2017-18 NH Winter Hive Loss Results

2017-18 Survey Executive Summary

- Survey covered the period from Oct 1, 2017-Mar 31, 2018

- Excellent Survey Response covering 377 Beekeepers, 170 towns, 1340 hives & 323 NUCs

- 2017-18 Winter Loss was ~58% for hives and ~49% for NUCs
  - 2016-17 Winter Hive Loss was 65% & 40% respectively

- Although sample size is small, the best survival rate (71%) was for hives that had
  - at least 1 varroa mite commercial treatment applied
  - a spring and fall treatment for Nosema

  Indicating that our high loss rates are most likely due to more than 1 issue

*As with any survey data, don't take the numbers as absolute fact – but an indication of the trends

Respondent's Club Affiliations

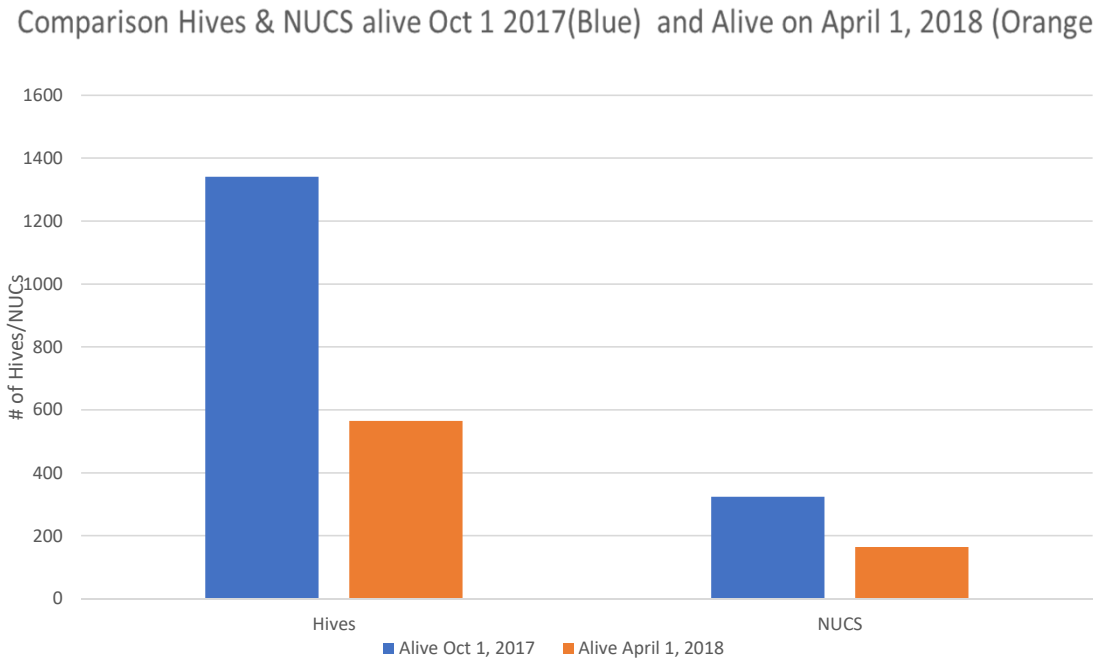
377 Respondents:

- 81 belong to NO Bee Club
- 276 belong to a NH "local" bee club
  - 68 belong to 1 Club + NHBA
  - 5 belong to 1 Club + another state/nat'l club
  - 170 belong to just 1 club & no other bee club affiliations
- 90 belong to NHBA & a NH Local club
- 9 belong only to NHBA

Club	Respondents
CABA	52
Seacoast	50
Pawtuckaway	47
Monadnock	38
KBA	36
MVBA	36
PBBA	34
Winni	20
North Country	16
CT River Valley	7

Club	Respondent
NHBA	99
EAS	3
ABF	3
VT Beekeepers	11
MA Beekeepers	4
ME Beekeepers	5

2017-18 Hive and NUC Winter Loss

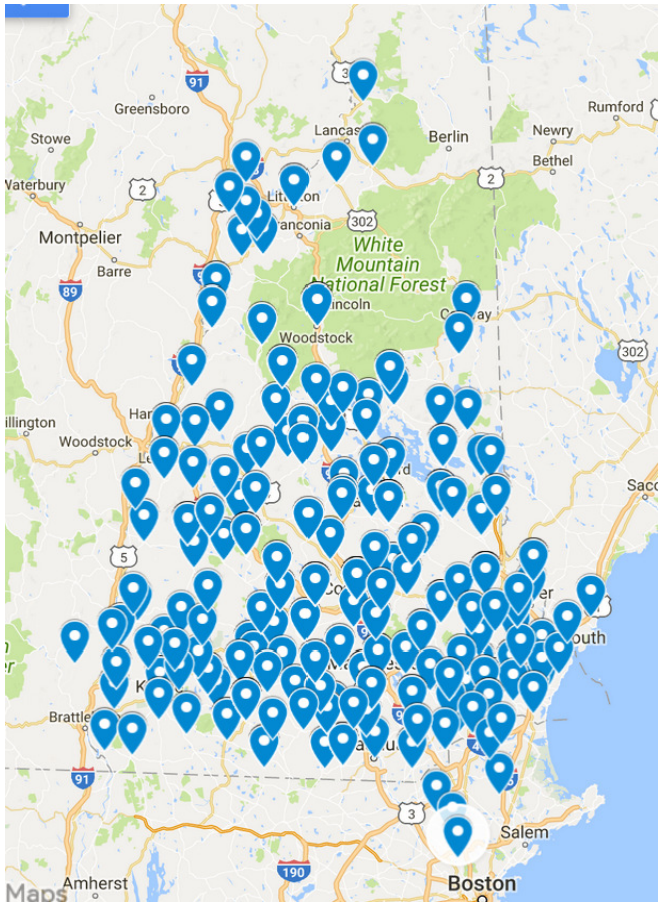


	# Hives	#NUCS
Alive Oct 1, 2017	1340	323
Alive April 1, 2018	564	164

2017-18 Winter Loss:
58% Hive & 49% NUC Loss

	Hive Loss	NUC Loss
2016 Loss	65%	40%
2017 Loss	58%	49%

Reported Hive and NUC Loss by County



Each pin represents
a town with at least 1 hive

	# Hives Reported	Hive Loss	# NUCs reported	NUC Loss
Coos	7	100%	1	100%
Merrimack	204	73%	6	100%
Rockingham	165	65%	17	82%
Hillsborough	199	57%	6	83%
Cheshire	158	55%	48	44%
Sullivan	184	53%	197	39%
Grafton	136	51%	92	43%
Carroll	94	49%	9	56%
Belknap	129	47%	28	43%
Strafford	81	38%	26	73%

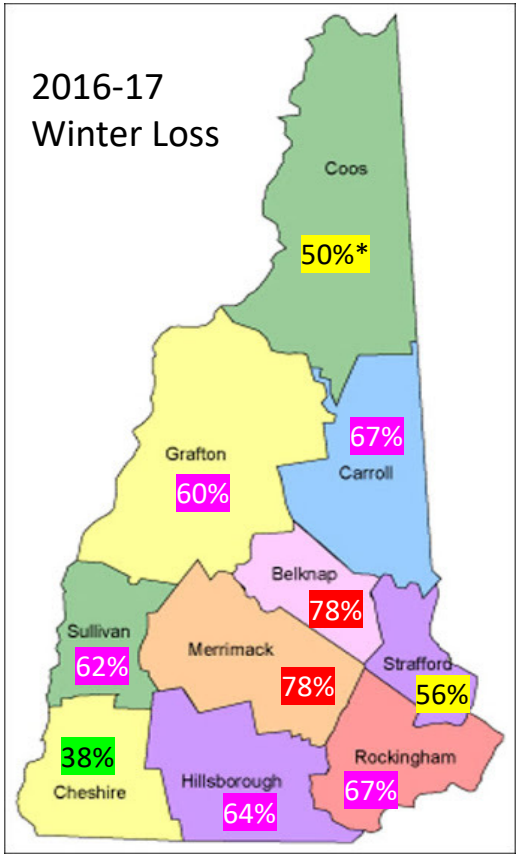
*MA: 49 hives (84% loss); VT: 8 hives (75% loss) ME: 3 hives (33% Loss)

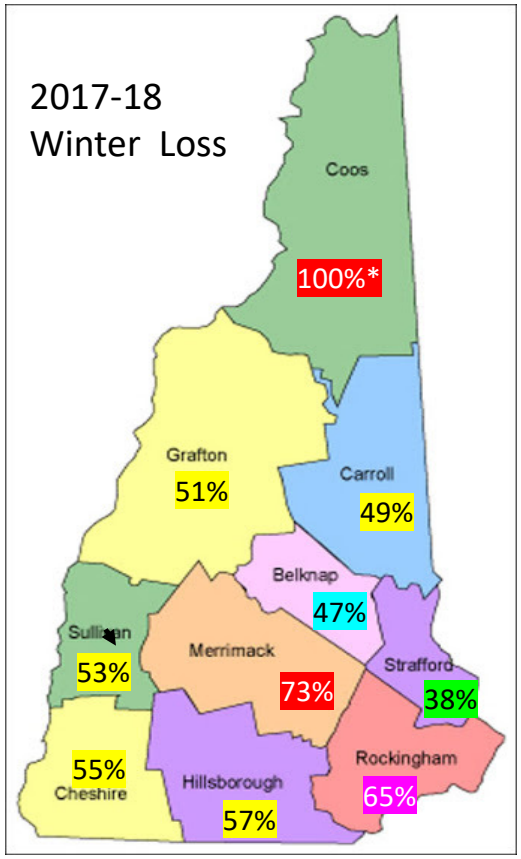
Hive Loss By County

	2017-18 Hives Reported	2017-18 Hive Loss	2016-17 Hives Reported	2016-17 Hive Loss
Coos	7	100%	4	50%
Merrimack	204	73%	194	78%
Rockingham	165	65%	134	67%
Hillsborough	199	57%	109	64%
Cheshire	158	55%	45	38%
Sullivan	184	53%	217	62%
Grafton	136	51%	93	60%
Carroll	94	49%	58	67%
Belknap	129	47%	49	78%
Strafford	81	38%	84	56%

- Belknap had the biggest change 78%→47% (2.5x larger sample)
- Hillsborough, Rockingham & Merrimack were similar year to year
- Cheshire's loss was 17% higher (3X+ larger sample)

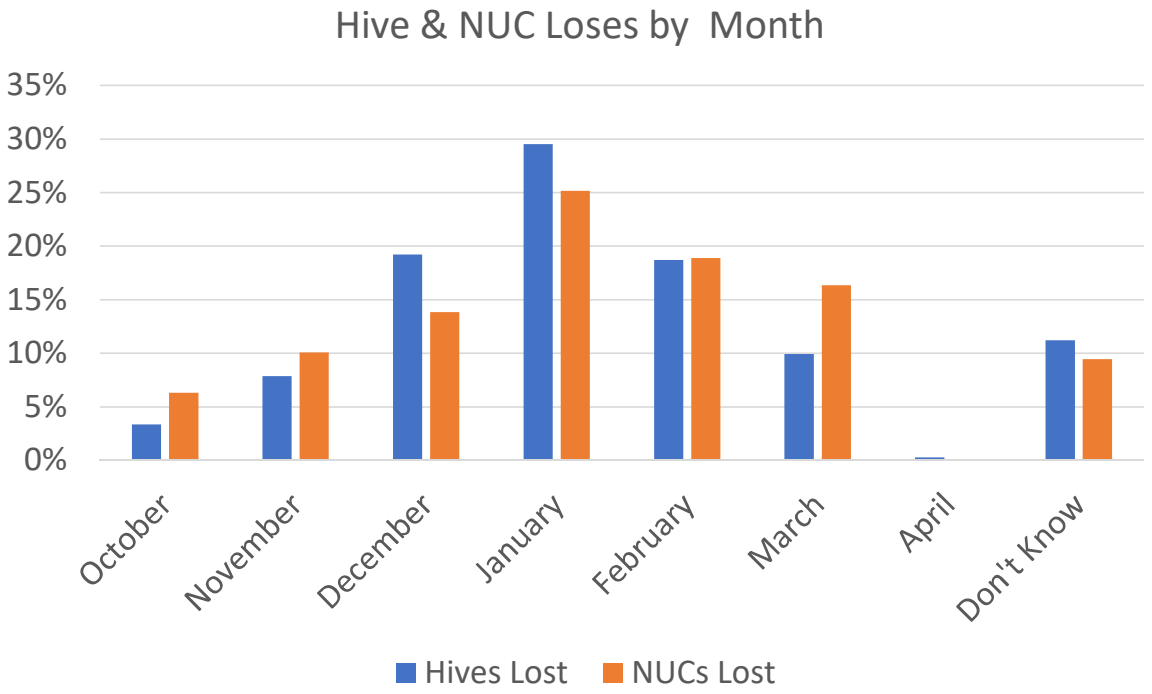
Unclear if the larger sample size may was a major contributing factor





