2015 Tualatin Valley (TVBA) Winter Loss by Dewey M. Caron & Jenai Fitzpatrick

At the March and April TVBA meetings I encouraged TVBA members to participate in the 2015-2016 PNW overwintering loss survey. Members were directed to the online survey at www.pnwhoneybeesurvey.com, a continuing effort to define overwintering success.

I received 249 responses from Oregon (OR) backyarders, and an additional 52 from Washington beekeepers. Tualatin Valley members plus 2 followers sent in 27 surveys, providing information on 144 fall colonies. This survey return was 3 fewer respondents than last year (reporting on 8 fewer colonies) and 16 fewer individuals than the previous year. Returns have been declining from the TVBA club and we would be very interested in hearing your comments or concerns. Feel free to email us at info@ pnwhoneybeesurvey.com so that we may address them in upcoming years.

Overwintering losses of the 25 respondents was 44 colonies = 30% weighted loss rate; ten percentage points lower than the OR beekeepers. Losses this past winter were 5 percentage points higher than last year but lower than the terribly elevated loses of the 2013-2014 winter. They were also lower than the 4 year average of 38%, see Figure 1.

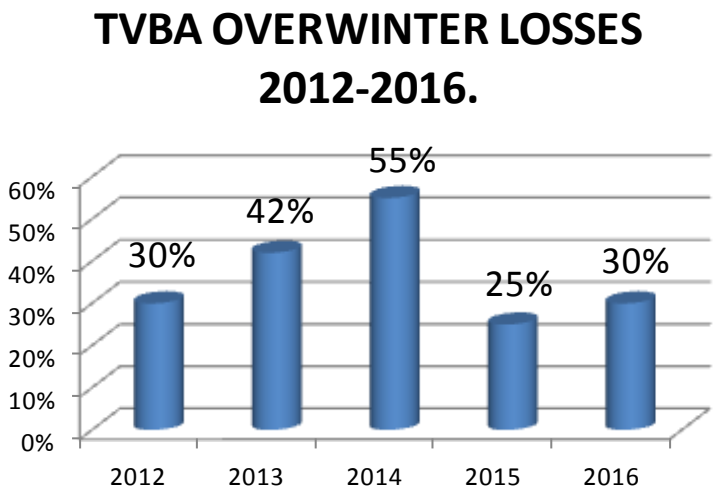


Figure 1

Loss rate was determined for 8 and 10 frame Langstroth hives, 5-frame nucs, Top Bar and Warré hive types. TVBA members started winter with 100 Langstroth 10-frame hives (69% of total), 24 Langstroth 8-frame hives, 7 5-frame nucs, 7 Top bar colonies, 5 Warré hives and 1 feral hive. The accompanying Figure 2 shows percent loss for each hive type compared with the Oregon (1007 colonies) data base. All TVBA hive types, except for top bar hives, had better survival rates than the overall OR beekeepers. All comparisons with last year are available to view on the website.

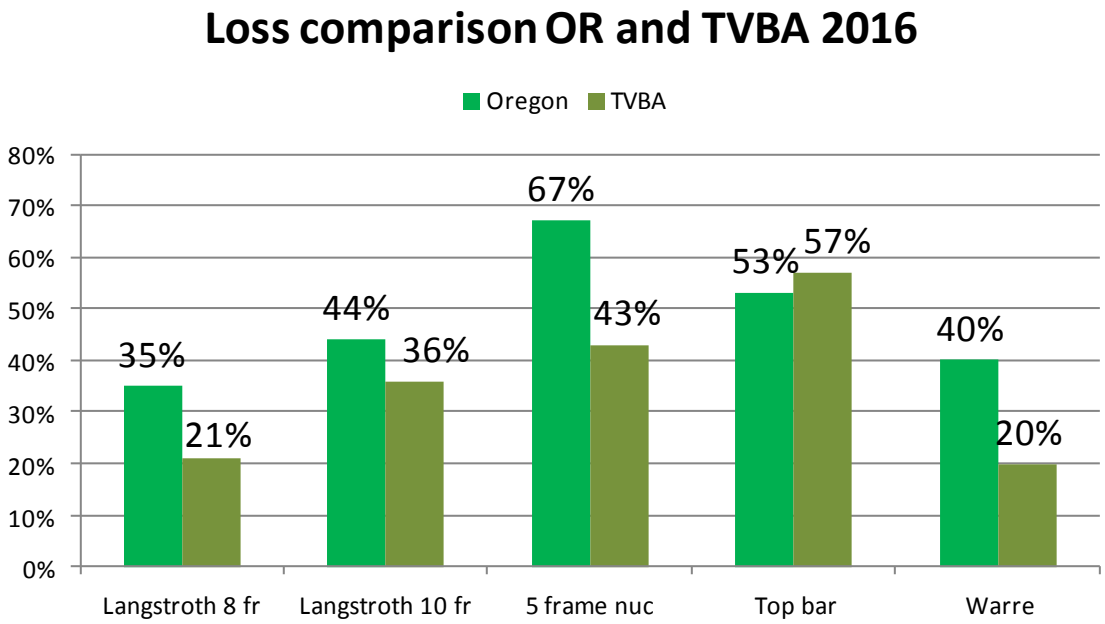
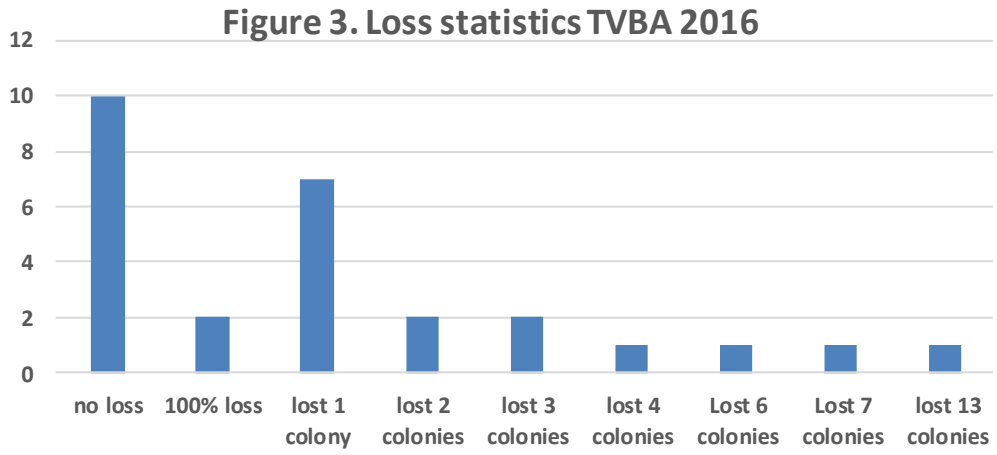
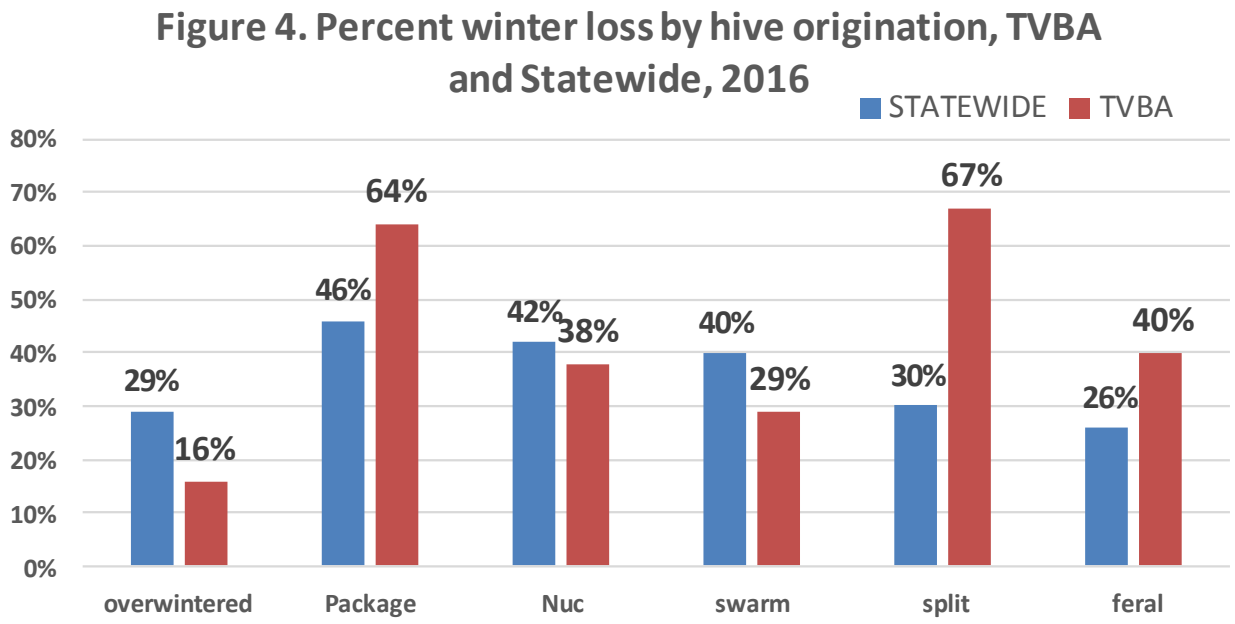


