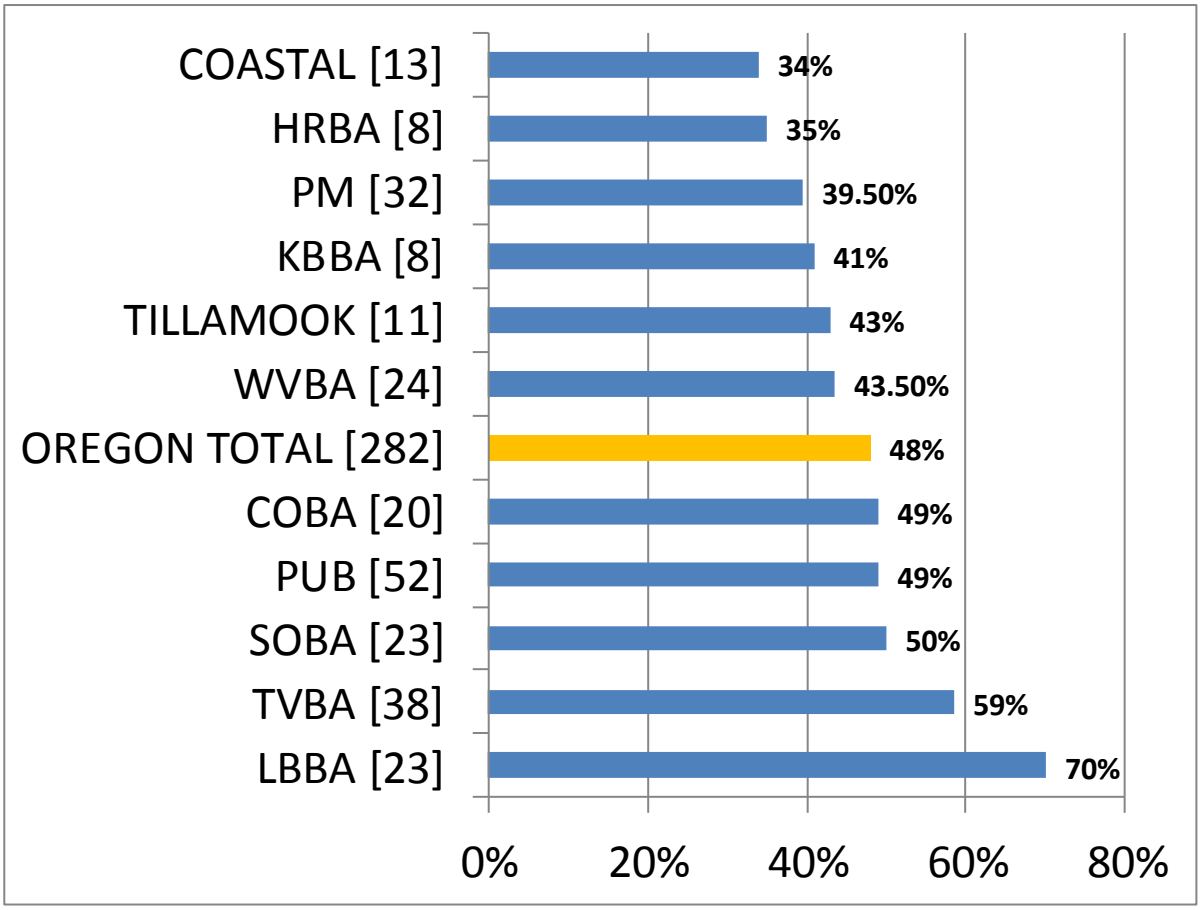
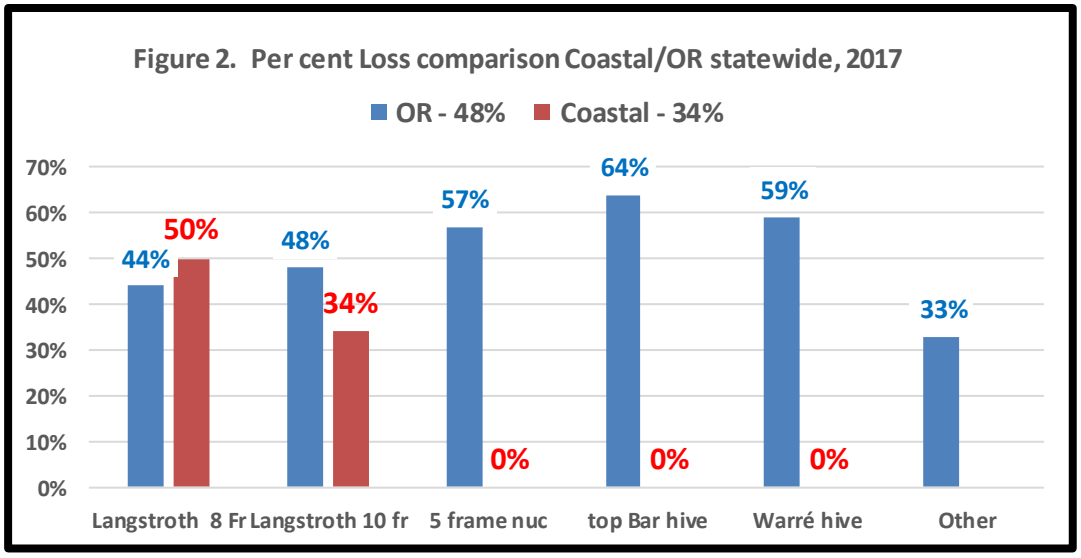
2016-17 Central Coast Winter Loss by Dewey M. Caron