*very small sample size

Hive and NUC Loss By Month

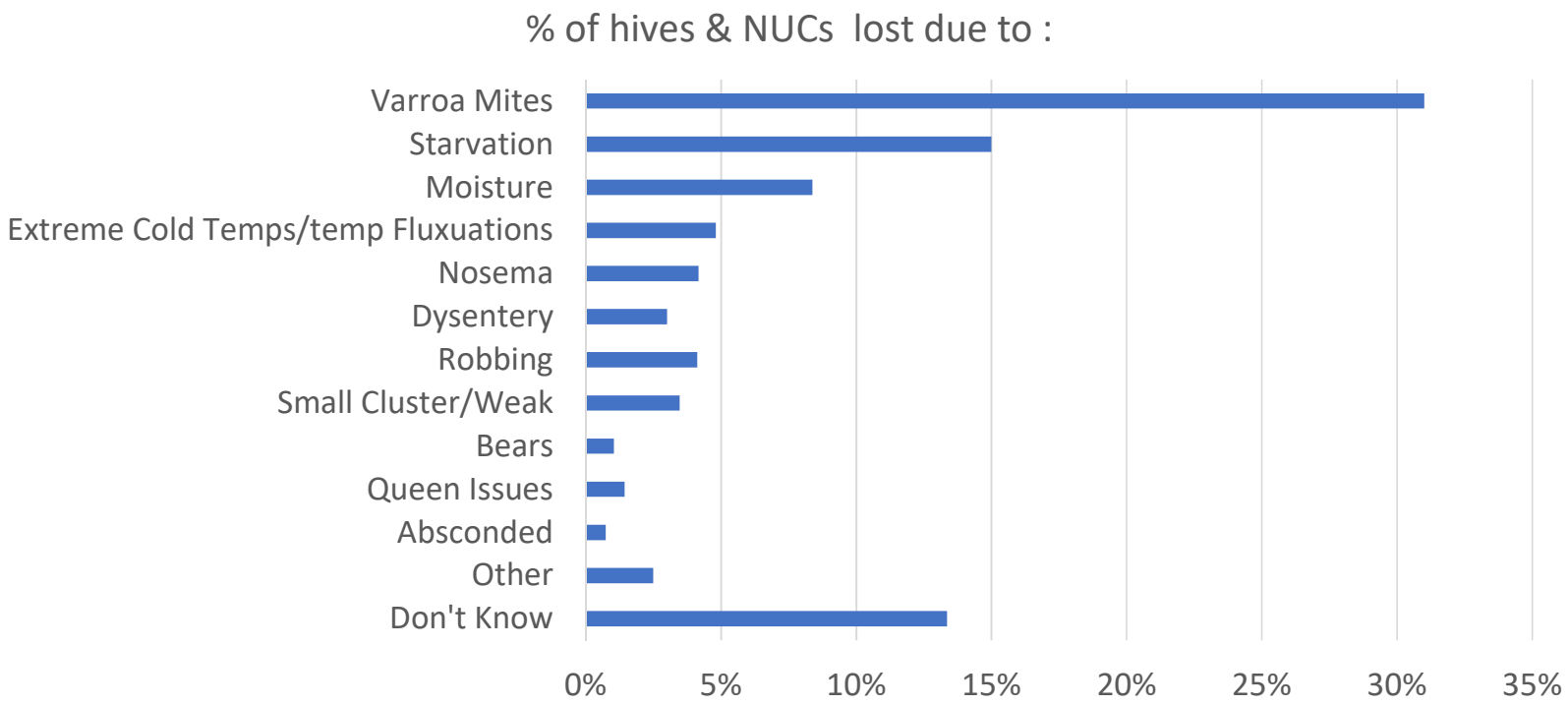


	# Hives Lost	# NUCs Lost
October	26	10
November	61	16
December	149	22
January	229	40
February	145	30
March	77	26
April	2	0
Don't Know	87	15

*note –When multiple months were listed for the loss in the apiary, the number of hives/NUCs lost was divided by the number of months listed & then applied equally to each month's

- Oct, Nov, Feb, Mar loss ~2-4% lower in 2017/18 than previous year
- Dec, Jan loss 8-9 % higher in 2017/18 than in previous year

Reported Cause of Loss



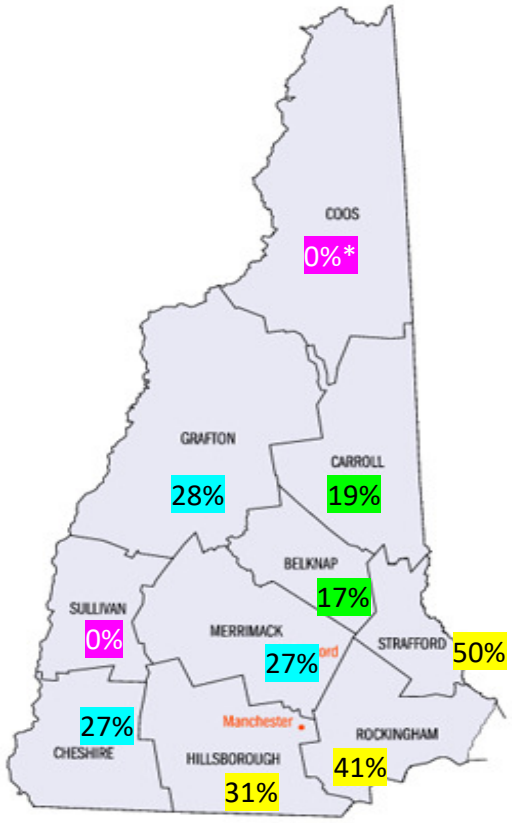
*note –When multiple causes were listed for the loss in the apiary, the number of hives+NUCs lost was divided by the number of causes listed & then applied equally to each cause

"Other": mice, flood, chalkbrood, wax moths, tree damage, pesticides

Yellow Jacket Robbing Issues

	% of hives that had yellow jacket robbing	# hives
Maine	100%	3
Strafford	50%	68
Rockingham	41%	145
Hillsborough	31%	173
Grafton	28%	117
Merrimack	27%	170
Cheshire	27%	130
Carroll	19%	90
Belknap	17%	92
Coos	0%*	5
Sullivan	0%	114
MA	0%	4
VT	0%	8

*Coos county 5 reported hives



Strafford, Rockingham & Hillsborough counties) had highest reported rates of yellow jacket robbing (30+%)

Lakes region (Carroll & Belknap) had low rates (17-19%)

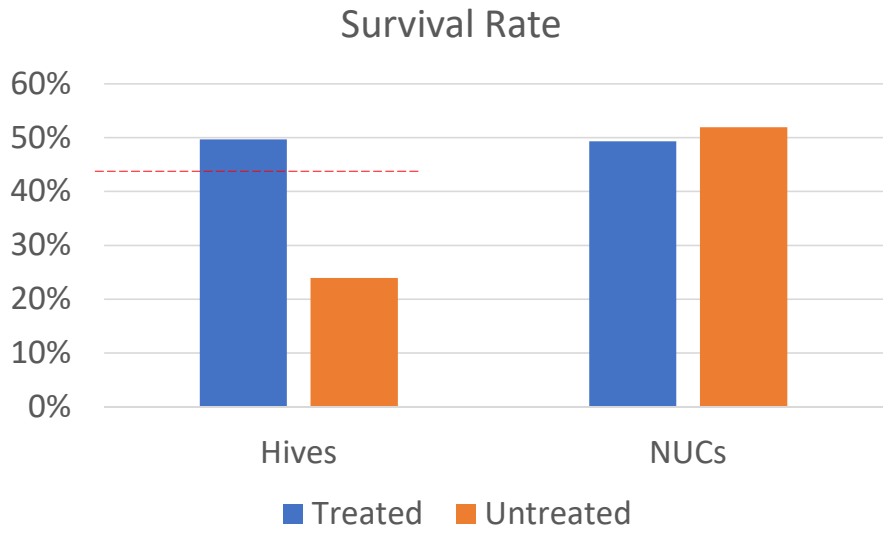
Sullivan county had no reports of yellow jacket robbing

reports cover 1119 hives

Next sets of graphs are SURVIVAL RATES

(Red dash line in graph indicates hive survival rate for state)

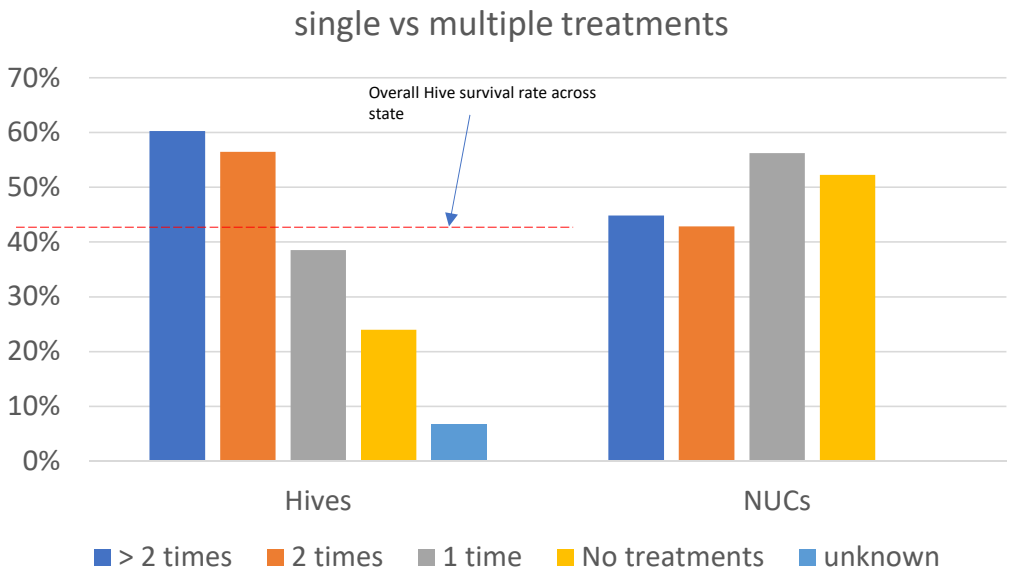
How does treating with commercial treatments affect survival rate?



	# Hives on 10/1	# NUCs On 10/1
Treated	947	143
Untreated	493	180

- Good Success overwintering NUCs
- Hives treated with commercial treatments had a 2X+ better survival rate.

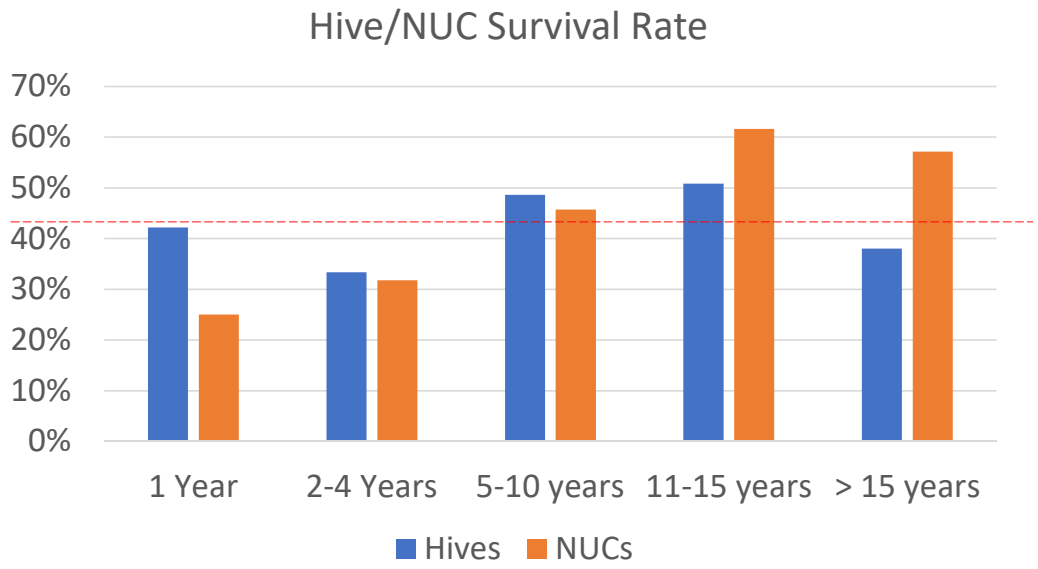
How does the number of times commercial treatments are used affect survival?