Figure 2

Not everyone had loss. Ten individuals reported total winter survival. Two individuals lost 100% of their colonies. Seven individuals lost 1 colony, 2 individuals loss 2 and another 2 lost 3 colonies, 3 individuals lost respectively 4, 6 or 7 colonies and one individual lost 13 colonies. Median number of colonies was 3; highest number maintained by one individual was 25 colonies. Six individuals started fall with 8 or more colonies. See Figure 3.



The survey also asked for hive loss by hive origination. Forty seven of 56 overwintered TVBA member colonies were alive in the spring (16% loss rate), 13 percentage points lower than statewide survival of overwintering colonies. Respondents reported a higher loss level of newly installed packages and splits with lower loss rates for nucs, swarm captures and feral transfers, see Figure 4.



Four individuals had 2 apiaries and one had a total of 5 apiaries. Four TVBA individuals moved bees during the year, two for better forage, one for neighbor concerns and one moved to other side of yard.

When asked to indicate where the majority of their beekeeping education was received, TVBA respondent numbers varied only slightly from statewide, with Books, journals and magazines listed first followed by club meetings (17%), with Bee Mentors and OR Master Beekeeping program indicated next. Fifteen TVBA respondents (60%) said they had a mentor available as they were learning beekeeping; statewide 58% said they had a mentor. TVBA survey respondents reported a wide range of beekeeping experience. Ten individuals (35%) had 5 years or more of bee experience, with the highest 60 years; 15 (52%) had 1, 2 or 3 years of experience.

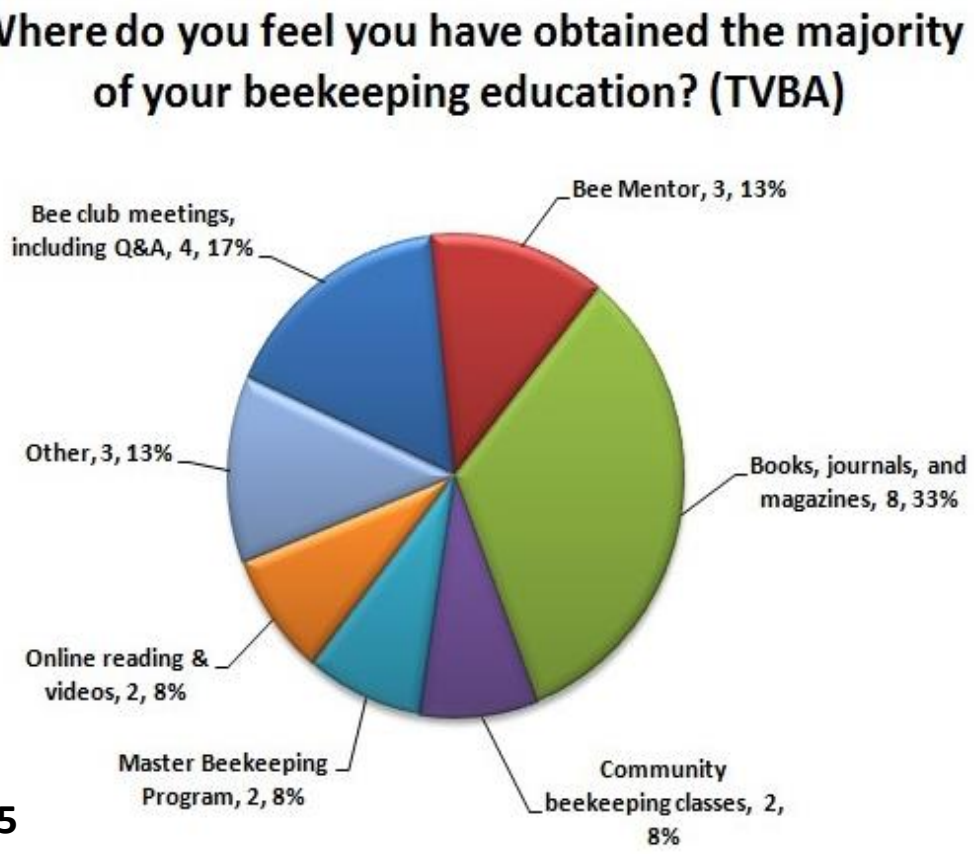


Figure 5

We asked for individuals that had colony loss to estimate what the reason might have been. Multiple responses were permitted. Eight TVBA beekeepers listed weak in fall, 7 starvation, 6 queen failure, 5 poor wintering conditions and 3 I don't know. When asked for an acceptable loss level 6 individuals said zero, 6 said 10 or 15 6 said 20%, 4 25% and 3 33%.

There is no easy way to verify reason(s) for colony loss, nor a consensus of an acceptable level. Colonies in the same apiary may die for different reasons. **Doing the forensics is the first step in seeking to solve a heavy loss problem. 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**.