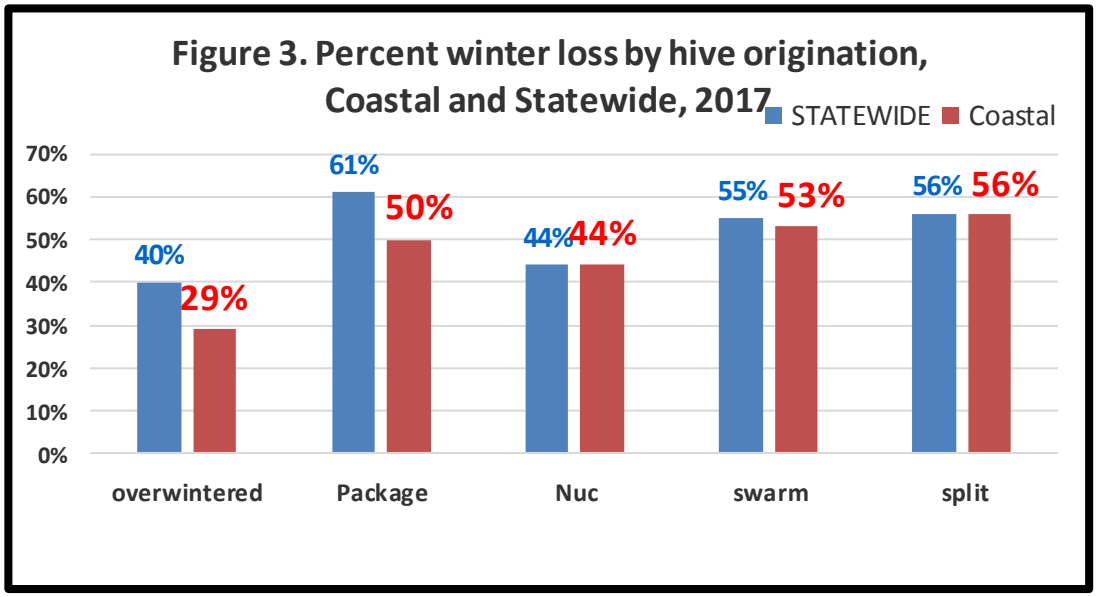
Oregon beekeepers were directed to a web-based survey document in a continuing effort to define overwintering losses/successes. This was the 9th year of such survey activity but the first to include Central Coastal beekeepers. I received 282 responses from Oregon backyarders and 52 from Washington beekeepers keeping anywhere from 1 to 48 colonies. Ten Central Coast Association members completed a survey, to which I added two Coos County and one Southern Coast respondent who had similar colony numbers and losses. A total of 50 Langstroth fall colonies were reported by these individuals.



Overwintering losses of Coastal respondents was 17 colonies = 34%. This loss is 12 percentage point lower than the statewide loss of 48% (database of 282 OR backyarders) and the lowest of all the local Oregon associations. Percent losses, determined for 5 hive types, is shown in Figure 1 comparing C. Coastal with the statewide backyarders. Coastal member respondents started winter with 44 Langstroth 10-frame and 6 Langstroth 8-frame hives but no 5-frame nucs, Top bar hives or Warré hives. For statewide, the Langstroth 8 and 10 frame loss rate was 47%. The two Coos and one southern coast beekeeper had the same loss percentage (33%) as the 10 Central Coast beekeepers.



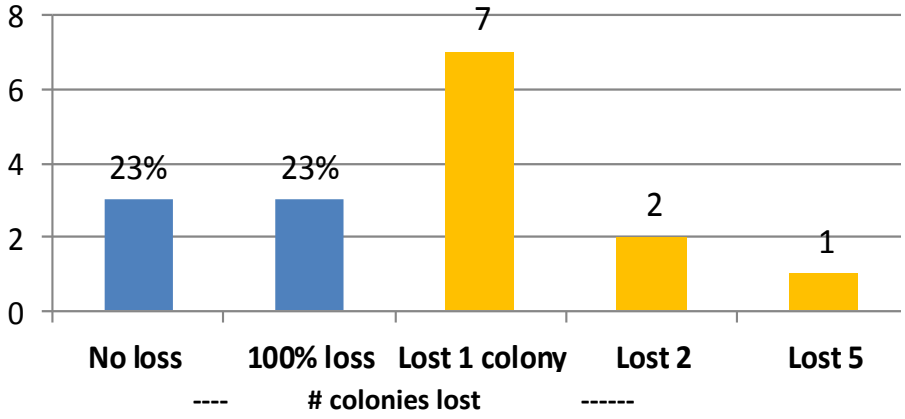
The survey also asked for hive loss by hive origination. Twelve of 17 overwintered C. Coast colonies were alive in the spring (29% loss rate), 11 percentage points lower than statewide. Two of 4 packages, 10 of 18 nucs (44% loss), 7 of 15 swarm captures and four of 9 splits (56%) were survivors. See Figure 3 for Coastal and statewide comparisons.



The Coastal survey respondents were a mixture of new beekeepers and older, more experienced individuals. Five coastal respondents had 1 fall colony, 4 had 2 (69% of individuals), 3 had 3 colonies, one had 5 and 2 had 9+ (largest number was 14). Seven individuals (54%) had 1, 2 or 3 year of experience, 4 had 4 to 7 years' experience and 2 had 13+ years' experience.