	# Hives On 10/1	# NUCs On 10/1
> 2 times	224	29
2 times	340	49
1 time	369	64
No treatments	392	180
unknown	15	1

Treating more than 1 time through the season increased survival rates . (consistent with 2016-17 data)

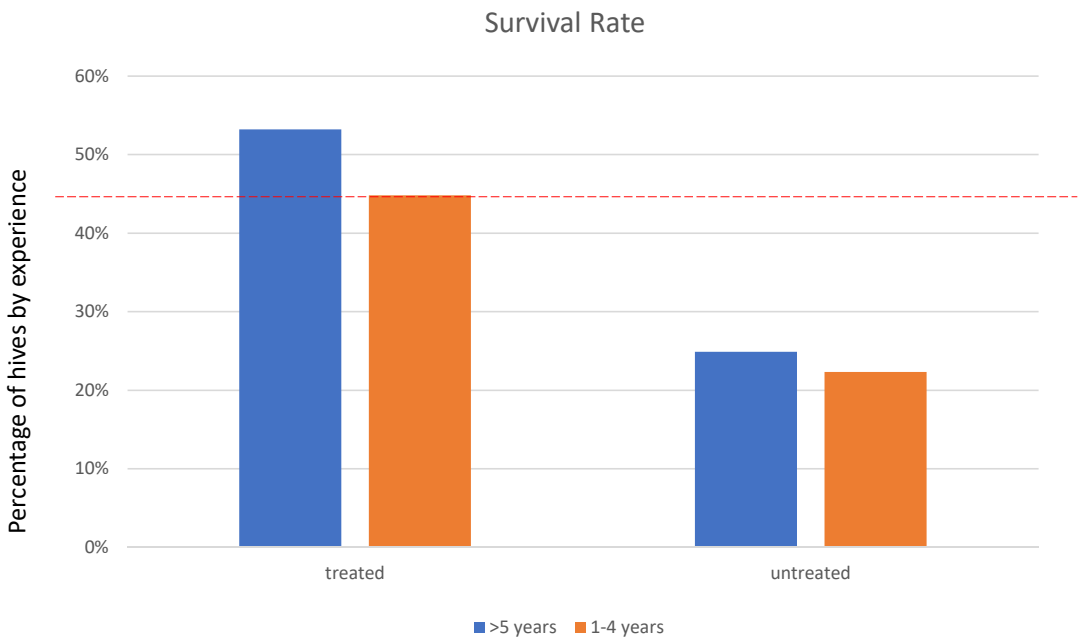
Does the Years of Experience Affect Survival Rate?



	# Hives On 10/1	# NUCs On 10/1
1 Year	159	12
2-4 Years	369	63
5-10 years	389	70
11-15 years	185	164
> 15 years	237	14

> 5 years experience seems to improve survival rate (consistent with 2016-17 data)

Is survival rate for > 5 years experience because they treat more often?



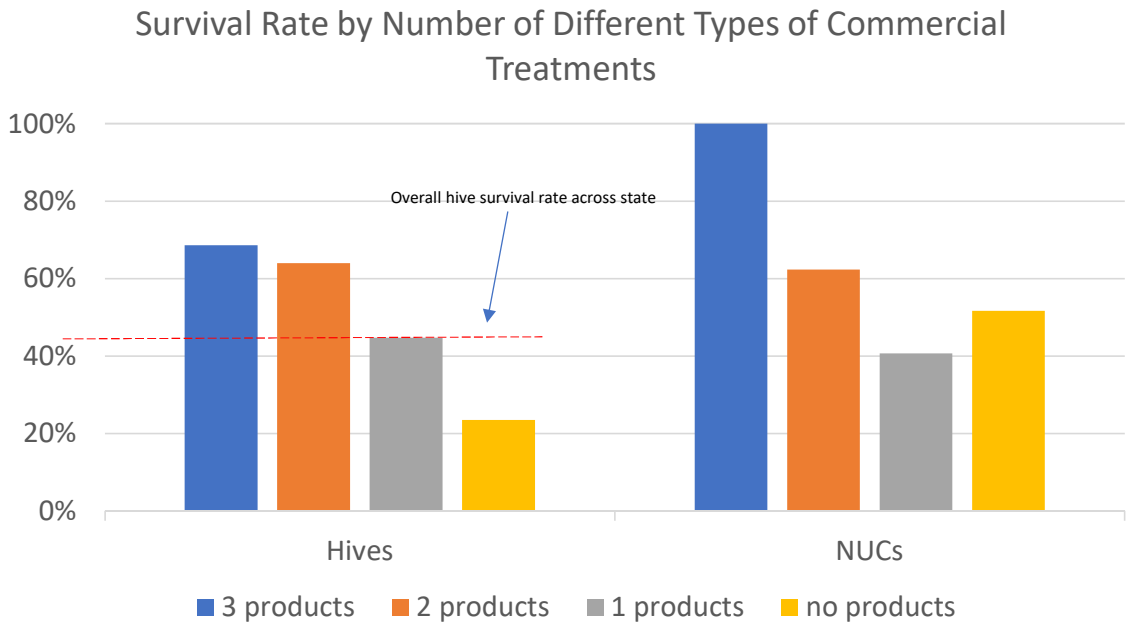
	# of hives for beekeepers with > 5 years experience	# of hives for beekeepers with 1-4 years experience
Treated	607 (75%)	326 (62%)
Didn't Treat	201	197

- 75% of the hives managed by beekeepers with > 5 years experience were treated with commercial products at least one

The reason beekeepers with > 5 years experience have better survival rates *could* be because:

- A higher percentage of their hives have been treated with commercial treatments (75 vs 63%)

Does the number of different commercial products affect survival?



	# Hives on 10/1	# NUCs on 10/1
3 products	35	2
2 products	211	53
1 product	698	86
0 product	396	182

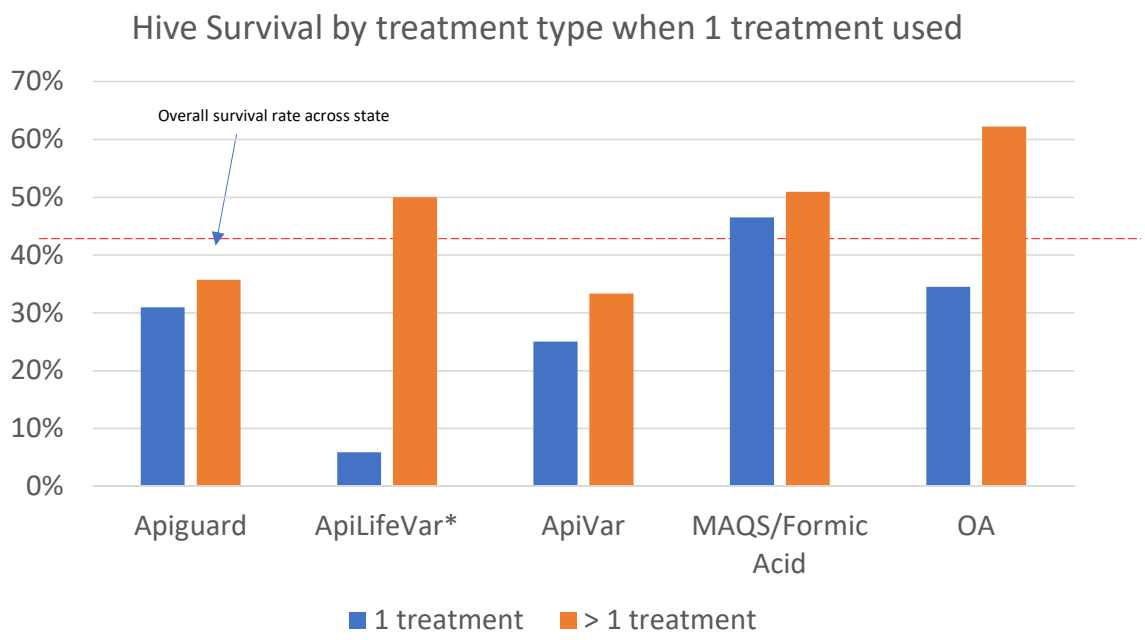
of the 246 hives and 55 NUCs that used > 1 product
206 hives & 33 NUCs were also treated > 1 time

	# of apiaries reporting
no products	156
1 product	212
2 products*	41
3 products*	7

*in 31 of these 48 cases OA was one Of the products used

Not sure we can draw too much from this info
Was it the # of treatments, # of products or both?

Does one commercial treatment help survival better than others?



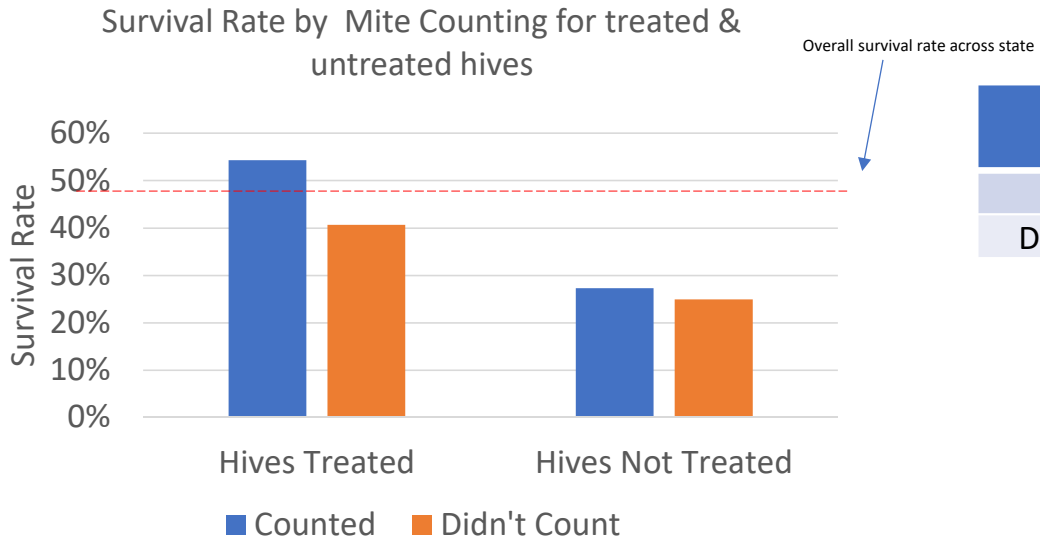
	# of hives on 10/1 that had 1 treatment of a single commercial product	# of hives on 10/1 that had > 1 treatment of a single commercial product
Apiguard	139	28
ApiLifeVar*	17	8
ApiStan	2	0
ApiVar	8	18
MAQS/Formic Acid	129	161
Hop Guard	0	5
OA	29	143
Total	**324**	**363**

*ApiLifeVar is a VERY small sample size

Unclear that a particular product improves survival rate – it is more likely the # of treatments through the year that had an effect.

Graph represents apiaries that were treated with only 1 type of commercial product during the year.
We did not include those apiaries that used multiple treatments because we don't know the split of treatments between surviving hives when multiple products were used
- 687 hives were treated with only 1 commercial product

Was hive survival rate better because mites were counted and hives were treated with commercial treatments?

