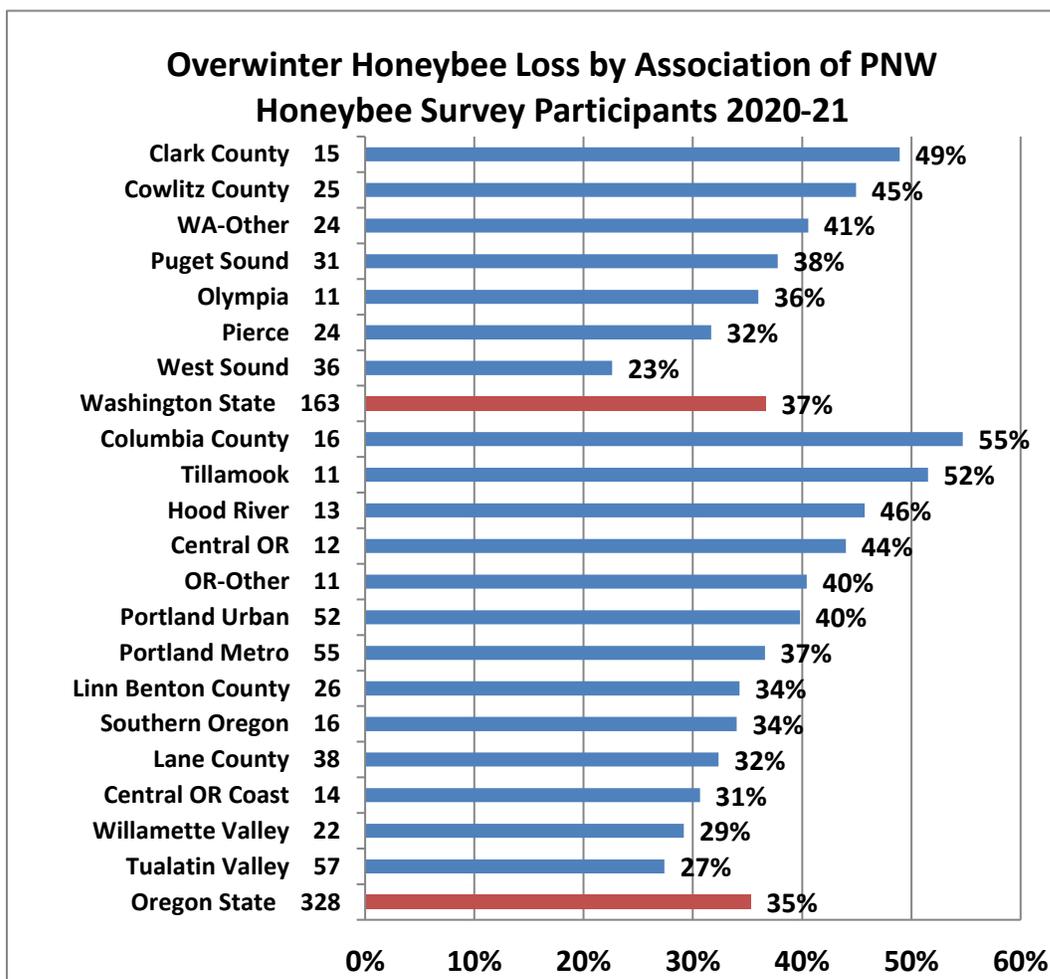


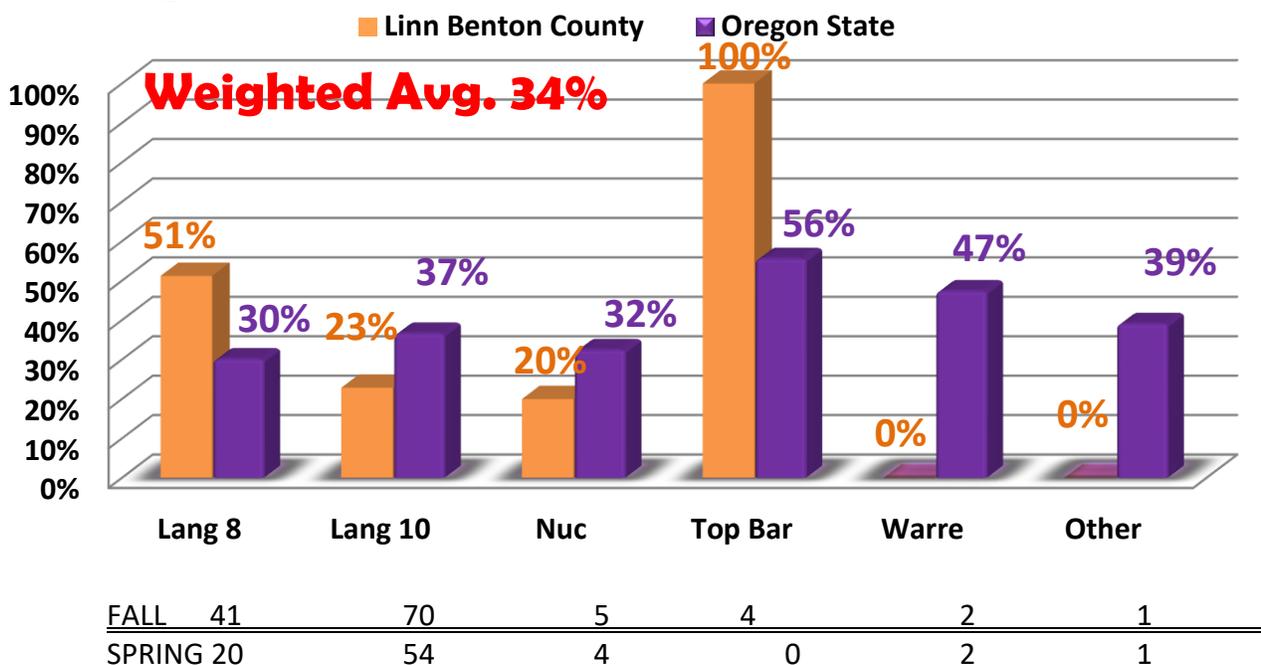
2020-2021 LBBA Winter Loss Report Part 1 by Dewey M. Caron

Linn Benton Beekeepers were encouraged to complete a web-based survey document in a continuing effort to define overwintering losses/successes of backyard beekeepers in Oregon and Washington. This was the 12th year of such survey activity. I received 328 responses from OR backyarders, keeping anywhere from 1 to 40 colonies; LBBA members sent in 26 surveys, 10 fewer than last year, reporting on 108 fall colonies. Linn Benton average losses = 34%, one percentage point lower than statewide average.



Percent losses, determined by hive types were 51% Langstroth 8 and 23% for Langstroth 10 frames hives (41 and 70 fall colonies respectively). Nuc losses were 1 of 5 fall colonies = 20%. All four Top bar hives were lost. Two Warré hives were alive and the one "other," a horizontal hive, also survived. See Figure 2.