Not everyone had loss. Three coastal respondents had NO LOSS (23%) but an equal number had total loss. Seven individuals lost 1 colony, two individuals lost 2 colonies and one lost 5 colonies, the largest loss. See Figure 4 for graphic of loss rates.

Figure 4. 2017 Coastal individual loss



One individual had two apiaries; loss at 2nd apiary was slightly heavier than the primary apiary (50%).

When asked to indicate where the majority of their beekeeping education was received, 10 Coastal respondents (77%) listed Books, journal and magazines, 9 listed Online including videos, 8 indicated the Master Beekeeping program and 7 each chose Bee Mentor and Bee Club (the Coastal bee club is newly formed). Nine (69%) Coastal respondents said they had a mentor available as they were learning beekeeping, four percent points greater than the 65% statewide response.

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). Of 276 statewide responses, 79 chose poor wintering conditions and 78 (18% each of respondents) chose varroa. Sixty-eight individuals (16%) indicated weak in the fall, 57 said starvation and 55 queen failure (13% each). I don't know was indicated by 25 (8%). The 13 Coastal beekeeper responses (total =19) were 3 each (16% of total responses) of CCD, varroa, queen failure, starvation, and poor wintering conditions. Two individuals said chemical treatments were responsible and one each said Weak in fall and absconding. Coastal and statewide comparison in Table below.

	Varroa mites	Poor wintering conditions	Weak in fall	Queen failure	starvation	I don't know	Other
Coastal # (%)	3 - (16%)	3 – (16%)	1	3 – (16%)	3	0	7
Statewide %	18%	18%	16%	13%	13%	8%	16%

Survey individuals are asked to indicate what might be an acceptable loss level. Among Coastal responses were zero (4 individuals), 10% loss acceptable (3 individuals), 25% (4 individuals) and 33% + 50% loss level as acceptable (1 individual each).

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. Colony forensics on dead colonies is, at best, confusing and, although some options may be ruled out, we are often still left with two or more possible reasons for possible reasons why a colony (ies) died.

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. Statewide, 47% felt 10% or less was acceptable while 10.5% statewide stated 50% or higher was acceptable. Over half of Coastal individual choices (7 individuals – 54%) chose 10% or less as acceptable.

Major factors in colony loss are thought to be mites and their enhancement of viruses such as DWV (deformed wing virus), pesticides, declining nutritional adequacy/forage and diseases, especially viruses and Nosema. Management, especially learning proper bee care and how to best use chemicals for varroa control, remain a factor in losses. What effects our changing environment such as global warming, contrails, electromagnetic forces, including human disruption of it, human alteration to the bee's natural environment and other factors, play in colony losses are not at all clear.

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

Management selections and losses

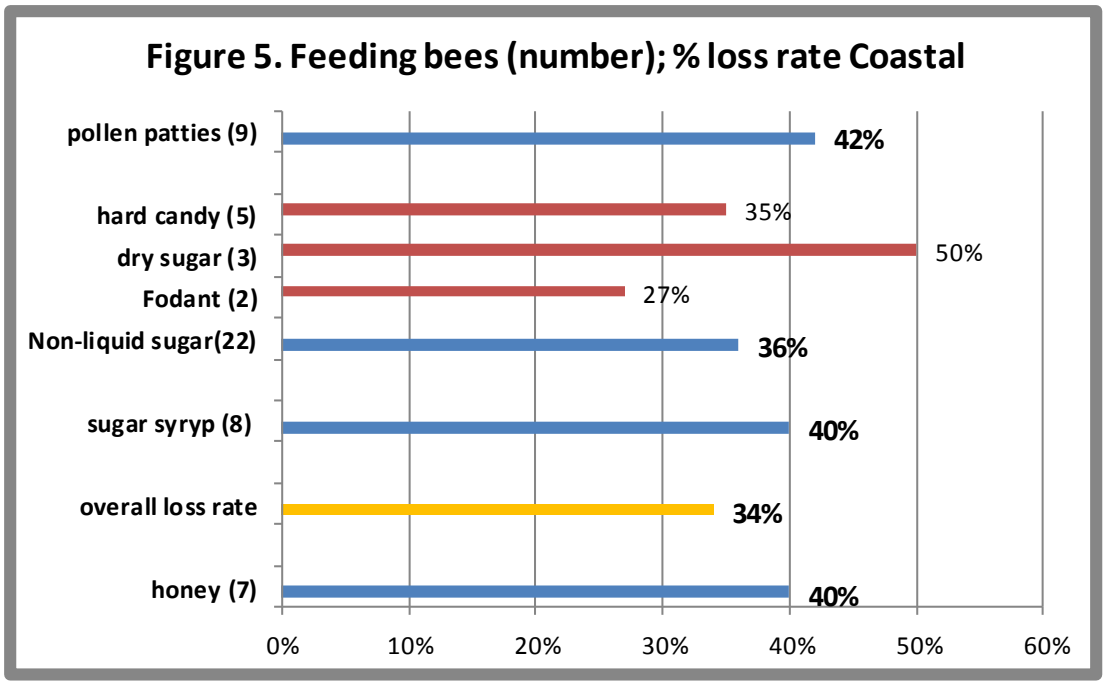
The survey inquired about feeding practices, wintering preparations, sanitation measures utilized, screen bottom board usage, queens, mite monitoring techniques and non-chemical and chemical mite controls used. Individuals could check none or more than one response; most beekeepers often do not do just one thing/management to their colony (ies) to control mites. It takes effort to improve overwintering success.