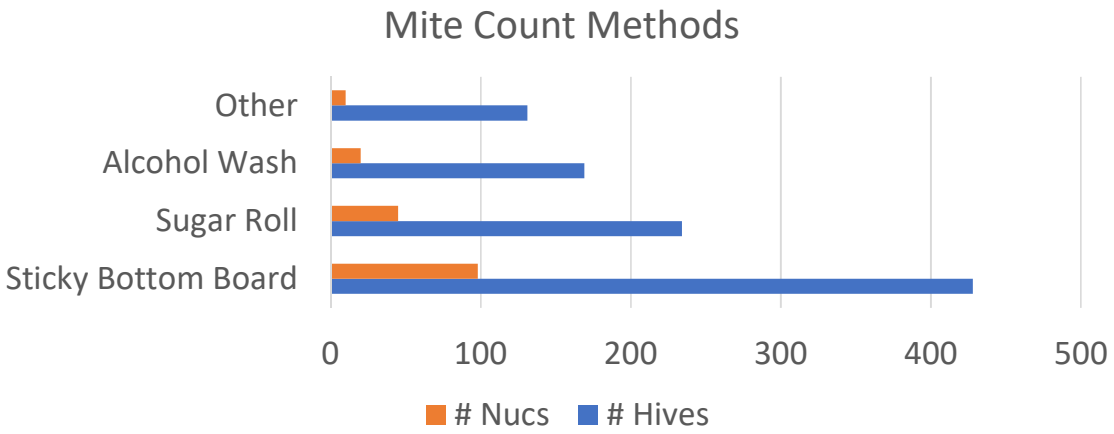


	# Hives Treated by 10/1	# Untreated Hives by 10/1
Counted	654	121
Didn't Count	214	205

- 14% of hives that had mite counting reported were not treated with commercial treatments
- ~50% of the hives that didn't do might counting were treated with commercial treatments

Survival Rates appear to improve when both commercial treatments were used & mite counting was done

What mite count methods were most common?



	# apiaries reporting
4 methods	1
3 methods	4
2 methods	31
1 methods	166
Didn't Count	141

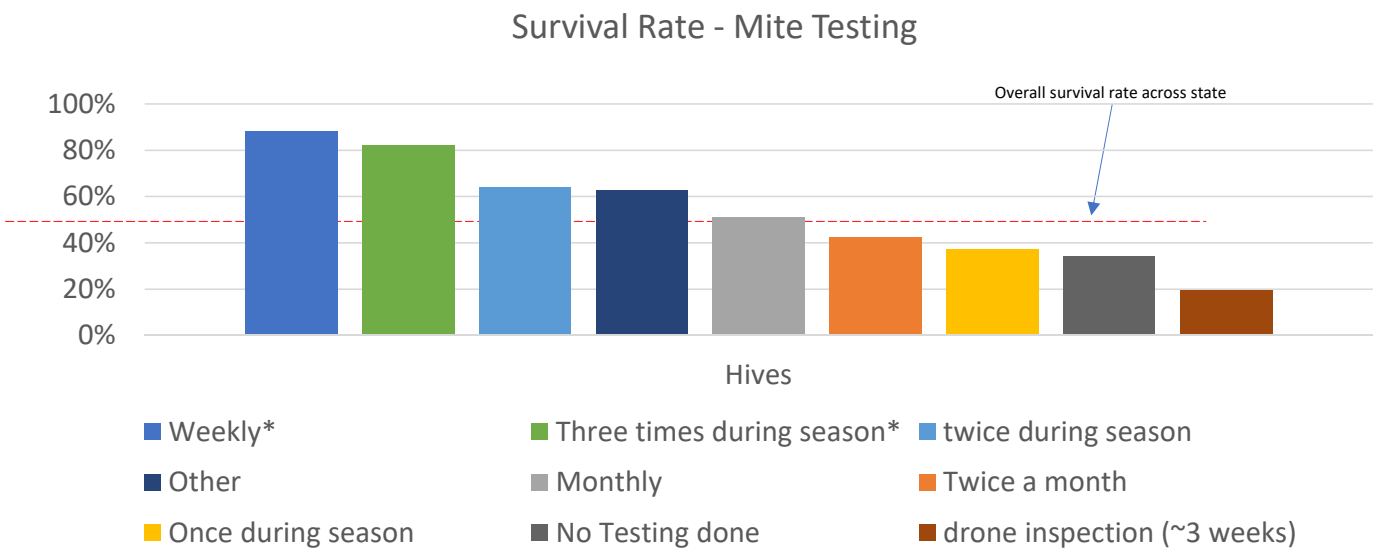
Other methods:

- Drone brood observation (most common “other” - Need to add this as an option in the future)
- Various methods of visual inspection of bees and brood. Including:
  - Took pictures of bees on frames, then enlarged them for observation.
  - Looked at dead bees left in the hive
- Easy Check - windshield washing fluid

*Several comments about being unhappy with the results of the sugar roll method

Sticky Bottom Board was the most common mite counting method

Survival rate based on the frequency of mite testing



	# Hives on 10/1
Weekly	17
Twice a month	66
Monthly	234
Once during season	190
twice during season	125
Three times during season	17
Other	67
drone inspection (~3 weeks)	76
No Testing done	384
Total	**1176**

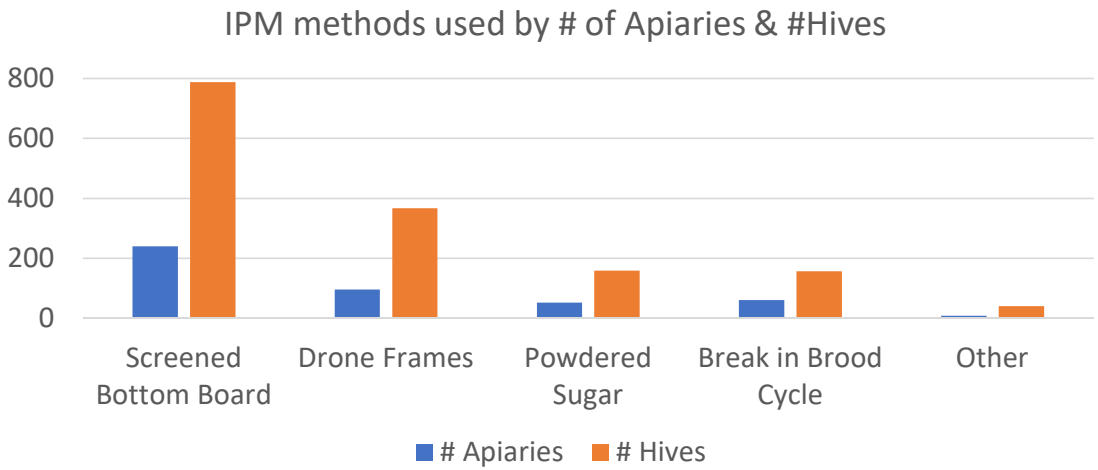
Weekly & three times a week are small sample sizes so their survival rate may be a little misleading

Notes:

- This graph is TESTING ONLY. It doesn't include whether the hives were treated
- "No Testing Done" includes those who didn't treat
- Other includes: bi-weekly and testing after mite treatments

Drone inspection doesn't seem as effective in knowing when to treat

What IPM Methods were used?



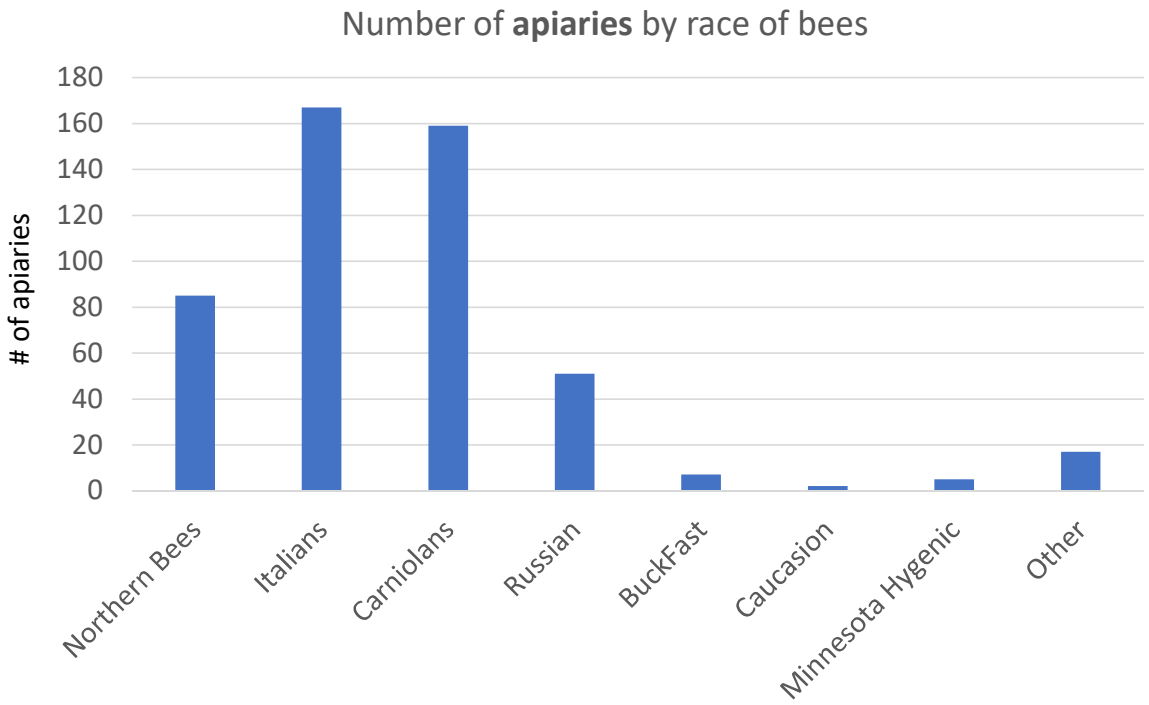
	# Apiaries	# Hives
Screened Bottom Board	239	787
Drone Frames	95	366
Powdered Sugar	51	158
Break in Brood Cycle	60	156
Other	7	39

- **Screen Bottom board is the most common IPM method used.**
- **Many apiaries use multiple IPM methods**
- "Other" responses:
  - Mineral oil (4)
  - Reduce drawn frames with lots of drones on them
  - Cut out drone brood
  - Bee gym
  - Thyme introduced into feed
- 5 comments that they didn't know what IPM is or didn't understand the question

# of ipm methods used in apiary	Apiaries	Hives
4	5	37
3	39	128
2	76	277
1	164	596
0	2	4
Unknown	129	297

Bee Races

What kinds of bees do our apiaries have?



416 Apiaries

- 201 have 1 race of bees
- 96 have 2 races
- 25 have 3 races
- 5 have 4 races
- 1 has 5 races

*northern is defined as a hive with a northern mated queen

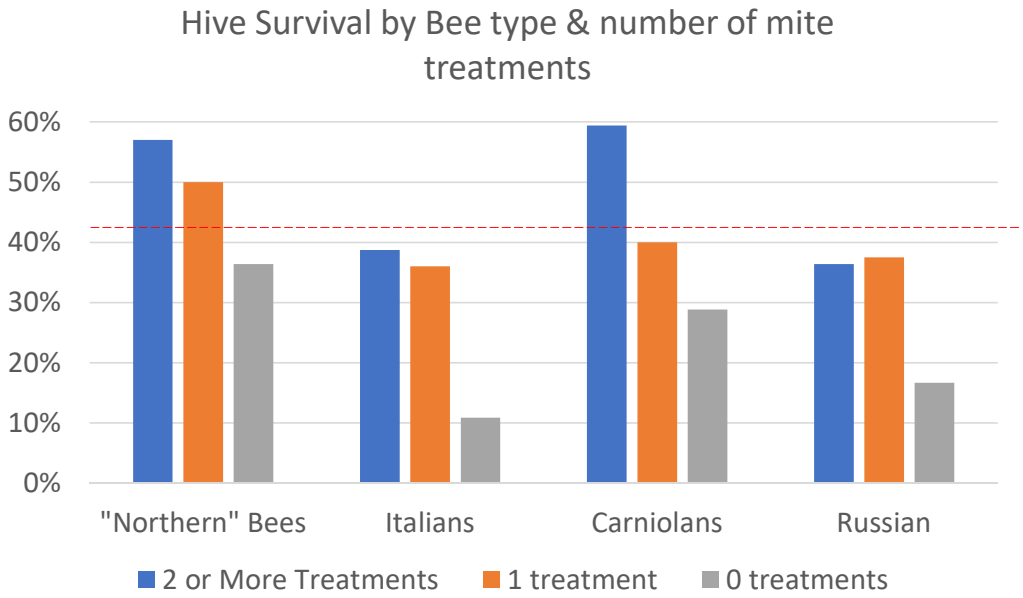
Does the “race” of bees affect survival rate?

