WINTER COLONY LOSSES AND RENEWAL OF HONEY BEE LIVESTOCK IN AUSTRIA

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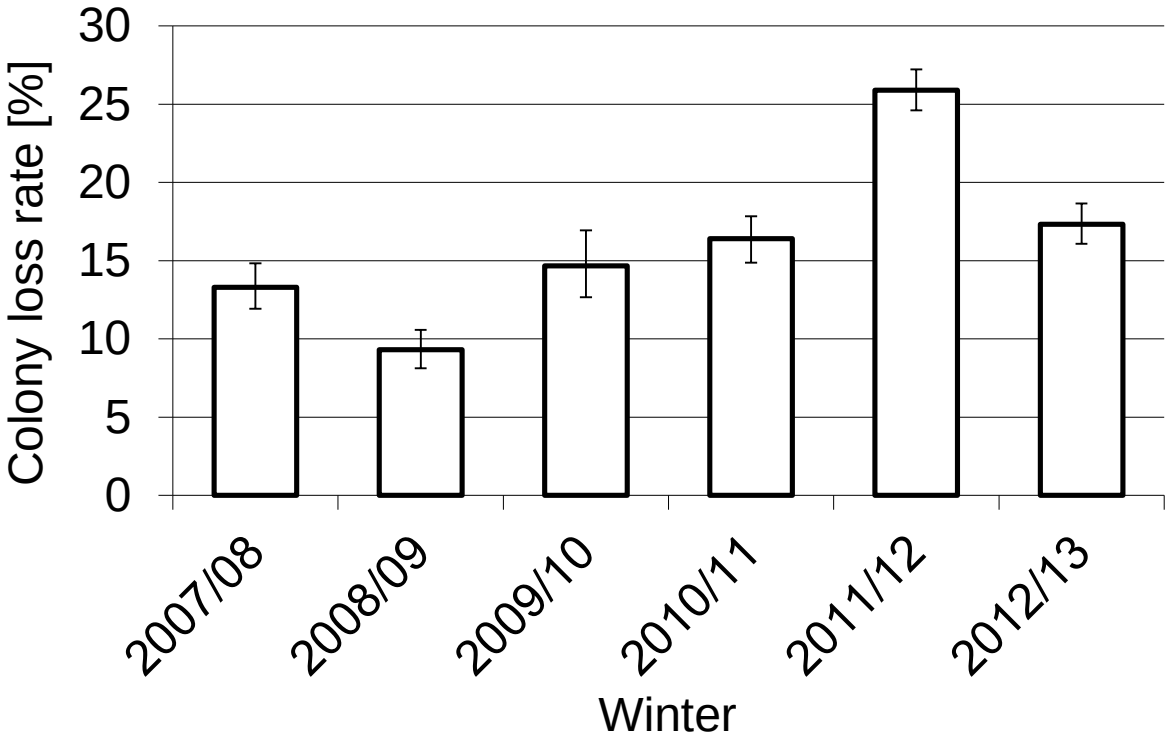
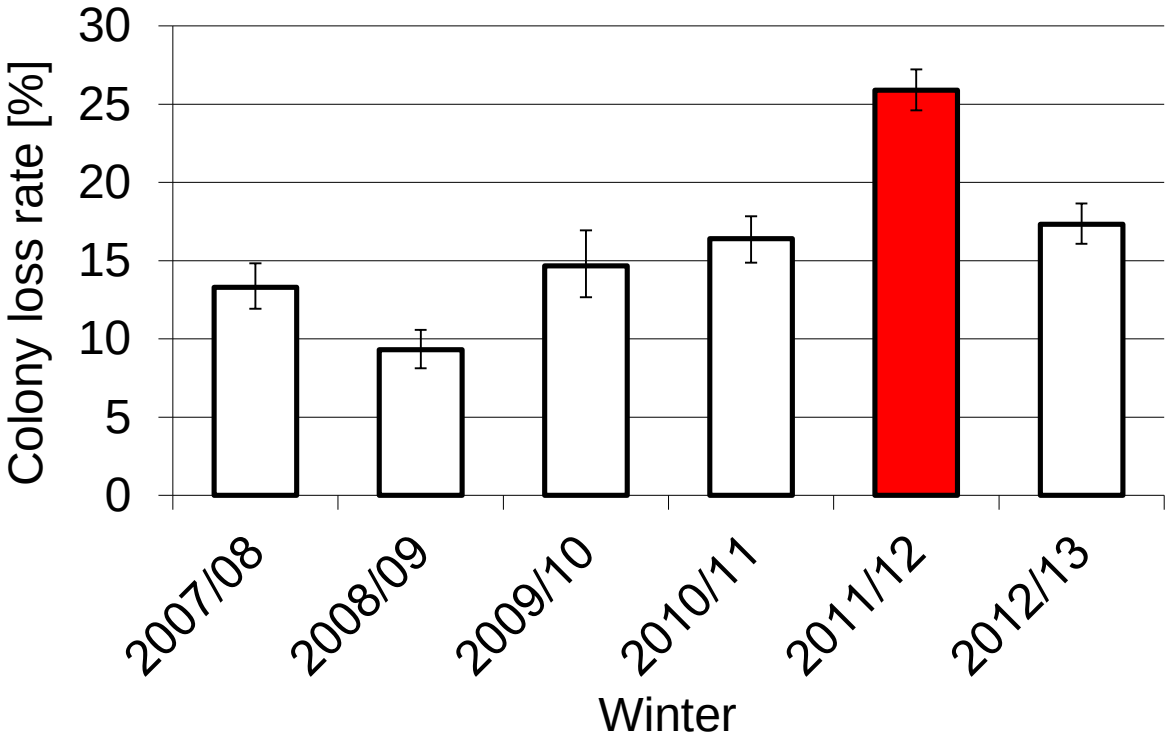
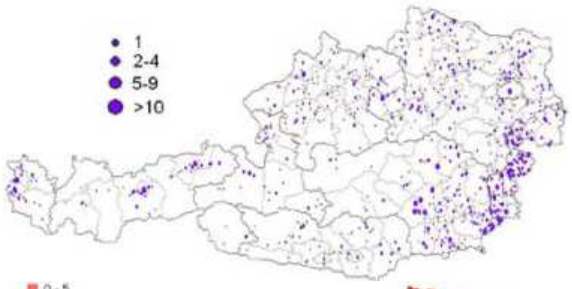
COLOSS survey on winter colony losses