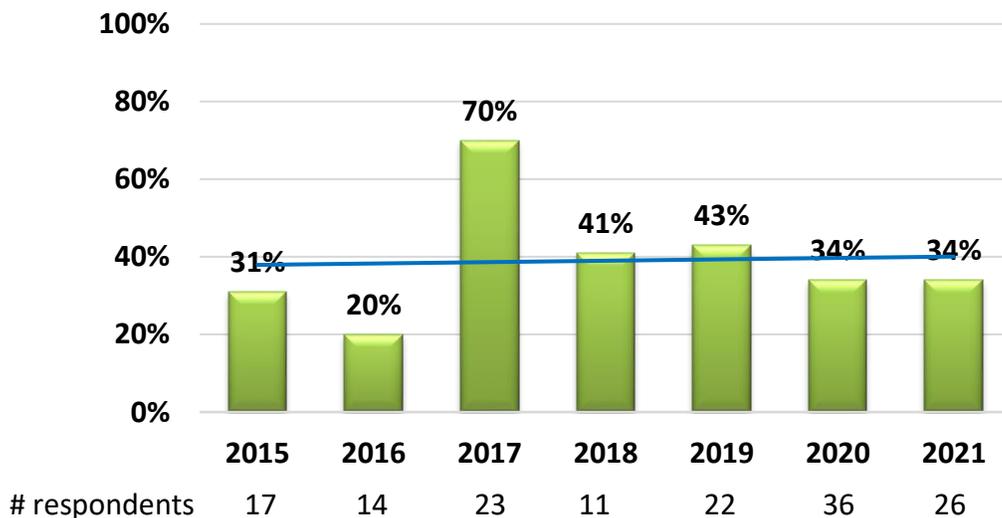
Figure 2 Winter Honeybee Loss % by Hive Type, 2020-21



Overwintering losses of LCBA respondents = 34 %, same level as last year. Loss level was 6 percentage points lower than the 7-year average losses for Linn Benton beekeepers (Figure 3) The trend line in red of losses is flat with lower losses the last 2 years; 40% loss level is the same as the average Oregon backyard beekeeper loss level of the past dozen years but double what commercial beekeepers experience.

Figure 3

Linn Benton County Loss History



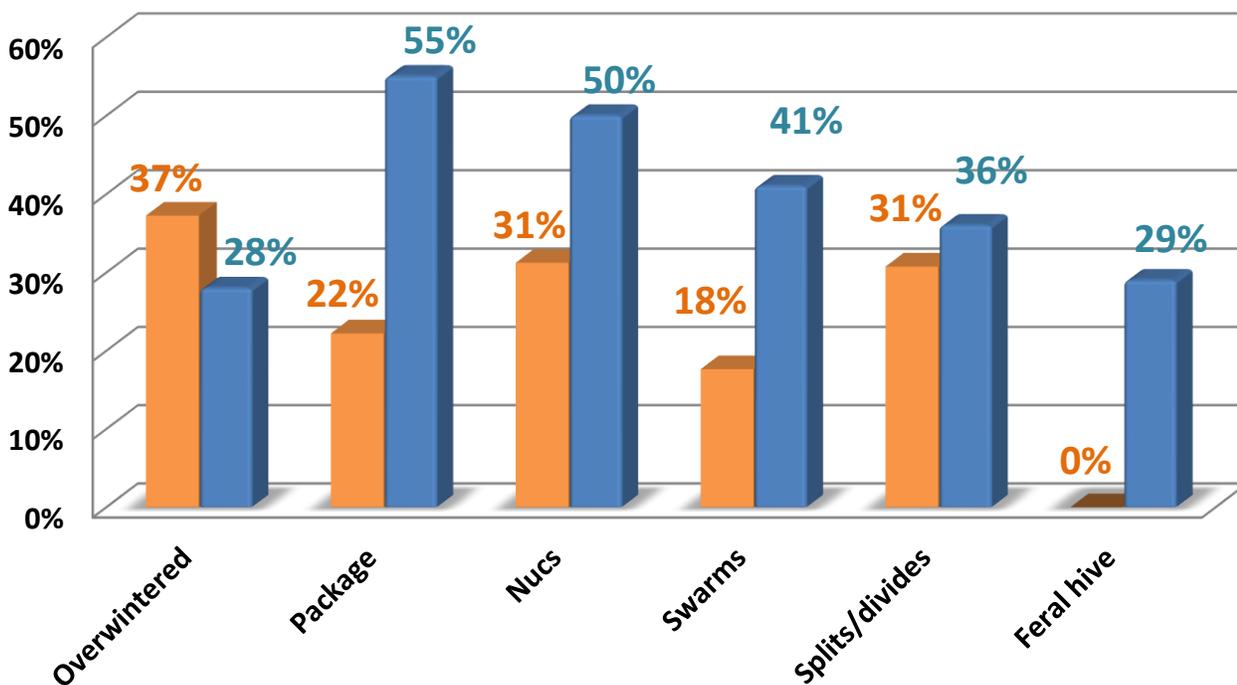
In the 2016- 2017 overwintering period, LBBA members had the highest loss rate of any of the OR associations (70%) and the year earlier (2015-2016) LBBA had the lowest rate of state bee groups(20%). The last four survey years have been consistently at about the 40% level. What is curious is the fluctuating level of respondent participation (11 individuals in 2018 and 36 last year). See figure 5

The survey also asked for hive loss by **hive origination**. Members reported 37% loss of previously overwintered colonies, 11 percentage points over the state-wide level. Package loses were only 22%, well below statewide level of 55%. Nuc (31% - 16 total in fall), swarm (18% - 17 total) and splits (30% - 13 fall total) losses were intermediate. Figure 4.

Figure 4

Winter Honeybee Loss % by Origination, 2020-21

■ Linn Benton County ■ Oregon State



FALL	57	18	16	17	13	0
SPRING	32	14	11	14	9	0

Typical of the statewide data, the LCBA respondents are beekeepers with few colonies. 52% of LBBA respondents had 1 to 3 fall colonies, there loss was 42%, seven individuals had 4 or 5 colonies with 50% loss and six individuals had 7 to 10 colonies with a 20% loss. Not everyone had loss. In fact, 5 members reported NO LOSS (19% of survey respondents) while 7 respondents (28%) reported total winter loss of colonies. Greatest loss was 1 colony - heaviest loss was 5 colonies by 2 individuals. Figure 5.