- To answer this question -
  - **Only used data from apiaries that reported only 1 race of bees (201 apiaries of 417)**
    - For apiaries with multiple races, our data was not fine grain enough to understand which races survived and which didn’t

- 519 hives & 61 NUCs represented

- NUC Sample size is small so only the hive data is presented

How does the race of bees combined with number of mite treatment affect survival?



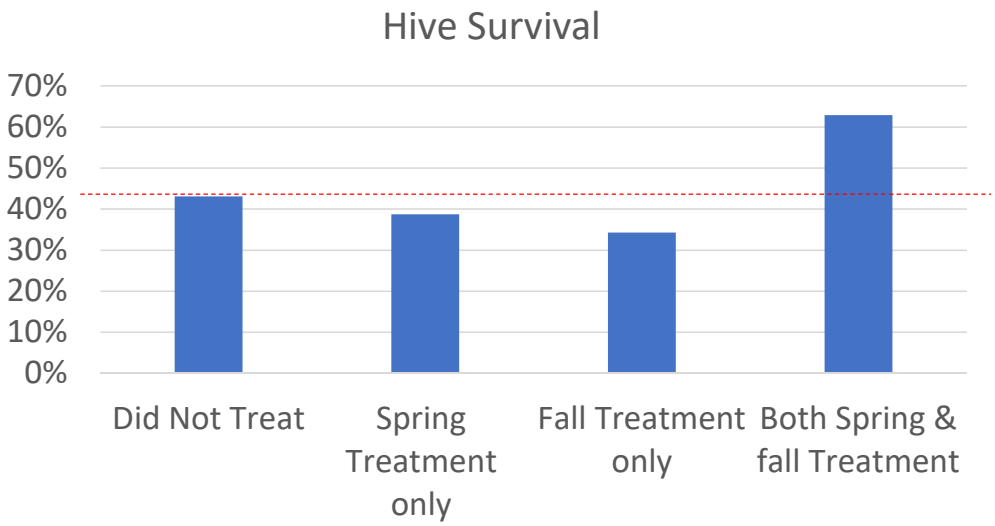
	"Northern" Bees	Italians	Carniolans	Russian
2 or More Treatments	107	62	64	11
1 treatment	12	75	30	8
0 treatments	11	46	59	12

Sample size is small, but still some interesting observations:

- 2 or more treatments helped all races – Helped Carni & Northern the most
- 1 treatment helped Italians the most
- 0 treatments; Northerns had best survival – but still low; Italians & Russians had very low survival (Note Russian has a small sample size)

Nosema Treatments

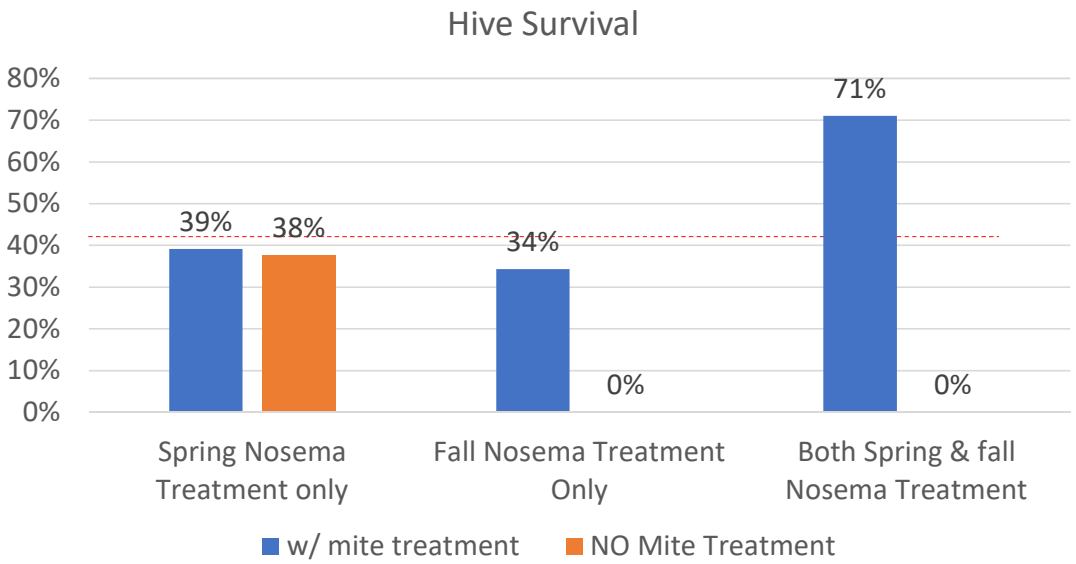
Did Nosema treatment affect survival?



	# of Hives on 10/1
Did Not Treat	947
Spring Treatment only	62
Fall Treatment only	73
Spring & fall Treatment	105

~ 20% of the reported hives were treated for Nosema (above data is a small sample size)
Doing both spring & fall nosema treatments appears to help survival rates

Overlaying mite treatment with Nosema treatment



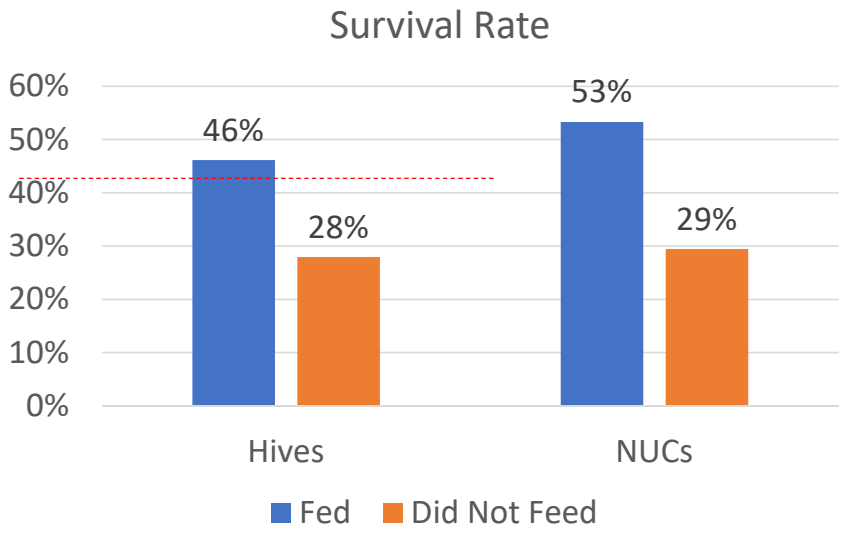
	# hives on 10/1 that had a varroa & Nosema Treatment	# hives on 10/1 that had only Nosema Treatment
Spring Treatment only	46	16
Fall Treatment only	52	21
Spring & fall Treatment	93	12

These are small sample sizes, but:

- Treating for Nosema in Spring & Fall as well as at least 1 time for Mites significantly improved survival
- Interesting that hives with only a spring nosema treatment have the same survival rate

Feeding (Fall, Winter & Protein Supplements)

Did fall feeding help survival rate?



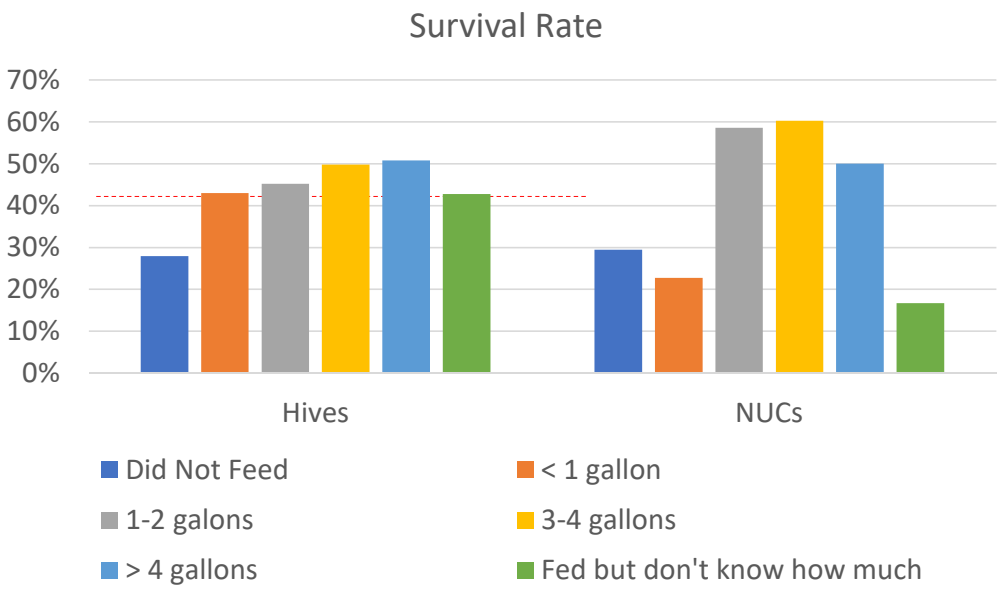
	# Hives on 10/1	# NUCs on 10/1
Fed	1058	289
Did Not Feed	258	34

Fall feeding in 2017 appeared to help survival rate
*consistent with 2016 findings

Comments given:

- Loose sugar offered in late fall and honey (0% survival)
- Fed but they prefer nectar and pollen from the gardens so I threw a lot away. (75% survival rate)
- The live hive took more syrup. The hive that died had lots of stores.
- Put it out but none was taken (0% survival – nosema & robbing listed as an expected cause of death)

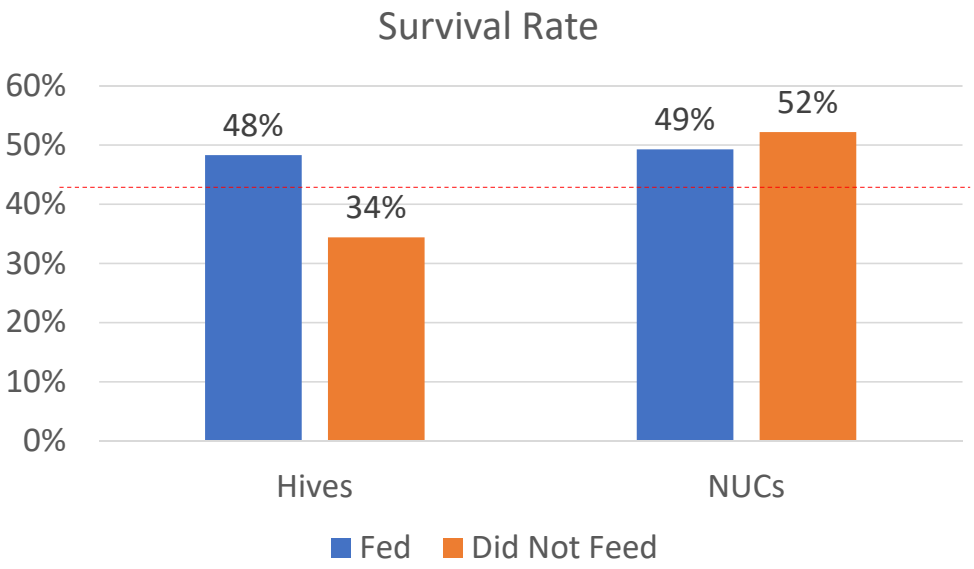
Did the amount of sugar syrup fed affect survival rate?