Why do colonies die? There appears to be no single reason for loss and 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. Major factors in colony loss are thought to be mites, pesticides, declining nutritional adequacy/forage and diseases, especially viruses and Nosema.

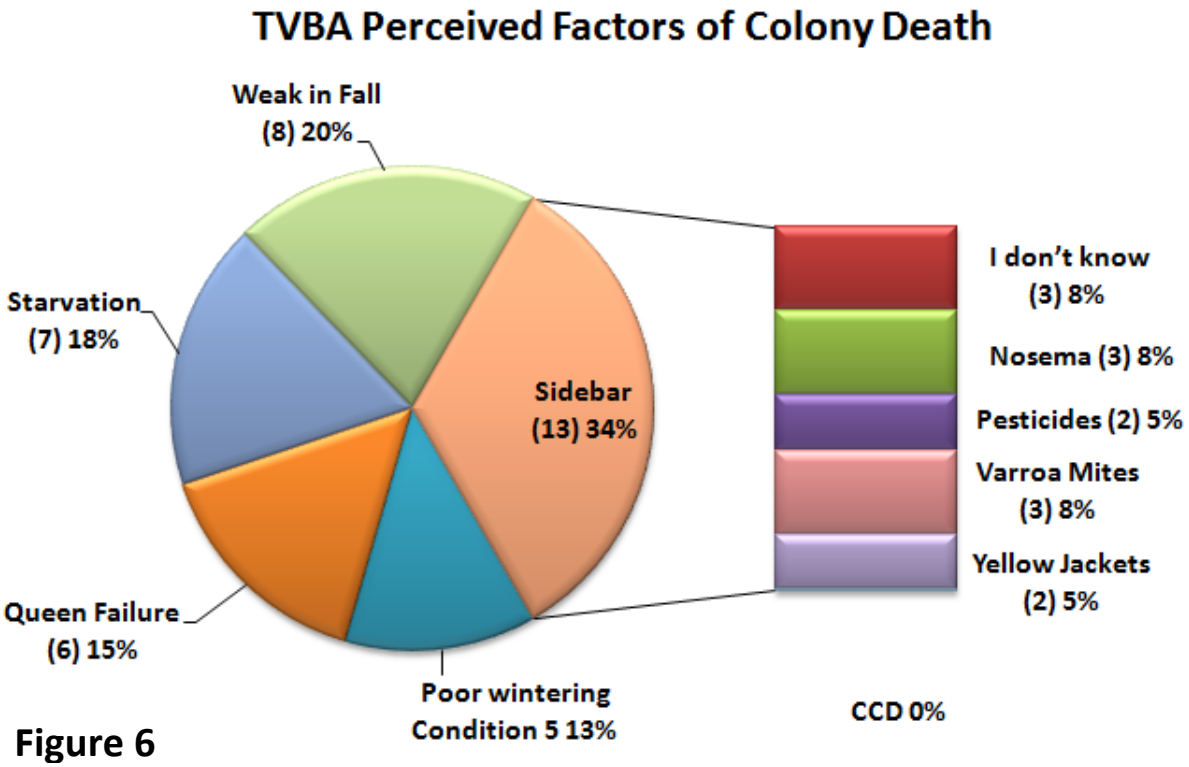


Figure 6

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 "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.

T**here 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 virus they transmit are considered a major factor, but by no means the only reason, colonies are not as healthy as they should be.**

General hive practices

We asked in the survey for information about some managements practiced by respondents. Multiple responses were encouraged.

FEEDINGS: Generally bee colonies benefit from feeding. The most popular feeding option selected was feeding of sugar syrup followed by pollen patties, dry sugar and frames of honey. The four were the same top choices for OR beekeepers with hard sugar candy ranked ahead of dry sugar feeding. Results indicate a high level of feeding management of both sugar/ honey and supplemental protein. No one material has been shown to be the most advantageous; feeding hard candy, dry sugar or fondant is preferred during the rainy months so as not to add additional moisture stress to colonies.

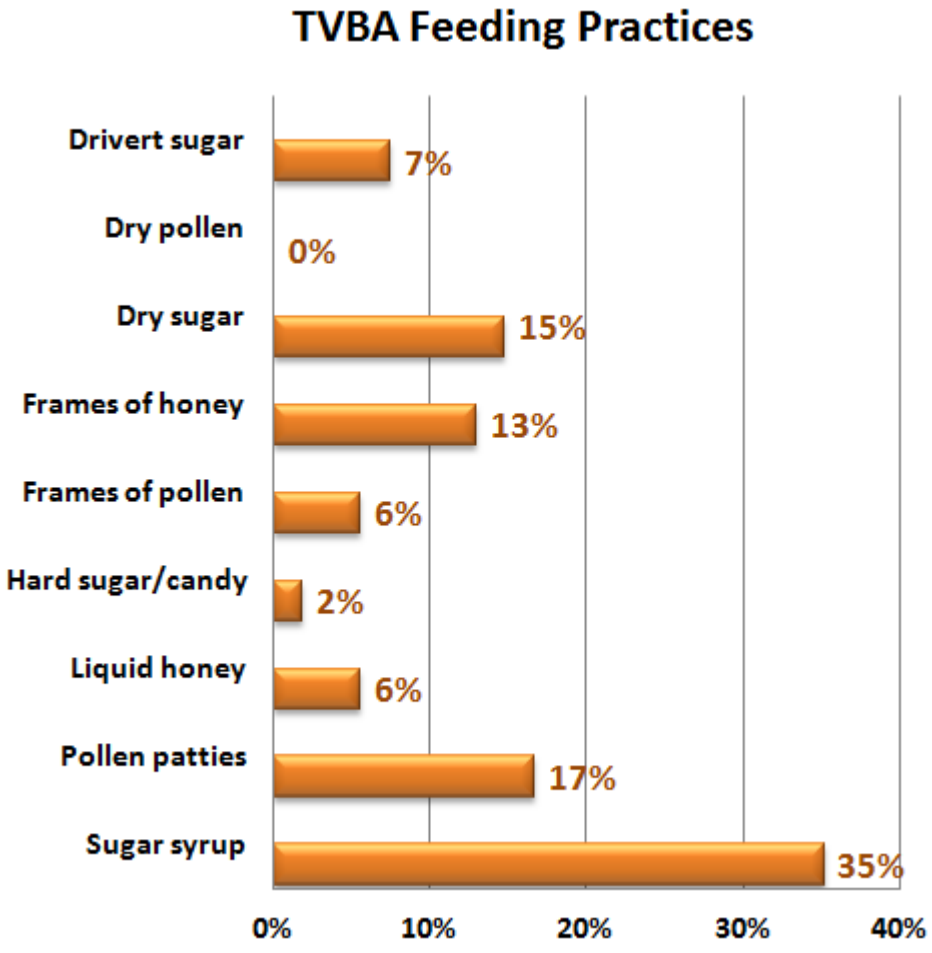
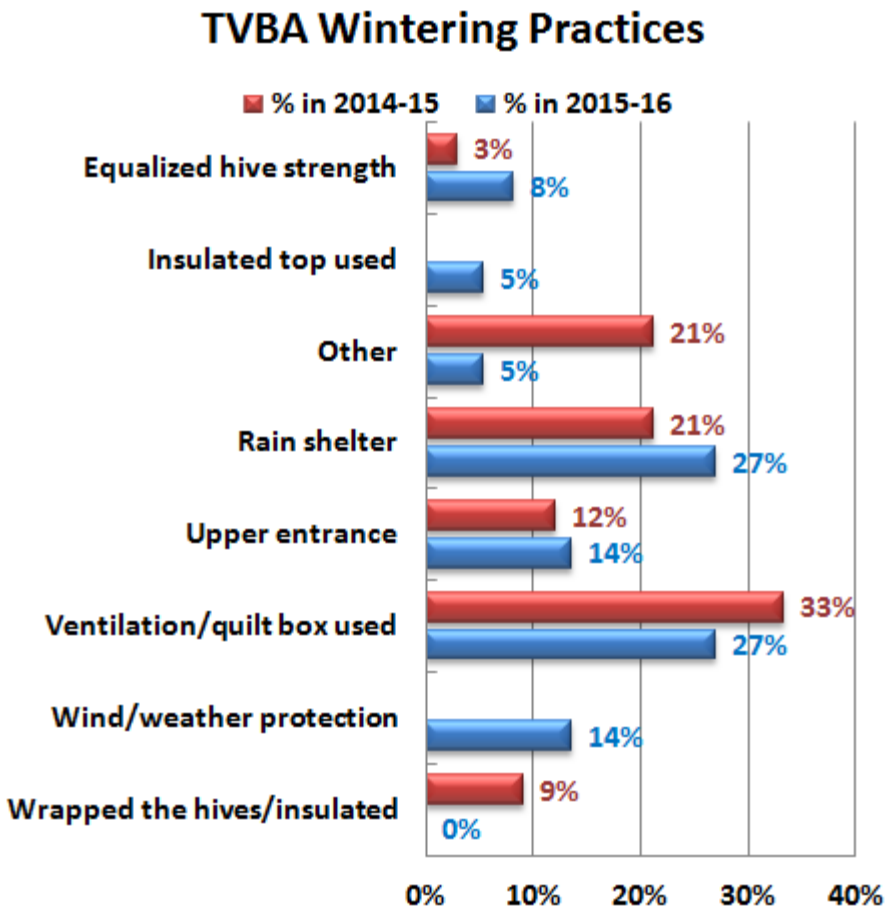


