

Colony losses - reasons and solutions

Current situation on bee health - in Sweden and internationally



Elva, Eesti - 21 juuli 2012

Preben Kristiansen

Beekeeping in Sweden

10 000 -14 000 beekeepers

110 000 -150 000 colonies

2 800 tons of honey

Beekeepers Colonies

11%

6%



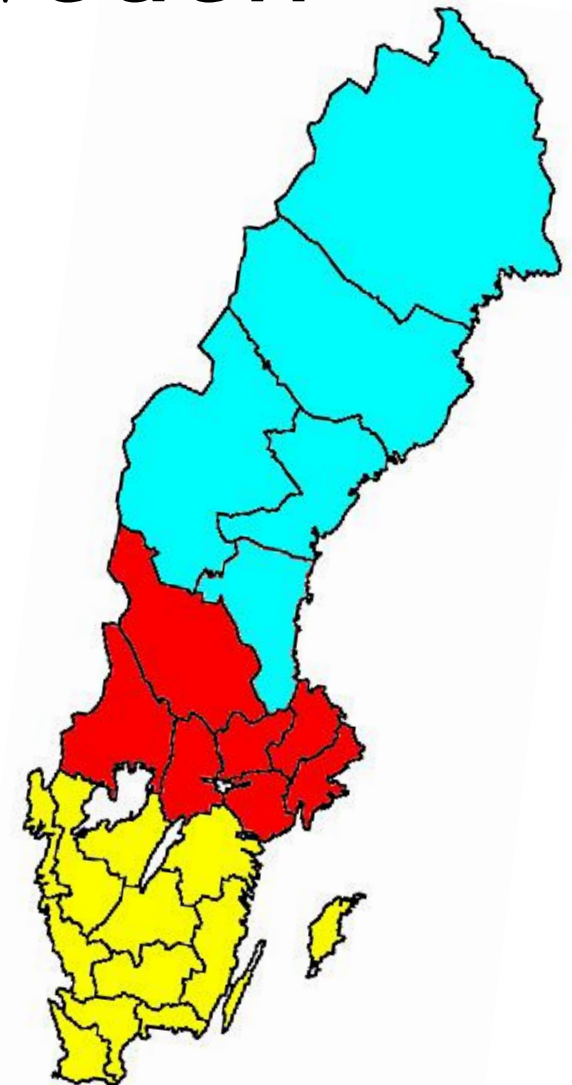
28%

33%



61%

61%



Two main organisations

Sveriges biodlares riksförbund (SBR)