For the larger data base of OR beekeepers, feeding dry sugar or candy board, as well as adding top insulation, a moisture absorbent feature at top of colony and/or an upper entrance resulted in significantly fewer losses. Screen bottom board usage, monitoring with alcohol wash or powdered sugar for mites and use of several of the chemical mite control options did likewise. See this analysis in the OR beekeeper report; www.pnwhoneybeesurvey.com

FEEDING: There were 34 total Coastal responses to the inquiry on feeding colonies (2.6/individual), with all but one beekeeper listing at least one management. Four listed 4

selections and 4 listed 3 choices. Statewide, eighteen (18) individuals (10%) managing Langstroth hives did not do any of the options offered; they had a 75% loss of colonies (compared to 48% overall losses).

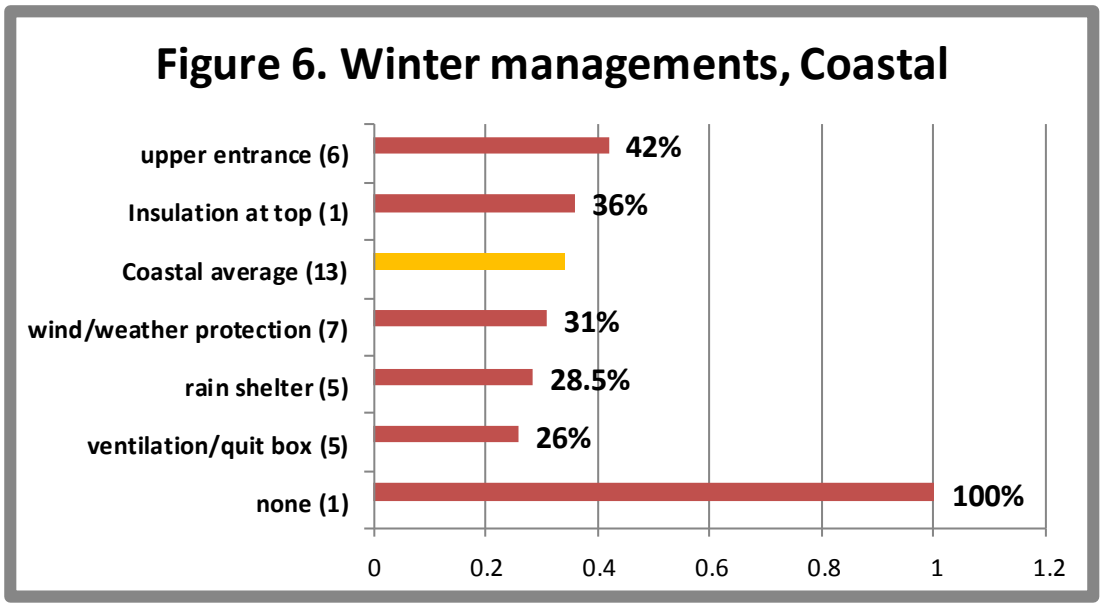
There is general consensus that feeding bees carbohydrate and protein can be useful. The choices of Coastal beekeepers are shown in bar graph below (Figure 5). Sugar syrup (8 individuals) and pollen patties (9 individuals) were the most common choices. Only 3 feeding fondant had a reduced loss. Statewide, hard sugar candy and dry sugar (but not fondant) users showed greater survivorship as did those feeding pollen patties and dry pollen. With smaller numbers this was not the case with the 13 Coastal respondents (Figure 5).



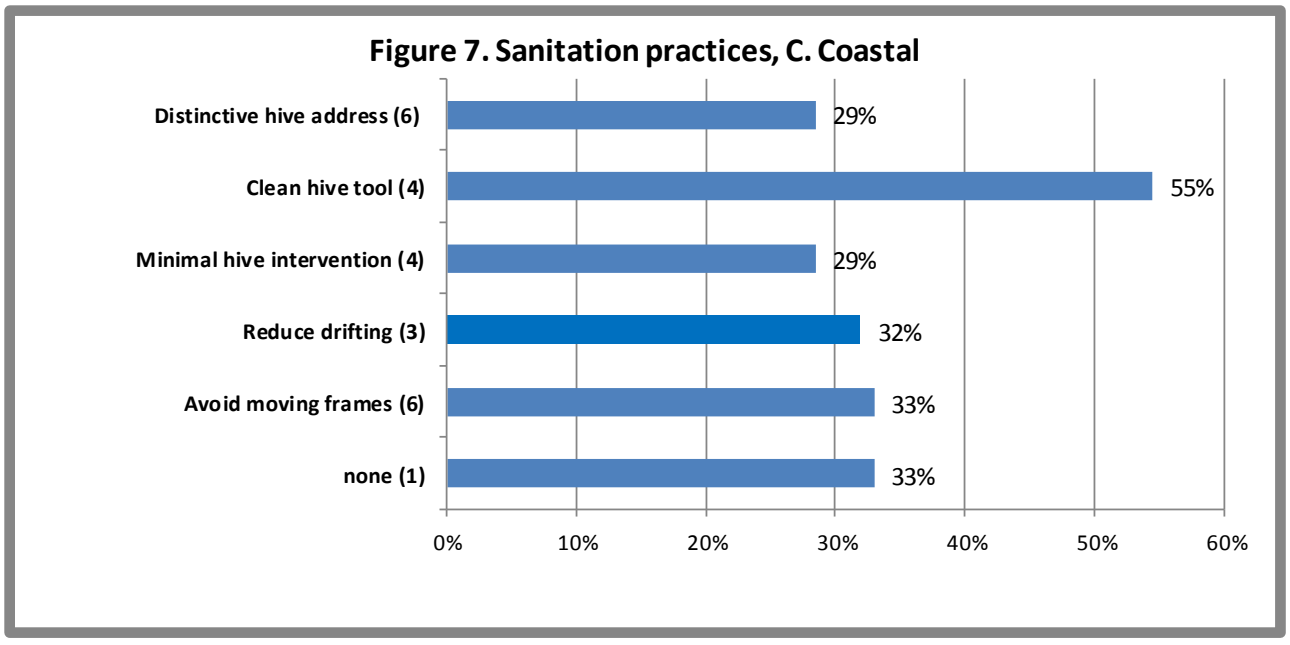
Wintering Practices: Statewide, OR beekeepers selected 538 responses about wintering management practices (1.9 average/individual) - more than one option could be chosen. Forty-six individuals, 17.5% of the respondents, indicated not doing any of the several listed wintering practices; these individuals had a 49.5% winter loss compared to overall of 48%. Among the Coastal respondents there were 24 selections (1.8/individual; one individual chose 5 managements while 2 listed 4; 6 individuals had a single selection, of which 3 were wind/weather protection. One Coastal individual did NOT do any of the Wintering practices; their loss rate was 100%, losing both of their colonies.

