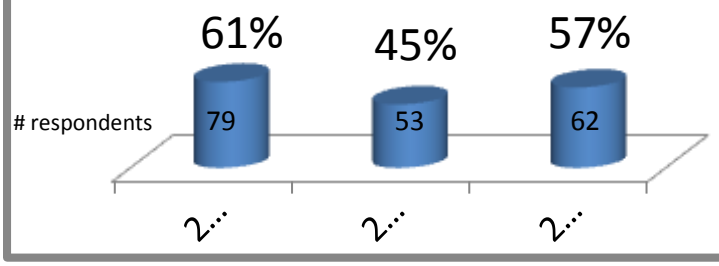
Analysis of PUB overwintering loss 2016 by Dewey M. Caron

The PUB association has had the heaviest winter losses (of the associations providing 20+ responses) in the last three years of the PUB supported electronic winter loss survey of OR Backyard, small-scale beekeepers (individuals with a maximum of 50 colonies). Losses this past year were at 57% well above the OR backyard beekeeper loss rate of 40%; average loss for the 3 survey years was 54%. See report at website: http://pnwhoneybeesurvey.com/survey-results/2015-16-survey-reports/individual-club-reports/

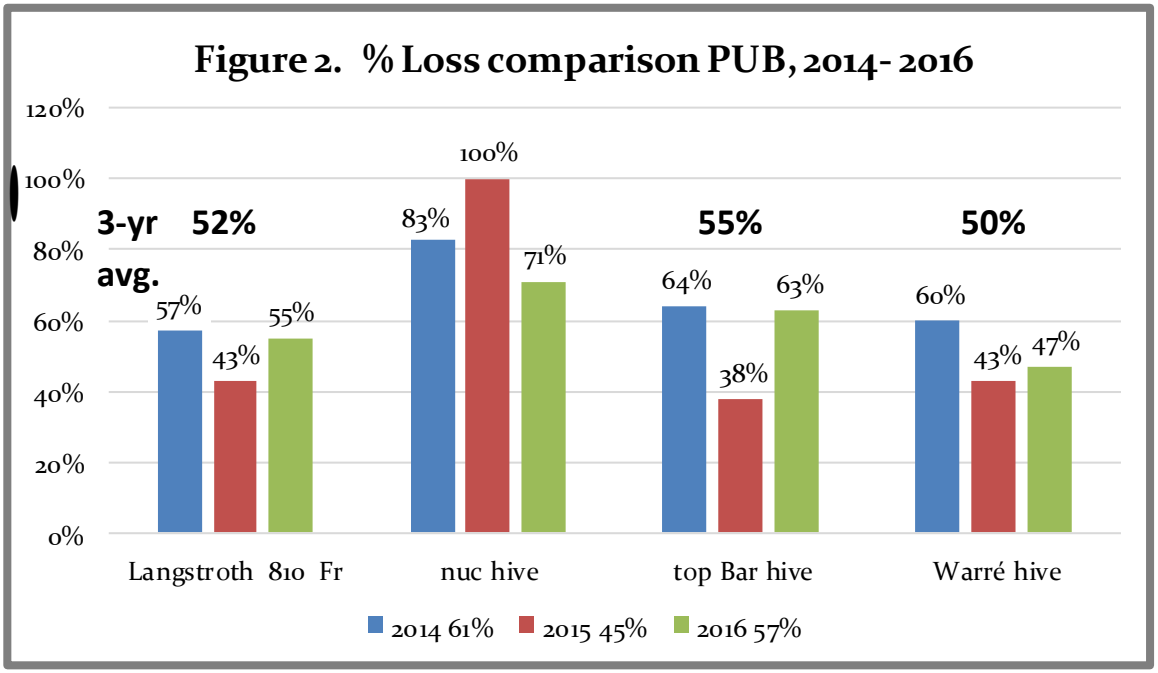
Data in Figure 1 shows the loss levels of last 3 years. In addition to heaviest loss levels, PUB response has been the greatest of all the clubs the past three years; 62 respondents this past year.