approx. 10 000 members

approx. 290 local clubs

25 district associations



www.biodlarna.se



Biodlingsföretagarna

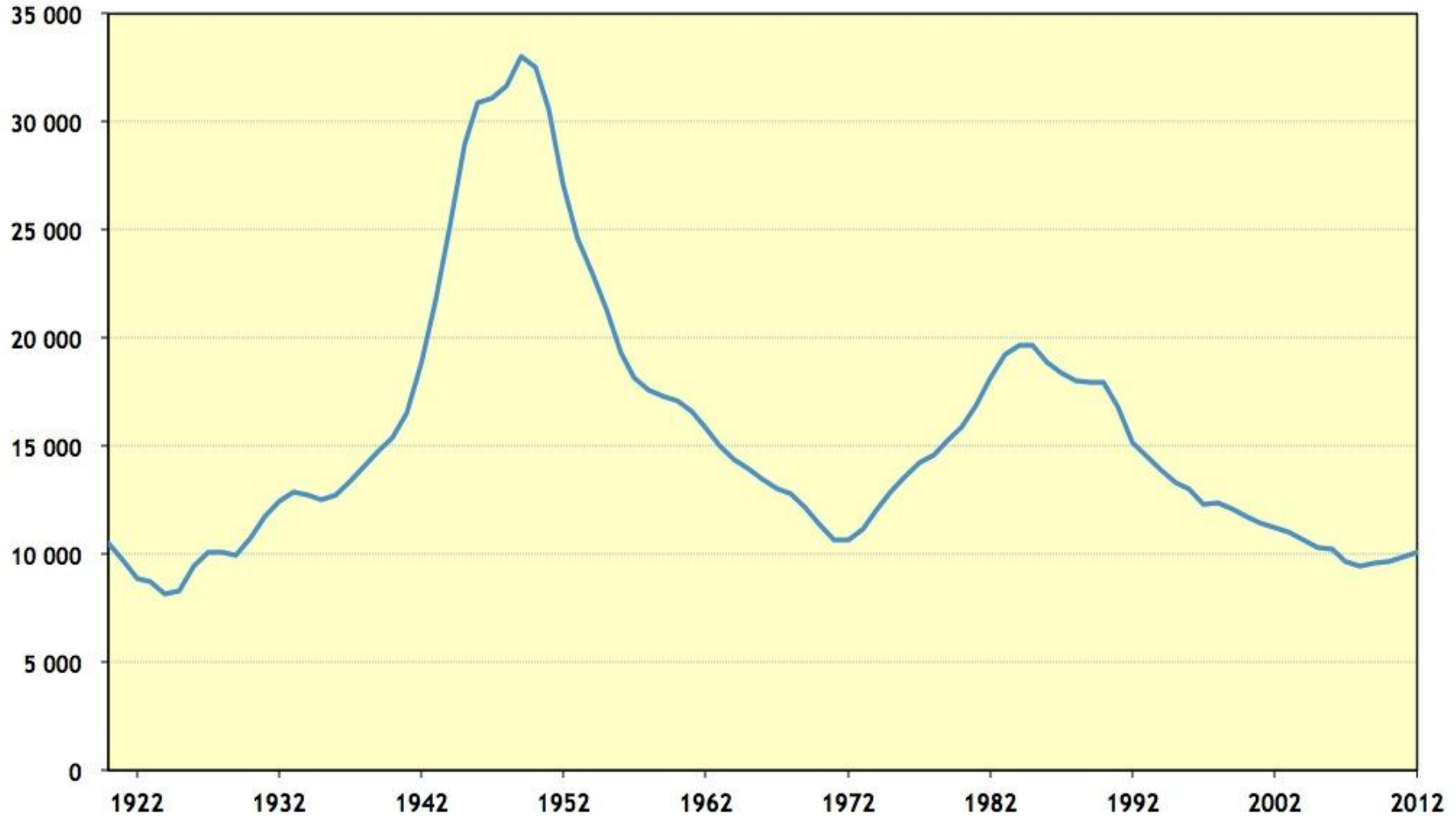
approx. 500 members



www.biodlingsforetagarna.nu/

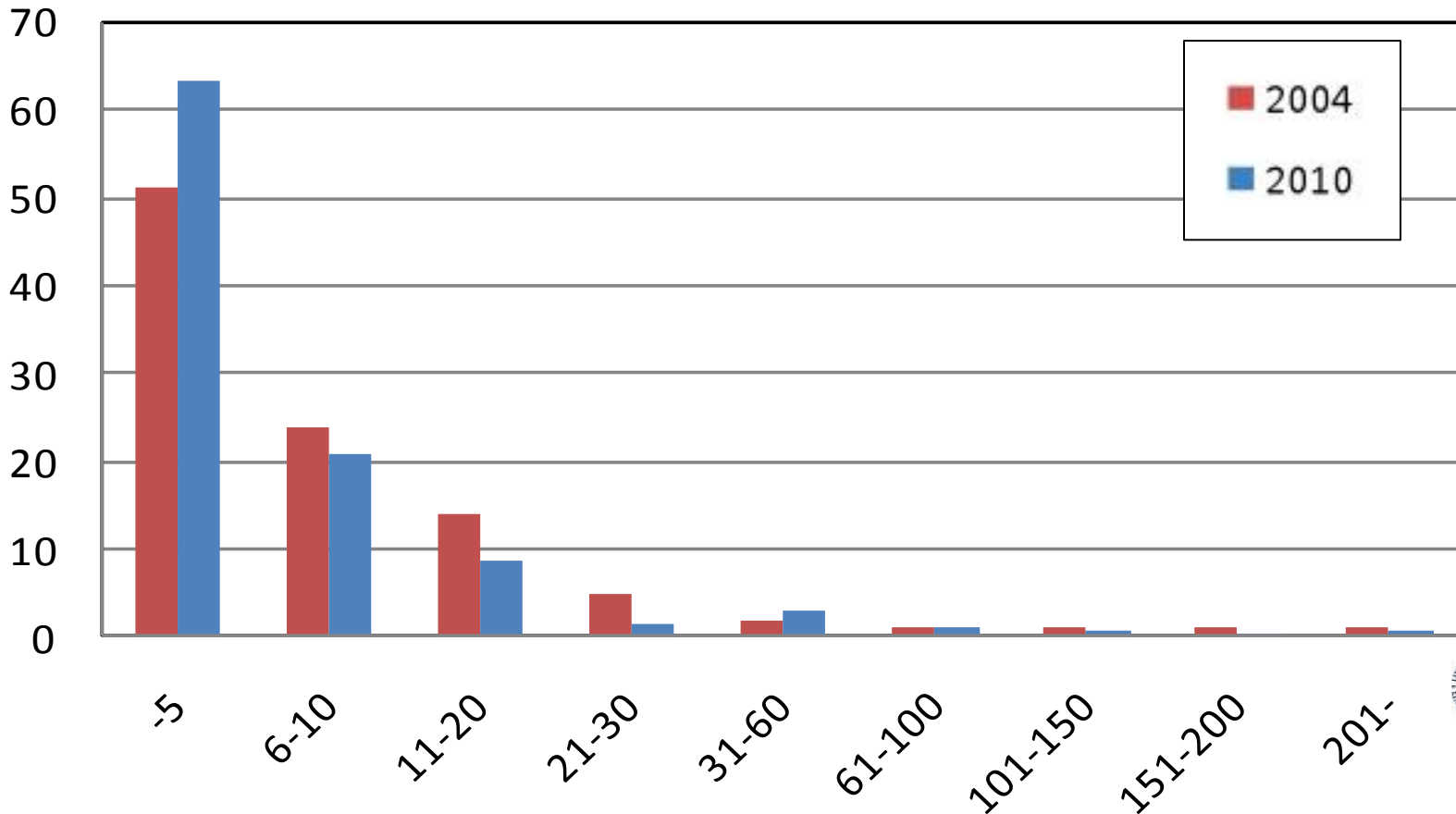


Members of the Swedish Beekeepers Association



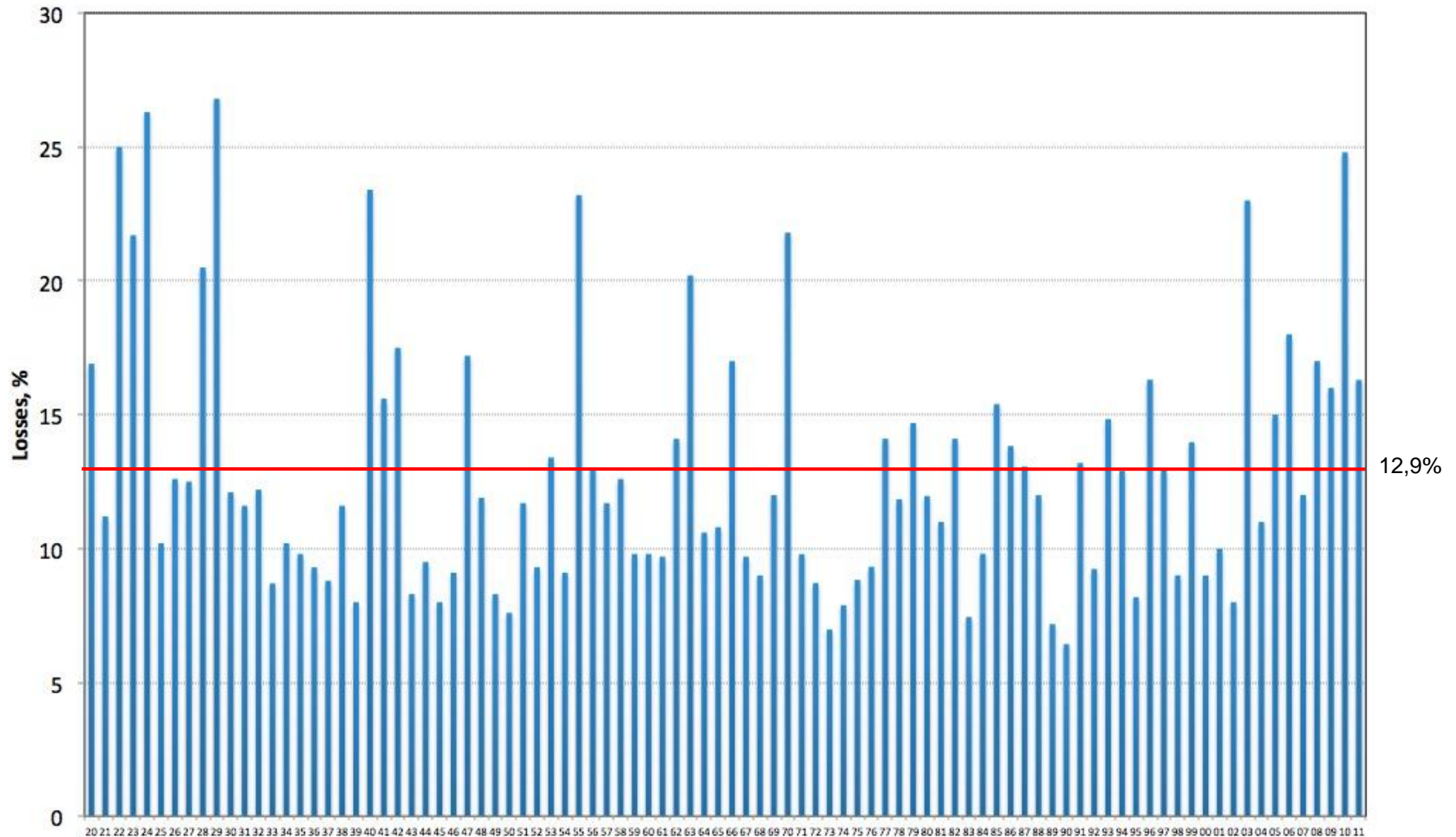
Swedish Beekeepers Association, SBR

How many colonies do the members of SBR have?



Colony losses in Sweden

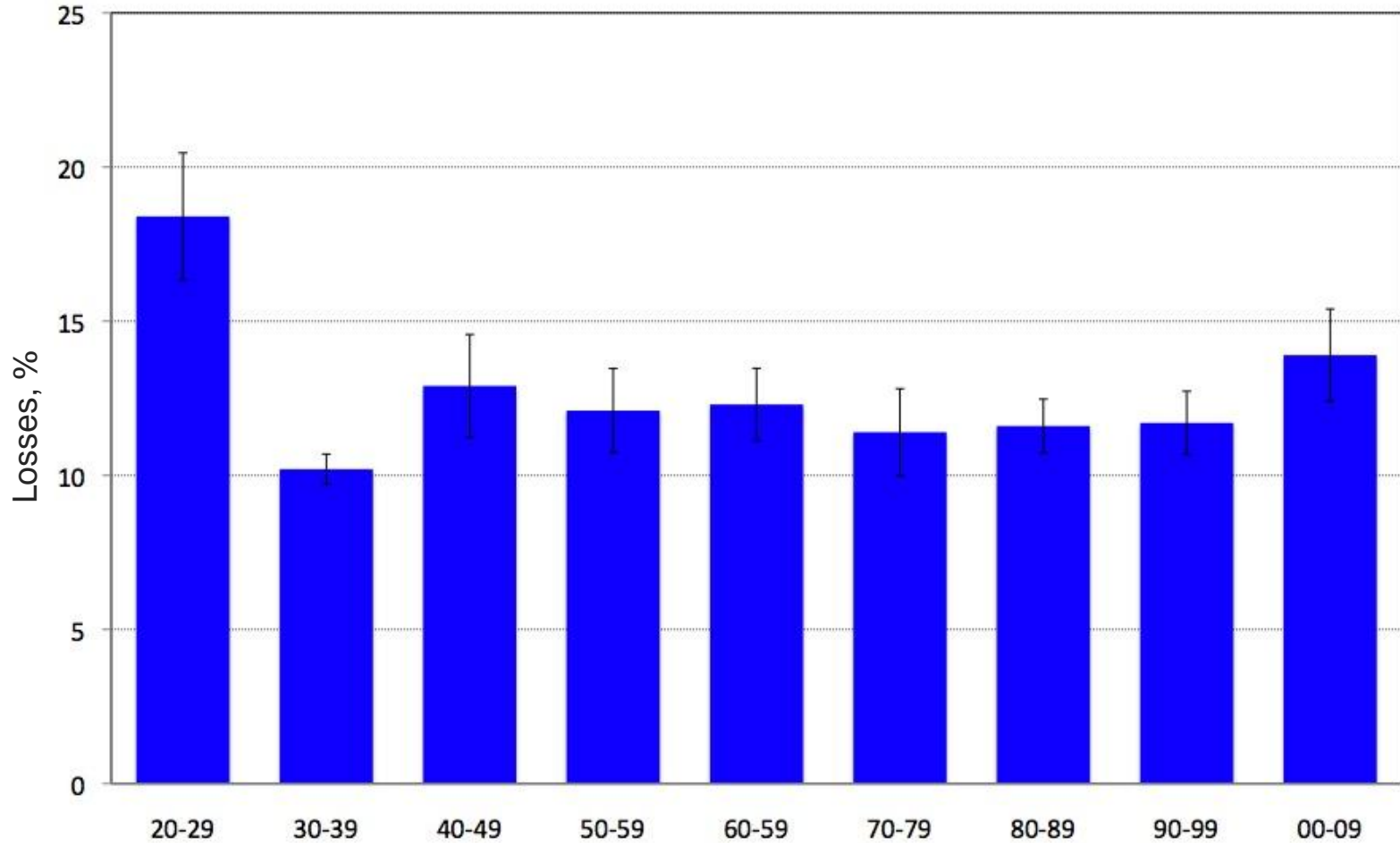
1920-2011



P. Kristiansen, 2012 – Data from SBR:

Colony losses in Sweden

1920-2009



P. Kristiansen, 2012 – Data from SBR:

COLOSS project



Survey on colony losses

COLOSS Questionnaire 2011
Corresponding author: Romée van der Zee

Please read the surveyor notes carefully before using the question sets!

Dear Beekeeper,

Why do we need some of your personal data?
We need to compare data between the years to determine if colony losses have patterns over the years, which may be stronger in certain areas and/or due to environmental factors or characteristics of your beekeeping. This information is crucial for the outcome of the survey and our further research.

How do we protect your privacy?
The data collected with the COLOSS questionnaire will be added to the COLOSS database. This database contains no names, only codes. The key which connects names and codes will be preserved separately and is only accessible for the supervisor and coordinator of the COLOSS data bank. For scientific research data may be provided, hereby an agreement for use of data will be employed.

The outcome of this survey will be reported in beekeeper and scientific journals. Your contribution is much appreciated.

Name of the national surveyor

Optional Beekeeper and Apiary Information

- A Firstname
- B Lastname
- C Address
- D City
- E Postal Code
- F Email

G If you only have one bee yard, what is:
the postal code of the bee yard (or a postal code nearby)
the name of a city/village near to your bee yard

Beekeeper Information and Mortality Quantification

Colonies did you have on **October 1st 2010 - April 1st 2010?**

are asked for numbers of colonies lost. Please consider a colony dead to a few hundred bees, or alive but with unsolvable queen

Colonies were lost between October 1st 2010 and April 1st 2011

Colonies were lost between October 1 2010 and April 1 2011 (queenless or drone-breeding queen)?

Colonies were lost between April 1 2011 and April 1 2011

Colonies bought, sold, united or split

How many colonies did you sell or give away?
eg two colonies united/merged together = loss of one colony

Colonies did you have at **April 1 2010 - October 1 2010?**

Colonies only if you bought, sold, united or split colonies

Colonies did you buy or split? Splits did you make?
How many colonies did you sell or give away?
eg two colonies united/merged together = loss of one colony

11 How many of your existing (present at April 1) and new production colonies were lost between April 1 2010 and October 1 2010

Work on colony losses within the COLOSS project

Journal of Apicultural Research 51(1): 100-114 (2012)
DOI 10.3896/IBRA.1.51.1.12

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ORIGINAL RESEARCH ARTICLE

Managed honey bee colony losses in Canada, China, Europe, Israel and Turkey, for the winters of 2008-9 and 2009-10



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COLOSS questionnaire - In Sweden survey done via internet

Data för beräkning av förluster under perioden 1 oktober 2011 - 1 maj 2012

De följande frågorna handlar om förluster.

I några av frågorna används begreppet "produktionssamhälle". Definitionen av detta är i det här sammanhanget ett samhälle som man avsett att använda för honungsproduktion eller pollinering, vilket innebär att även avläggare invitrade föregående år kan inkluderas.