The most common wintering management selected by Coastal beekeepers was wind/weather protection (7 members), 6 selected upper entrance and 5 each rain shelter and ventilation box/quilt box. A single individual used an insulated top. As is evident in Figure 6, graphing number of individuals ( ) and percent loss %, wind/weather protection and a rain

shelter might help winter survival; use of a quilt box/insulated box at colony top was helpful for coastal and statewide beekeepers.



SANITATION PRACTICES: Although critical that we practice some basic sanitation in our bee care, we probably do too little to help insure healthy bees. One Coastal survey respondent said they did not practice any of the several alternatives. The two most common selections were painting hive distinctly/other ID measures and avoid moving frames (6 individuals each). Both distinctive hive address and minimal hive intervention had slightly better winter survival (29% loss) but avoiding moving frames or cleaning hive tool/frequent glove washing did not.



Apiary site selection and colony configuration within the apiary, although not commonly used, are additional important sanitation choices. Anything we might do to give colonies distinctive "addresses" has been shown to reduce drifting of adult bees and helps to reduce incidence of disease and mites.

SCREEN BOTTOM BOARDS: In the survey we asked what percentage of hives had screen bottom boards and whether they were blocked during the winter. Statewide 21% said they did not use screened bottoms; only a single Coastal beekeeper said they did not use them and they lost both their colonies (loss rate 100%). Statewide 66% used them on all their hives while all individual Coastal beekeeper used screen bottom boards on all their hives (excepting of course the one not using SBB). The majority statewide (51%) and for coastal beekeepers (63.5%) left them open over the winter period (never response). 18% statewide and one coastal beekeeper closed them during the winter (and 3 sometimes closed them). Those 4 individuals (never and sometimes closed them) had a 33% loss rate.

There is no good science on whether open or closed bottoms make a difference in overwintering success 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. When SBB use is correlated with colony losses, a small (5 percentage points) advantage is gained with their use but this did not occur for Coastal beekeeper respondents.

Managements 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. Individual beekeepers do not frequently do only a single management nor do they necessarily do the same thing to all the colonies in their care. Smaller numbers, as in local associations, are sometimes widely skewed and it is more difficult to show significance of different numbers.

We do know moisture kills bees, not cold, so we recommend hives be located in the sun out of the wind and, when exposed, provided with some extra wind/weather/rain protection to improve survival. Using screened bottom boards and leaving them open (or closed) as per your preference for ventilation helps too. Use of insulted tops/quilt box with moisture collector such as burlap, straw, old towels, etc. with extra top ventilation and a top entrance, especially as it may help vent excess moisture, is also of potential benefit in reducing winter losses.

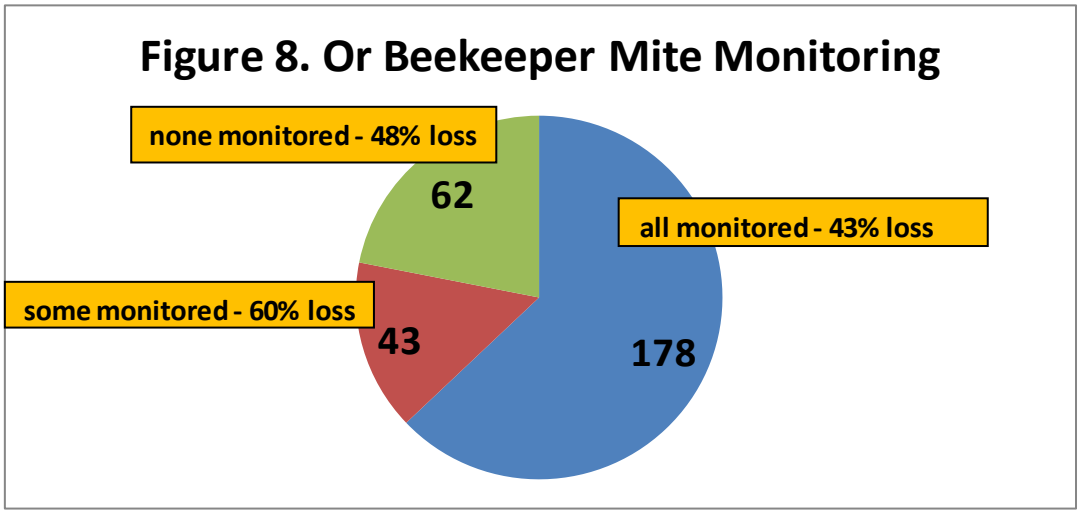
Feeding bees either sugar syrup or honey from other disease-free hives, helps insure enough food stores during early fall management. Once fall rains start, halt syrup feeding and switch to feed dry sugar or a hard sugar candy to avoid adding additional moisture stress to colonies. Finally, it would seem prudent to review basic sanitation measures, as anything we can do to help reduce sick bees and improve colony health, will improve overall survival.