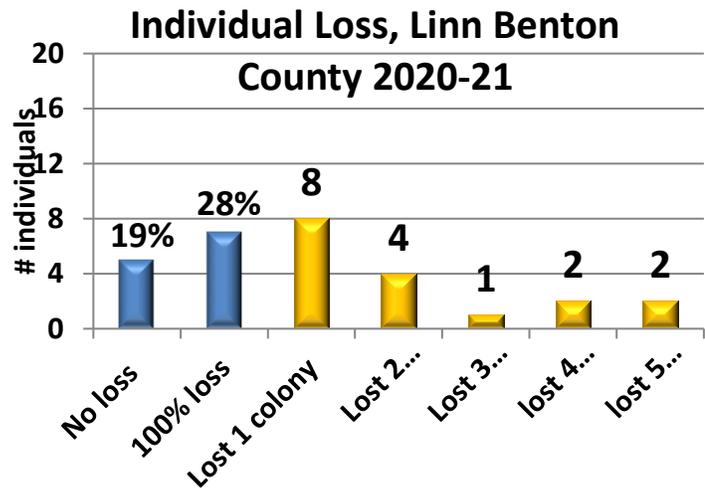
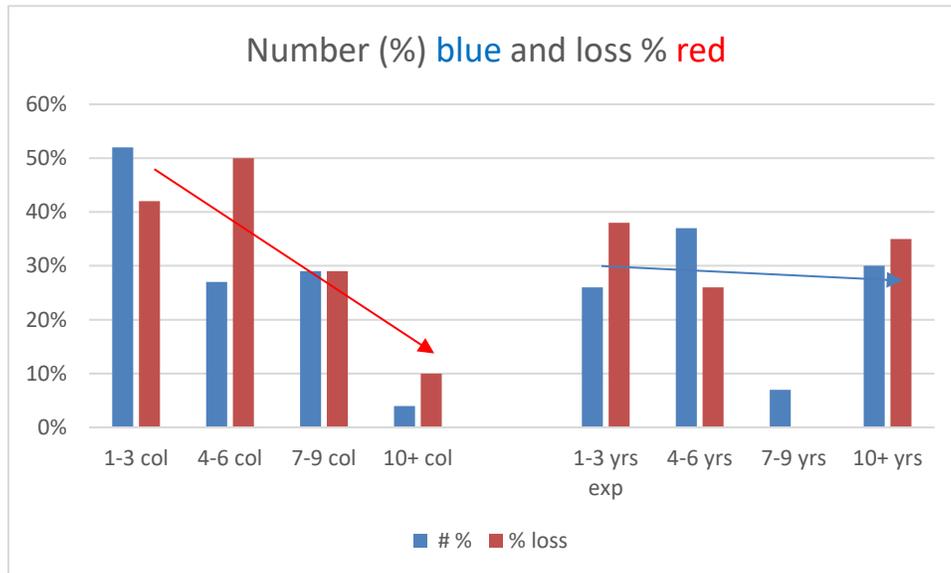


Figure 5

Seven (27%) LB respondents had 1 to 3 years of beekeeping experience; they had 38% loss level. 10 individuals reporting 4 to 6 years experience, had 26% loss, 2 individuals had 8 or 9 years experience with no loss, and 8 individuals (31%) had 10+ years experience, with 47 years the highest; this groups loss was 35%. Although number of colony losses go down with increasing colony numbers they do not go down with years experience (see arrows Figure 6).

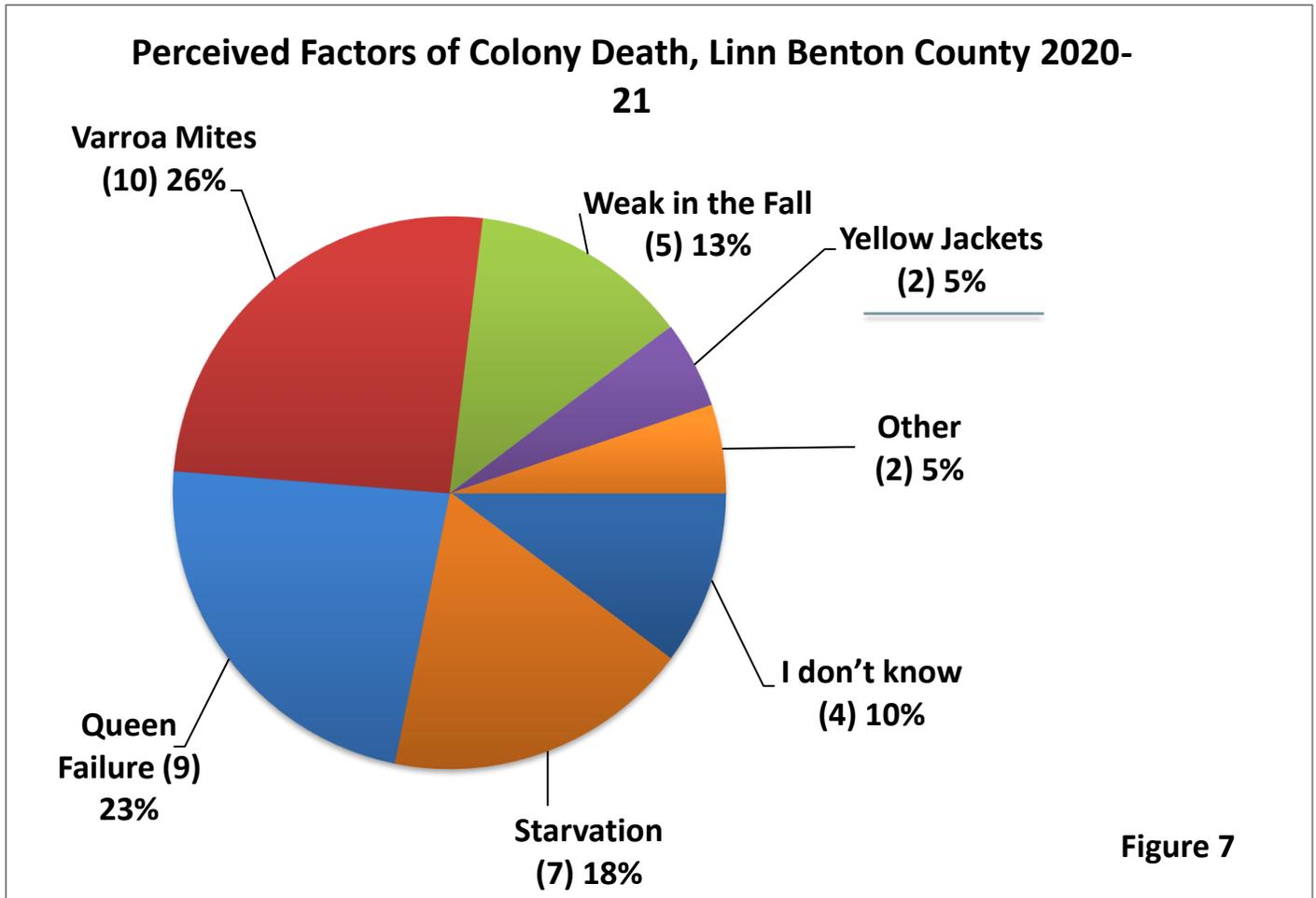
Figure 6



Reasons for Loss/Acceptable loss

We asked of individuals that had colony loss to estimate what the likely reason(s) might have been, Multiple responses were permitted. There were 35 listings, 1.6/individual. Ten individuals (48% of those

with losses) said varroa (which was 26% of total choices as shown in Figure 7, 9 (43%) said queens (23% of total choices), 7 (33%) said starvation, 5 indicated weak colonies (24%) and 2 said yellow jackets. Four said they didn't know. Suggested reason for losses were very similar to last year.



Survey individuals are asked to indicate what might be an acceptable loss level. Nine individuals listed none. The median (middle) selection was 20%, same as statewide. Seventeen LB responses (46%) were 15% or less; five respondents selected 25% and five 33% or more, including one who listed 100% loss as acceptable.