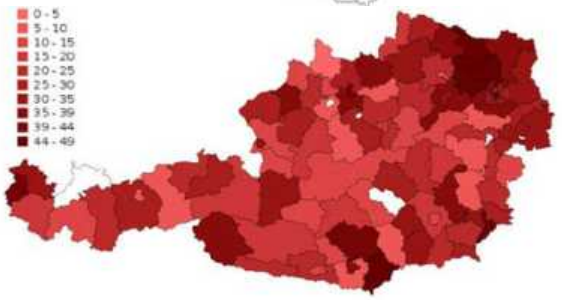


Brodschneider et al., 2010; van der Zee et al., 2012

COLOSS survey on winter colony losses







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Colony dynamics

Winter				
2007/08	2008/09	2009/10	2010/11	2011/12

537 operations

Colony dynamics

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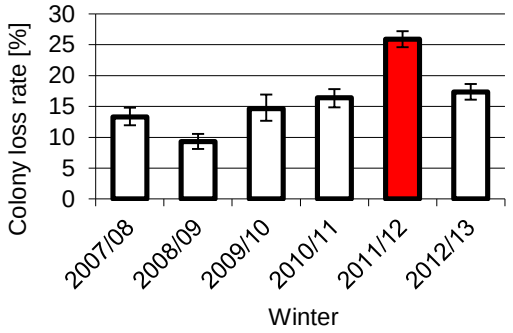


832 operations

Summer reproduction

Fall 2011

20841 colonies

Winter loss

Spring 2011

17566 colonies

Spring 2012

15198 colonies

$P<0,05$, Chi^2 Test

Renewal of honey bee life stock

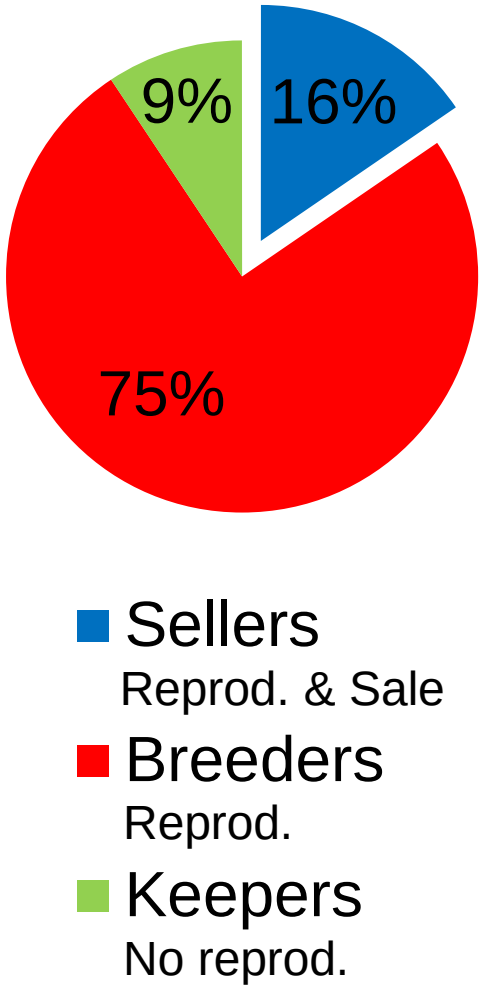
- After a winter with very high losses
- How do beekeepers compensate for losses?
- „Market research“ on honey bee trade

Material & Methods

- COLOSS survey on winter loss
- Follow-up study
  - Online (LimeSurvey 1.91)
  - 27.9.2012 - 5.11.2012
  - 75% response, 246 answers
- Production of livestock
- Buy and sell of livestock
  - Queens, nuclei, swarms, colonies
- „Market research“: reasons; details of bee trade etc.

Results: operation types

	n	Median operation size	Winter loss (%, 95% CI)
Keepers	23	6.5	18.0 (8.7-33.6)
Breeders	185	12	25.0 (21.5-28.9)
Sellers	38	45	15.0 (10.7-20.7)
Total	246	13	21.0 (18.3-24.1)
Precursor study	1537	12	25.9 (24.6-27.2)



Multiplication Factor (MF)

$$MF = \frac{(NewUnits + OriginalColonies)}{OriginalColonies}$$

- Queens — MF_Q
- Swarms, Nuclei — $MF_{S/N}$
- Colonies — MF_C

Honey bee units

After winter

Photo: www.lvwi.de

Multiplication Factor (MF)

$$MF = \frac{(NewUnits + OriginalColonies)}{OriginalColonies}$$

- Beekeeping operation 1 colony
  - 0 new colony → MF = 1
  - 1 new colony → MF = 2
  - …