Ett samhälle bör betraktas som förlorat om det är dött eller om det enbart består av några få hundrade bin. Samhällen utan drottning eller med puckelkyngel bör också betraktas som förlora

Hur många produktionssamhällen hade du den 1 oktober 2011? *

Hur många av dessa produktionssamhällen dog under perioden 1 oktober 2011 - 1 maj 2012? *

I hur många fall var dina försvunna från bikupan i det döda samhället? (Inga förlorade kupor).*

I hur många av de döda samhällen fanns det foder kvar i kupan och i samhället dött ange då 0).*

I hur många av de döda samhällen fanns det inget foder kvar i samhället dött ange då 0).*

Hur många av de förlorade samhällen (de som förlorades under perioden 1 oktober 2011 - 1 maj 2012) hade problem med drottningen (puckelkyngel)? *

Hur många av de överlevande samhällen varit pga. att du sålt eller förlorat dem under perioden 1 oktober 2011 - 1 maj 2012? *

Frågor om varroa och varroabekämpning.

Har varroa påvisats i dina samhällen? *

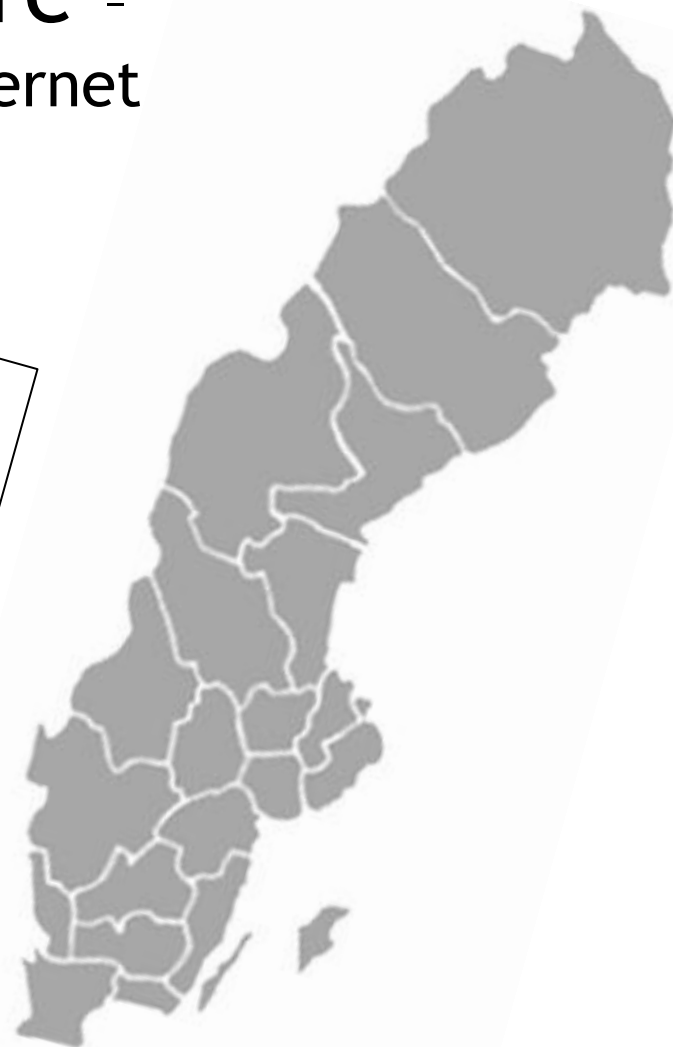
Genomförde du hudfästundersökningar eller någon annan form av undersökning för att uppskatta varroangreppgraden i dina samhällen under säsongen 2011? *

Har du behandlat dina samhällen mot varroa under perioden oktober 2011 - april 2012? *

Har du behandlat mot varroa, har du också behandlat alla samhällen i en bihold på samma sätt och under samma period? *

Andra schemat vilka åtgärder du vidtagit mot varroa och när du vidtagit de olika åtgärderna. Vid behandlingen ska man alltid använda sig över en längre period (Lex, Apislar, Tymol och långtidbehandling med myrsyra) ange den månad behandlingen påbörjades.

	Okt 2010	Nov 2010	Dec 2010	Jan 2011	Feb 2011	Mars 2011	April 2011	Maj 2011	Juni 2011	Juli 2011	Aug 2011	Sep 2011	Okt 2011	Nov 2011	Dec 2011	Jan 2012	Feb 2012	Mars 2012	April 2012	Maj 2012
Drönaryngelbortstämning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sigarett	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Avsläpning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Myrsyra, korttid (1-5 dygn)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Myrsyra, långtid (1 mer än 5 dygn)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nikotinsyra	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oxalotrya	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Oxalotrya - förlängning	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tymol (Lex, Apisguard)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apistat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andra kemisk substans (ange medan)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andra metod (ange medan)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Andra kemisk substans eller metod	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>





Colony losses in Sweden

Survey via internet (COLOSS-questionnaire)

	Beekeepers	Colonies	Losses, %
2008-2009	565	7354	17,5
2009-2010	751	13598	24,7
2010-2011	572	11700	14,5
2011-2012	1600	25100	11,9



Colony losses in Sweden

Survey via internet (COLOSS-questionnaire)

	Beekeepers	Colonies	Losses, %
2008-2009	565	7354	17,5
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2010-2011	572	11700	14,5
2011-2012	1600	25100	11,9

Data from SBR based on yearly reports from beekeepers

	Beekeepers	Colonies	Losses, %
2008-2009	3898	32052	16,0
2009-2010	3814	32629	24,8
2010-2011	3952	32286	16,3
2011-2012	?	?	?

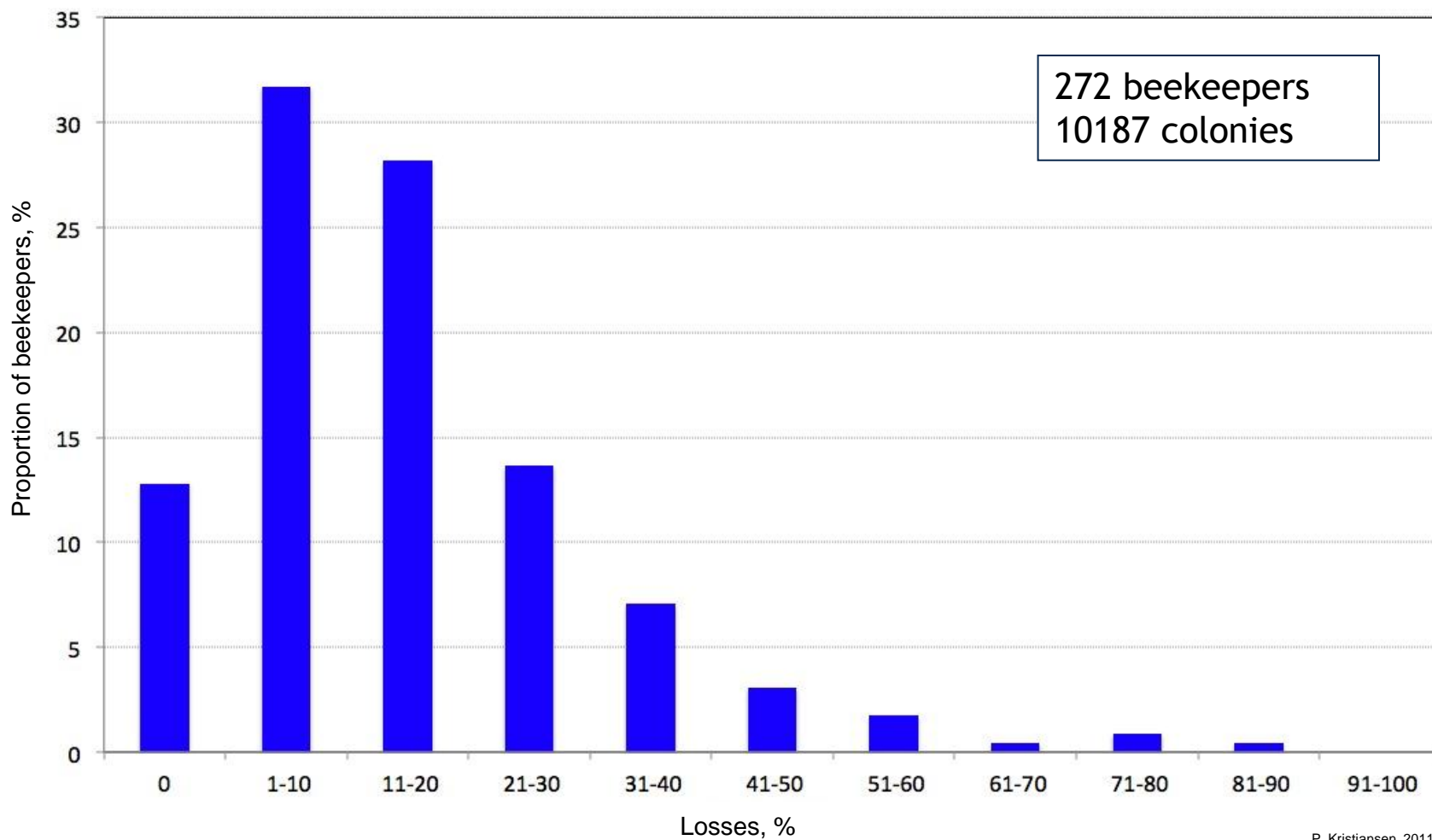


Colony losses 2010-2011

Operation size	Beekeepers #	Colonies #	Losses %
1-10	370	1756	14,6
11-20	97	1396	11,9
21-50	61	1806	17,6
51-100	19	1411	13,3
101-500	23	4085	14,9
> 500	2	1246	14,1
<i>All</i>	<i>572</i>	<i>11700</i>	<i>14,5</i>