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. LBBA individual choices varied from zero to 100%, with medium of 20%. This acceptable loss level has crept upwards over time.

Major factors in colony loss are thought to be mites and their enhancement of viruses especially DWV (deformed wing virus), plus declining nutritional adequacy/forage and diseases. Pesticide in the agricultural environment weakens colonies. Yellow jacket predation is a constant challenge to weaker fall colonies, Management, especially learning proper bee care in the first years of beekeeping, remains a factor in losses. What effects our changing environment such as global warming, contrails, electromagnetic forces, including human disruption of 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. Colonies are not as healthy as they should be. LBBA members also considered queen failure and weak in fall as major reasons for high winter losses.

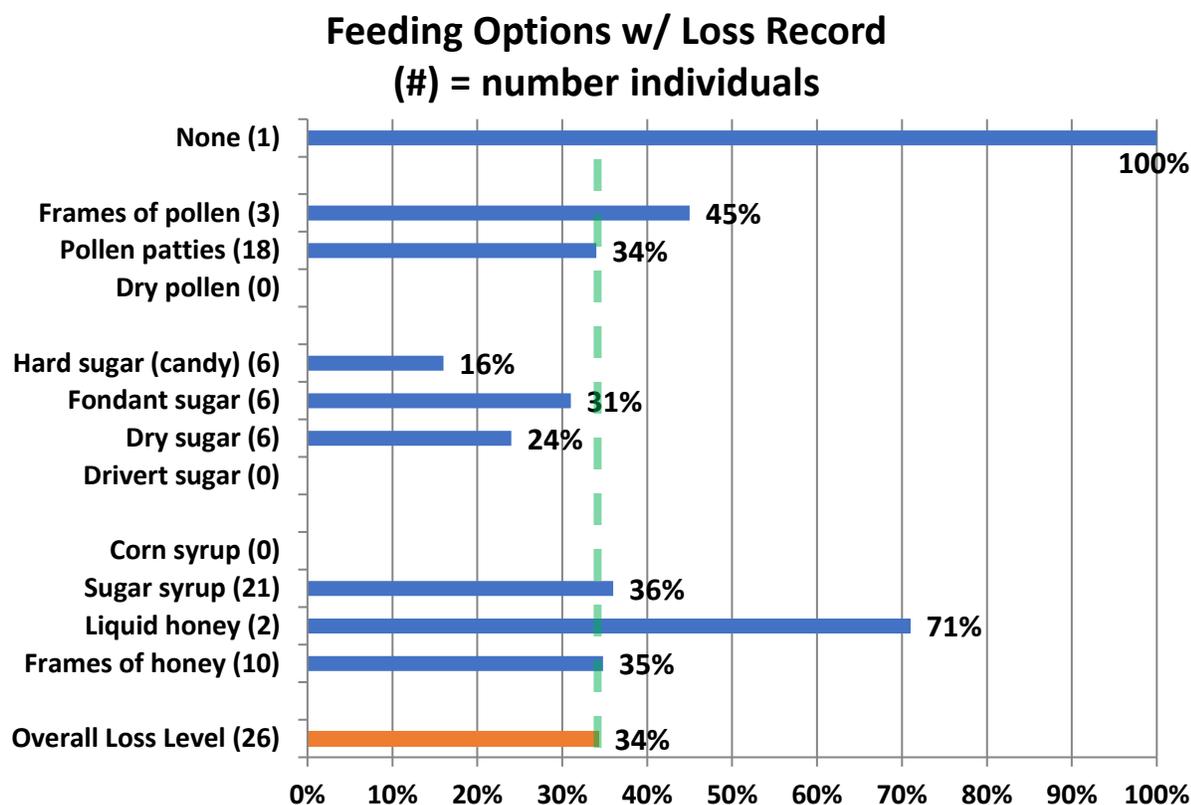
Management Selections and Losses

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 LBBA and OR beekeepers often do not do just one thing/management to their colony (ies) to control mites to improve 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: Linn Benton survey respondents checked 72 feeding options = 2.8/individual. One individual selected none – they had winter loss of 100%. Two Linn Benton Co. individuals selected a single choice (one dry sugar and the other inverted sugar syrup). They had a 10% loss. Seven selected 2 options (67% loss), 9 selected three (the greatest choice and median choice – 40% loss) and 6 selected four to 6 (16% loss). The more selections (except for the anomaly of one) the better the survival.

Percent colony losses are presented for feeding options with numbers of LBBA members indicating doing the management in (). Bar lengths of left of 34% (**green dashed line**) indicate better than average survival while those to right had heavier than average losses. Individuals feeding pollen patties (18 individuals), the 21 persons feeding sugar syrup and the 10 who fed frames of honey had average losses. Frames of pollen did not improve survival. Individuals feeding non-liquid sugar had better survival with 6 fondant feeders not quite as good as the survival of colonies supplied with hard candy (6) feeders or with dry sugar (also 6 individuals.) The 2 liquid feeders of honey had poor survival. See Figure 8.

Figure 8



For the last 4 years statewide, exclusive of past season (=43% average losses), individuals doing no feeding had poorer survival all 4 years: **Those indicating doing NO feeding had losses 12.6 percentage points higher than average overall losses.** For Linn Benton this year, the single individual doing no feeding lost 100% (it was a single colony). Individuals statewide that fed sugar syrup had a 7¼% lower loss level (average for the 4 years). This year sugar syrup feeders in Linn Benton had an average survival. Those feeding liquid honey did even worst. Statewide feeders of honey (as frames or liquid) had lower loss only 2 of past 4 years. There may be good reasons for feeding of carbohydrate as sugar syrup or honey, but they do not necessarily help winter survival.