Photo: www.lvwi.de

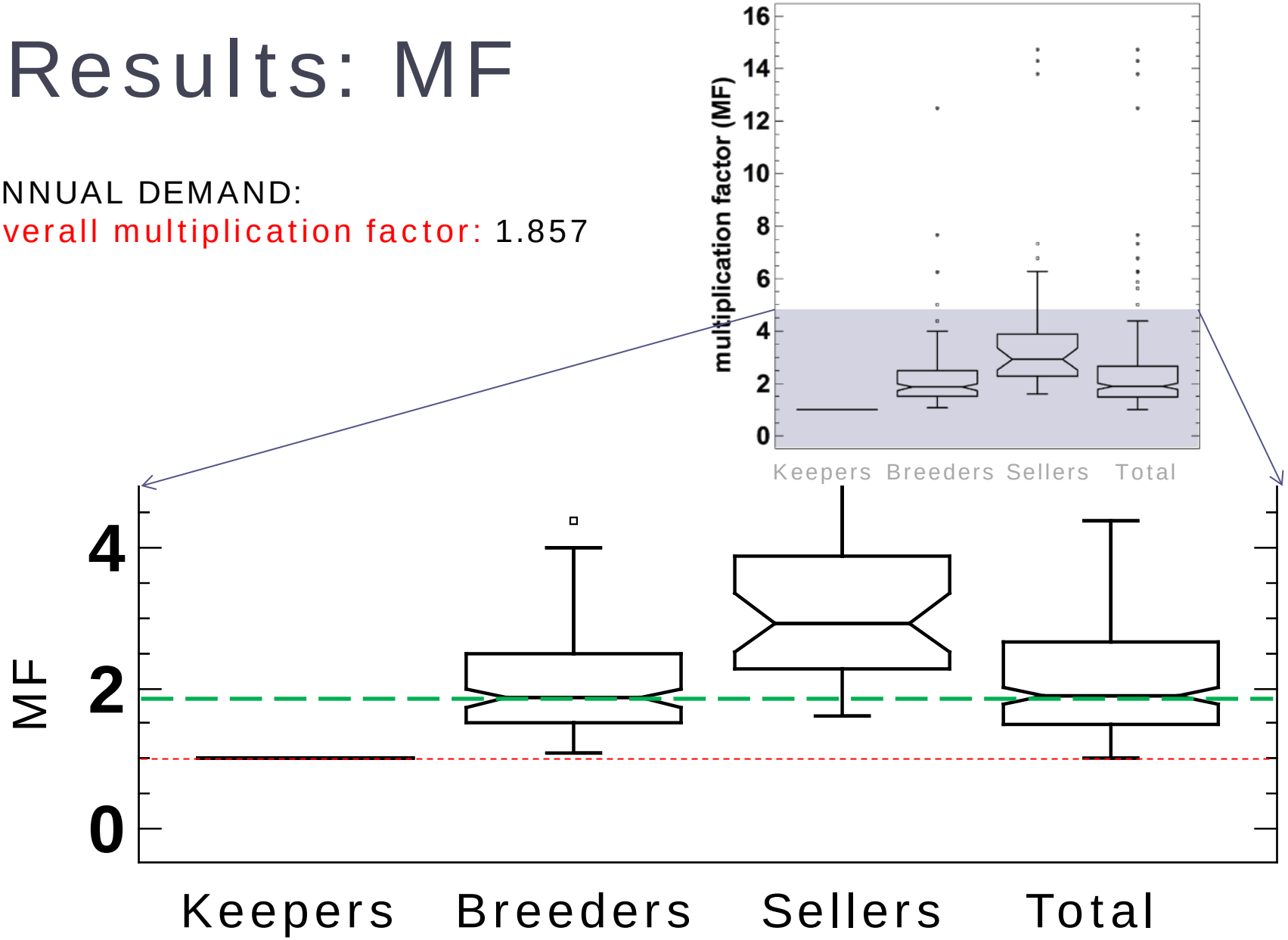
Multiplication Factor (MF)

- Annual demand for honey bee livestock:

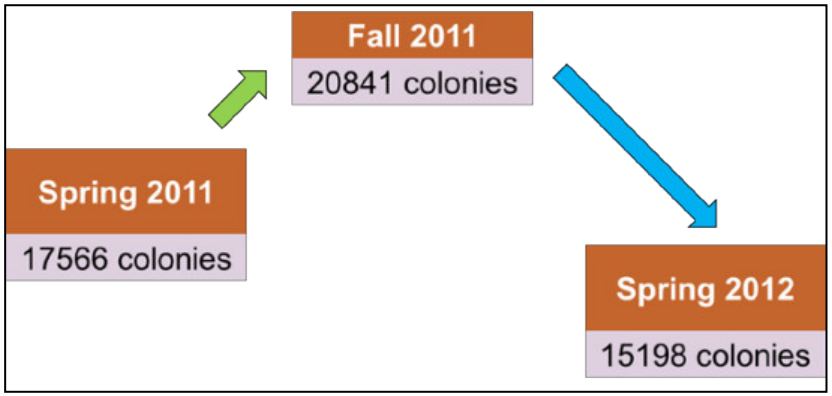
	%	MF
Compensation winter losses	25.9	1.371
Regular requeening	40.9	0.409
Problem related requeening	7.7	0.077
Other losses	??	--
Overall multiplication factor:		1.857
Median operation MF:		1.667