	# Hives on 10/1	# NUCs on 10/1
Did Not Feed	258	34
< 1 gallon	135	22
1-2 gallons	456	123
3-4 gallons	195	108
> 4 gallons	134	18
Fed but don't know how much	138	18

Not feeding in 2017 shows significant loss
*2016 showed losses if fed < 1 gallon

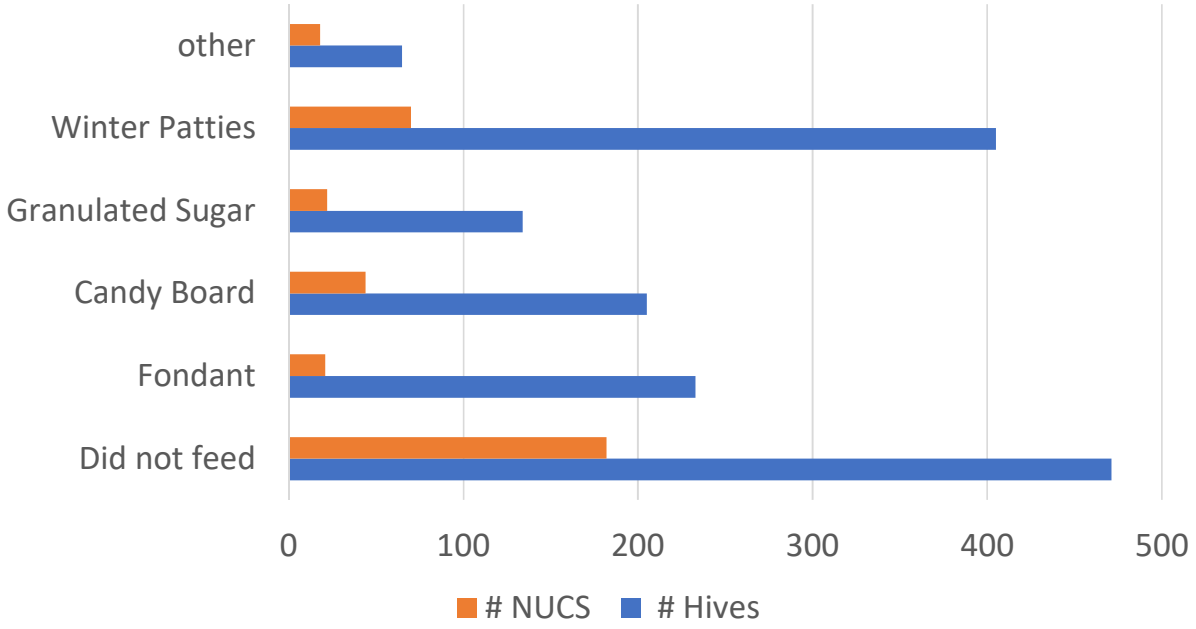
Did winter feeding help survival rate?



	# Hives on 10/1	# NUCs on 10/1
Fed	818	140
Did Not Feed	471	182

Feeding Hives (beyond their own stores) appears to have helped survival rate in 2017
*consistent with 2016 findings

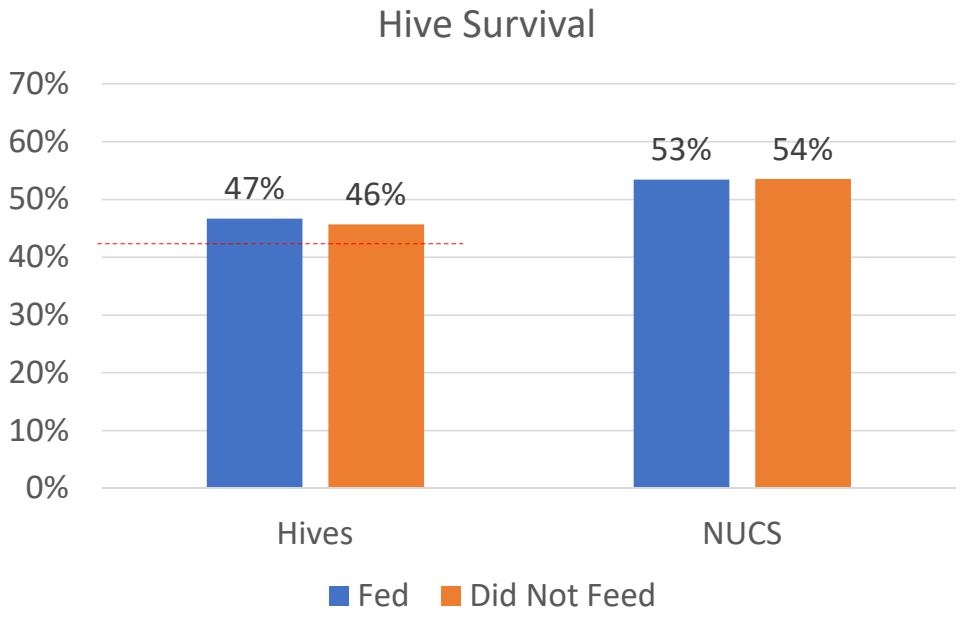
What types of winter feed was used?



	# Apiaries
1 Type of Feed	186
2 types of feed	58
3 types of feed	4

Other includes: sugar bricks & honey added from other sources (not the hives own stores)
Does NOT include pollen patties or a hives own stores

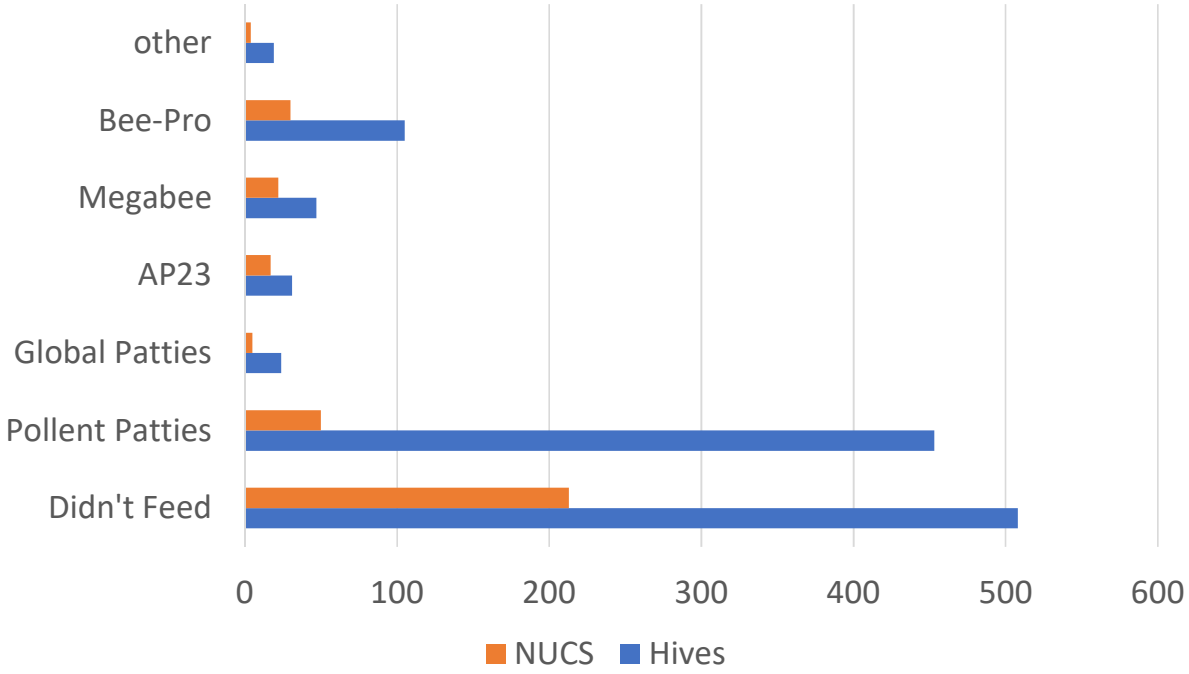
Does feeding protein supplements help survival?



	# Hives on 10/1	# NUCs on 10/1
Fed	598	88
Did Not Feed	508	213

Feeding protein supplements doesn't appear to help the 2017-18 survival rate?
*Does this indicate they had enough pollen stored?
Results maybe different if we broke down the data by regions

What types of protein supplements were used?

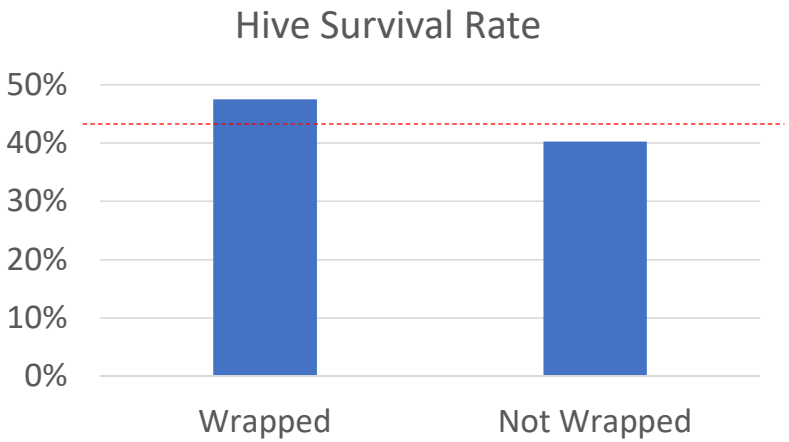


	# Apiaries
1 Type of Feed	170
2 types of feed	10
3 types of feed	2

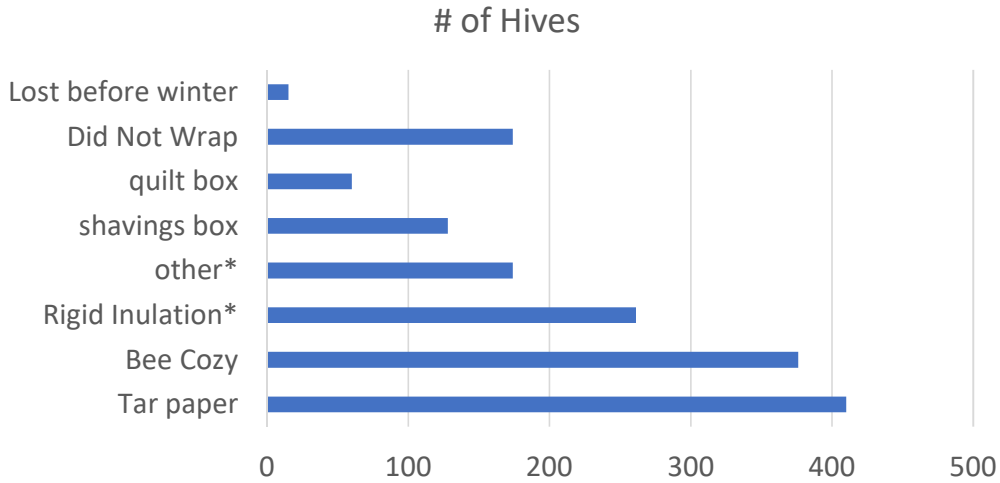
Of the apiaries that fed protein supplements, most used 1 type

Wrapping & Moisture Control

Wrapping Hives for Winter



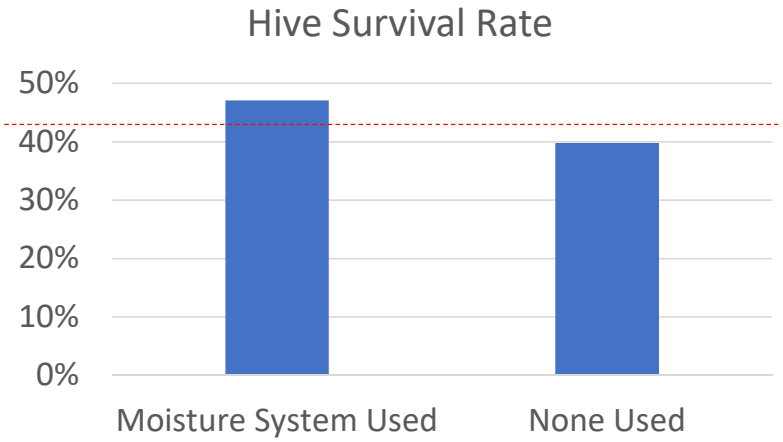
~80% of apiaries responded
- 944 hives wrapped
- 174 hives not wrapped