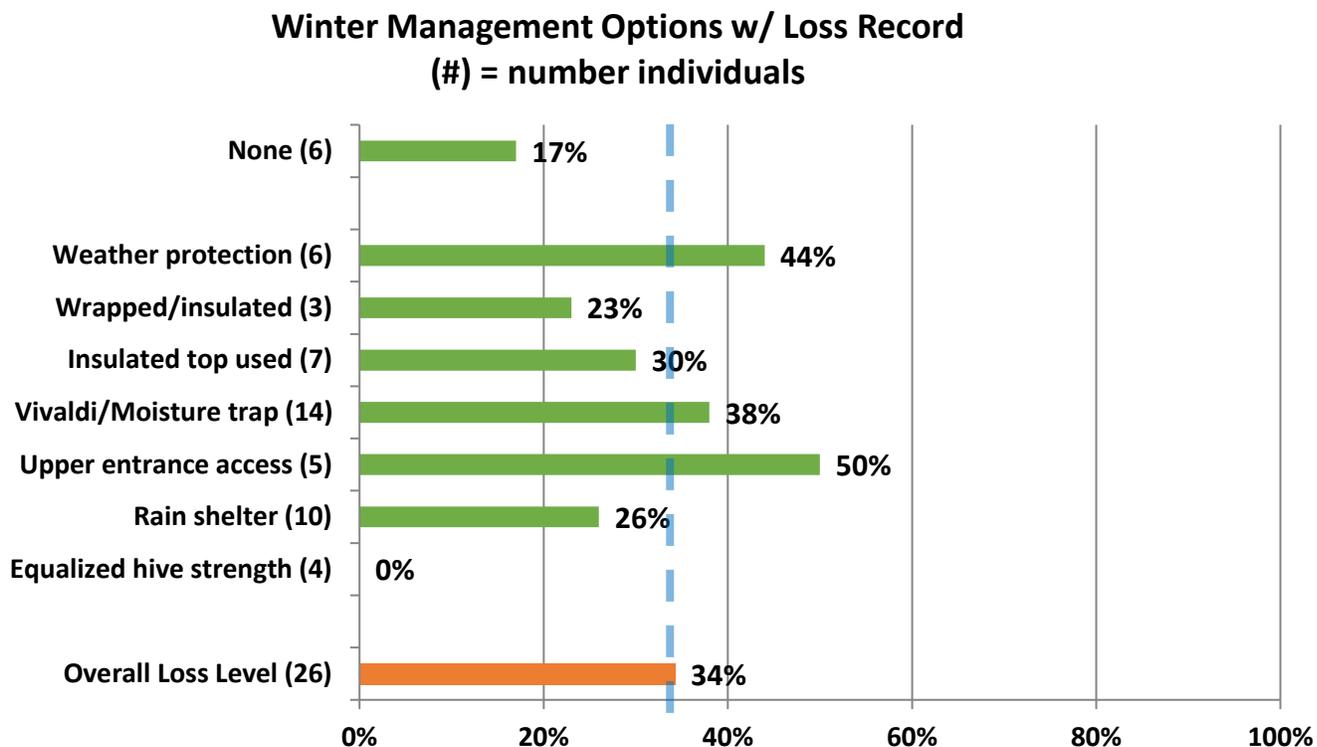
Individuals statewide feeding non-liquid sugar (in any of the forms) had 5 or 6 percentage point lower losses all four past winter seasons compared to average 4-year losses. The 6 LBBA dry sugar feeders had improved survival this year; dry sugar feeders statewide had slightly better survival all 4 winters (average 4 winters 39¼%). Hard candy feeders (6 LBBA individuals - 16% loss) is great improvement over average loss; statewide candy feeding improved survival all 4 winters (31% average survival). Fondant feeders had better survival 3 of the 4 winters (37 ¾ %) statewide and for the 6 LBBA members a 3 percentage point better survival.

For individuals feeding protein statewide, only the protein patty users showed better survival all 4 years; the LBBA members feeding patties had only average survival this past winter. None fed dry pollen; statewide dry feeders had much better survival in two of the four years with losses the remaining two years close to the overall yearly average.

WINTERING PRACTICES: Six Linn Benton individuals (24%) reported doing no winterizing; they had loss level of a mere 20%. Multiple selections were possible and in fact the 20 Linn Benton members doing winter

managements averaged 2/individual. Five individuals chose a single management and had a 42% loss level, 8 selected 2 (51% loss) and 5 had 3 choices (35% loss). The 2 individuals with 4 and the one with 5 had 14% loss.

Figure 9



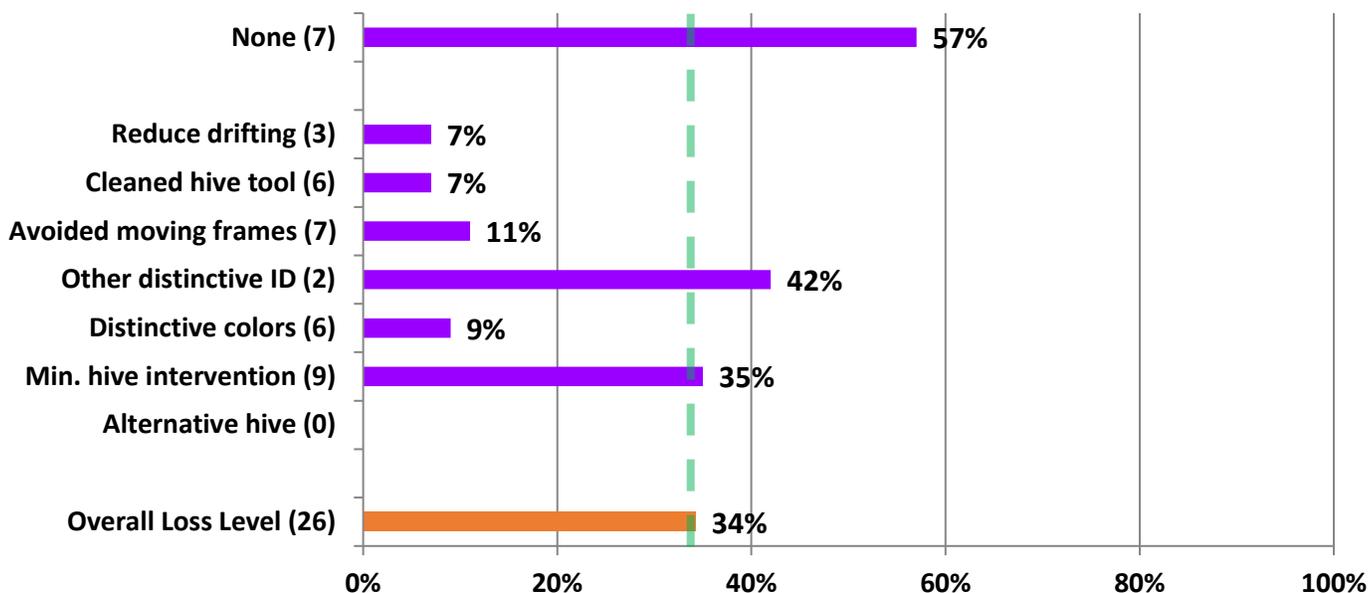
Over the past four years individuals that did no winterizing practice (average 13.4% of individuals) averaged 46% loss compared to 42% overall average loss of last 4 years, a 4-percentage point poorer survival rate. The L6B doing no wintering had the opposite, a 14 percent advantage but for the previous 2 seasons those 7 doing nothing last year had a 67% loss and the year before the 3 reporting doing nothing had a 63% loss level.

Statewide only 2 winterizing managements improved survival all 4 years – wrapping (29% lost rate, a 13-percentage point improvement) and upper insulation (32%, a 10-percentage point improvement). Vivaldi/quilt box (38%), upper entrance, also 38% (most Vivaldi boards have an upper entrance built into the equipment) and wind/weather protection (36%) had only slightly improved survival rates. Average loss rate for last 4 years statewide was 42%. Equalizing hive strength (4 individuals had no loss), wrapping (3 individuals) and providing a rain shelter (10 members) improved LB member survival the most this past winter. Both wrapping and equalizing also improved survival statewide this past winter.