Results: MF

ANNUAL DEMAND:
Overall multiplication factor: 1.857



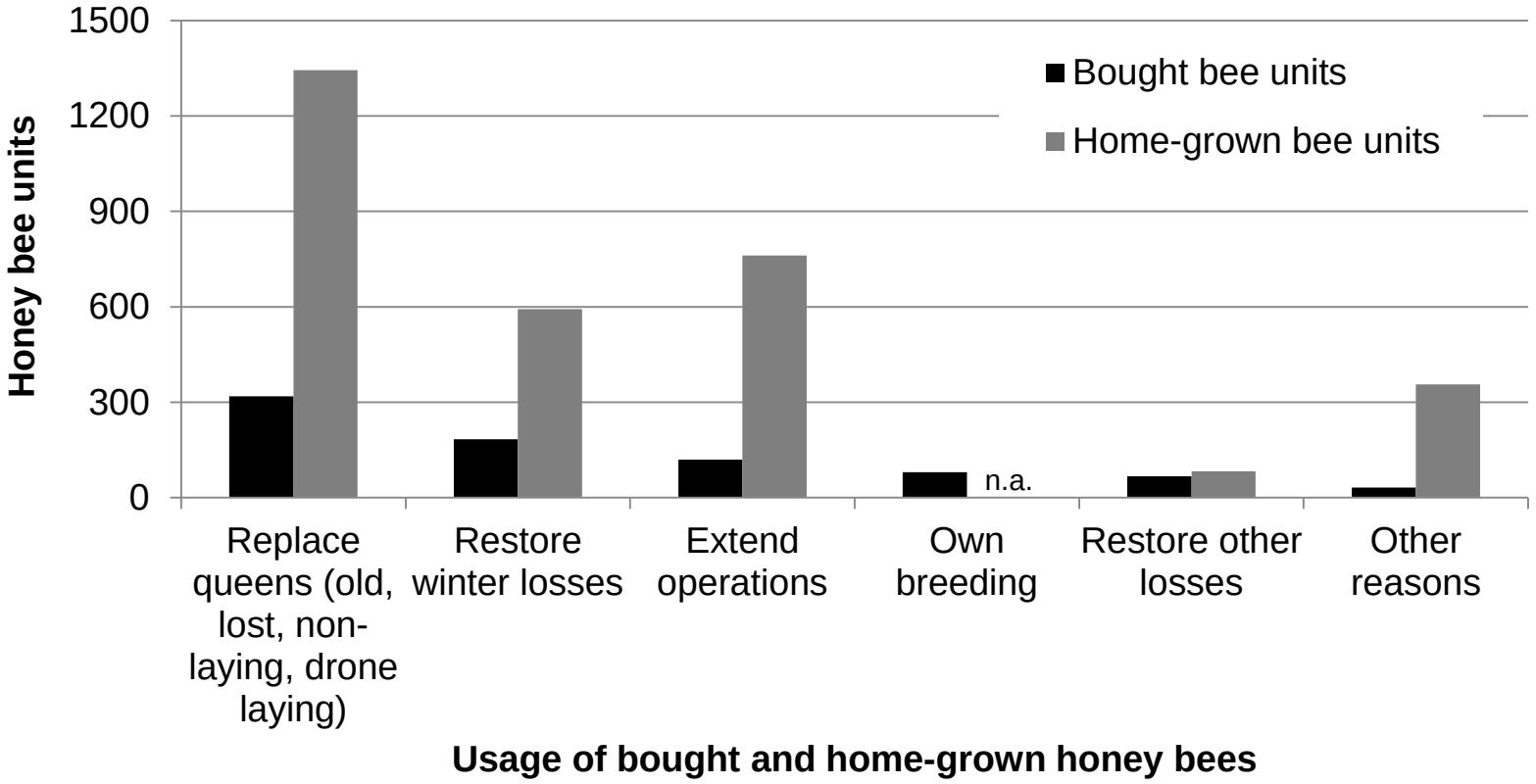
Results: Reproduction



How is renewal accomplished?

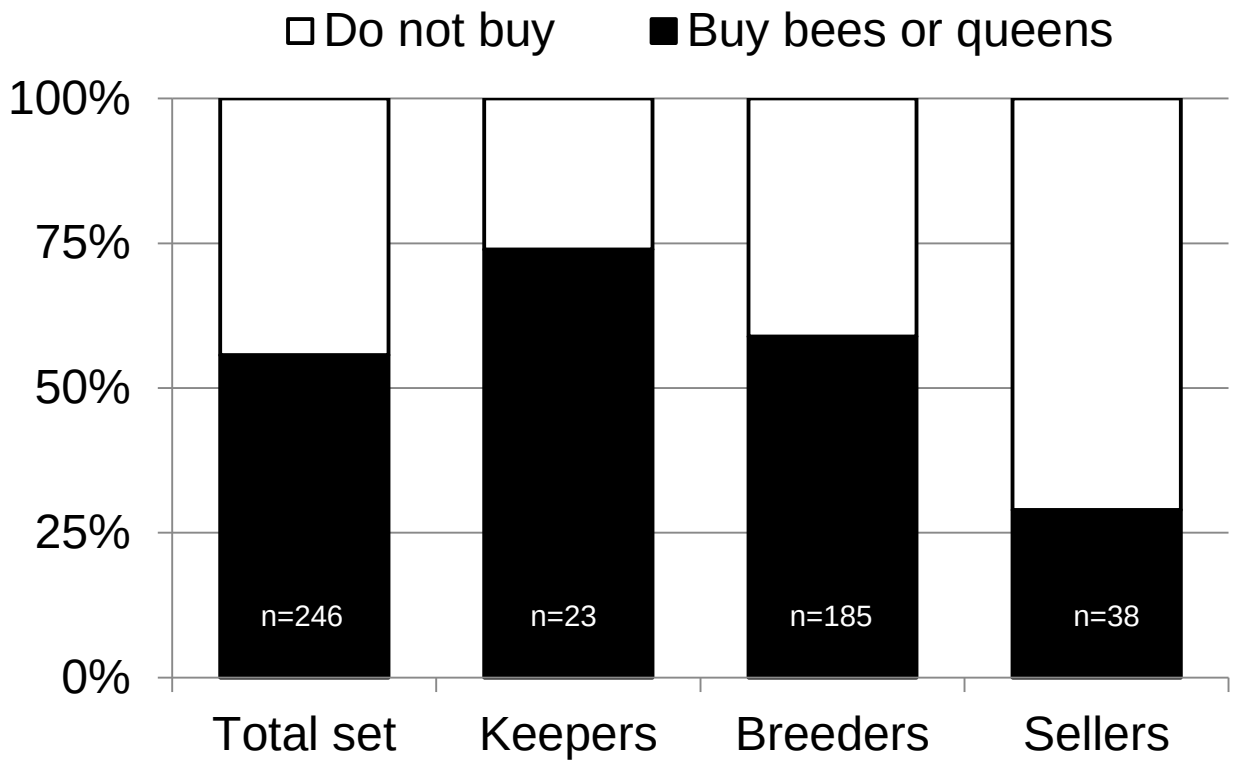
	Queens	Nucs, swarms
Home-grown	83.7%	97.6%
Purchased bees	16.3%	2.4%