Figure 7

WINTERING PRACTICES: Comparison of the wintering practices of the past 2 survey seasons are shown for TVBA members in Figure 8. Six TVBA individuals (16%) did NOT do any of the Wintering practices. Most popular selected choices were use of ventilation/quilt box/lid insulation (27%) and a rain shelter in each of past two years. Wind/weather protection (listed under "other" in 2014-15 was next most common wintering practice. The wintering selections demonstrate that TVBA beekeepers are taking extra measures to help colonies survive winter conditions. What we will do with data is compare loss rate with these practices to determine if there is a trend or if one or a few of these reduce winter loss rate. TVBA and OR beekeeper responses were very similar (see website for OR state beekeeper responses).

Figure 8

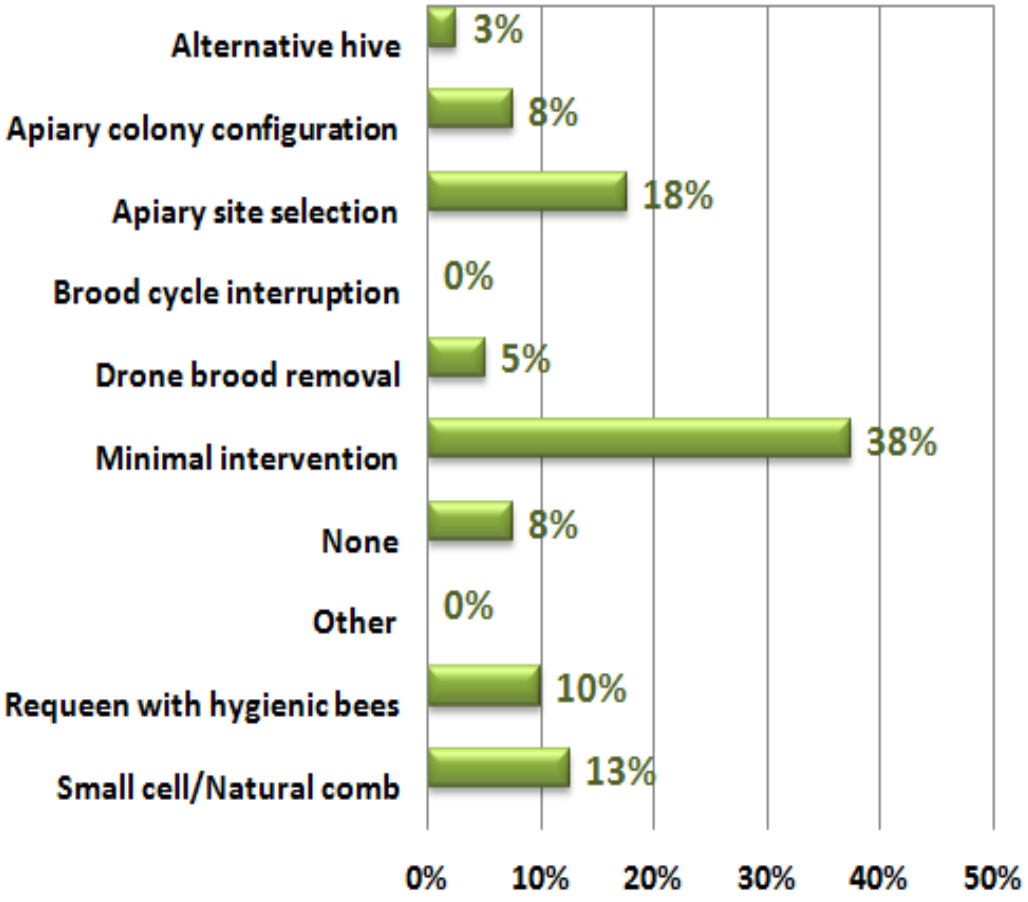


SANITATION PRACTICES: We can do more basic sanitation (some prefer use of term bee biosecurity) in our bee care. Three individuals said they did not practice any of the 8 offered alternatives. **Minimal hive intervention was the most common option selected** – this was encouraging as less intervention means reduced opportunity to compromise efforts of the bees themselves; needless, excessive inspections/manipulations can potentially interfere with what the bees are doing to stay healthy. Responses are shown in Figure 9.

Following minimal hive intervention, Apiary site selection was next most popular sanitation practice. Site selection, both of apiary and colony configuration within the apiary, although less commonly utilized by TVBA beekeepers, are important sanitation choices because providing colonies with a distinctive "addresses" has been shown to reduce drifting of adult bees and help to reduce incidence of disease and mites.