Colony losses 2010-2011

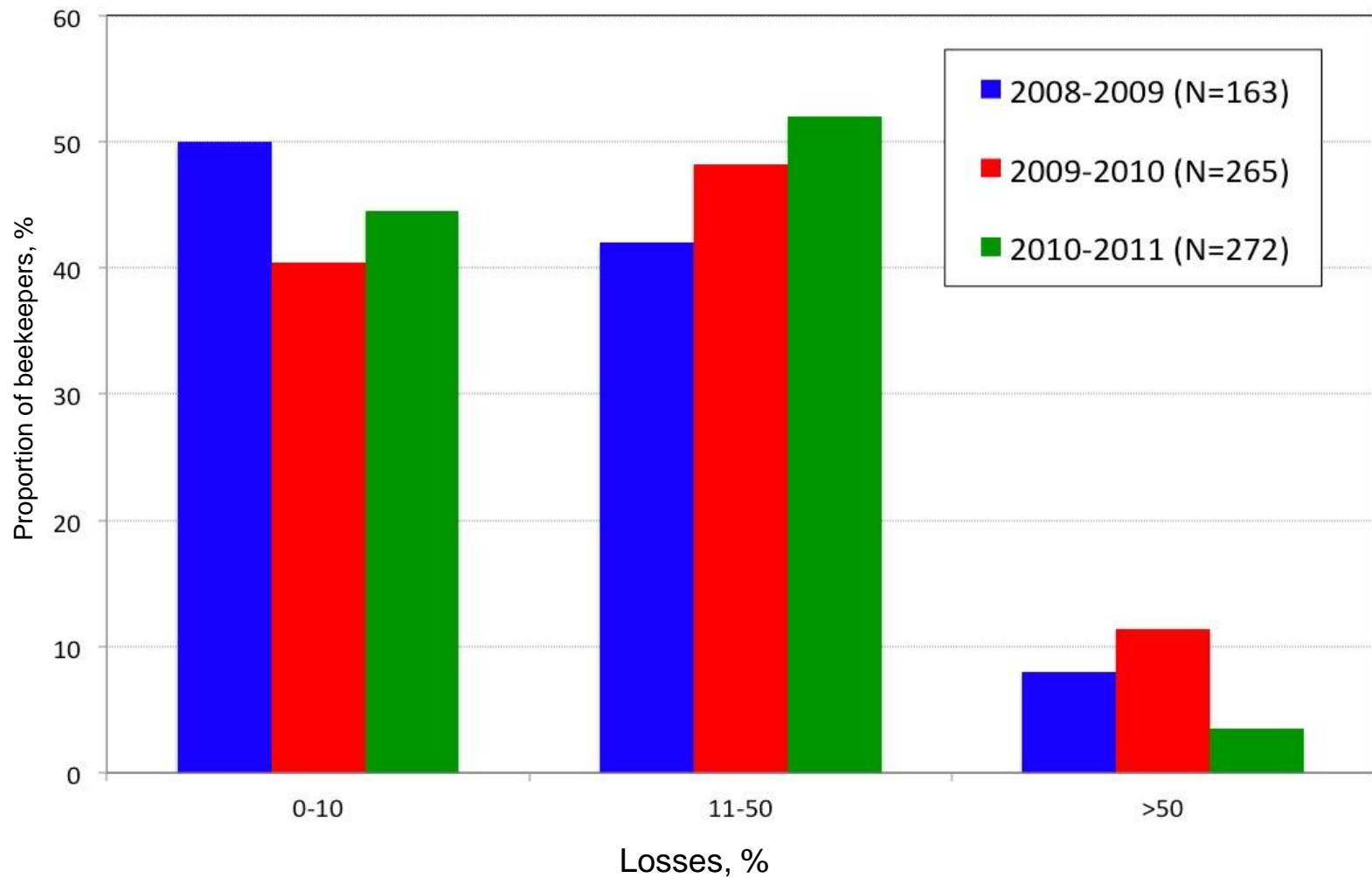
beekeepers with 10 or more colonies



P. Kristiansen, 2011

Colony losses

beekeepers with 10 or more colonies



Colony losses

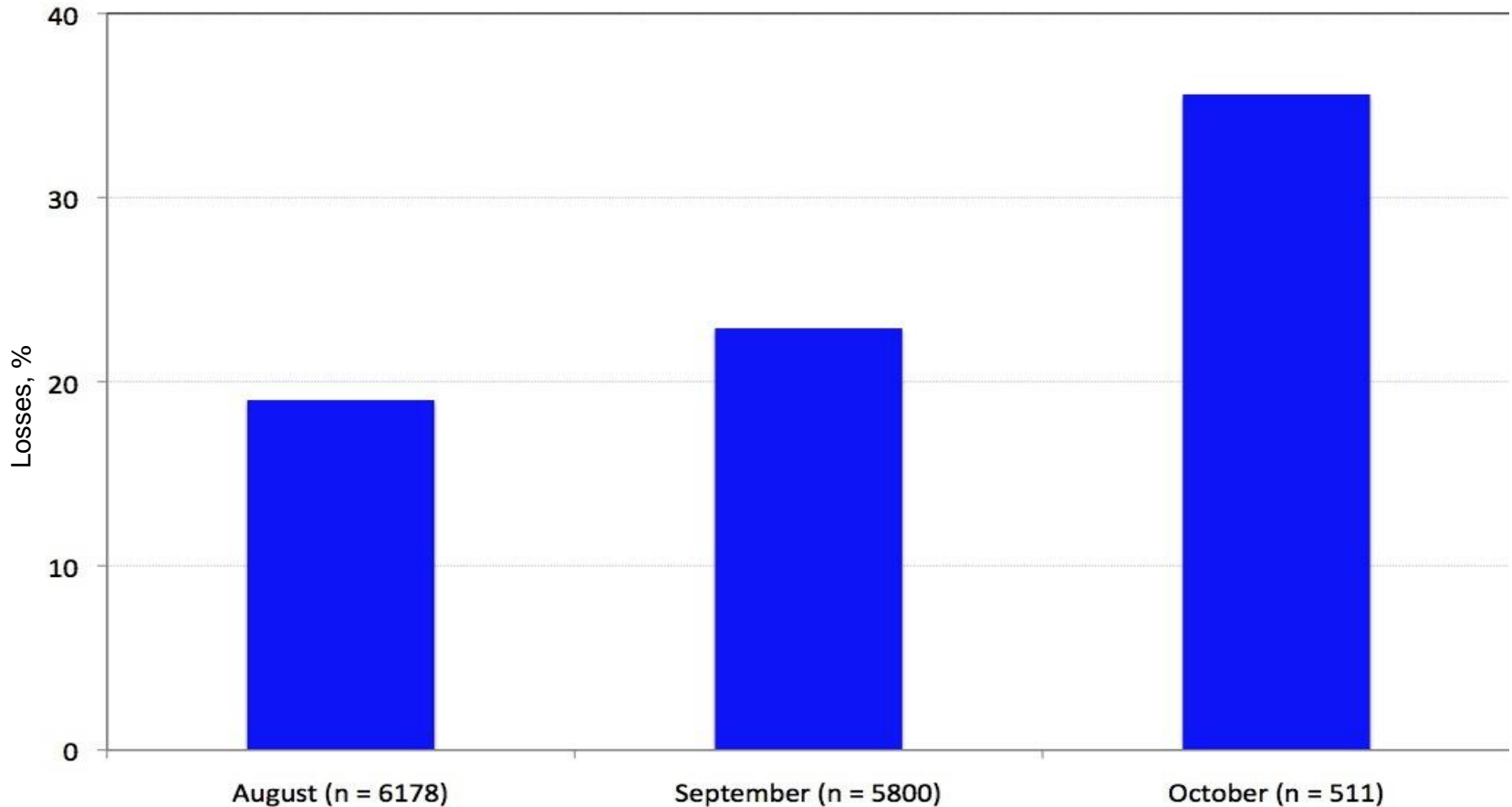
important factors that influence

- Varroa present or not
- Control methods of varroa
- Timing of treatment against varroa
- Timing of wintering
- Amount of sugar