SANITATION PRACTICES: It is critical that we practice some basic bee sanitation (some prefer use of term bee biosecurity) in our bee care toward insuring healthy bees. Linn Benton beekeepers had 41 responses 2/individual to sanitation management questions. Sixteen percent statewide and 7 Linn Benton individuals (28%) said they did not practice any of the 6 offered alternatives. Loss rate statewide was 52% and for the 7 LBBA members 57%. Last year 8 LBBA individuals doing no sanitation had a 56% loss rate. The 5 individuals who had 2 choices had 11% loss while the 4 with 3 or 4 choices had even lower, 8% loss.

Figure 10

**Sanitation Practice Options w/ Loss Record
(#) = number individuals**



Avoiding moving frames and reducing drifting were the two sanitation choices that demonstrated better average survival the past four years – 4-year loss rate was 36% for not moving frames which is 6 percentage points better survival. The 7 LB that did this management had only an 11% loss. Statewide loss (35%) for reducing drifting improves survival statewide compared to overall rate of 42%; it also was beneficial to LB members (only 7% loss). Alternative hive had the best survival this year, but it has not been over past 4 years. For LB, none selected this choice. Sanitation appears to be relatively minor toward improving survival.

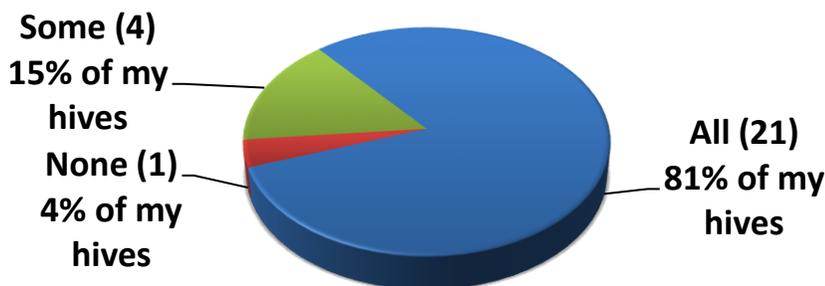
Screen Bottom Boards (SBB)

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 1 individual in LBBA (lost both colonies - 100% loss) said they did not use screen bottom boards. This was the

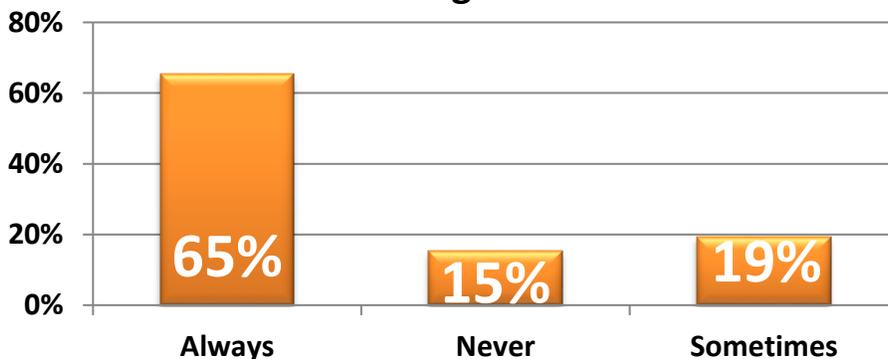
lowest percent of respondent non-use of SBB in last 6 years. Average non-use is 18% vs 82% use on some or all colonies over 6-year period. Figure 11 LBBA data.

We asked if the SBB was left open (always response) or blocked during winter. This past season 21 Linn Benton respondents (65%) always or sometimes (5 individuals - 19%) blocked the SBBs during winter. Those 4 (15%) who said they never blocked had a 60% winter loss (compared to 32% loss of those who always or sometimes blocked). This was a much bigger difference than statewide. **Comparing the always and sometimes left open with the closed in winter (all closed + some closed) statewide response, reveals a 12 percentage point difference in favor of closing the SBB over the winter period to improve survival; for Linn Benton members it was a 38 percentage point advantage.**

Linn Benton County Beekeepers used Screened Bottom Board on __ During 2020-21



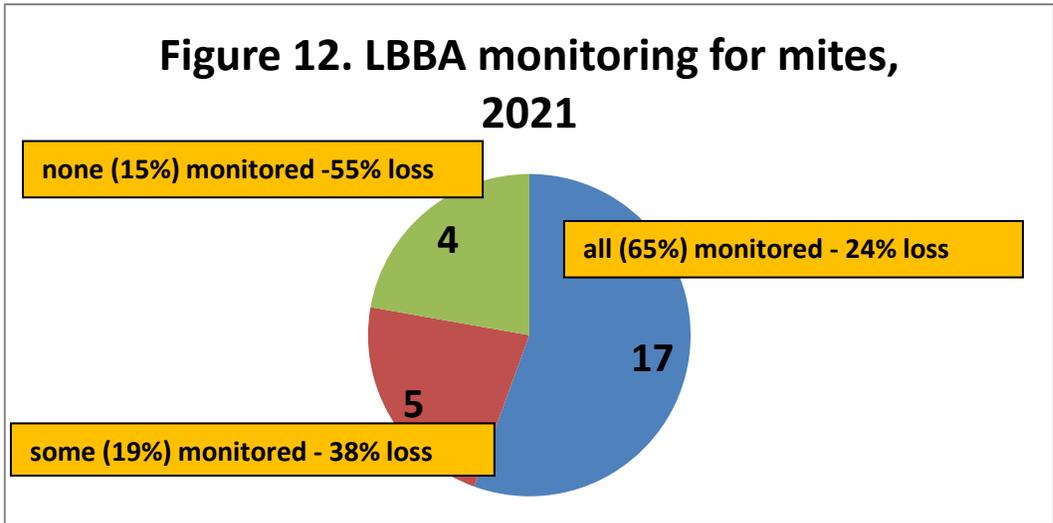
..and Blocked Screen Bottom on __ of them During Winter



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

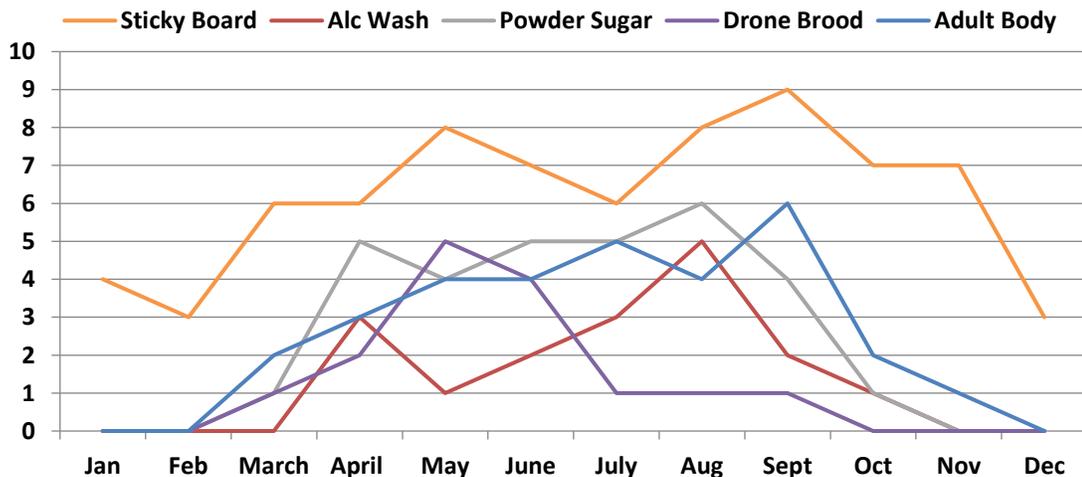
Mite Monitoring/Sampling and Control Management

We asked percentage of Oregon hives monitored for mites during the 2020 year and/or overwinter 2020-21, 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 LBBA members, 17 individuals (65%) monitored all colonies; they had 24% loss. Five individuals monitored some colonies; they had a 37.5% loss level. Four individuals (15%) did no monitoring and they had a 55% loss. Statewide the same advantage holds but is weaker - 34% loss for monitoring all and some and 36% loss for those doing no monitoring. Monitoring helps.