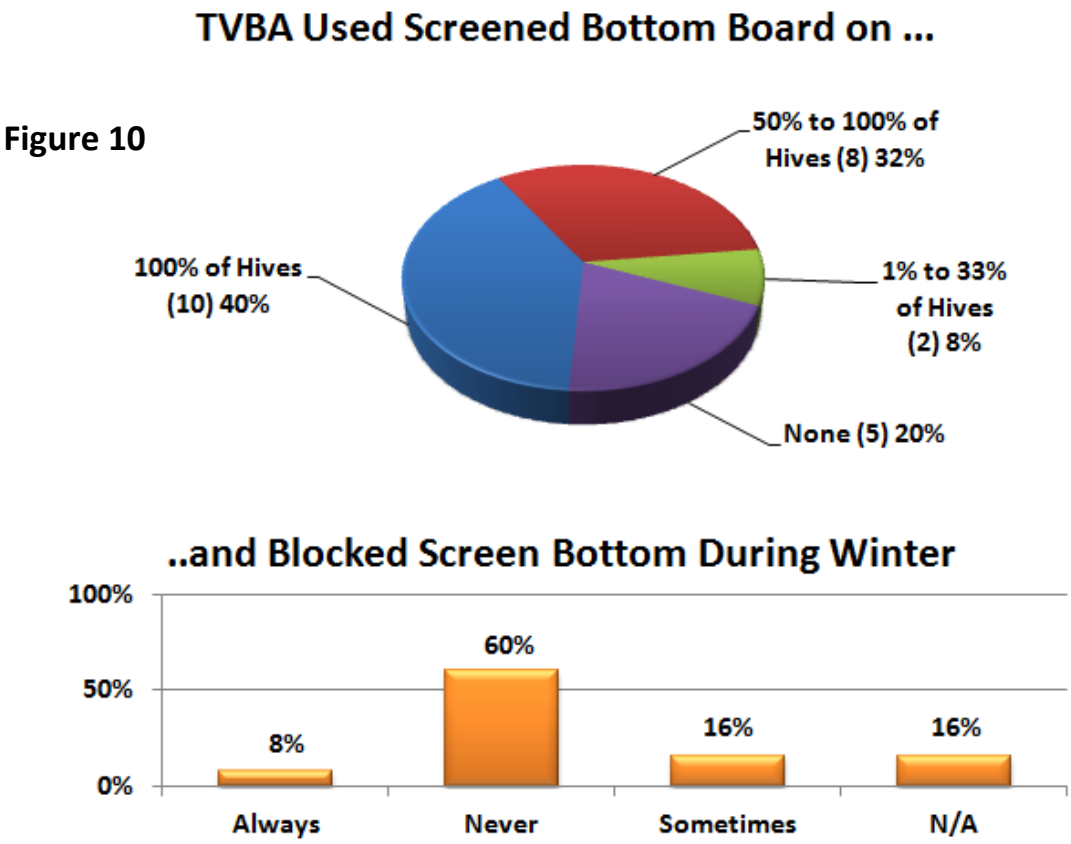
Small cell/natural brood comb, along with requeening with hygienic bees are proactive approaches, for better mite population control. Along with drone brood removal and brood cycle interruption, all are difficult to do and highly interventive but have been demonstrated to be workable alternatives to chemicals in mite control. NOTE: Some of the choices are not sanitation but rather mite control options – the question and options needs to be modified.

Figure 9 **TVBA Sanitation Practices**



SCREEN BOTTOM BOARDS: Our survey asked what percentage of Oregon backyard beekeeper hives had screen bottom boards and whether they were blocked during the winter. Five TVBA individuals said they did not use screened bottoms; 10 individuals used them on all their hives as illustrated in Figure 10. Fifteen individuals (the never response) did not block them in the winter season, while two members said they always closed them in winter. There is no good science on whether open or closed bottoms make a difference in overwintering but some beekeepers "feel" bees do better with them closed overwinter. An open bottom, at least part of the year, can assist the bees in keeping their hive cleaner.

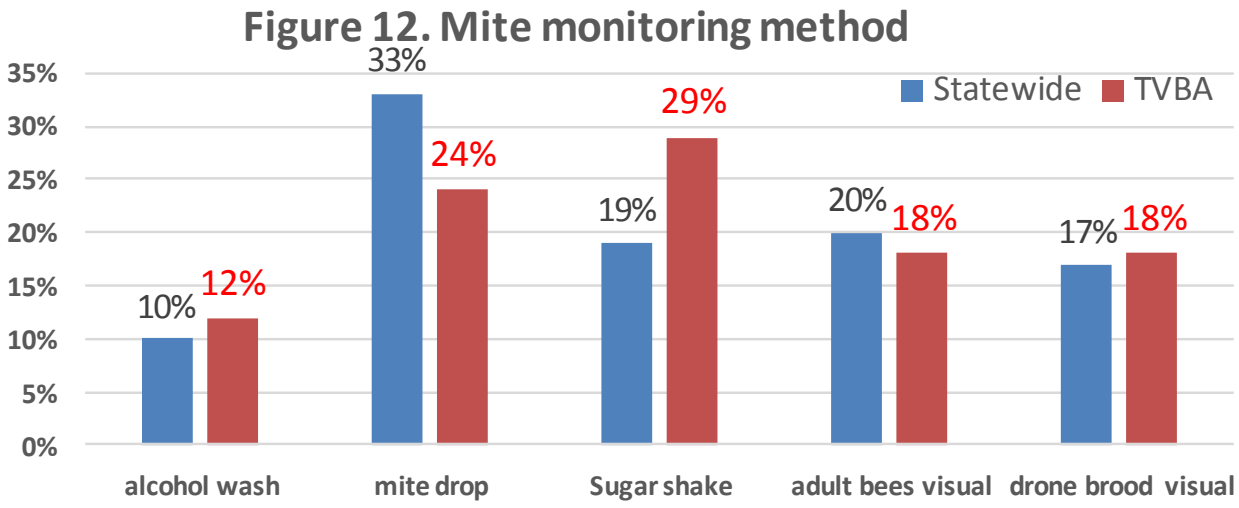
Figure 10



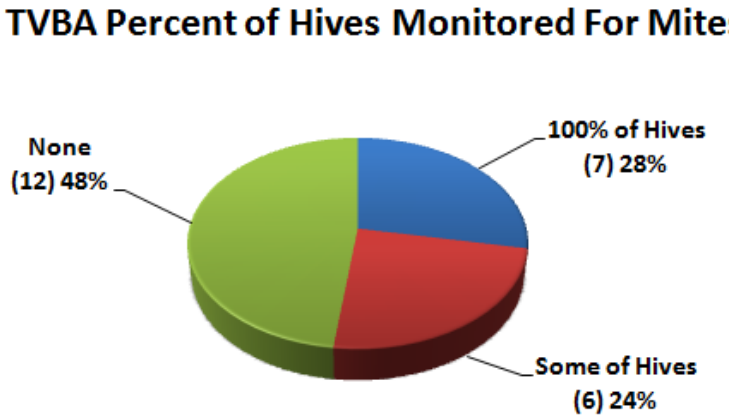
Mite monitoring/sampling and control management