Results: Reproduction

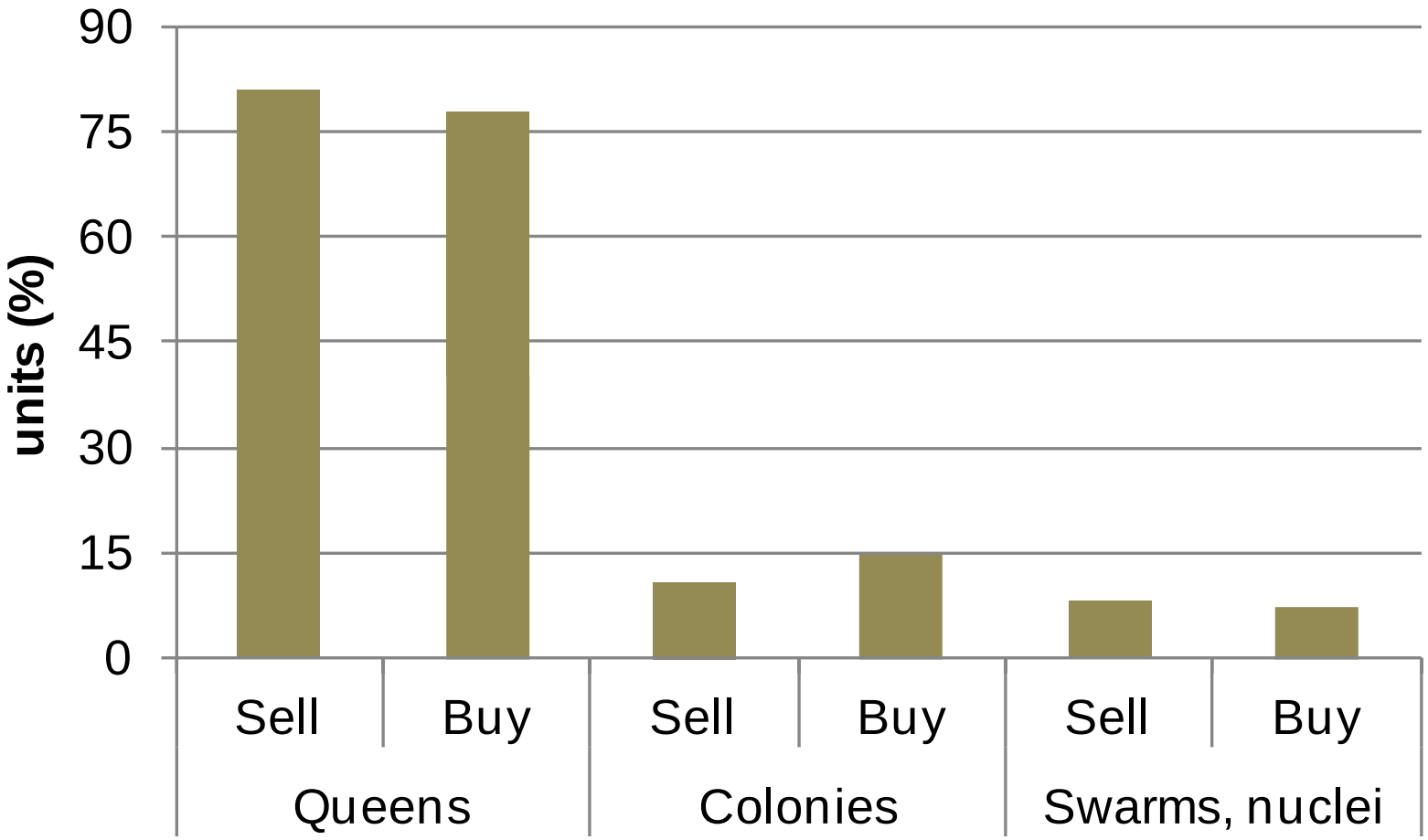


n = 802 bought bee units,
3137 home grown bee units

Results: Buying queens or bees (Market research)

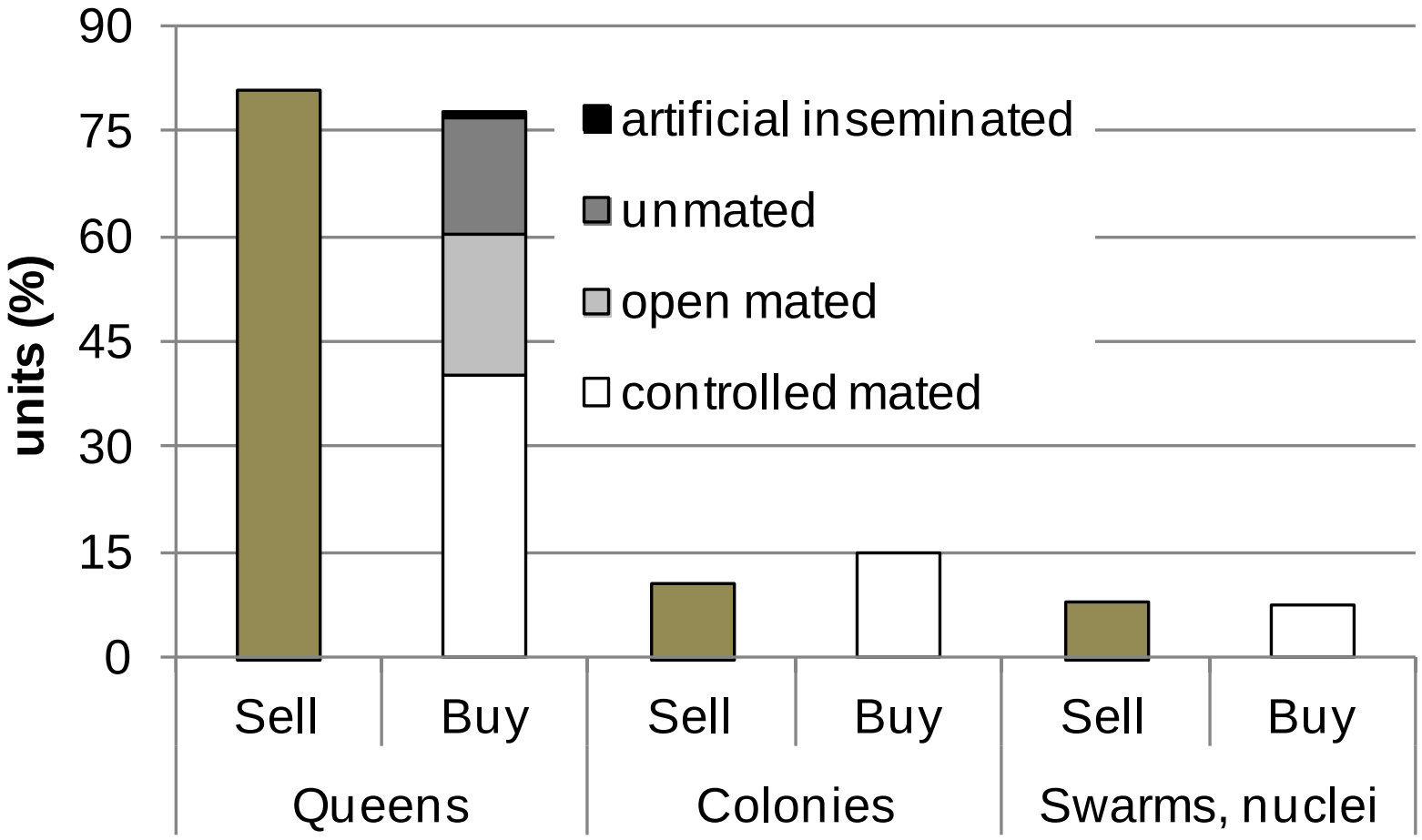


Results: Buying and selling



n=2247 (sell), 756 (buy)