In order of popularity of use, sticky boards were used by 14 of 22 total LBBA respondents, 6 used alcohol monitoring, 7 used powdered sugar monitoring, 6 used drone brood and 7 said they monitored by looking at adults. Multiple choices were permitted. Most sampling to monitor mites was done in July – September, as might be expected (Figure 13), since mite numbers change most quickly during these months and results of sampling can most readily be used for control decisions.

Figure 13 Monthly Monitoring of Linn Benton County Beekeepers 2020-21



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 counting 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 as most mites are not on the adult bees. They are 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. It is obvious that monitoring alone is a means towards improved winter survival.

See **Tools for Varroa Monitoring Guide** 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 2-3% 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 either high mite numbers or sometimes to the treatment itself.

Mite Control Treatments

The survey asked about non-chemical mite treatments and also about use of chemicals for mite control. two LBBA individuals (8% compared to 14% statewide) said they did not employ a non-chemical mite control and 6 LBBA individuals (23%, compared to 19% statewide), did not use a chemical control. Those LBBA individuals who did not use a non-chemical treatment had a 100% loss; last year 6 LB individuals doing none had 81% loss). Statewide the 2 LB members were among the 45 individuals doing one; loss level was 48 statewide, 13 percentage points higher than average loss. The 6 LBBA members not using a chemical control had a loss rate of 92%; statewide lost rate=61% of colonies for individuals using no chemical treatment.

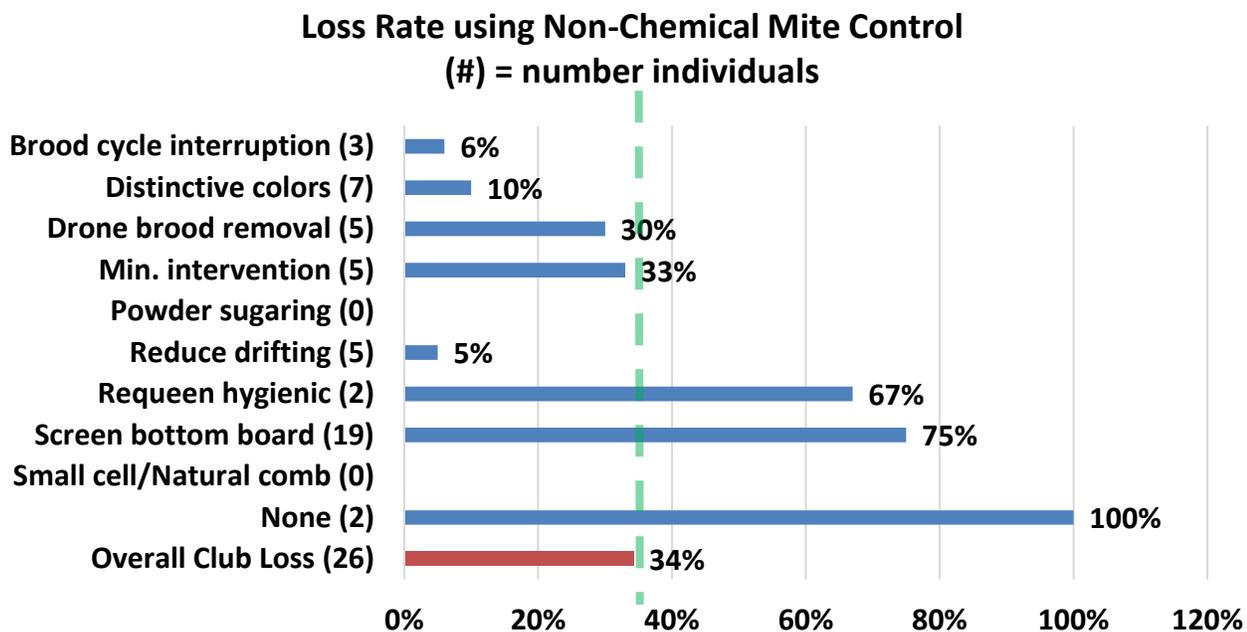
NON-CHEMICAL CONTROL: Of nine non-chemical alternatives offered on the survey (+ other category) 2 individuals selected none – they had 100% loss. Twelve individuals used one method (34% loss), 6 used two (47% loss), 3 used 3 (7% loss) and 3 used 4 or 5 – they had an 8% loss. Doing more than one treatment improves winter survival.

Use of screened bottom board was indicated by 19 of 24 individuals but losses were quite high (75%). All other managements improved survival except for the 2 individuals who indicated they requeen with hygienic stock. Last year one individual selecting this had zero loss. This year 3 individuals performing brood cycle interruption had only a 6% loss but last year the 3 LB individuals doing same management had a 71% loss. Small club numbers can swing wildly one year to the next. See Figure 14.

Statewide, two of the non-chemical alternatives have demonstrated reduced losses over past 5 years. Reducing drifting such as spreading colonies (33% loss average for 3 years – question not asked in 2016-17 survey) and brood cycle break (36% average) have consistently year after year demonstrated somewhat better survival than average loss (41%). Reducing drifting by the 5 individuals had only a 5% loss this year, while last year the increased survival was only 4 percentage points better than average loss for LBBA members. Different colony colors in apiary and drone brood removal were both 41%, the 5-year average. Distinctive hive colors

had only 10% loss for LB this year. Some non-chemical control alternatives demonstrate an advantage on one or two years (such as drone brood removal this past season) but then not another year.

Figure 14



Chemical Control: For mite chemical control, 6 individuals (23% of total Linn Benton respondents) used NO chemical treatment. They had loss rate of 92%. Those using chemicals did so at rate of 1.9/individual (same as statewide). LB members using one chemical (6 individuals) had a 53% loss rate (the individual using ApiLifeVar had 100% loss as did the individual using Apivar. The 3 individuals using MAQS had 17% loss and the one using Oxalic acid vaporization had 40% loss). There were 6 individuals who used 2 chemicals and they had a 19% loss (2 used Apiguard and Oxalic acid (1 Vapor & 1 Drizzle), 50% loss, 2 used Apiguard with Oxalic acid Vaporization 8% loss and 2 using MAQS and Oxalic acid (1 drizzle, 1 vapor) had zero loss). Seven individuals used 3 chemicals and had 19% loss – had 22% loss (4 individuals used Apiguard and MAQS and OA (1 drizzle, 3 vapor) had 30% loss, 1 individual used ApiLifeVar, MAQS & OAV and had 22% loss, 2 individuals used Apivar, MAQS and OA (1 drizzle, 1 vapor) and had 18% loss), The 1 individual using 4 chemicals had total survival of 9 colonies and indicated use of Apivar, Apiguard, OAV and OAD.