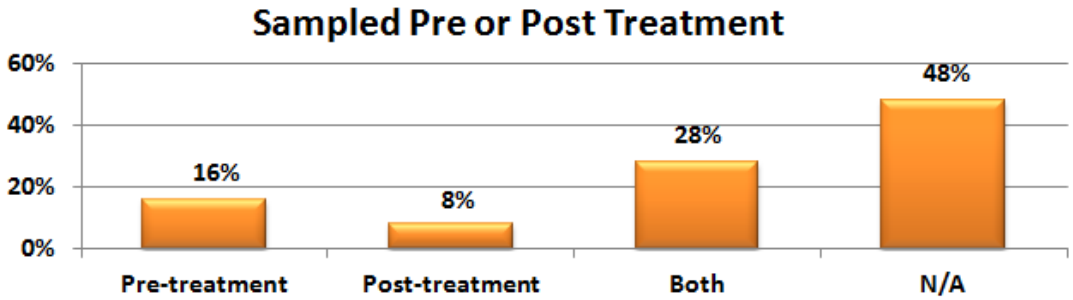
We asked percentage of hives monitored for mites, whether sampling was pre- or post-treatment or both and, of the 5 possible mite sampling methods, what method was used and when it was employed. In order of popularity of use, sugar shake was more commonly used by TVBA members than mite drop with sticky boards. Alcohol wash was the least employed. Figure

12 shows a comparison of TVBA responses to those in OR. Most sampling was done in August September and October as might be expected.



Twelve individuals said they did not monitor for mites and they had a loss rate of36% while 7 monitored 100% of their hives; their loss rate was 29%. More monitored both pre and post treatment than only once. It seems that mite monitoring helped some individuals improve survival.

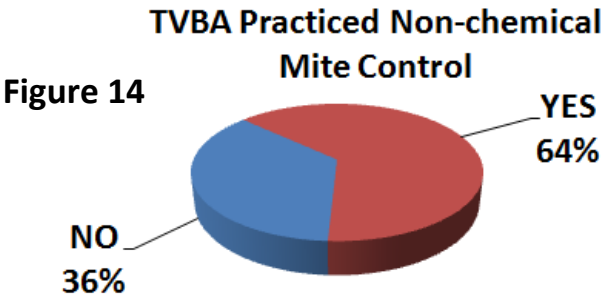




Use of medications and control treatments:

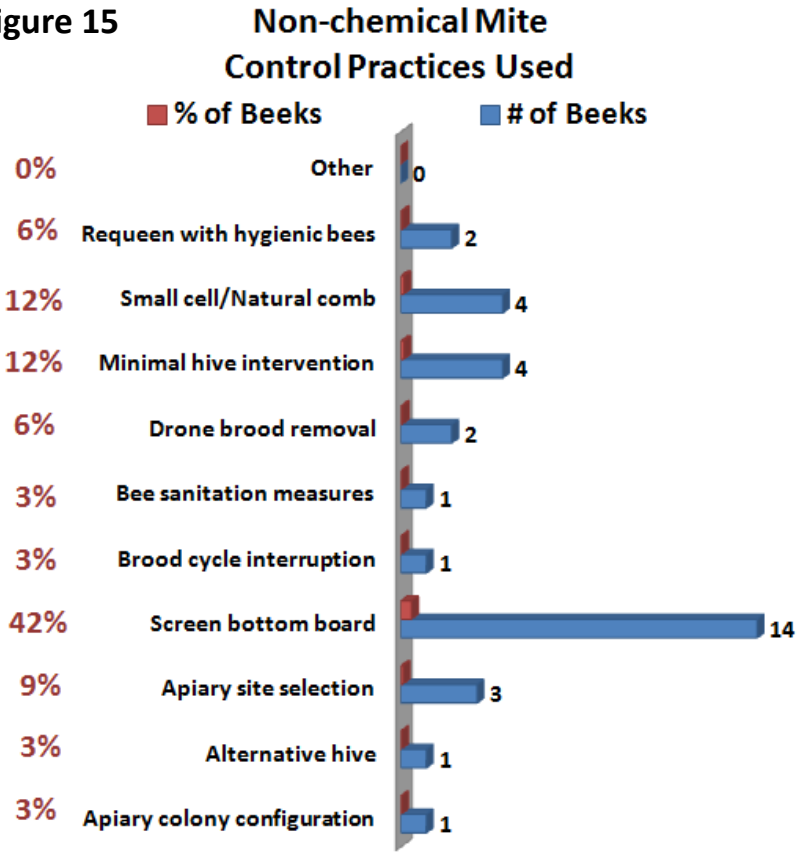
The survey asked about chemical and non-chemical mite treatments and also about use of chemicals for mite control. Sixteen TVBA individuals (64%) said they did employ a mite control which was 7 percentage points higher than OR beekeepers. The 16 individuals that said they did employ a control had a 25% loss while the 9 TVBA members who checked 'No they did not do a control' had double the loss rate, a 50% loss.

Figure 14



Non-Chemical control: Of 10 non-chemical alternatives offered on the survey, seven respondents indicated they did not use any of the choices. For the respondents who checked at least one choice (more than one selection was permitted), use of screened bottom board was by far the most commonly listed (14 TVBA respondents). The next most common selection was minimal hive inspection. An equal number of TVBA members (4) also indicated use of small cell/natural comb. Apiary site selection was checked by 3 TVBA members. The highly interventive and difficult managements of drone brood removal and brood interruption were collectively used by 3 individuals. Both are labor intensive and require some experience to do successfully. They work well only under limited circumstances. Two individuals indicated they requeened with hygienic bees, which can be useful while four said they utilized small cell/natural comb, which may or may not

Figure 15



be useful. **Timing of use of these manipulations needs to be completed in time for the bees to properly prepare for winter and insure successful mite reduction.** See Figure 15.

Comparison of the use of non-chemical alternatives is complicated as most of these controls were not very widely used. The 7 indiividauals who did not select any alternative had a 44% loss rate. The most popualr alternative, Screen bottom boards, indicated by 14 individuals, did show an advantage, a loss rate of 26%. The next two most commonly selected alternatives, were Minimal hive interrvention and small cell/natural comb, were both selctions of 3 of the 4 idnividuals. Those cehcking minimal hive intervetnion had loss rate fo 39% and those checking small cell/natural comb as one of their alternative choices had a 60% loss. It does appear that use fo these tehniques were NOT effective in reduced losses and in fact relaince of such management might result in a higher loss.

Chemical Mite control: We also asked about chemicals used for mite control. Forty four percent of total respondents said they did not use any of the 9 alternatives. Nine TVBA individuals (30%) said the same. For the TVBA respondents who checked at least one (more than one selection was permitted), formic acid (MAQS) was the most commonly used material, by six individuals, followed closely by Apivar and Apiguard (4 individuals each). Formic was not selected last year with Apivar and Apiguard the top selections. Oxalic acid and the essential oil ApiLife Var was the choice of two individuals.

