

Timing of varroa control & bee and colony survival in winter

Tjeerd Blacquièrè, Lonne Gerritsen, Sjef van der Steen
& Bram Cornelissen
tjeerd.blacquiere@wur.nl



PLANT RESEARCH INTERNATIONAL
WAGENINGENUR

Intro

- brood cell infestation with varroa:
 - lower protein
 - more virus infections
 - **reduced life expectancy**

- Normal expectancy:
 - spring 30-60 days
 - summer 15-36 days
 - winter >140 days
- short lived 'winter' bees:
 - early spring
 - death



intro

- Healthy young bees:
 - diseases: low or now infestations
 - good condition/shape
 - nutrition:
 - plenty of good (and diverse) pollen
 - plenty and good royal jelly
 - Good royal jelly if:
 - Nurse bees are healthy and in good shape
 - only true if one month ago:
 - colony was healthy
 - plenty of good food (pollen & nectar) available



Research questions

1. When are winter bees raised in NL
2. How long do they survive
3. Is individual bee survival affected by varroa infestation (timing of control)
4. Is colony survival affected by timing of varroa control



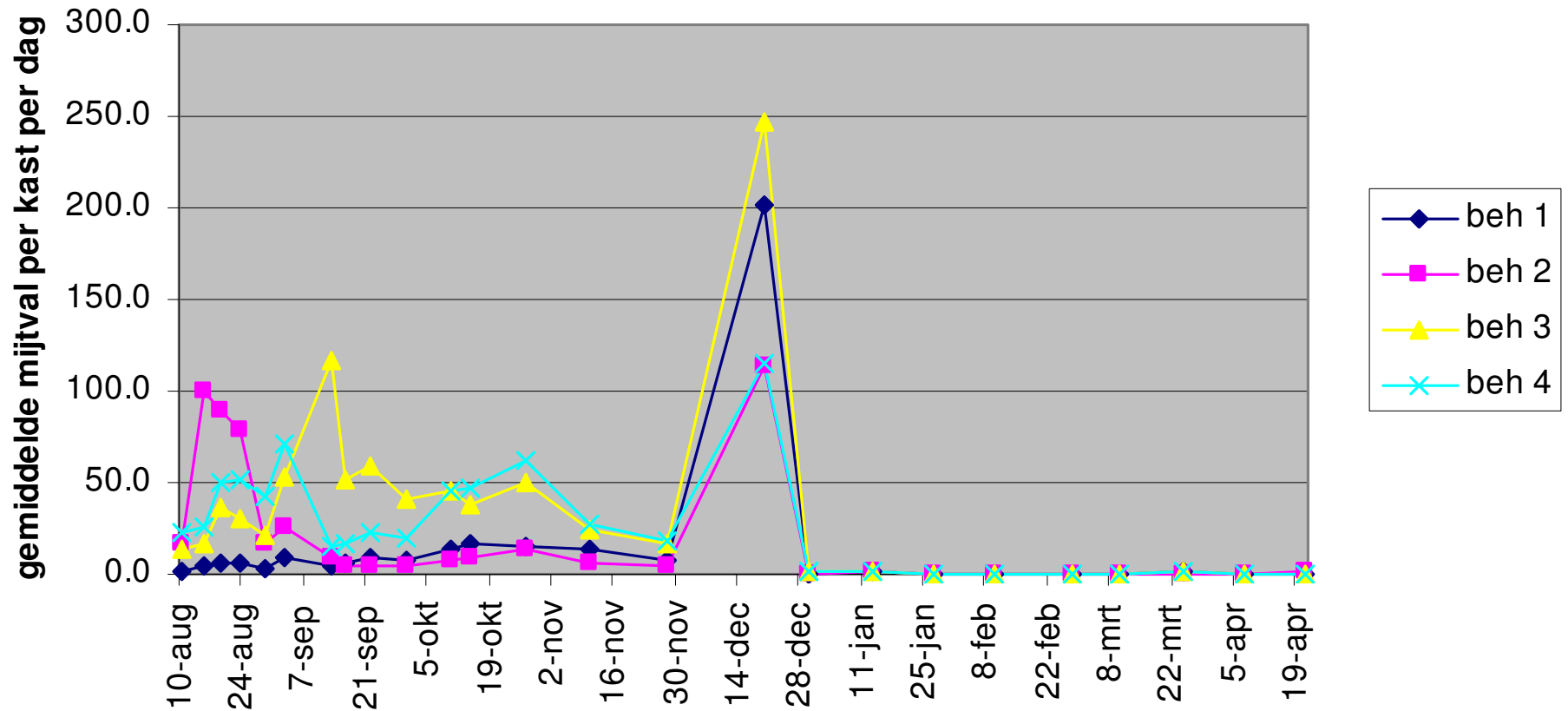
M&M

- Bee colonies treated against varroa before:
 1. July 1 (and December 13: OA) N=6
 2. September 1 (and December 13: OA) N=6
 3. October 1 (and December 13: OA) N=6
 4. not treated (only December 13: OA) N=6
- Marking 'grey' bees every fortnight from Aug-Nov
 - count survivors every two weeks
 - count number of sealed brood cells every two weeks
- Evaluate surviving and dead colonies in April