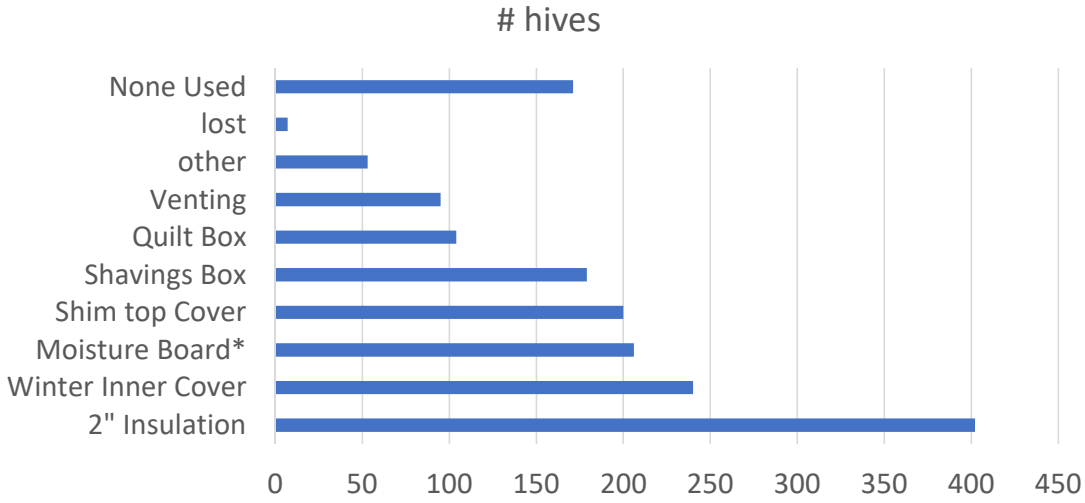
Many apiaries used more than 1 type of hive wrap/insulation
- Rigid insulation includes polystyrene, Styrofoam, foam board
- Other includes:
  - Black plastic, ty-par, Tyvek, tarps, landscape fabric
  - Various wind breaks
  - Apimaye plastic hives
  - Solar pool cover

85% of the reported hives were wrapped
Tar paper & Bee Cozies are the most common type of wrap.
Not clear that wrapping significantly improved survival

Winter Moisture Control



~79% of apiaries responded
- 952 hives used moisture control
- 171 hives did NOT use moisture control

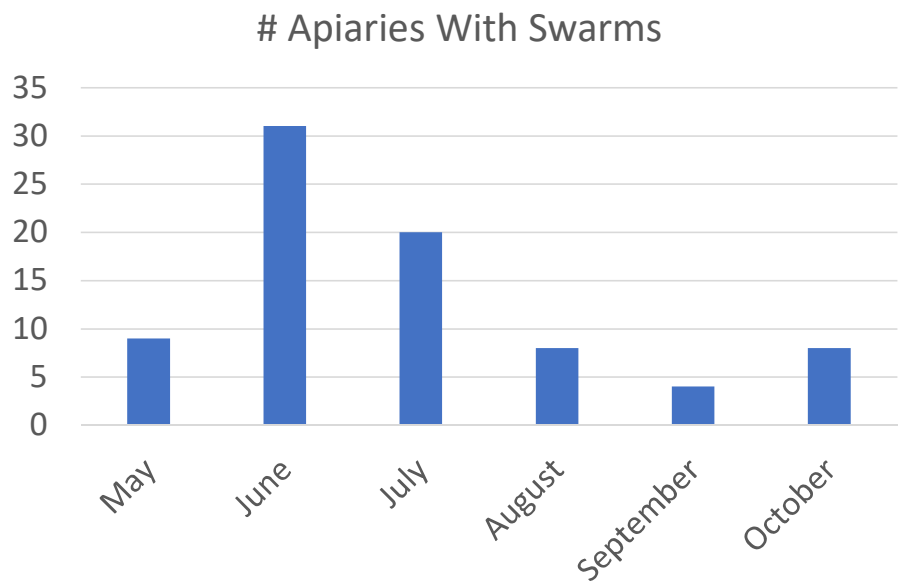


Many apiaries used more than 1 type of moisture control system
- Moisture board includes homasote, sound insulation
- Venting includes vent holes & open screen boards
- Other includes:
  - Wool, pine needles,
- Funniest response: “Wrapped in Florida Sunshine”

~85% of the reported hives used a moisture system
*It could be more because we didn’t include “venting” as an answer choice)
Insulation under outer cover is the most common Moisture control

Swarming

Apiaries reporting swarms



73% of apiaries answered this question
- 71 apiaries reported swarms (23%)
- 234 apiaries (720 hives) did not have swarms

We do not have granular enough data to tie swarming to survival rate

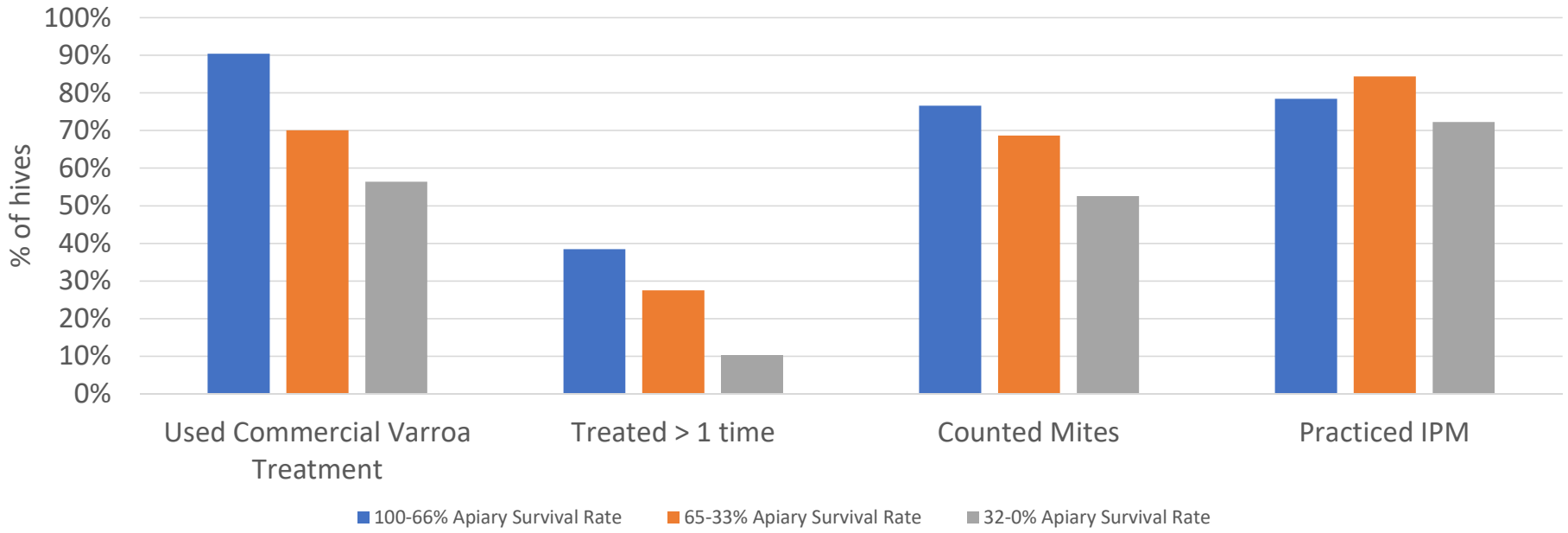
23% of the apiaries reported swarms

Big Picture: Can we determine "best management" practices from those apiaries that had high survival rate?

Methodology:

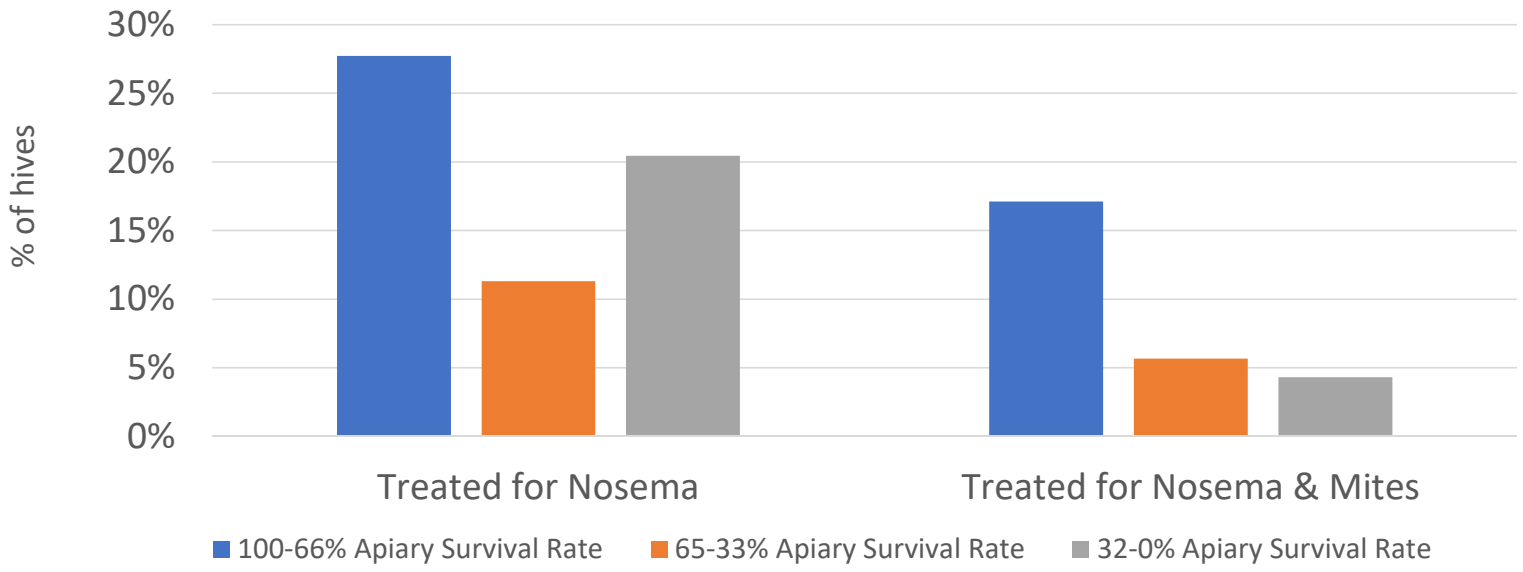
- Divided the apiaries in 3 groups: 0-32% survival; 33-65% survival & 66-100% survival
  - Hive breakdown in these groups was :
    - 0-32% survival: ~40% of hives
    - 33-65% survival: ~28% of hives
    - 66-100% survival: ~32% of hives
- For each major category, report what percentage of the hives were managed using a specific technique:
  - Ex: Report the percentage of the hives in each of the 3 categories that used commercial varroa treatments.
  - Assumption: all hives in an apiary were managed the same way.

Big Picture: Varroa Management



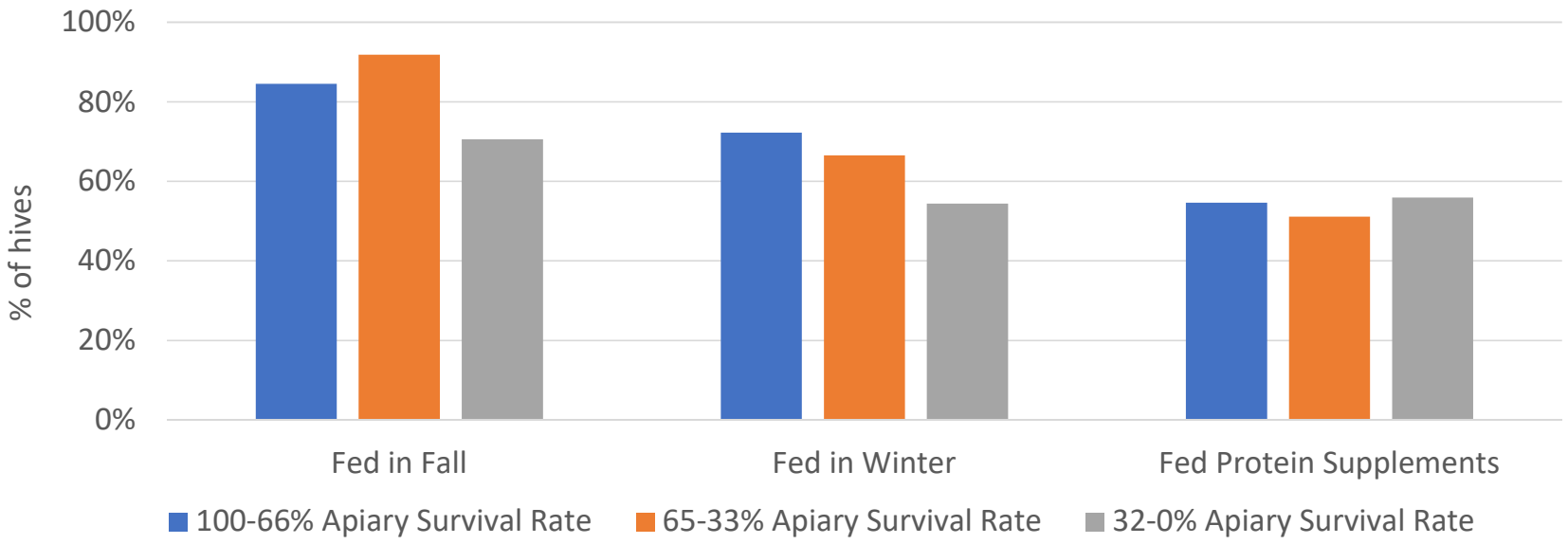
Hives in Apiaries with the best survival rates used a commercial varroa treatment at least one time
Just under 40% of those hives were treated multiple times during the season.