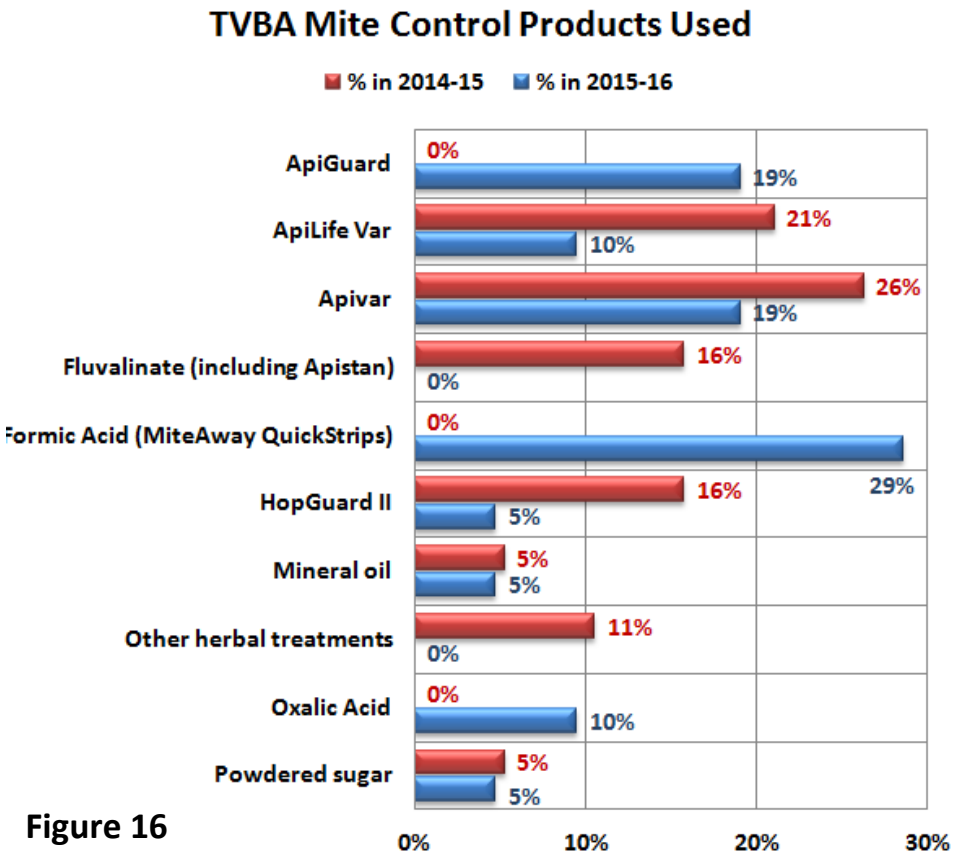


Figure 16

Nine individuals did not use any of the chemicals shown in Figure 16. These individuals had a 50% overwinter loss. The 19 individuals who did use a chemical indicated use of 26 of the chemicals. thirteen used only a single chemical material and their loss rate was 29%, essentially the same number as the 28 TVBA total respondents (numbers are not large for analysis). But loss rates do change drastically when individual chemicals are considered. For example 6 individuals said they used formic acid (MAQS), 4 using ONLY this chemical, had a 19% loss. Two individuals used the essential oil ApiLife Var and 4 used Apiguard; their loss rate was ONLY 18%. And most spectacular of all, 4 individuals who used Apivar, 2 of which used only Apivar, had a mere 4% loss rate.

Six individuals of 144 that responded statewide (4%) indicated they treated with Terramycin for foulbrood disease, one was a TVBA member. Thirty individuals (21%) indicated use of Fumigillin for Nosema disease control, 1 in TVBA. Prophylactic use of antibiotics is not generally advisable.

What works? Alternative of drone brood removal is a non-chemical treatment that works in most colonies during spring buildup. You can buy a drone foundation frame or put a shallow frame into a standard brood box and have bees construct drone cells below the shallow bottom bar. The colony doesn't need that many drones so you harvest them in capped stage to discard with their mites. This technique only works during spring buildup.

Breaking the brood cycle, with requeening, especially if hygienic queen stock or local selected stock is used to requeen or replace removed queens, can also keep mite numbers at manageable levels in most bee colonies. Both are a lot of work and new beekeepers should not seek to use such techniques until they have a better understanding of bee colony life cycles and queen event behaviors in colonies.

There is a wide array of chemical treatments available to treat varroa mites and are often the best choice when colony mite populations are high as they can be very effective. Materials that can be used include acids such as formic acid (Mite-Away Quick Strips, or MAQS – especially the ½ dose treatment) and Oxalic or the Hopquard II product when there is little or no brood present, essential oils Apiguard or ApiLife-Var, under narrow temperature conditions and the highly effective synthetic miticide, Apivar (amitraz). All have possible serious negative effects to the beekeeper applicator and they can contaminate the beeswax and honey of the hive. Only use of MAQS is permitted when supers are on colonies. There may be significant queen or brood losses with many of the chemicals and post treatment sampling is recommended to insure the control has worked as expected. It is important to follow label

directions. Consult Tools for Varroa Management from Honey Bee Health Coalition, available for free download from OSBA website or www.honeybeehealthcoalition.org/varroa

Queens

We hear lots of issues related to queen "problems". On the survey we asked what percentage of loss could be attributed to queen problems. Ten individuals said none and six said "I don't know".