Figure 1. PUB overwinter losses 2014-2016



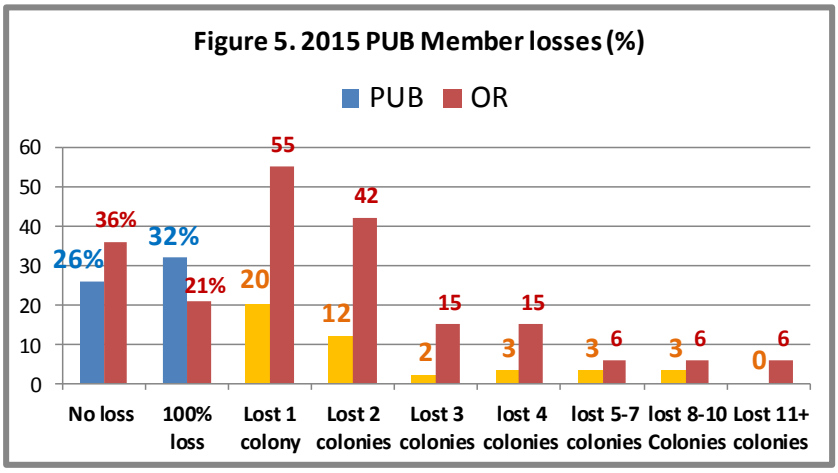
Iformation on loss is collected by asking fall and spring colonies by hive type. The data for the past three years is shown in Figure 2. Although the PUB group did account for over 50% of alternative hive use reported by OR beekeepers, it is clear heavy losses are not related to use of the Top Bar nor Warré hives. Three year averages are 52% loss for Langstroth hives (8 and 10 frame), 55% for Top bar hives and 50% for Warré hives. Loss of 5-frame nucs has been heavier (85%) but few numbers are included – 6 in 2015 and 7 in 2016.

Figure 2. % Loss comparison PUB, 2014- 2016



Three-quarters of PUB and statewide respondents keep 1, 2 or 3 colonies; the largest number was 23 in PUB and 43 statewide. PUB survey respondents reported a **range of beekeeping experience**. Sixteen individuals (31%) had 1 or 2 years of experience. Eight individuals (16%) had 7 years or more of bee experience, with the highest 15 years; statewide 5 individuals had 40 or more years of experience. Three years' experience was the greatest numeral response and the median. Years of experience was essentially the same as the statewide response.

Not everyone had loss. **Sixteen PUB individuals (26%) reported total winter survival** compared to 36% statewide; **a third of PUB members lost 100% of their colonies**, 11 percentage points higher than the OR statewide number. Seventy five percent (75%) lost 1 or 2 colonies, with heaviest loss 10 colonies (16 colonies was highest loss by any individual in OR). So small numbers of hives or few years of experience does not explain the heavier PUB losses.



The survey asked about some general management related to feeding, wintering and sanitation. Several common managements were offered (more than one option could be selected) and there was a line to include other managements not listed.

Among PUB members, 12 individuals, 9 of them keeping Top bar/Warré hives, checked they did no feeding; their loss level was 57%, slightly greater compared to the total PUB loss rate. For statewide, 24 individuals said they did not feed (includes the 12 PUB individuals) and their loss rate was 54%. The 12 PUB individuals represents 22% of total member responses; statewide response was 11% of total.

FEEDING PUB 2016	#	%
Corn syrup	0	0%
Frames of honey	15	18%
Liquid honey	4	5%
Dry pollen	1	1%
Frames of pollen	1	1%
Pollen patties	10	12%
Dry sugar	10	12%
Hard sugar/candy	1	1%
Drivert sugar	7	8%
Sugar syrup	34	41%
Other	0	0%

The PUB choice responses differed little from statewide except pollen patty (19% statewide) and hard sugar candy (10% statewide) were lower, while dry sugar feeding by PUB was a bit higher than statewide (12% vs 8% statewide). Looking at individual choices statewide, loss rates were not significantly different from overall (for example 38% loss for those feeding frames of honey, 42% loss for those feeders of sugar syrup; pollen feeding (all 3 forms) loss rate 39%). So feeding seemed to help survival but not to great extent.

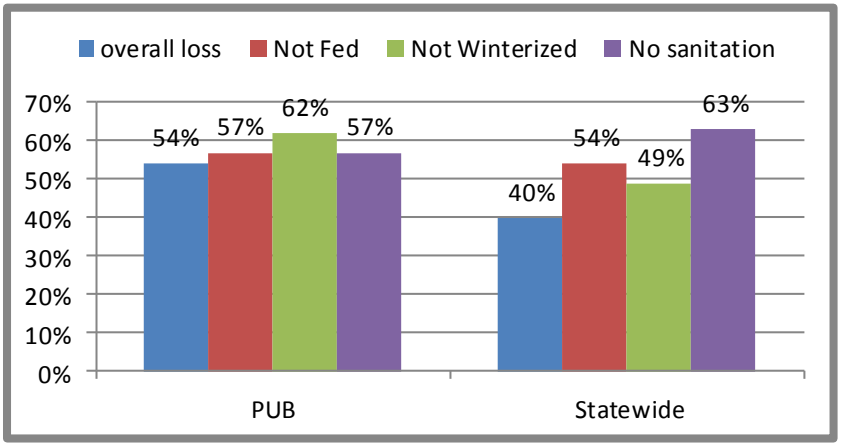
No wintering management choices, of the 7 options, were listed by 15 PUB members, half with Top bar or Warré hives (27% of total respondents) while 48 OR individuals (22% of total respondents) did likewise. The PUB loss rate for those not winterizing was 62% and statewide it was 49%. Responses were very similar, with PUB rain shelter use (28% slightly higher than statewide (22%) and ventilation/quilt box use slightly lower (24% PUB vs 29% statewide).