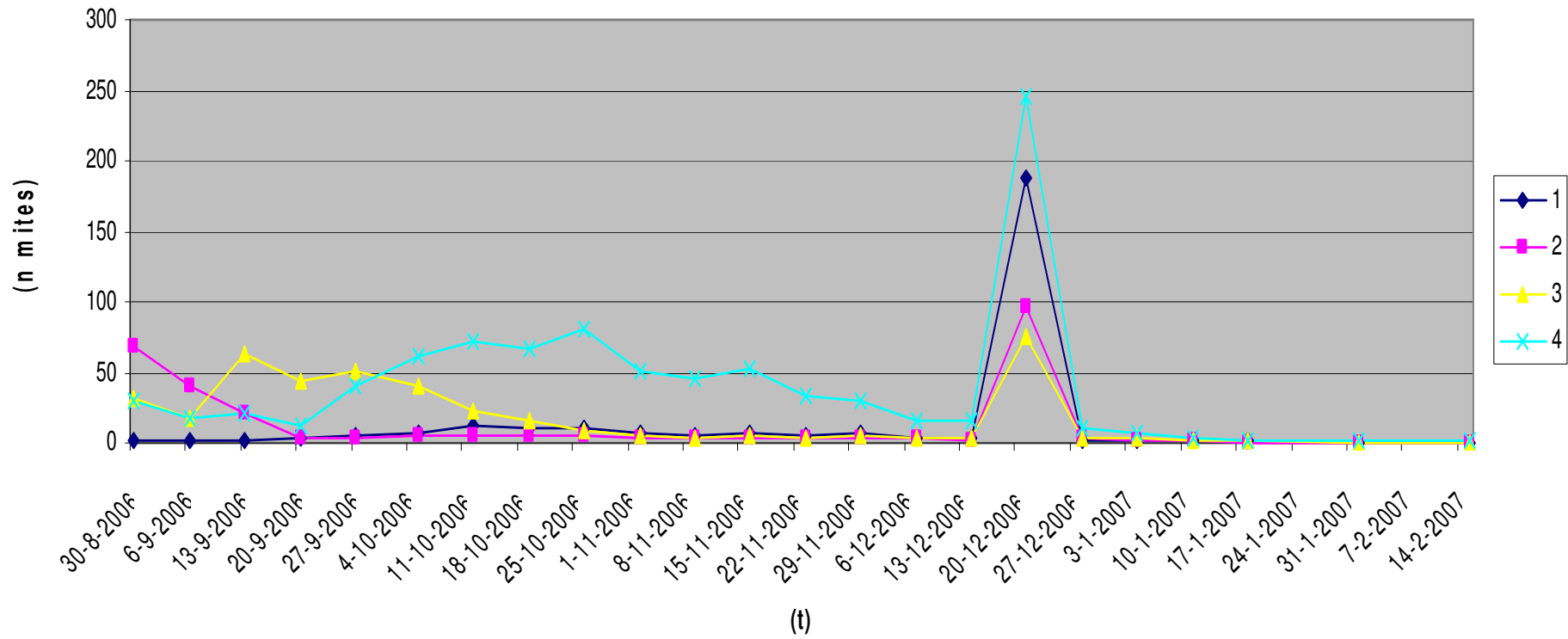
Results: mite fall