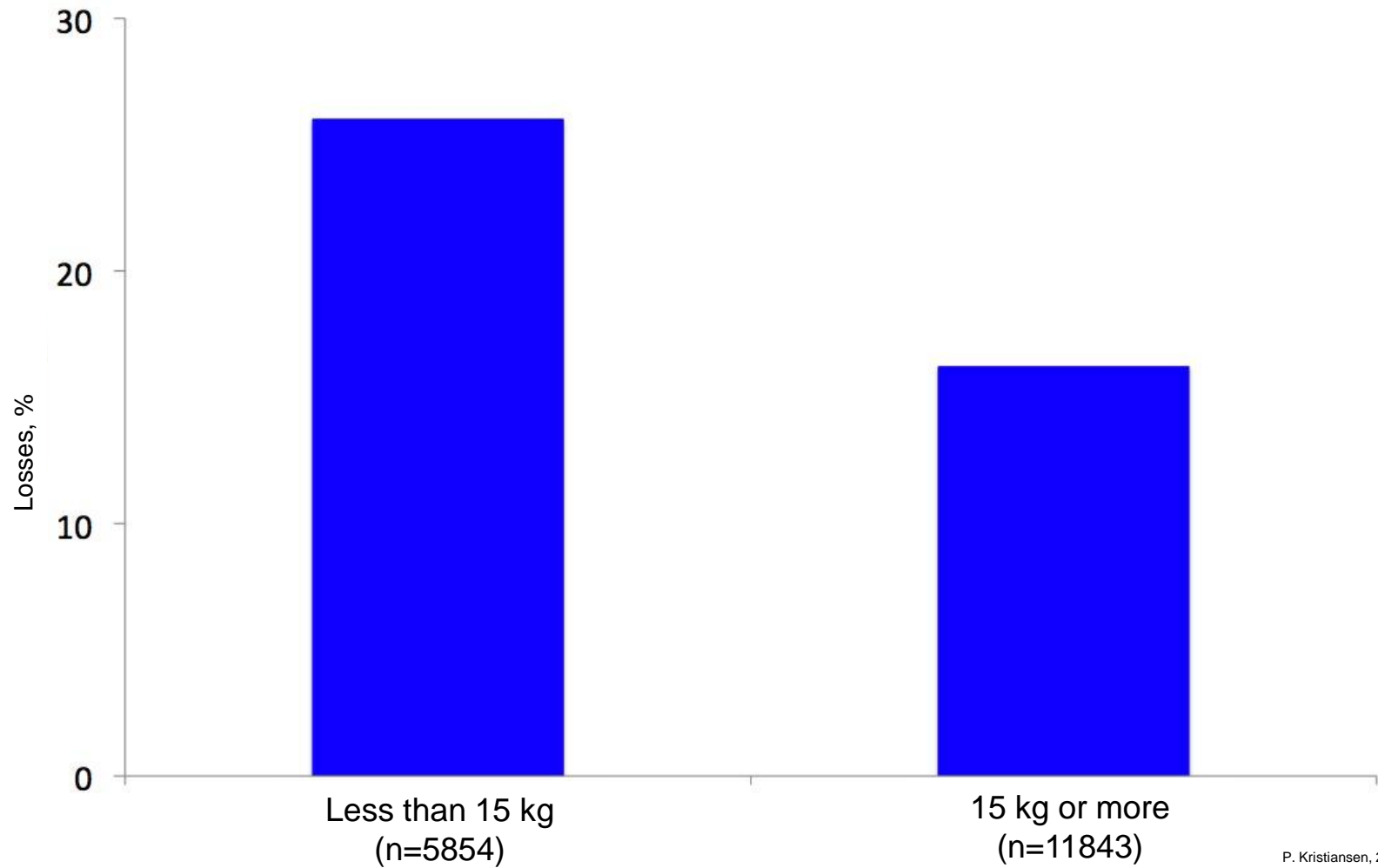


Colony losses

- start of feeding for winter



Colony losses - amount of sugar

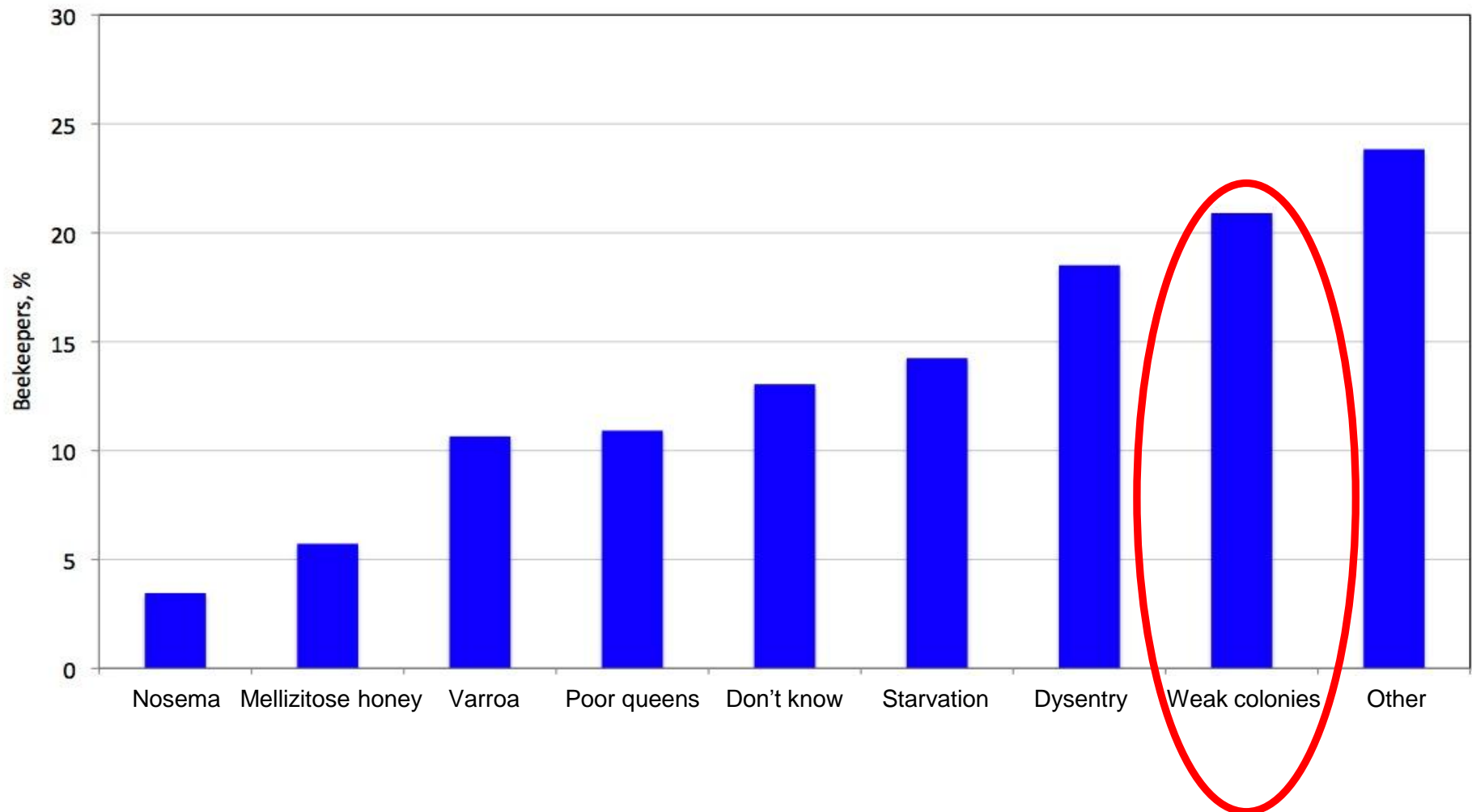


P. Kristiansen, 2003

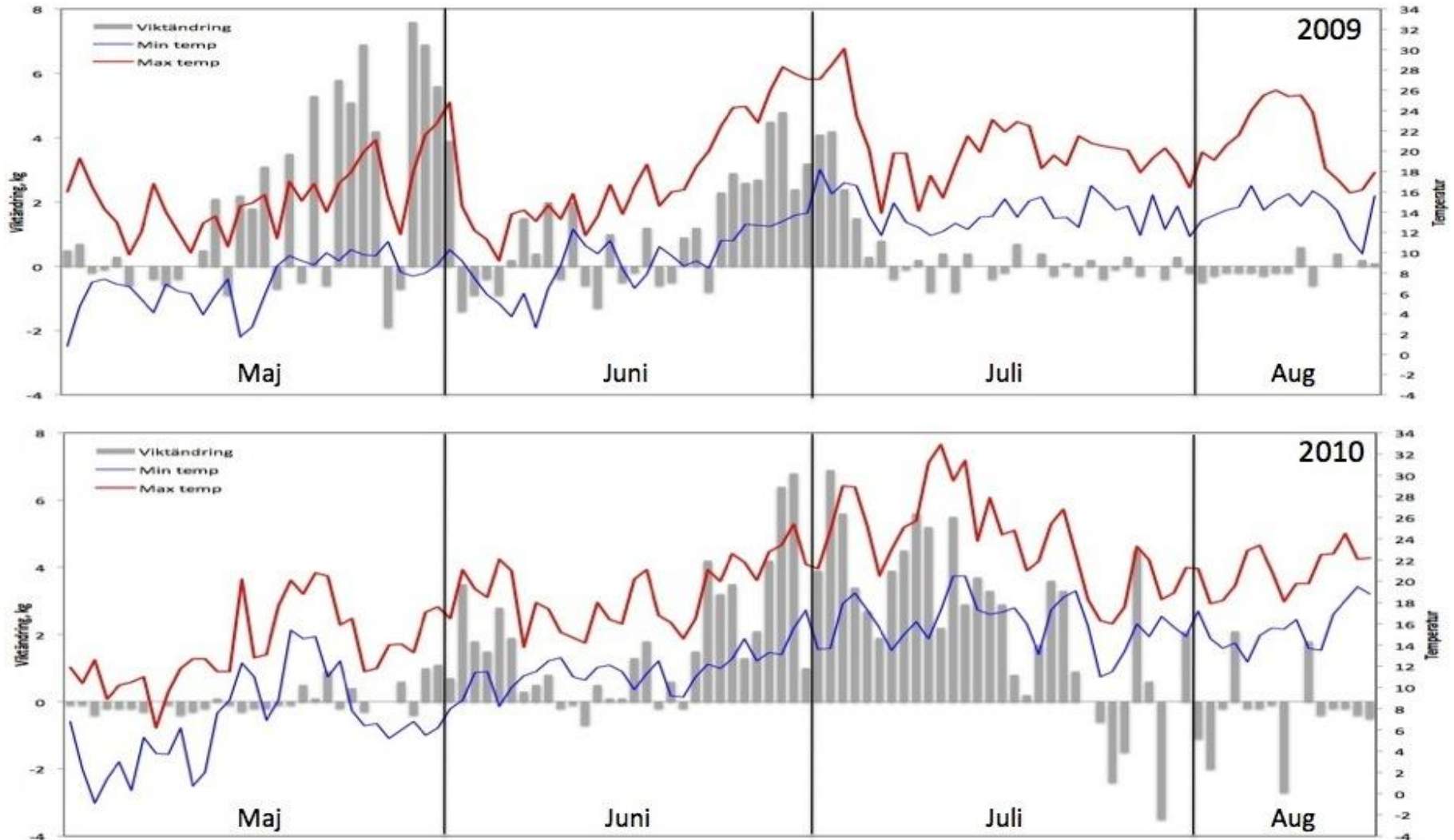
Colony losses

Survey 2009-2010

and major causes according to beekeepers

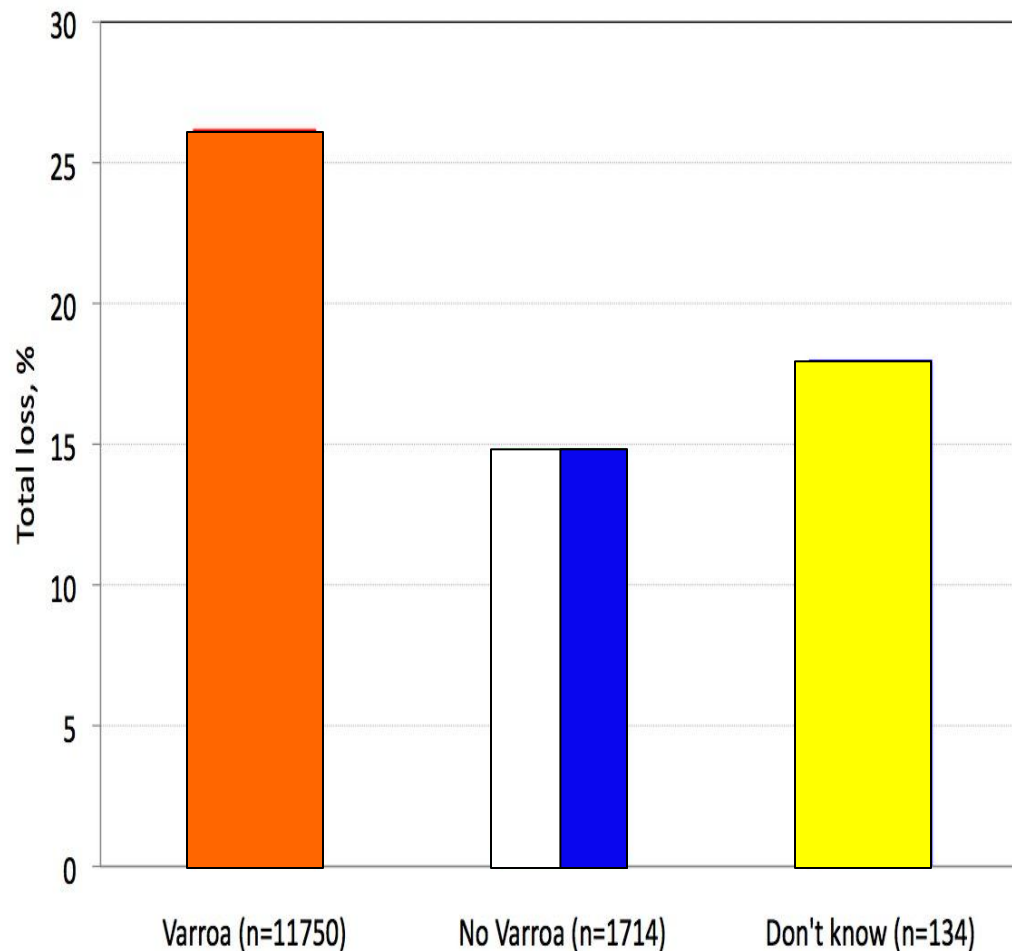
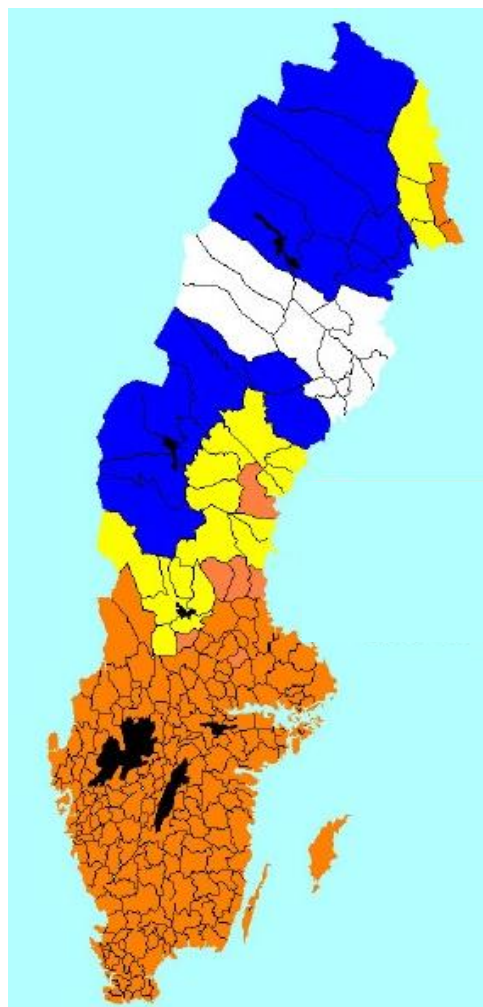