WINTERING PUB 2016	#	%
Equalized hive strength	4	5%
Insulated top used	4	5%
Rain shelter	23	28%
Upper entrance	12	14%
Ventilation/quilt box used	20	24%
Wind/weather protection	12	14%
Wrapped the hives/insulated	5	6%
Other	3	4%
	83	100%

The choices related to sanitation were similar. 19 PUB individuals (34% of total), 12 keeping top bar/Warré hives, checked nothing while 53 individuals (24%) did statewide. Loss rate for those checking nothing was 57% in PUB, 3 percentage points higher than overall loss and 63% for statewide, 23 percentage points higher than total. In PUB, the small cell/natural comb option was double (19% vs 9% statewide) and requeening with hygienic queens was lower (1% PUB vs 6% statewide.)

SANITATION PUB 2016	#	%
Alternative hive	4	5%
Apiary colony configuration	3	4%
Apiary site selection	4	5%
Brood cycle interruption	2	2%
Drone brood removal	3	4%
Minimal intervention	32	39%
Requeen with hygienic bees	1	1%
Small cell/Natural comb	12	15%
Other	2	2%
None (34% total)	19	23%
	82	100%

Graphically, as is evident, each management adds to a bit less loss; collectively they can make a minor difference and improved success.



In 2015-2016, 16 PUB members (29%) said they did not use a screen bottom board and had a loss rate of 44%, 10 percentage points below total PUB member loss rate; those using SBB on 100% of their hives had a 62% loss, higher than the total. Total Oregon beekeeper loss for those not using a screen bottom board was 37 individuals (17%) and their loss rate was 37%, 3 percentage points below the total loss. Those using SBB on 100% of their colonies also had a slightly reduced loss. A mixed message; SBB do not seem to improve overwintering success.

Examining sampling In 2015-2016, 32 PUB members (57% of total respondents) said they did not monitor compared to 39% of total OR beekeepers (including PUB) who said the same. PUB members who did not monitor had a 60% loss rate (compared to overall total of 57%) while the 85 total OR beekeepers who did not monitor had a 39% loss rate (compared to 40% total). The value of monitoring to reducing loss is not evident with these survey results.

The response from PUB to question did you use any control was 19 individuals (35%) and for OR statewide 132 individuals (60%). Loss rate for PUB members not using a control was 38% a significant improvement over the total (54%) as was the case for statewide OR backyarders, 57% loss for those not using a control vs 40% base loss rate.

Questions on controls used for mite control were divided into 2 separate questions – non-chemical and chemical options. For a report see *Varroa mite controls - What worked in 2016* on website http://pnwhoneybeesurvey.com/survey-results/2015-16-survey-reports/

First non-chemical control use vs non-use. 25 PUB respondent individuals, almost ½ of total did not check any alternatives – they had a 57% loss; those who checked at least one selection had a 52% loss. Comparison to total sample of 219 OR beekeepers - 62 individuals did not select any choices (just over ¼ of total) reported a 51% loss; those who did select at least one alternative had a 34% loss.

Among PUB individuals (compared to total OR beekeepers) there was higher selection of small cell/natural comb (16% PUB vs 5% statewide) and minimal hive intervention (PUB 26% PUB vs 18% statewide). Those individual PUB members selecting these two selections had losses above the overall base loss of 54% (60% for small cell/natural comb and 63% for minimal hive intervention) as did those in the entire OR database. Those OR beekeepers doing drone brood removal, brood interruption and requeening with hygienic bees, all highly interventive (and lots of work), had the best survival rates.