Results: Buying and selling



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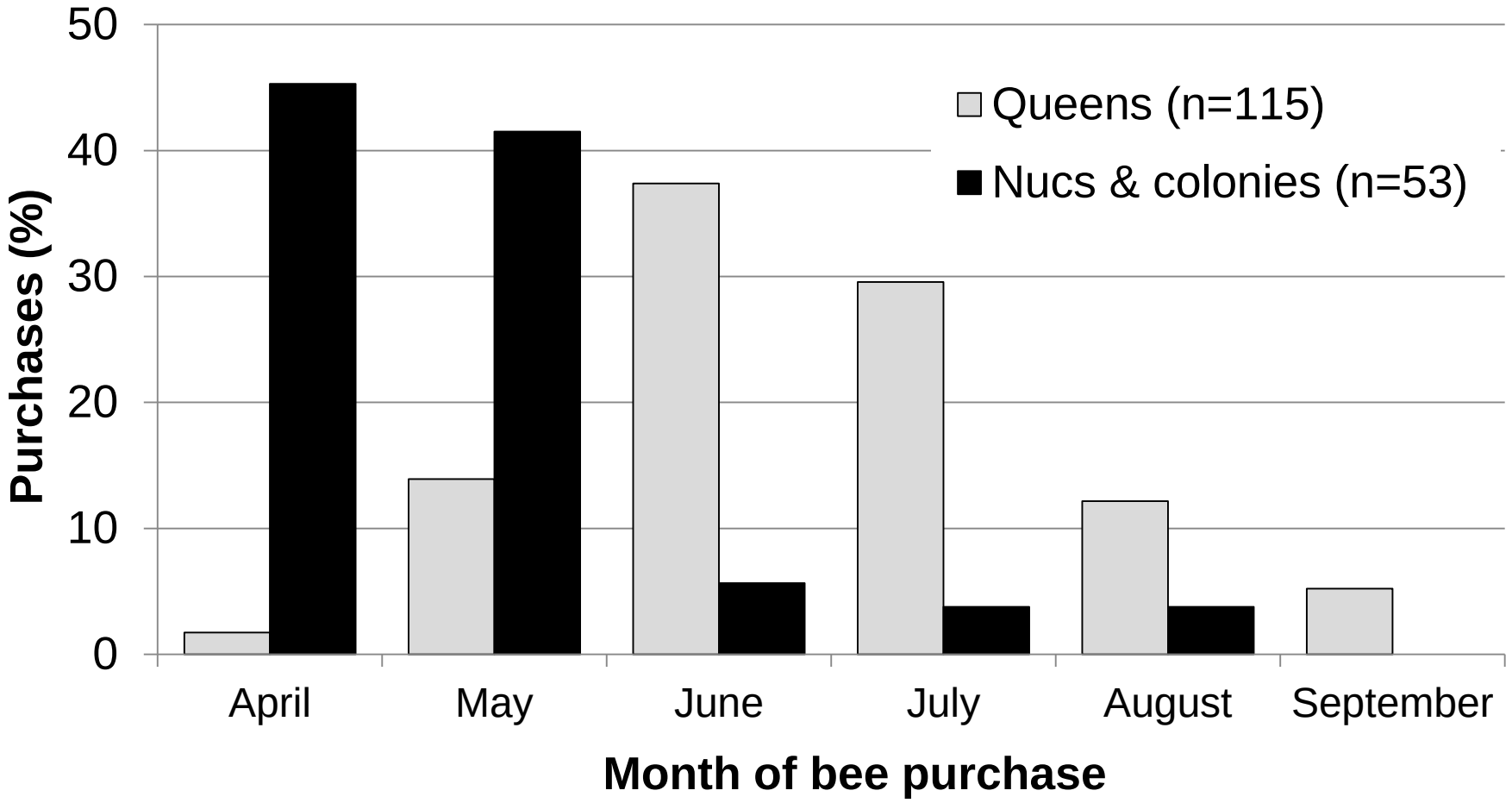
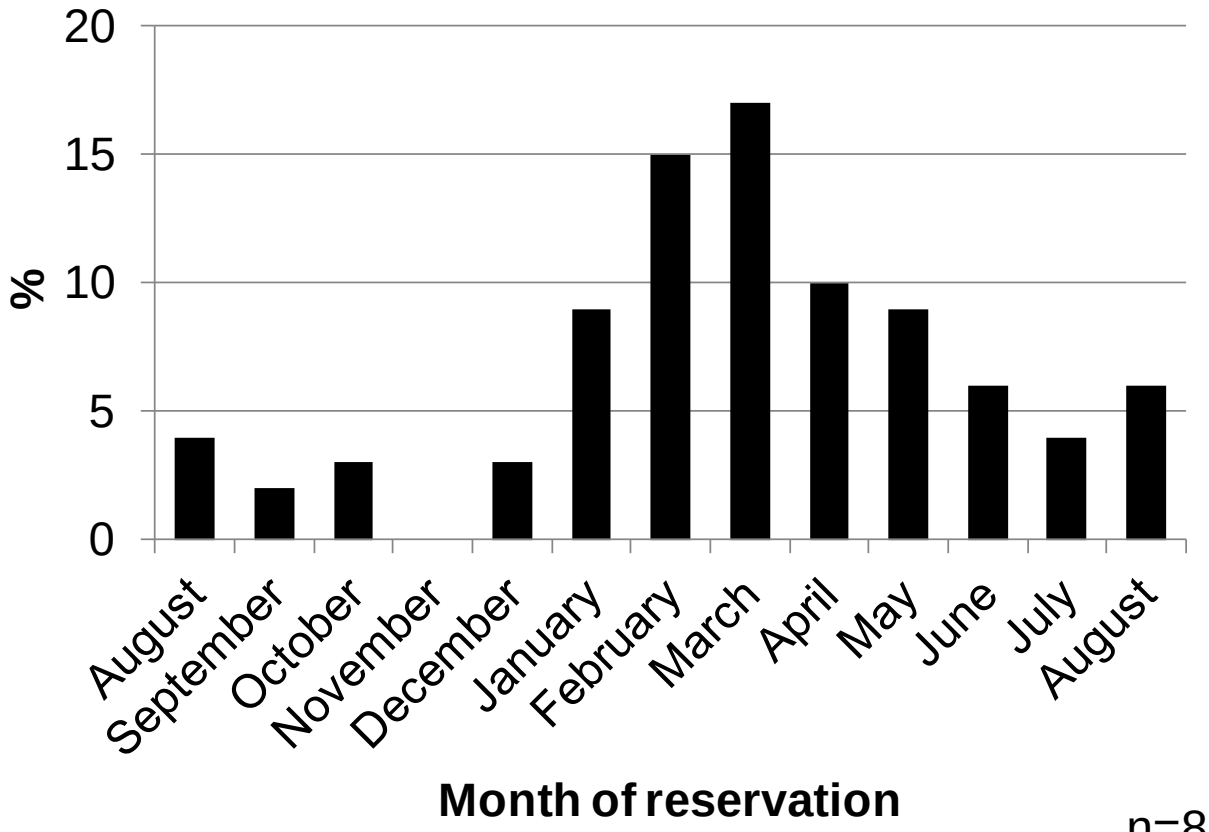


