monitoring of drones and 13 (42%) monitored adults for mites (numbers are greater than 100% since multiple methods were utilized).

The most common sampling of respondents in 2017-18 was both pre and post-treatment (34%), as was the case the previous year. Sampling just pretreatment was similar each year but sampling just post treatment, also practiced at a similar level both years, showed a lower loss level

similar to both pre and post treatment sampling. Other sampling treatment/sampling combinations exhibited higher loss levels than the overall mean (38%). The option ‘Neither Sampling nor treating’ had the highest loss level (60%) with ‘Sampling and not treating’ (52% loss level of those using this approach) also exhibited a loss level above the mean. Both these selections showed the greatest 2-year variation.

Among TVBA respondents 3 indicated both, 6 just post, 12 pre-treatment (26%) with same number indicating treated but did not sample. 14 individuals (30%) did NOT sample or treat; they had the highest loss level. None sampled but did not treat in TVBA which was the 2nd highest among statewide beekeepers in loss level. Figure 14 shows both TVBA (blue bar) percentage of individuals doing the action and statewide as well. The single bar (mottled gray color) shows statewide losses associated with each management.

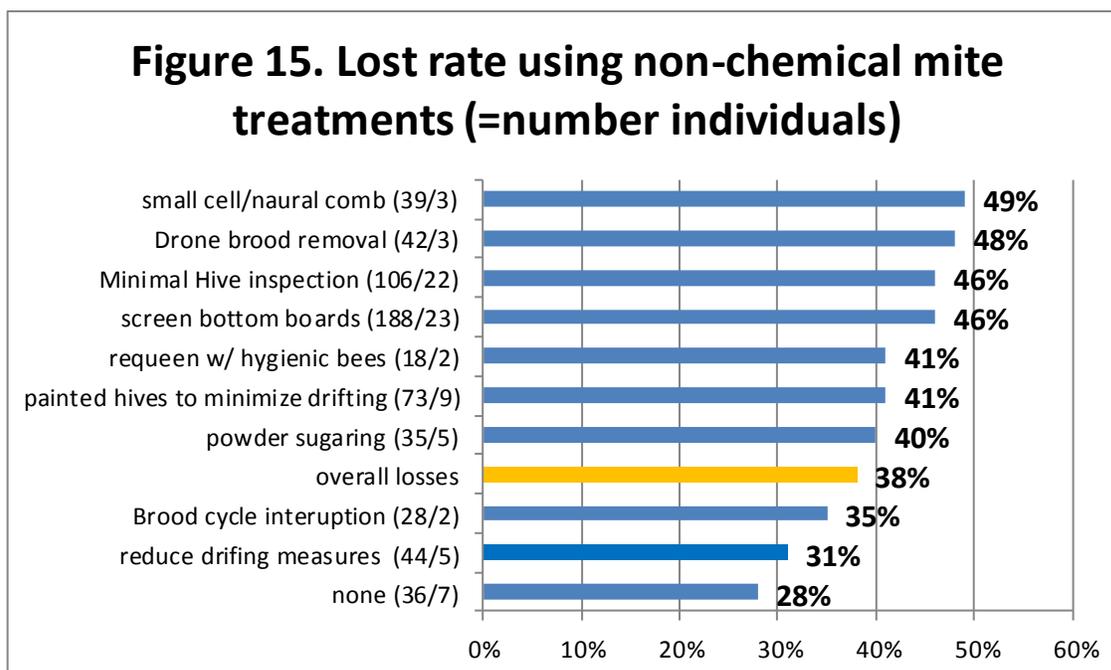


It is important to KNOW mite numbers. Less effective mite monitoring methods include sticky (detritus) boards below the colony (often so much detritus drops onto a sticky board that picking out the mites can be hard, especially for new beekeepers). Visual sampling is not accurate: most mites are not on the adult bees, but in the brood. Even looking at drone brood is not effective; if done, look at what percentage of drone cells had mites.

The survey asked about both non-chemical and chemical mite treatments. Statewide 36 individuals, (14.5%) said they did not employ a non-chemical mite control; 7 were TVBA members (17%) and 2 of those also did not use a chemical control. Those 2 individuals had a 67% loss. Among the statewide beekeepers 90 individuals (29%) did not use a chemical control; 9 were TVBA members (22%). Statewide those who did not use a non-chemical treatment reported a 28% winter loss, a

lower loss rate than those who did use a non-chemical control. This paradox is explained perhaps by individuals relying too heavily on those control techniques. In contrast, those who did not use a chemical had a 63.5% loss rate, compared to overall loss rate of 38%.

Non-Chemical Mite Control: Of nine non-chemical alternatives offered on the survey (+ other category) use of screened bottom board was listed by 188 individuals statewide and 23 TVBA beekeepers. The next most common selection was minimal hive inspection (114 individuals statewide and 22 TVBA members). Employment of the remaining 7 selections are shown in Figure 19 as number in () with first number statewide individuals and second number TVBA members. Bar length shows in percent the loss rate of those individuals statewide.