Mite monitoring/sampling and control management

All OR bee hives have or will have varroa mites. It is important to know **how many mites are present.** Knowing how many mites provides an estimate of approximate risk of mites elevating colony losses for the time of year the sampling is done and, when sampling is started in July and continued into October, for the overwintering period. Mites are not the only pest/predator/pathogen than can seriously weaken or kill colonies but studies point to their being the most significant.

MITE MONITORING: To know how many mites, beekeepers need monitor/sample hives for mites. The PNWhoneybeesurvey asks percentage of OR hives monitored for mites during the 2016 year and/or 2016-17 overwinter, whether sampling was pre- or post-treatment or both and, of the five possible mite sampling methods, what method was used, including when (month) it was employed. Statewide, 178 individual respondents (63%) said they monitored all their hives. Comparing losses of those individuals monitoring all their hives, alongside those not monitoring, as well as those who indicated they monitored some of their hives, reveals a 43% loss of those 178 individuals monitoring all their hives, the 62 individuals (22%) who reported they did no monitoring had the statewide average loss of 48% loss while the 43 individuals who monitoring some of their colonies had a 60% loss. **Monitoring helps!**

The comparable numbers for Coastal respondents was 7 individuals (58%) monitored all their hives and had a 46% loss rate. Two individuals monitored some of their hives and had 25% loss while the three individuals that did NO monitoring had a 28.5% loss rate. These numbers show the small number effect and are contrary to the statewide results. Figure 8 below illustrates the statewide data.



When asked how they monitored hives, the 9 coastal individuals who indicated they did monitor had five choices. All but one individual selected more than a single method. Most

popular was sticky boards (7 individuals 78% total monitoring beekeepers), followed by visual examining drone brood or adults in the colony (5 individuals each). Two individuals used powdered sugar and 3 alcohol wash. As with statewide, individuals who used powdered sugar monitoring had lower loss level (30%) and those using alcohol even lower losses (20%). Sampling both pre and post (8 individuals) was the most common response. These individual had a 30% loss rate. Three individuals indicating they treated but did not sample had a 57% loss and the single individual who said they sampled but did not treat, lost both colonies (100% loss).

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 seeing number of mites collected can be difficult). Visual sampling of adults is not accurate: most mites present in the colony are not phoretic on the adult bees, but are reproducing within capped brood cells. Likewise looking at drone brood for mites is not effective to determine how many mites are present but looking at some drones during colony exam can be useful if, when we see mites in drone brood, it triggers use of a more reliable adult washing technique.

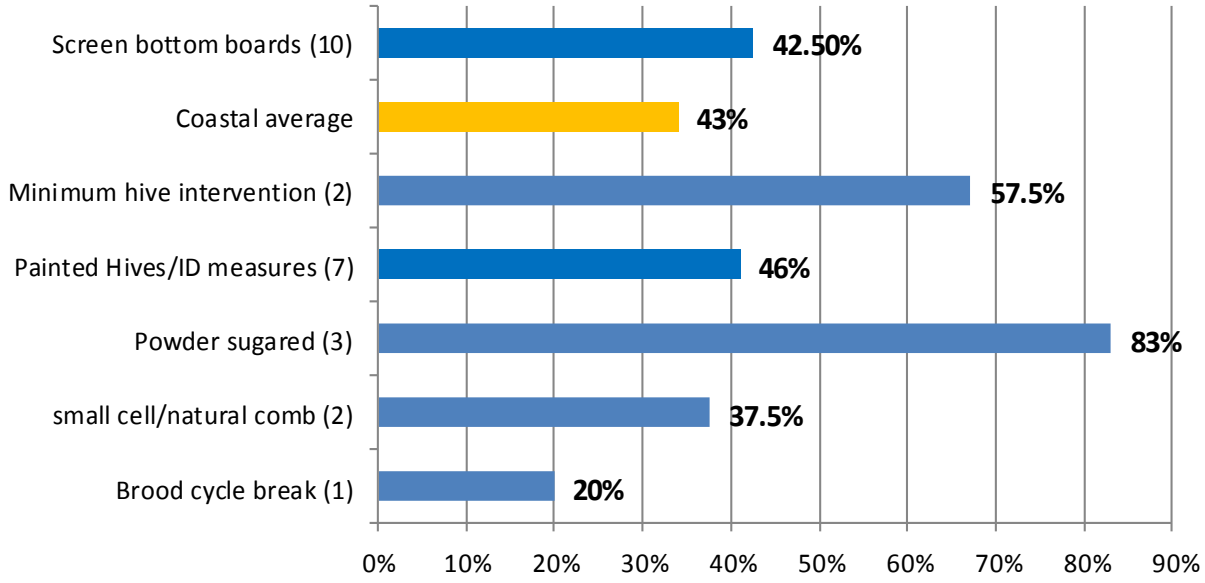
See Tools for Varroa Monitoring Guide www.honeybeehealthcoalition.org/varroa on the Honey Bee Health Coalition website for a description of and videos demonstrating how best to do sugar shake or alcohol wash sampling. The Tools guide also includes suggested mite level to use to base control decisions based on the adult bee sampling. A colony is holding its own against mites if the mite sample is below 2% in spring (i.e. 2 mites/100 adult bees) and below 5% (no more than 5 mites to 100 adults) when at its largest size during nectar flow following buildup. It is critical to not allow mite levels to exceed 2-3% during the fall months when bees are rearing the fat fall bees that will overwinter.