Results: Buying queens or bees

46.7% of purchasers order in advance

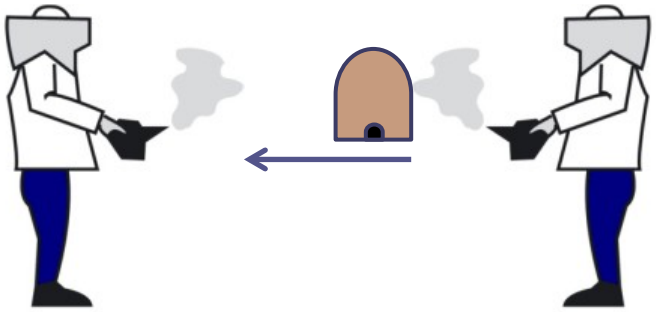
92.5% of pre-orders were successfully executed



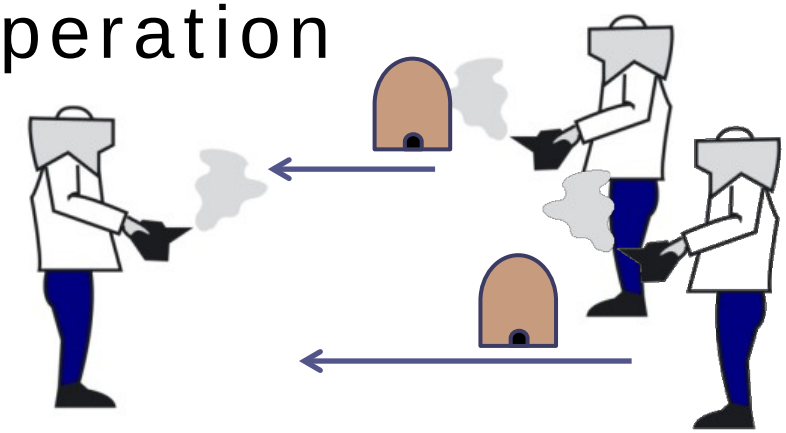
n=88

Results: Buying queens or bees

- 51.8% purchase bees from one sales operation



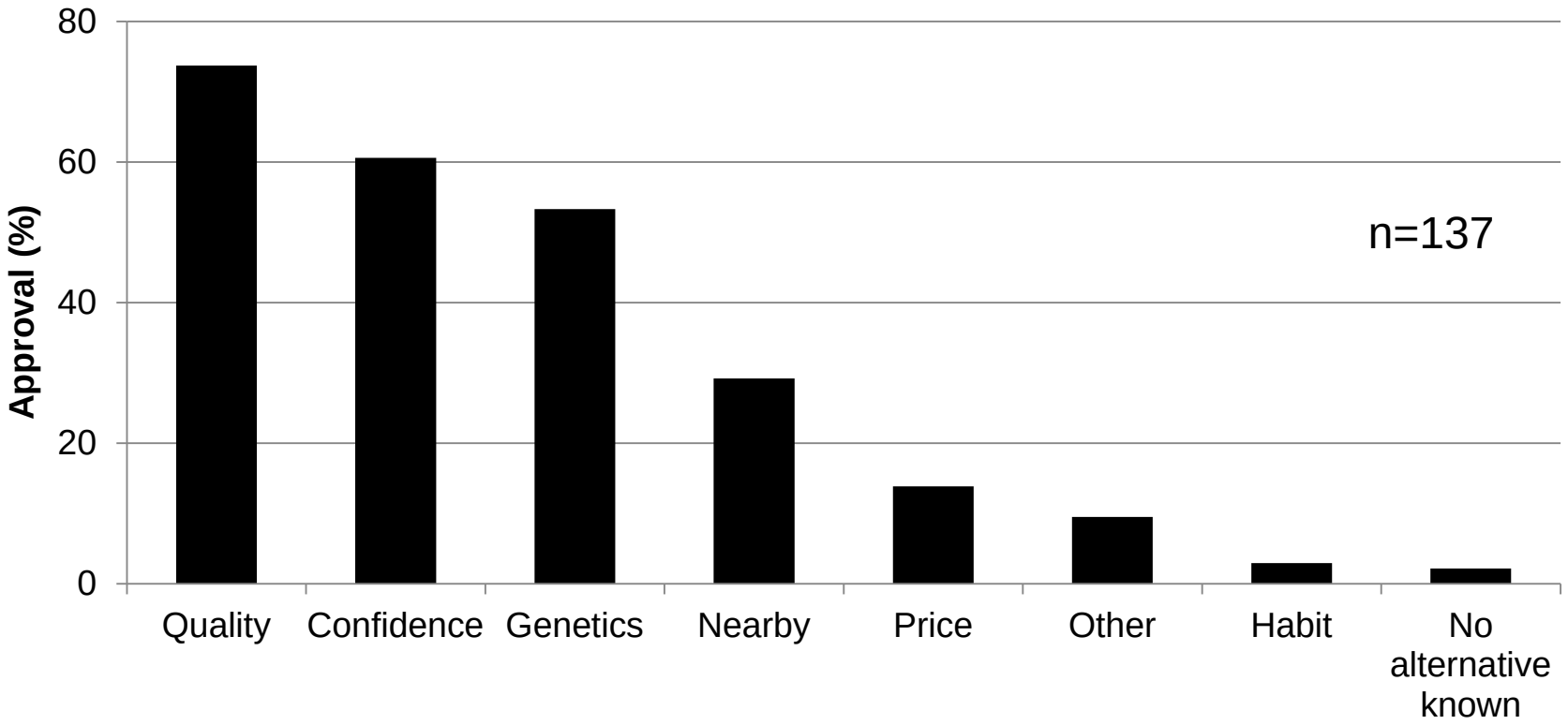
- 48.2% purchase bees from more than one sales operation