The honey flow



Colony losses 2009-2010

in areas with and without varroa



Products against varroa



Apistan



Apiguard

“Ecological” varroa control methods

- Removal of drone brood
- Trapping comb
- Formic acid
- Lactic acid
- Oxalic acid
- Nucs



Apistan

+ Fast

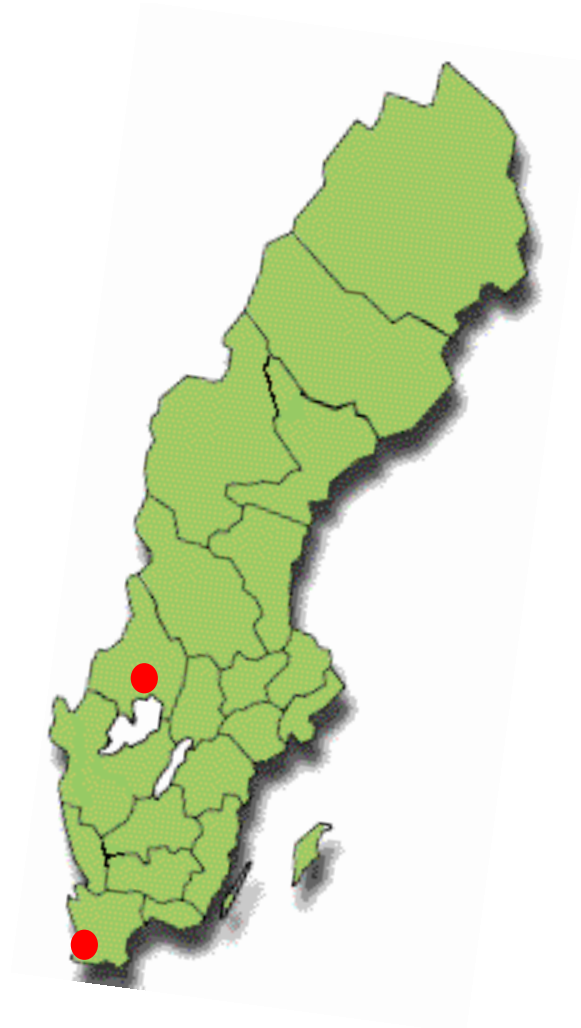
+ Efficient

- Residues in wax

- Resistance



Resistant mites in Sweden



“Ecological” varroa control methods

- More work (?)
- Varying efficacy
- + No residues
- + No resistance



Bekämpning av varroakvalster med snärrboxmetoden

Varroabekämpning med ekologiska metoder

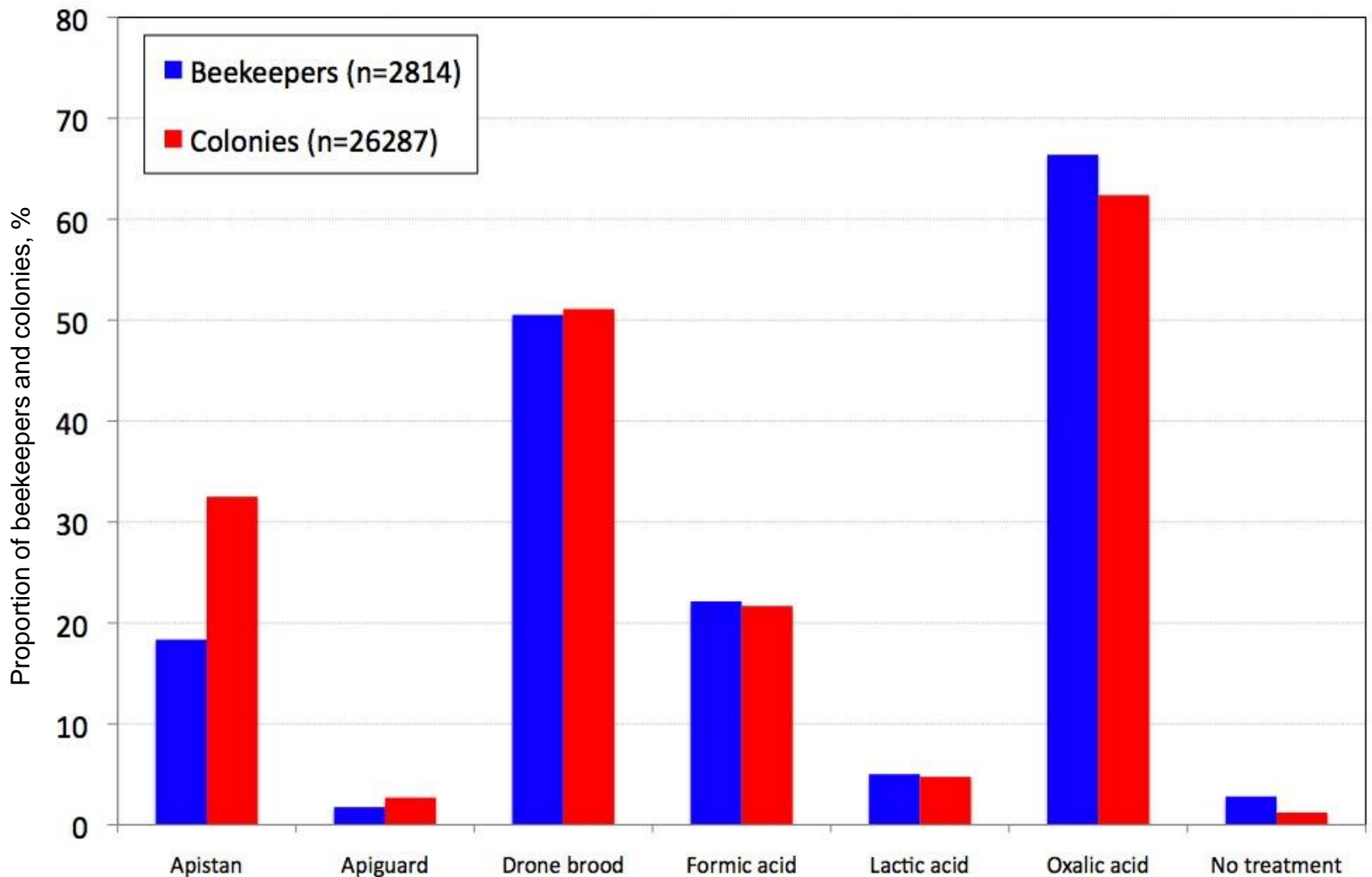


JORDBRUKS
VERKET

Jordbruksinformation 10-2001

Varroa control methods

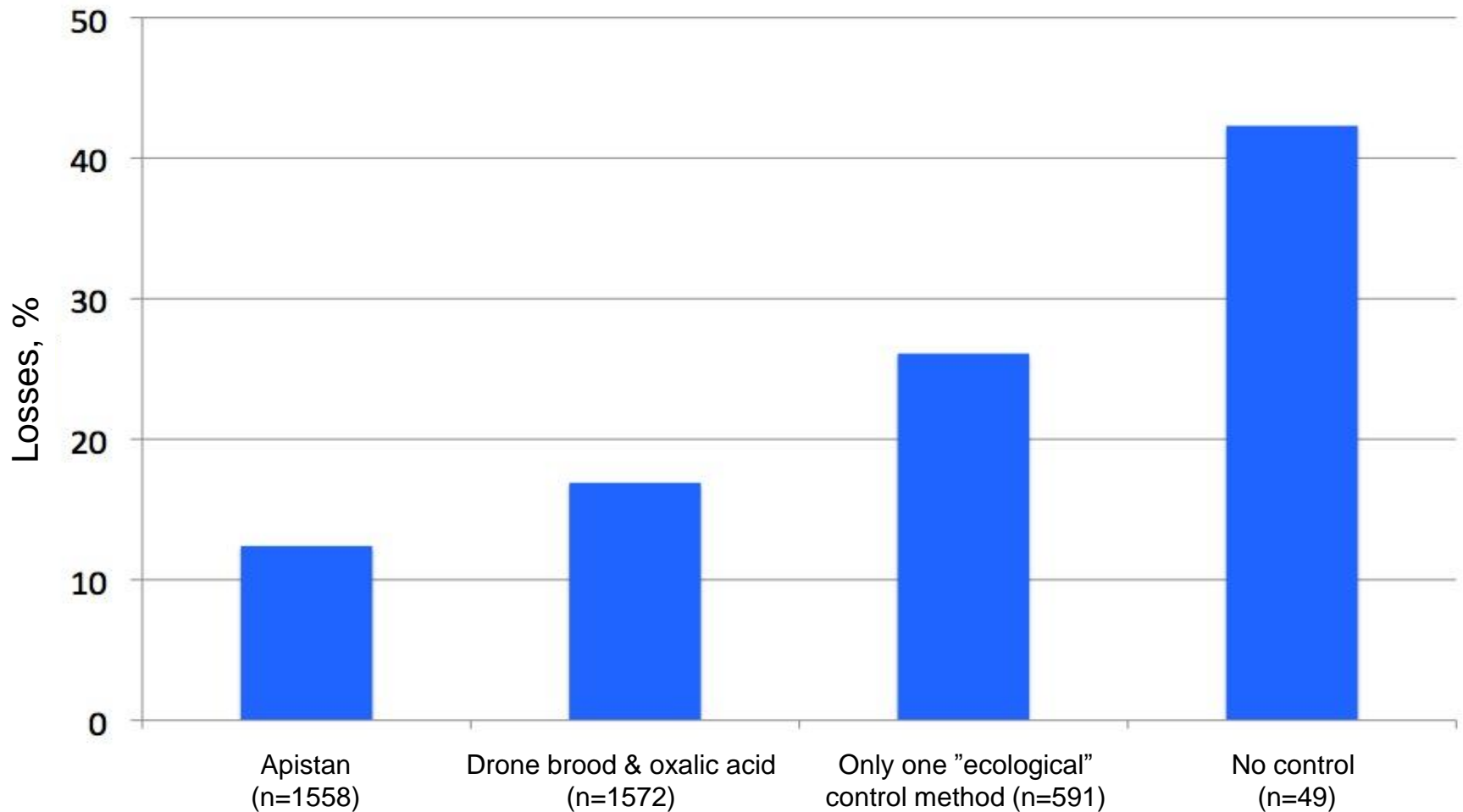
Survey 2011



P. Kristiansen, 2011

Colony losses

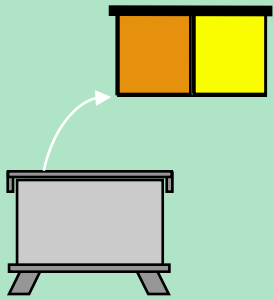
- varroa control methods



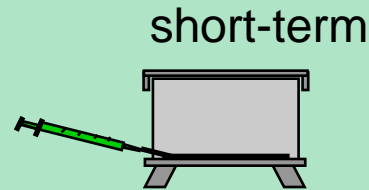
Control concept

dronebrood removal and OA + FA if needed

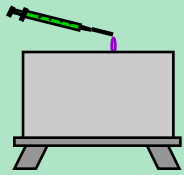
Removal of dronebrood



FA



OA



May

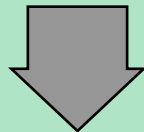
June

July

August

September

October

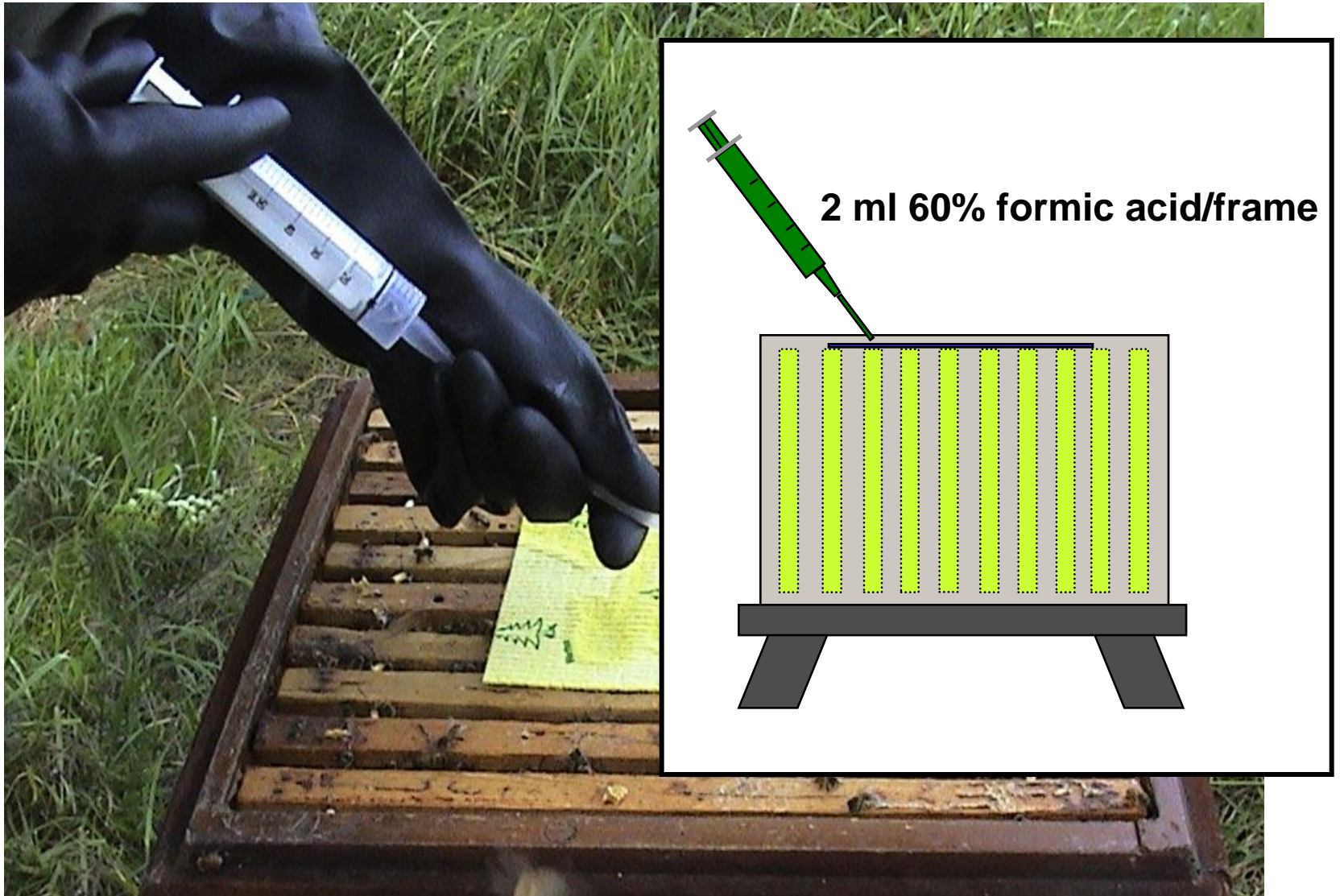


Natural mite drop

Removal of drone brood