MITE CONTROL: The survey asked about use of several non-chemical mite treatments and also about use of chemicals for mite control. A single Coastal individual, 7.5%, did not use either non-chemical nor chemical control. Another individual (2 total) did not use a non-chemical technique to control mites.

NON-CHEMICAL CONTROL: Respondents were offered 7 alternative, non-chemical mite treatments and could check more than one choice and could use a blank "other' to indicate any additional techniques used. Of these seven alternatives on the survey, use of screened bottom board was listed by 200 individuals (71%) statewide and these individuals had slightly lower overwinter loss (46%). All Coastal member respondents indicated use of SBB but their loss rate was 42.5%, slightly higher than the average of 34%.

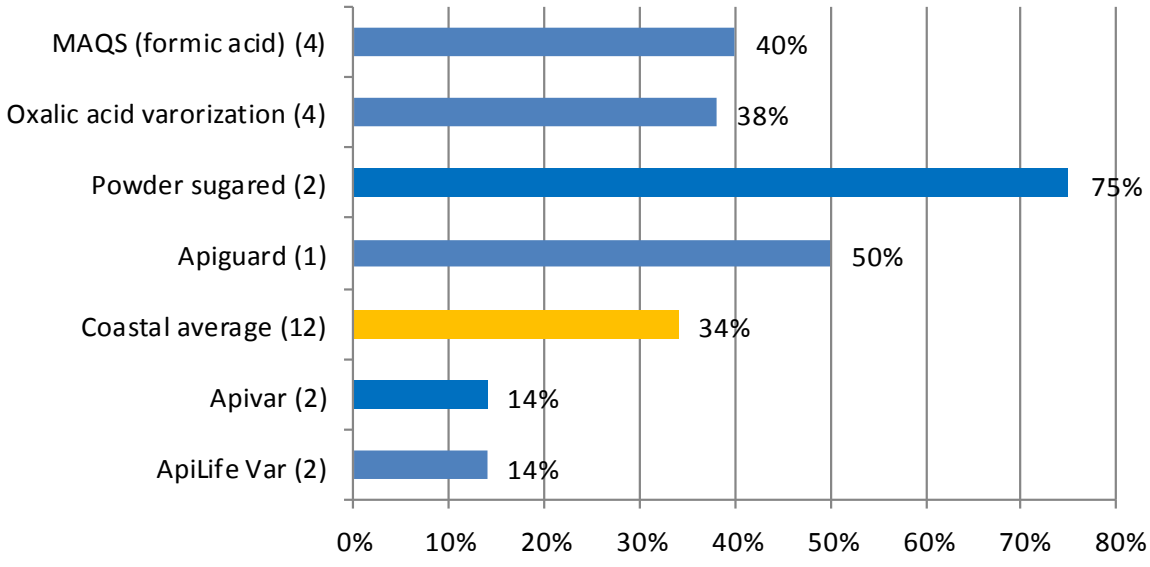
Coastal members checked 25 selections (1.9/individual); two individuals made 4 selections, 4 had 3 selections and three had a single selection, all SBB. Painting hives a distinctive color/other hive ID measures by 7 members and the remaining by 1 to 3 individuals. See Figure 9 for number of individuals ( ) and the loss rate for those with each selection. It is evident only brood cycle break of the non-chemical controls improved survival for Coastal beekeepers.

Figure 9. Coastal beekeeper Alternative mite controls



CHEMICAL CONTROL: Use of a chemical control was indicted by 215 (76%) statewide OR beekeepers, 12 of them Coastal beekeepers (only one coast respondent did not treat with a chemical). Eight individuals had a single selection and 3 used 2 materials (2nd choice in two instances was powdered sugar). Oxalic acid (evaporation) and MAQS (formic acid) were chemicals of choice by 4 and 3 individuals respectively. As with statewide beekeepers both Apivar and Apilife Var users had greater survival. Figure 10 shows this advantage.

Figure 10. Coastal beekeeper Chemical mite controls



NOTE: Powder sugar when checked as a chemical (in this survey section) by 2 individuals had a 75% loss rate and when checked by 3 individuals as a non-chemical control an 83% loss.

What works? The non-chemical alternative of drone brood removal can be used during spring buildup and breaking the brood cycle, with requeening, especially if hygienic queen stock or local selected stock is used to replace removed queens, also keeps 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. Only brood cycle break resulted in loss rate below the average for coastal beekeepers, although used by only one individual respondent.

Among the chemical treatments available to treat varroa mites, use of Apivar and Apilife Var resulted in lower overwinter losses by coastal beekeepers, as did use of both chemicals for OR beekeepers statewide (see www.pnwhoneybeesurvey.com 2017 report.