Big Picture: Nosema Management



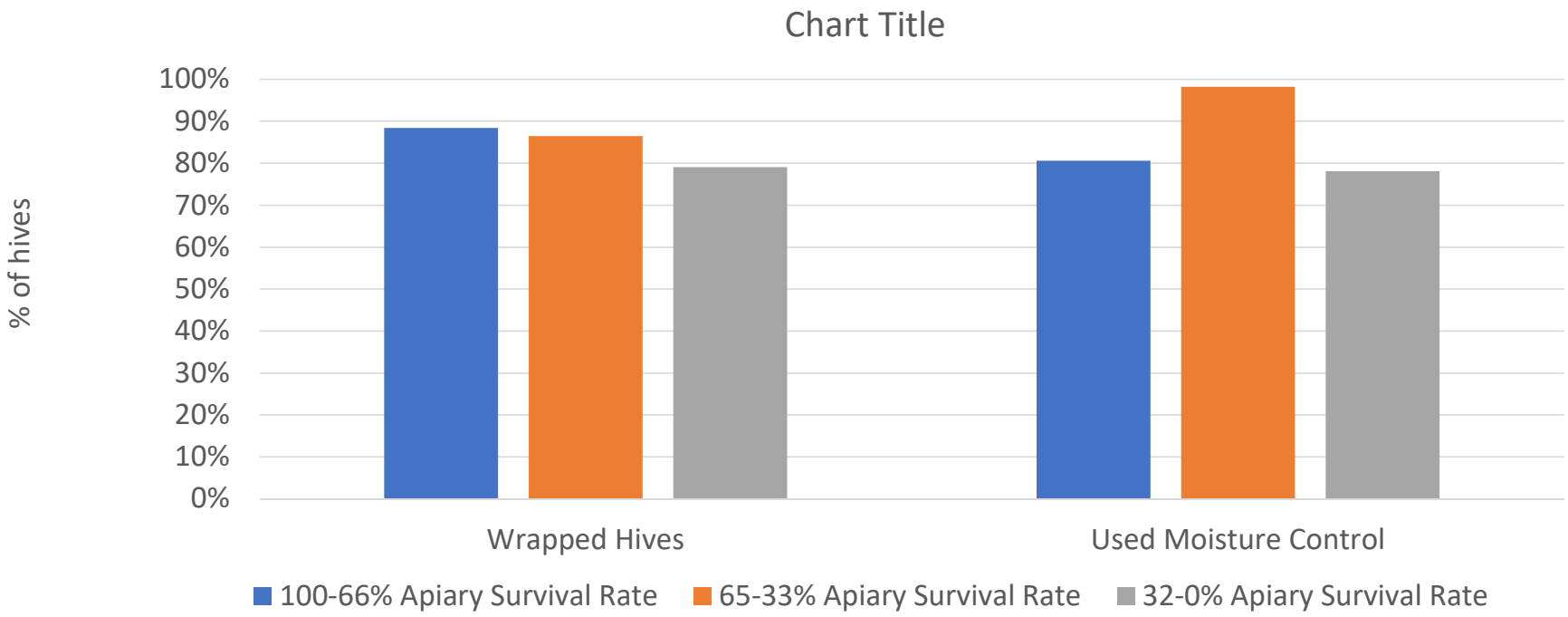
Hives in apiaries that treated for Nosema & mites had a better survival rate than those that didn't

Feed Management



Feeding Protein supplements didn't seem to affect survival rate
The higher survival groups has slightly higher percentages of winter & fall feeding
Since feeding needs are so hive & region specific, in the future should look at data more regionally

Big Picture: Winter wrapping & moisture control systems



Little difference in winter wrapping & moisture control systems between groups
Most Apiaries wrap & use moisture control
In the future should look at data more regionally to see if there is more impact

2016-17 Hive Loss Survey Summary

- 2017-18 Winter Survey data indicates:
  - 58% Hive Loss & 49% NUC Loss
  - Best survival rates were for those that used Commercial Varroa Treatments and Spring & Fall Nosema treatments
  - Yellow Jacket Robbing was more of an issue in the seacoast areas than elsewhere
- We need to look at combination of management practices to understand what are the most successful in NH.
  - There is much more analysis that can be done with the data we've collected.
- We need to continue to collect multiple years of data to really understand trends

2017-1 Hive Loss Survey Recommendations & Request for Approval

- Work with our UNH coop extension colleagues using this data to continue :
  - Support grant applications to further beekeeper education.
  - Help shape the 2nd & 3rd year of the SARE Grant
  - Combine learnings from the Nosema testing to help better understand why we have such high losses
  - Draft a SARE grant proposal to use citizen & data science to further our understanding of the state of our honeybees in NH
- Make this summary data public on our website
  - Present data at club meetings if the clubs are interested.
  - Email the summary (or a pointer to the info on the website) to :
    - All NHBA Membership
    - All participants that submitted information to the survey
  - Send paper copies of the summary to members who participated via postal mail.
- Run this survey annually
  - Research committee takes the lead on doing an annual survey – including taking input on how to improve data collection along with other data to be collected

Approved by NHBA board on 6/14/18

Background Information

Notes

- Hive & NUC Loss per month – If there was more than 1 month listed, I assume that the hives/NUCs were lost equally across the months.. Ex: If 2 hives were lost & 2 month were listed, I applied 1 hive loss in month1 and 1 hive loss in month 2
- For “survival by Type” graphs, I only used the data for apiaries with 1 race of bees, because I had no way to know the split of which hives survived and which died when there were multiple races reported in a given apiary.
- For “survival by treatment type” graphs, I only used the data for apiaries that used 1 type of commercial treatment because I had no way to know the split of what products were used on which surviving hives in a given apiary

Meeting Topic Feedback

Meeting Topic	% of respondents
Successful Over Wintering Techniques	76%
Diagnosing and Treating Hive Issues	60%
Varroa Management & Latest Research	58%
Creating Splits and NUCs	54%
How to Utilize Products From the Hive to Make Candles, Lotions, etc	22%
Other (See below)	10%

Other" topics: (I grouped similar responses together – the number in () indicates how many similar responses)

- Keep it technical

Queens

How are queen bees reared in NH Fairing?

Rearing/breeding (9)

Habitat:

Pollinator gardens

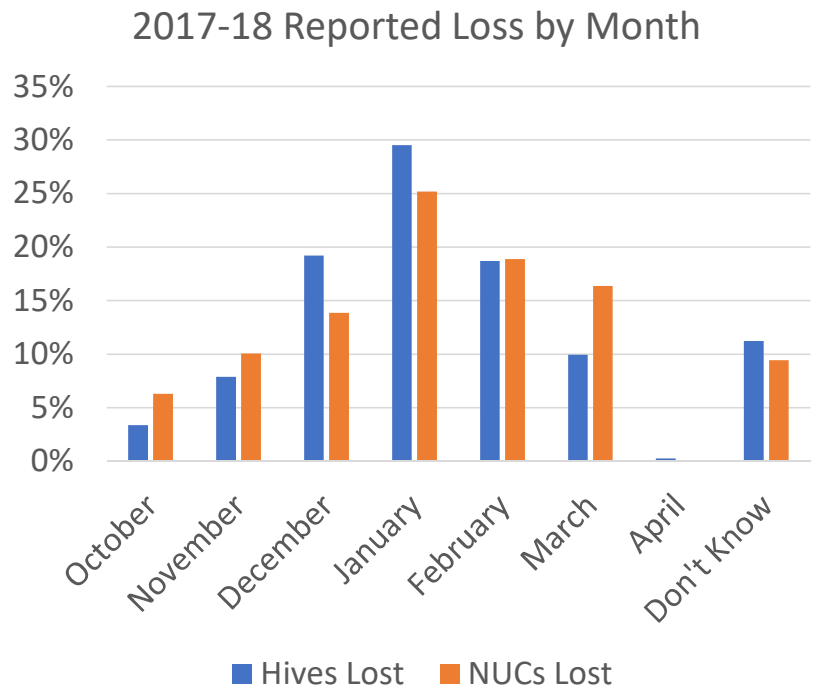
What plants bees use for winter (is the state eradication of knotweed affecting the bees?)

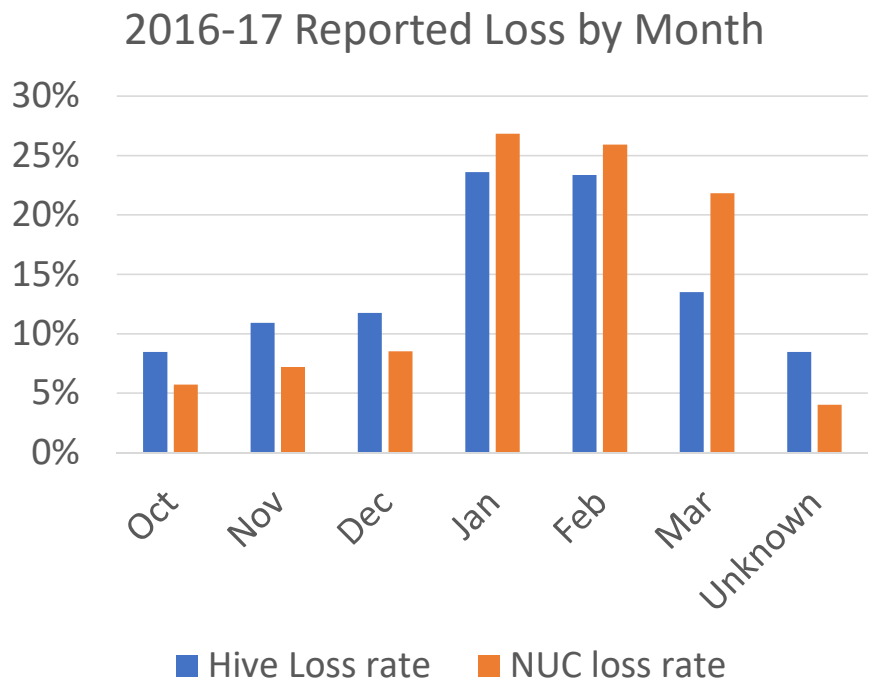
Continued on next page

Meeting Topic Feedback (cont'd)

- Mites:
  - Not more mite talk unless something is new – otherwise rehashing
  - Best techniques for testing mites
  - Sustainable (no treatment) for the small HOBBIEST beekeeper (3)
  - How honey bee biology influences varroa survival
  - Mite treatments (3) – safe with honey, spring & summer treatments, natural mite & disease treatments
  - How honey bee biology influences varroa survival
- Other
  - Better beekeeping business practices & marketing (2)
  - Swarm attracting & Catching (3)
  - More information on correct procedures for diagnosing Nosema (all kinds) (2)
  - Pollinator gardens
  - Apitherapy
  - State apiary for research
  - Urban beekeeping
  - Diagnosing dead outs
  - Keeping bears from finding my hives
  - Handout reviewing successful overwintering techniques.
  - Pesticide research & the effect on bees

Comparing Loss Month between the 2 surveys





Changes for 2018-19 survey

- Moisture Control & wrapping
  - Change homasote → Moisture board
  - Include venting & open screen bottom board as an option (moisture control)
  - Change polystyrene → rigid insulation
- IPM Methods:
  - Spell out IPM
  - Add drone inspection as an option
- Winter feeding:
  - Include added honey from other sources
- Analysis
  - Look at feeding, wrapping & moisture control data regionally in the future.