Alternative Mite controls 2016	#	%
Apiary colony configuration	2	3%
Alternative hive	4	6%
Apiary site selection	2	3%
Screen bottom board	20	29%
Brood cycle interruption	3	4%
Bee sanitation measures	2	3%
Drone brood removal	4	6%
Minimal hive intervention	18	26%
Small cell/Natural comb	11	16%
Requeen with hygienic bees	1	1%
Other	1	1%

It is however in use of specific chemical tools where improved survivorship is most evident. 39 PUB respondents (70%) said they did not use any chemical controls. The loss level of those not using a chemical was 67% compared to 35% loss level of those 17 PUB individuals who did use a chemical; two used two chemicals, the remainder a single one. Only 19 choices were indicated as being utilized, 6 uses of MAQS (formic acid) and 4 each of Oxalic acid and Powdered sugar. The 6 PUB individuals who used Formic had a loss rate of 21%; the four using Oxalic had a 36% loss rate and the 4 using powdered sugar had a 50% loss rate.

PUB Chemical mite Controls 2016	#	%
ApiLife Var	2	11%
ApiGuard	2	11%
Apivar	1	5%
Formic Acid (MiteAway QuickStrips)	6	32%
Fluvalinate (including Apistan)	0	0%
HopGuard II	0	0%
Mineral oil	0	0%
Oxalic Acid	4	21%
Other herbal treatments	0	0%
Powdered sugar	4	21%

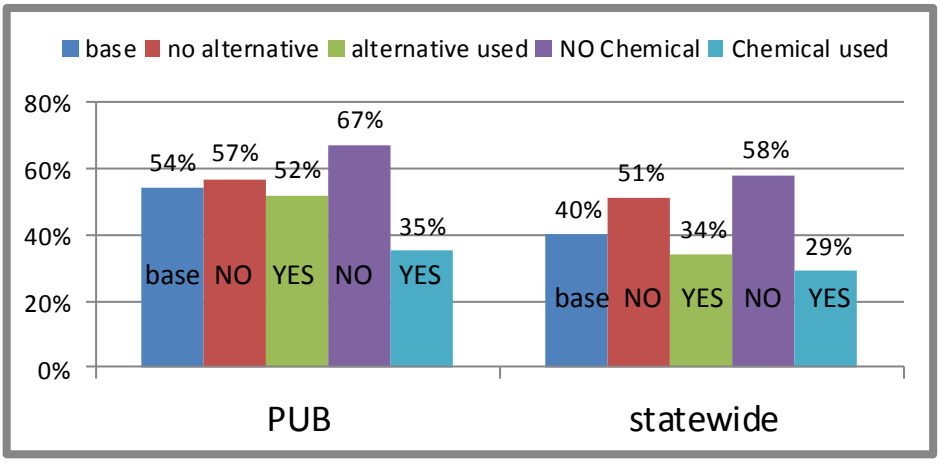
89 Oregon individuals (41%) said they did not use a chemical control; they reported a 58% loss rate compared to total base loss of 40%.

Examining chemical use by the larger 219 respondent OR beekeeper base. [Recall that the base loss level was 40%. As with other questions more than one choice could be selected], Apivar, the synthetic amitraz chemical, was used by 43 individuals and they had a much better survival rate with only a 23% loss rate. Twenty one individuals used ONLY Apivar, 15 used 2 chemical materials, 5 used 3 chemicals and 1 each used 4 & 5 chemicals. MAQS (Formic acid) was used by 42 individuals who also had significantly better survival rate with a lost rate also of 23%; among the 42 individuals, 17 used ONLY MAQS, 16 used 2 chemicals, 9 individuals used 3 and 1 each used 4 & 5 chemicals.

The essential oil Apiguard was used by 32 individuals and they had a 26% loss; 14 individuals used ONLY Apiguard, 10 used 2 chemicals, 7 used 3 and 1 used 5 chemicals Oxalic acid was used by 30 individuals; they had a loss rate of 35%. Seven of these individuals used ONLY Oxalic acid, 15 used 2 chemicals, 7 used 3 and 1 used 4. Powdered sugar was the chemical choice of 16 individuals; their loss rate was 29% of the 16 individuals, 7 used ONLY PS, 2 chemicals were used by 3 individuals and 4 used 5 chemicals.

It seems obvious that chemicals used for mite control can be the major factor in the heavier losses of PUB. Less than a 1/3rd of responding members used a chemical, compared to 3/5th of OR beekeepers. Any chemical, even powdered sugar, improved survival. See summary graphics for chemical control and associated loss rates in two graphs below.

Comparison of loss rate, overall to No alternative chemical, alternative used and No Chemical to Chemical used, PUB and Statewide, 2016



Comparison of loss rate, with various mite control chemicals PUB and Statewide, 2016. PUB numbers are (small) sample size.