Short term treatment with FA

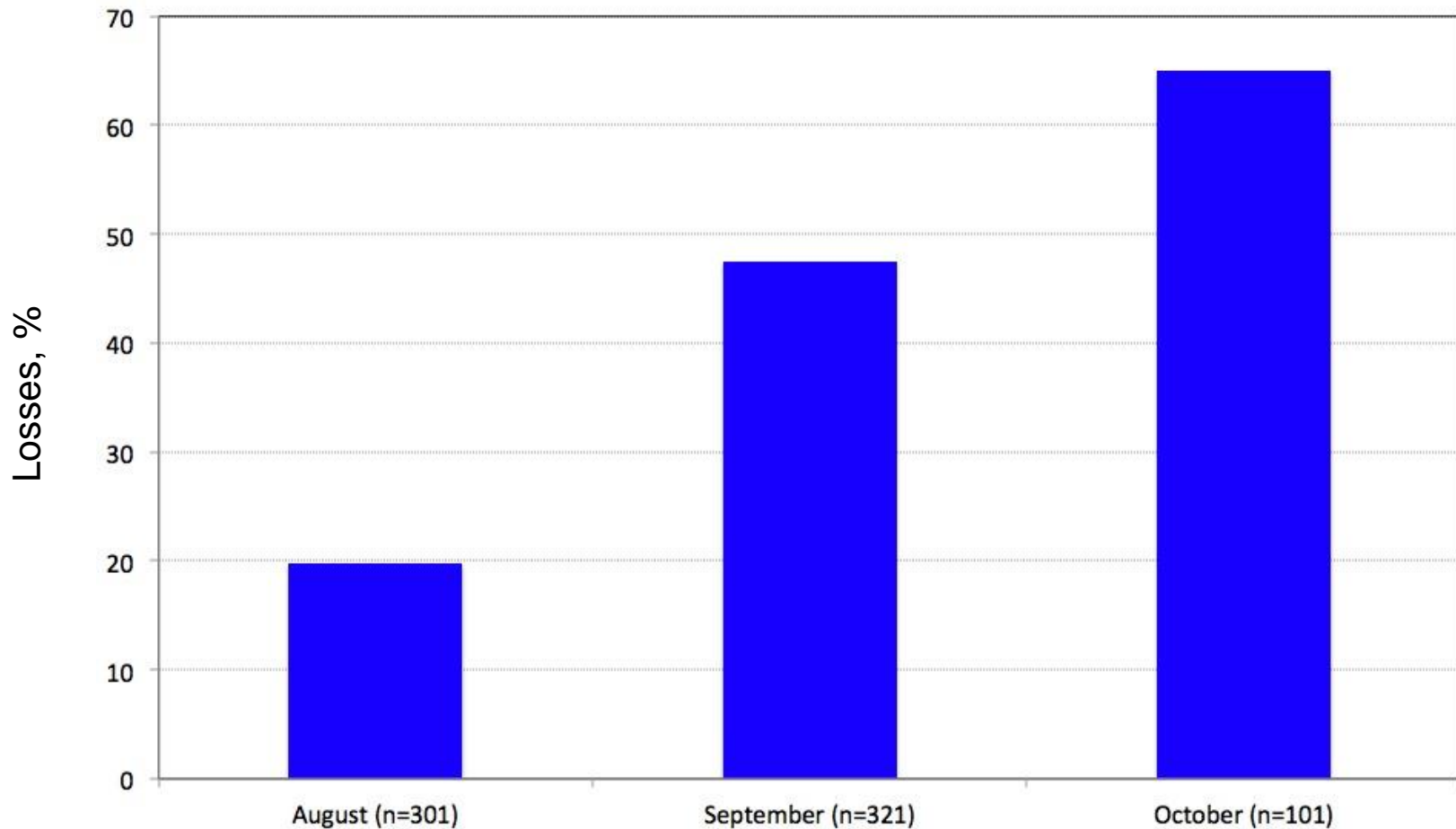


Treatment with OA



Colony losses

- first treatment with formic acid



How to avoid winter losses



Strong colonies

Healthy winter bees

Enough food for winter



Threats to the health of bees



Inadequate environment

Agrochemicals

Competition for food

Diseases and parasites

Bad management

How to get healthier bees

- Environment that gives enough food
- Good management
- Bees with tolerance against diseases
- Beekeeping without medicine*



How to get healthier bees

The apiary

Avoid low and humid places and places in full shade

Protect the hives against wind

Good pollen and nectar sources throughout the season

Don't overcrowd the apiary with colonies

Avoid to place the apiary in areas with risk for pollution



How to get healthier bees

The management

Strong and well functioning units

Right proportion

- between bees and space
- between brood and bees

Always enough food of good quality

New colonies every year (nucs)



How to get healthier bees

The management

Frequent change of queens

Frequent renewal of the wax combs

Frequent cleaning and disinfection
of hives and equipment



How to get healthier bees?