The chemical treatments, to a greater or lesser degree, have limitations that may affect usefulness, just as do the non-chemical treatments. We need to learn how to use such tools more effectively. Materials that can be used effectively include acids such as formic acid (Mite-Away Quick Strips, or MAQS – especially the ½ dose treatment) and Oxalic acid or the Hopguard 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. It is important to follow label directions. There may be significant queen or brood losses with many of the chemicals and post treatment sampling is strongly recommended to insure a mite control, non-chemical as well as chemical, has worked as expected.

It is clearly evident that use of several chemical mite control materials reduced overwinter losses and improved survival. The non-chemical techniques may help reduce loses but to a lesser extent. As for using more than one, and which ones to use during a season, there appears to be NO one best combination. Control choices should be driven by monitoring, seasonal considerations and an estimation of size of mite population.

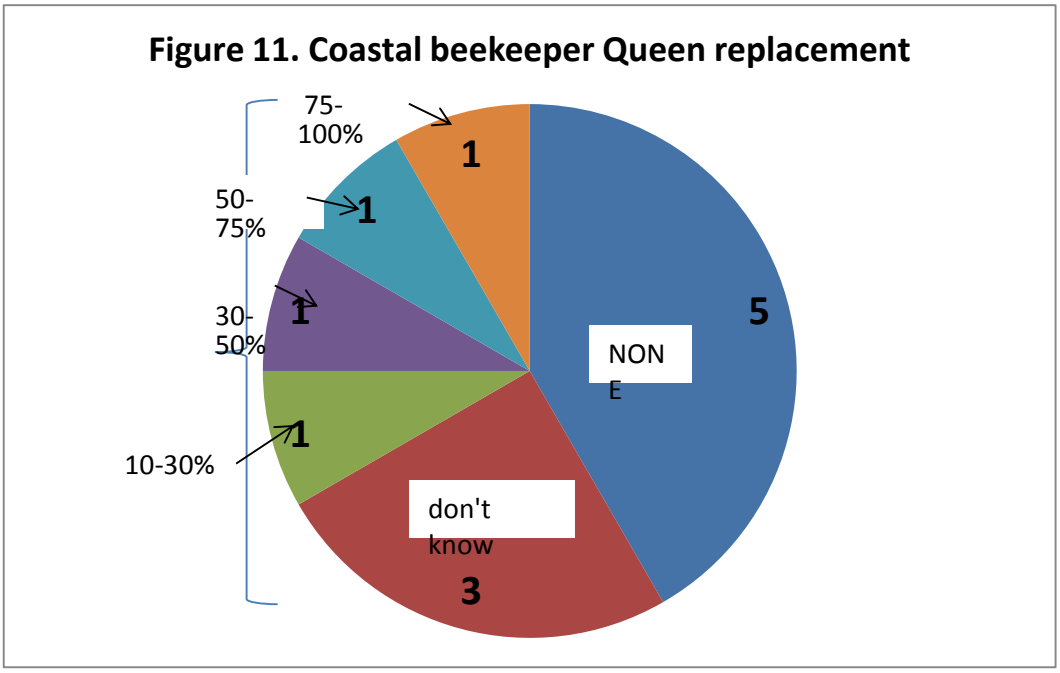
Queens

The PNW honey bee survey asks individuals with overwinter loss to what they attribute their loss. Fifty-five of the 282 OR respondents (13%) attribute at least some of the loss of their colonies to queen failure; among coastal respondents, 3 individuals (16% of total listings) listed queen failure as one of the contributing reasons for their losses.

However, with the health and welfare of the queen (the 'heart of the hive') critical to bee hive development and success, we also have a survey section just covering queens. We ask specifically what percentage of colonies might have been lost to queen related issues. For the total OR respondents, 127 (47%) said none and 66 respondents (24%) checked 'I don't know.' Twenty-nine percent (29%), double the number who listed it as reason for winter loss, responded that queen loss might have been a factor in colony losses.

Among Coastal respondents, 5 individuals (41.5%) said none of their losses were likely due to queen failure and 3 (25%) said they did not know. Four individuals (33%), 1 more than in previous self-reported reasons for loss, did attribute possible winter losses to queen failure, similar to the percent statewide. This last response required an estimate of the approximate percent of colony loss that might be attributable to queen failure; one individual (25%) said 10-30%, 1 indicated 30-50%, one said 50-75% and 1 felt 75-100% of their loss could be due to queen failure.

Figure 11. Coastal beekeeper Queen replacement



One non-chemical management technique to reduce mite buildup in a colony is to requeen/break the brood cycle so we also asked about how managed colonies are requeened. Six Coastal beekeepers said their colony (ies) did not requeen and 3 said they did not know if their colony (ies) requeened. Thus 3 individuals reported their colony (ies) did requeen. Loss level of this group was 33%.

One individual said colony queen replacement was via supersedure and two individuals (64%) said they requeened by introduction of a mated queen. One of two had marked queens.

Closing comments: This survey is designed to 'ground truth' the larger, national Bee Informed loss survey. Some similar information is additionally available on the BeeInformed website www.beeinformed.org and individuals are encouraged to examine that data base as well. Reports for individual bee groups are customized. As they are completed they will be posted by the name of the group. Additionally analysis will be performed and these reports will be posted to pnwhoneybeesurvey as they are completed.

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 with "REMINDER" in the subject line. We have a blog on the 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 June 2017