For single use comparison, only 6 materials were used by 20 members using a chemical. MAQS was used by 12 of 20 members. They had loss of 22%. All but Oxalic acid drizzle and ApiLifeVar showed improved survival and these two chemicals had club average survival. (Figure 15). Last year these two had loss level above the LB average loss as well. Oxalic acid vapor use showed the best survival improvement last year (11% loss) as it did this year (11 individuals used, 12.5% loss).

Consistently the last 5 years five different chemicals have helped beekeepers improve survival statewide. The essential oils Apiguard (average 5-year loss level 31.6%), Apivar (32% average 5-year loss level), Oxalic acid vaporization (32.6% average loss level over last 5 years – in contrast the oxalic acid drizzle average of last 4 years is 40% loss level), ApiLifeVar (34.4% average loss level over last five years) and formic acid MAGS formulation 39.4% loss level the last 5 years. Average loss level has been 41% the last 5 years. Those who mix formic into shop towels have heavier losses. Formic Pro has increased in use – it looks very promising at a 25.3% loss level the past three years (when average loss was 40.3%). None of the IBBA respondents indicated using the towel method nor did they use Formic Pro.

Figure 15

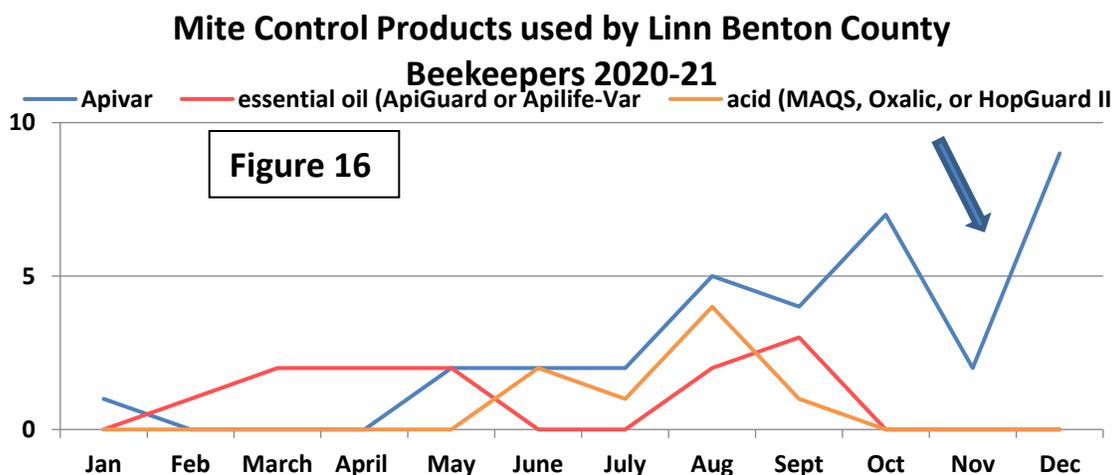
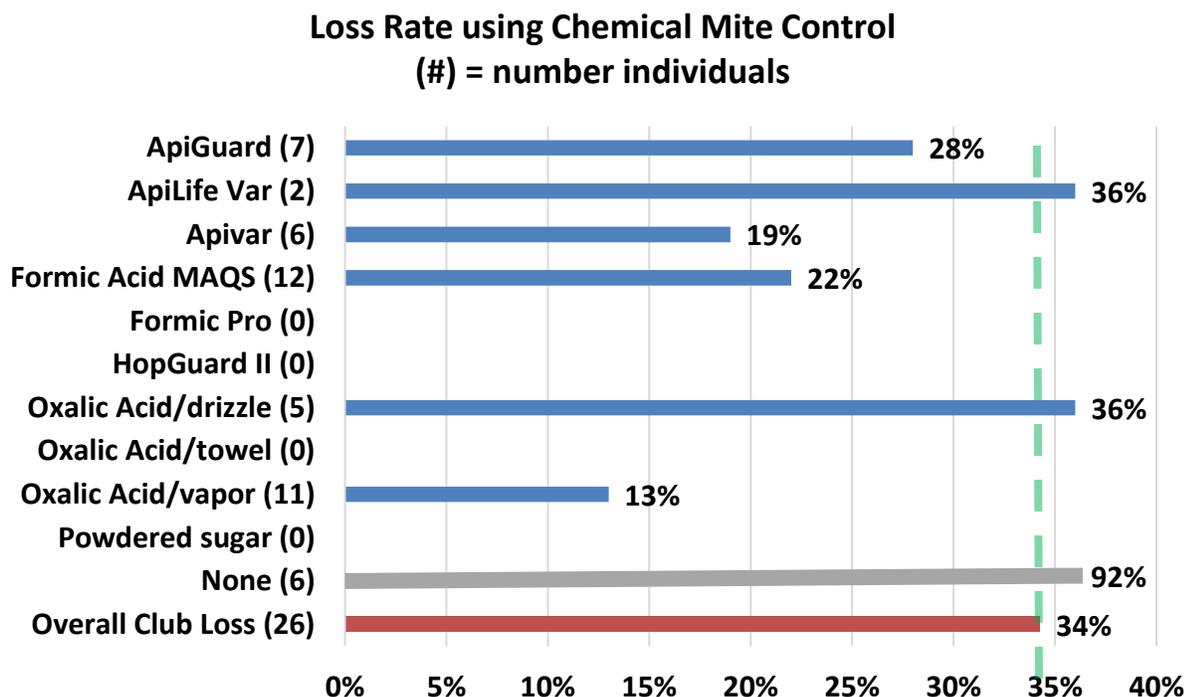


Figure 16 shows pattern of use of these chemicals by Linn Benton members. Note that the color code is incorrect. The blue line shows annual use of acids (the spike in December represents use of Oxalic acid vaporization; the red line (not blue) shows use of Apivar (it is most commonly used in August and September) .

Queens

We hear lots of issues related to queen “problems”. Seven of 19 LBBA individuals (37%) said they did not have any queen issues and 3 (16%) said they didn’t know. Two individuals of the 10 individuals who said they did have queen issues checked 10-30%, another two said they had 50-75% level of queen issues and 5 checked 75-100%. Statewide results similar - 36% 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. Eleven individuals said yes (42%) and 15 (58%) said no. Statewide 32% said yes and 68% no. The related question then was did you or your bees replace their colony queen? Fourteen (54%) said Yes, 6 did not know and 6 (23%) said no. Response mirrors statewide - 56% said yes, 24% 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 eleven individuals who used a mated queen, 1 a virgin queen and 3 who used queen cells (53% total). The remainder requeened naturally via supersedure (4 individuals), split (also 4 individuals) and 5 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 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 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 July 2020