The bees

Bees adapted to the climate

Bees adapted to the management system

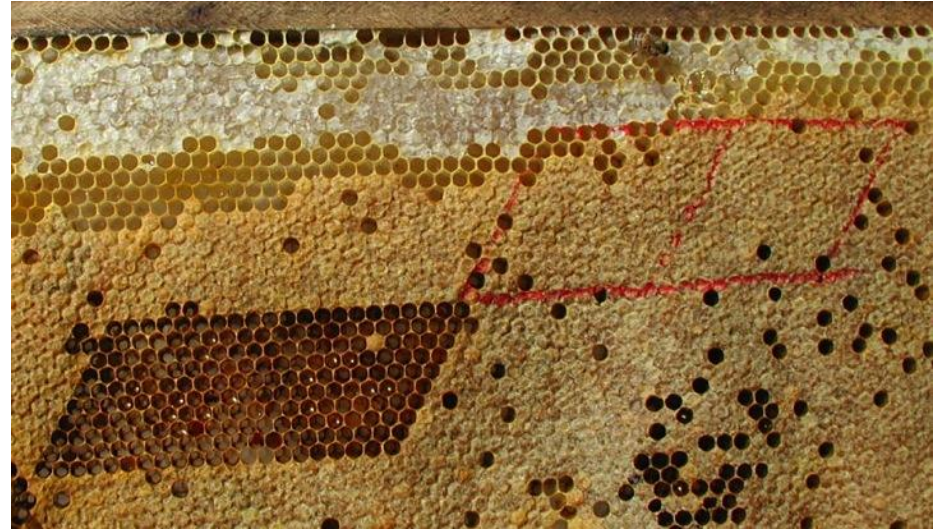
Tolerance against diseases

Hygienic behaviour

Temper

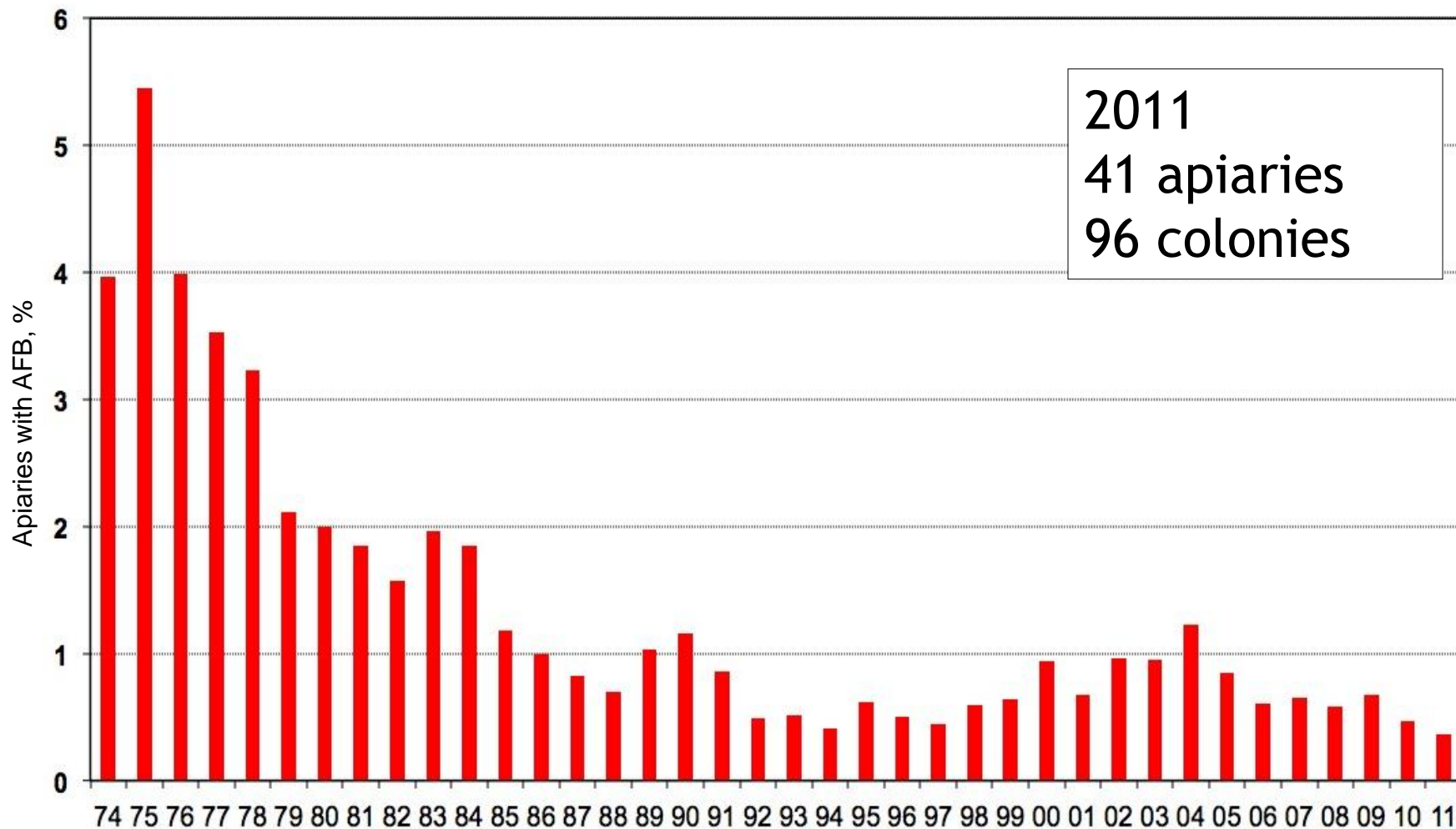


Hygienic behaviour



American Foulbrood in Sweden

1974-2011



P. Kristiansen, 2012

Source: Statistical data from the Swedish Board of Agriculture

Pathogen survey in Sweden 2010-2011

Varroa All counties except Y, Z and AC

Microsporidia: Nosema in 23 of 130 samples (2 pure *N. ceranae* , M)

American foulbrood: Found in 7 of 130 samples (D, E, H and M)

European foulbrood: Found in 1 of 130 samples (S)

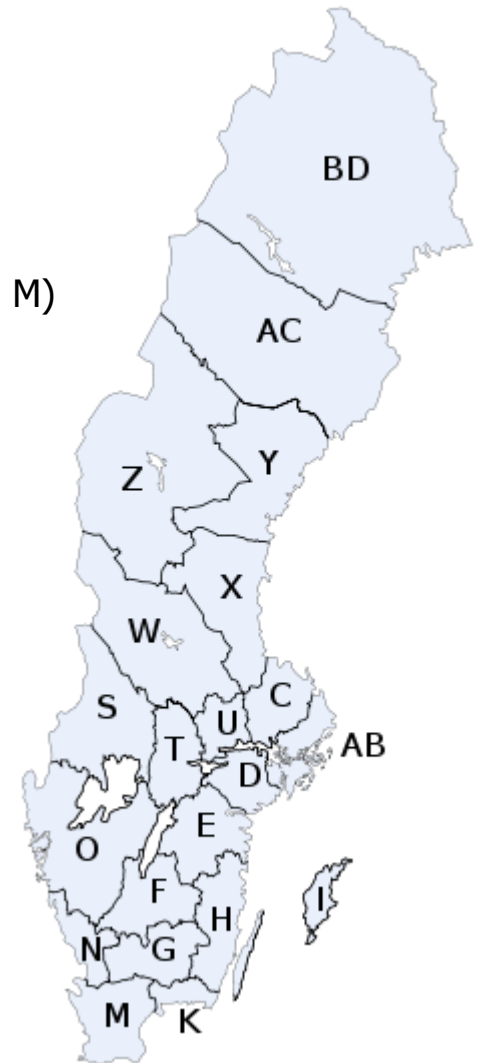
Virus: Only 4 of the 8 analyzed types of virus were found

DWV (deformed wing virus)

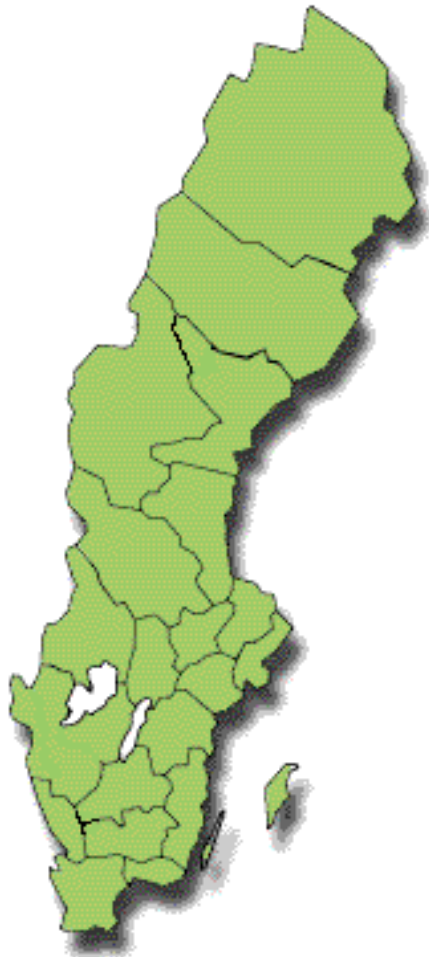
ABPV (acute bee paralysis virus)

SBV (sac brood virus)

BQCV (black queen cell virus)



Pathogen surveys in Sweden



Conclusions

Tracheal mites has still not been found

EFB doesn't seem to be a problem

The data cannot be interpreted as if *N. ceranae* is replacing *N. apis*

Information on diseases and bee health



*Thanks
for your attention!*



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www.apinordica.se