Listed among the “other choice were treatment such as oil/sugar mix, soya/garlic mix, local queens, isolation, and limiting hive size. One TVBA member added capturing wild swarms.

Other than doing nothing (10 percentage points lower losses level in both of past two survey years statewide), two of the non-chemical alternatives, brood cycle interruption (28 individuals 2 in TVBA, loss level 35% statewide and managements to reduce drifting such as spreading colonies in apiary (44 individuals, 5 in TVBA, 31% loss statewide) had losses below the overall loss rate.

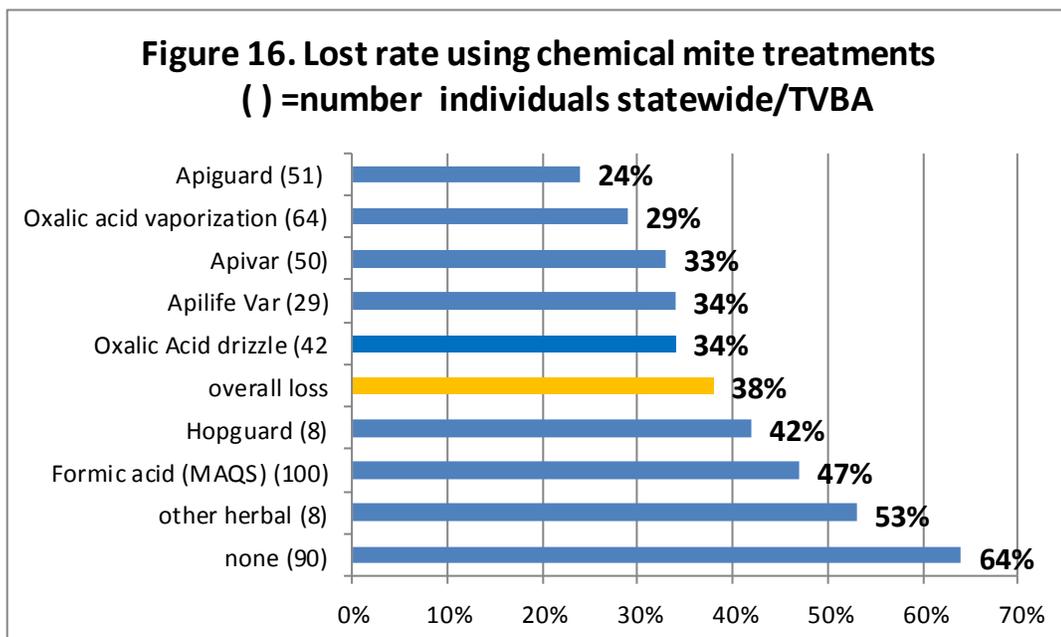
Chemical Control: For mite chemical control, 100 OR Beekeepers (47% of total chemical uses) indicated they most commonly utilized MAQS, formic acid, followed distantly by Oxalic acid vaporization (64 individuals, 30%); 12 TVBA members used both.

Apiguard had the lowest loss rate of 24% of all the chemical choices, 14 percentage points lower than the overall loss rate of 38%. It was used by 51 individuals (but only 1 was a TVBA

member); last year it had a loss rate of 38%, which was 10 percentage points lower than overall rate. Oxalic acid vaporization use increased this year (64 individuals compared to 38 last year statewide and by 8 individuals within TVBA) had loss rate that was 9 percentage points below overall (last year 14 percentage points below overall).

Apivar also had a low loss rate by users of 35% but this was elevated compared to the previous 2 survey seasons (27% loss 2016-17 and 23% loss rate 2015-16). It was used by 6 individuals within TVBA. Oxalic acid drizzle use was higher this year (42 individuals compared with 27 last year statewide) and loss rate indicates, like vaporization, that it can reduce loss rate (4 percentage points below overall this season: last year 7 percentage points lower). Its use continues to grow in popularity each survey season; in 2015-16 20% (both methods) to 50% of users last year statewide. ApiLife Var, used by 29 individuals (increase from 16 last year) had a loss rate of 34% (10 percentage points greater than last year) continued to be a popular choice with TVBA members (12 users.)