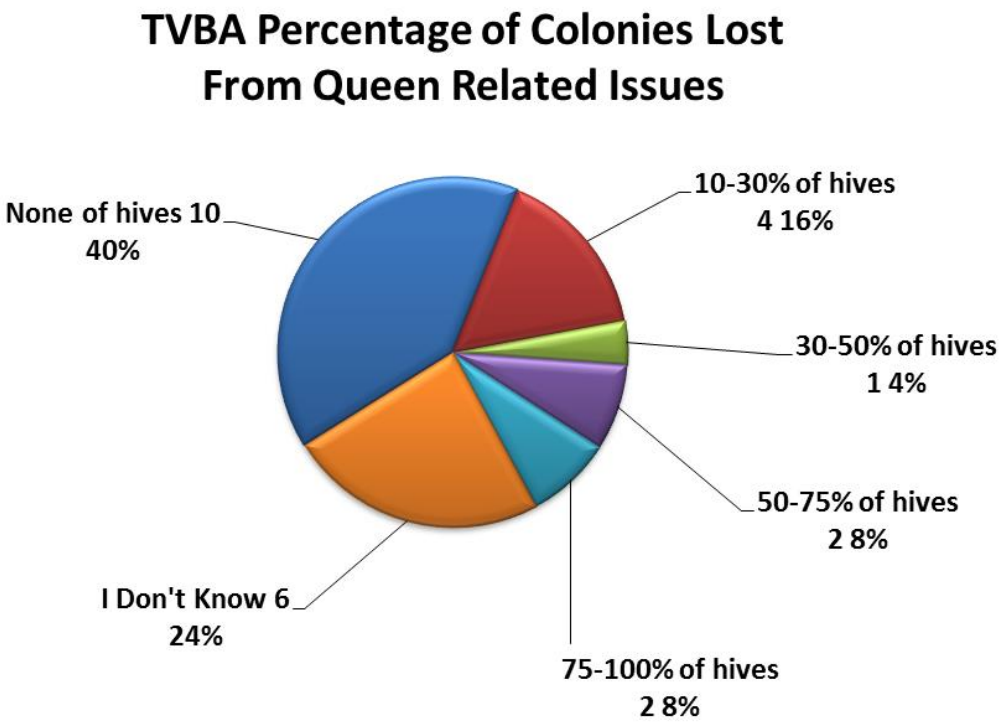
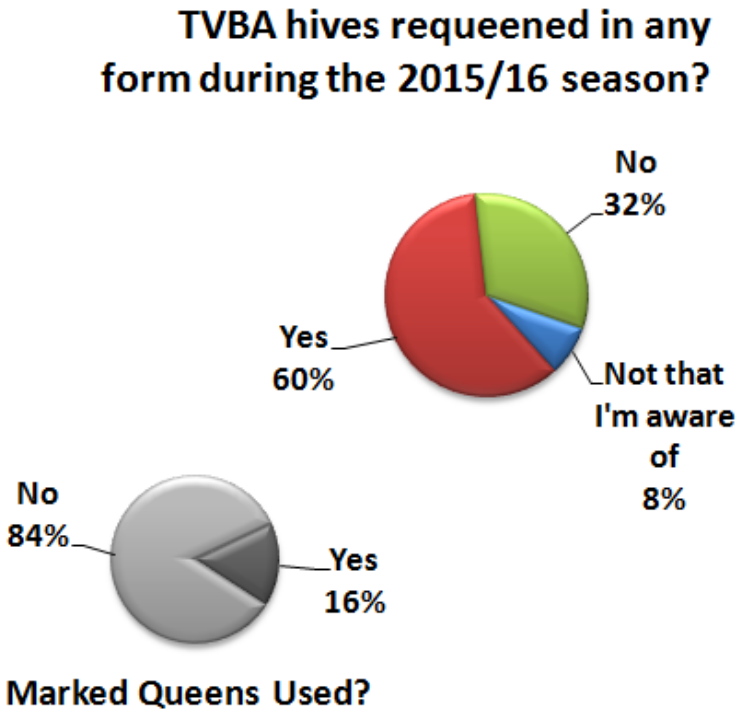


Figure 17



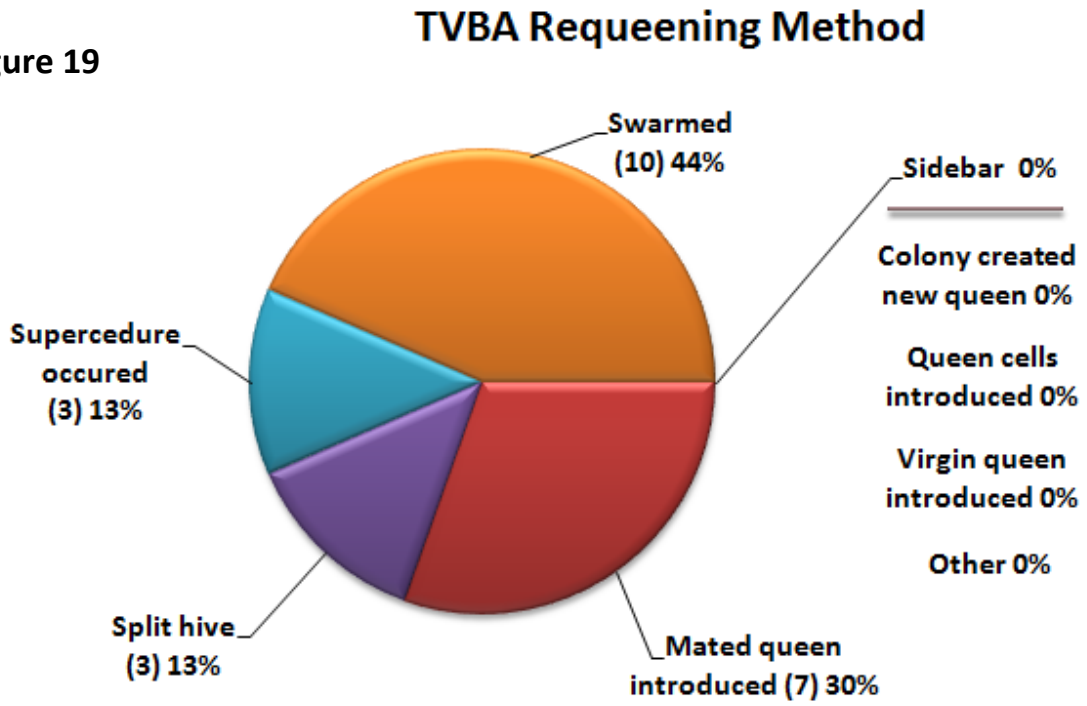
Queen events can be a significant factor contributing to a colony not performing as expected. We asked "Did you or did your hive requeen, in any form during the year". Thirty one percent of OR beekeepers said no as did one percent fewer TVBA members. Responses were very similar to previous year with slightly more saying no (36%) and slightly fewer saying yes (45% responded yes last year).

We asked if queens were marked. Four TVBA individuals said yes. It would be difficult to be able to

say yes or no if a hive requeened, with absence of queen marking, unless requeening was done by the beekeeper.

Responding to the question "How did bees/you requeen" 13 TVBA beekeepers indicated requeening by the bees via swarming and supersedure. Mated queen introduction was done by 7 individuals and three via hive splitting.

Figure 19



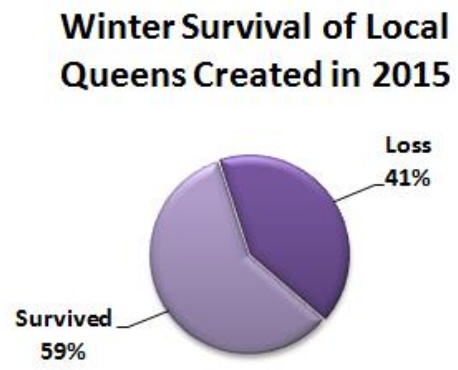


Figure 20

Fifty one individuals indicated they reared 150 local queens via splitting/grafting or other method; in TVBA 2 individuals reared a queen with 1 of 2 colonies surviving. For OR beekeepers, three-fifths of locally reared queens survived winter. See Figure 20.

We also asked about product production. Seventeen TVA beekeepers produced 1,040 pounds of honey, 16 pound average, six indicated some beeswax was also harvested.

Closing comments: As indicated we will further analyze the loss by managements (feeding/wintering practices/sanitation) as well as losses relative to use of control techniques/chemicals utilized. Some of this information is additionally available on the BeeInformed website (www.beeinformed.org) and individuals are encouraged to examine that data base as well.

Thank You to all TVBA members who participated . We intend to refine this instrument for another season and hope you will join in response next April. If you would like to be put on the reminder list for next seasons survey please email info@pnwhoneybeesurvey.com with "REMINDER" in the subject line. There is also a blog on the pnwhoneybeesurvey.com and will respond to any questions/concerns you might have.

Dewey Caron and Jenai Fitzpatrick, June 2016