n=137

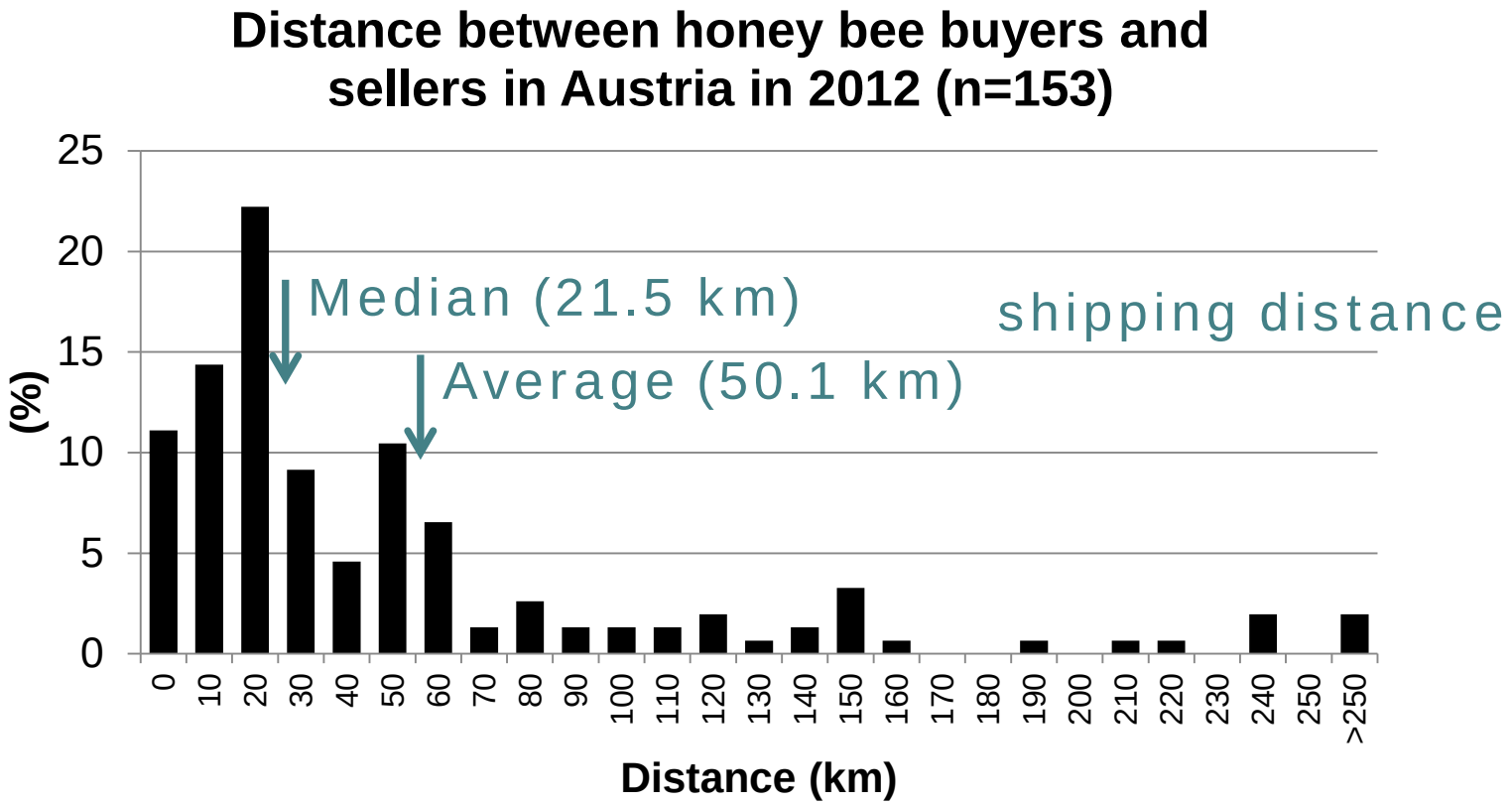
Results: Buying queens or bees

- Reasons to choose sales-operation



Results: Buying queens or bees

- Spatial aspects:



Conclusions - general

- The production of and business with honey bee livestock is an important part of beekeeping
  - This might become more important when colony losses increase
- Proposition to study not only colony losses but also compare with reproduction
  - Multiplication factor
    - Estimate annual demand
    - Estimate annual reproduction

Conclusions - Austria

- MF in Austria 2012 ~ 1.8
  - „Breeder“ operations (and total community) achieve this MF
  - Specialised „Seller“ operations exceed this MF
- Beekeepers are self-supporters
- More than 50% of operations buy honey bee livestock
  - Replace queens
  - Restore winter losses
- Bee trade is mainly a local business