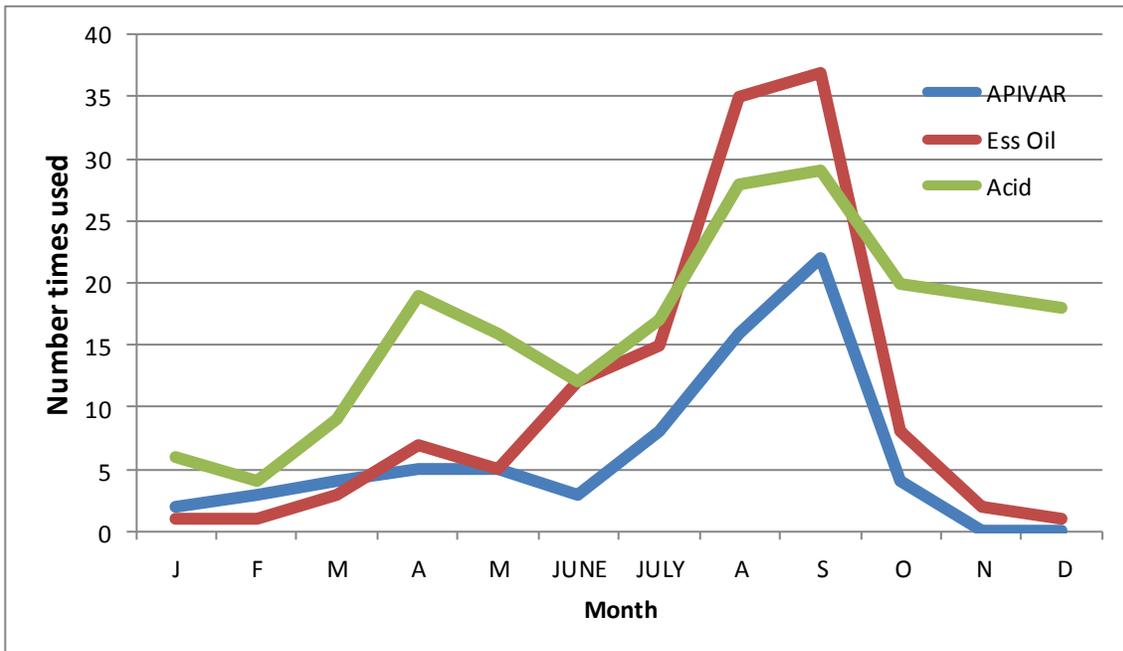
Chemical use was 2.3 choices/individuals statewide and 1.5 choices/individual in TVBA. 104 individuals (48.5%) statewide and 12 TVBA individuals (38%) indicated use of a single compound, 33% used two statewide, 8 in TVBA (25%), up 4 percentage points from last year, 16% used three statewide (last year 15%) of which 6 were TVBA individuals ((19%) and only 4 individuals used 4 (2 in TVBA) and one used 5 chemical treatments. The individual that used 5 had zero losses and the 4 that used 4 had 9.5% losses.



MAQS (formic acid), other herbal treatments and Hopguard II users all had losses heavier than overall. Hopguard II has performed poorly in reducing losses. Eight individuals, one in TVBA reported its use and had a 42% loss this season [3 of the 8 used only Hopguard as their chemical treatment (they used non-chemical treatments) had a 69% loss rate). Ten used it last year and had a 66% loss rate.

Under other, TVBA members listed other herbal use, mineral oil and 2 indicated use of powdered sugar.

The monthly use of Apivar (blue line), essential oil (red line) or an acid (green line) is shown in Figure 21 for 2016-17 season. Further review is needed to determine if the timing of treatments was more effective than at other times for the various chemicals



Antibiotic use

Thirteen individuals statewide (4%) used Fumigillan (for Nosema control); their loss rate was 52; 5 of the 13 were TVBA members. Two individuals (one less than last year) indicated use of terramycin; none TVBA

Queens

We hear lots of issues related to queen “problems”. Under the questions asking the reasons why colonies didn’t survive 62 individuals statewide (17%) and 8 (22%) of TVBA respondents selected queen failure as one of their choices. In Section 8 of the survey we asked what percentage of loss could be attributed to queen problems. 48% (129 individuals) statewide, 20 TVBA respondents said none. An additional 61 individuals (22% statewide, 9 (21%) TVBA) said they didn’t know. Of those 81 individuals statewide indicating loss due to queen failure (and 14 TVBA), 15% statewide, 18% TVBA said queen failure could have been responsible for 10-30% of their loss; 2 TVBA members checked 30-50% and one 50-75%.

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. Eighty one (up 7 from previous survey year) (29% stateside 20% PUB) said yes. The related question then was did you or your bees replace their colony queen? Forty-three percent (121 individuals) said yes, 36% said no and the remainder 'not that that I am aware of statewide. For TVBA respondents 35% said yes, 53% said no and 4 individuals (12%) said not they were aware of.

One technique to reduce mite buildup in a colony is to requeen/break the brood cycle. The question "How did bees/you requeen" received 197 responses (more than one option could be checked) statewide of which 21 were TVBA members. Statewide over one-third of respondents indicated their bees were requeened with a mated queen. Bees did their own requeening more commonly via swarming than supersedure according to respondents. For TVBA members 9 introduced mated queen, 10 swarmed/superseded and 1 requeened via splitting.

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 June 2018