mijtval

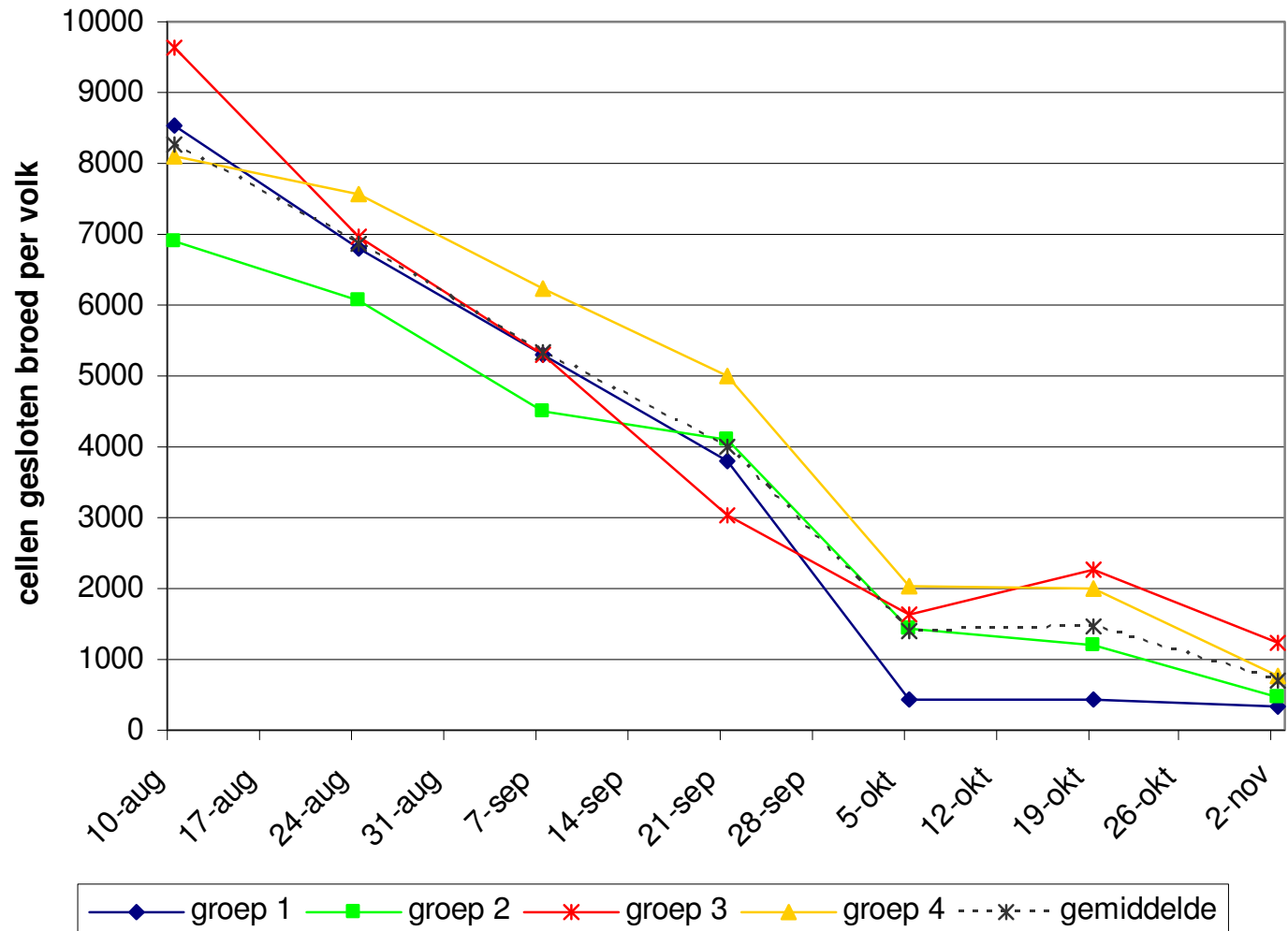


Mite fall

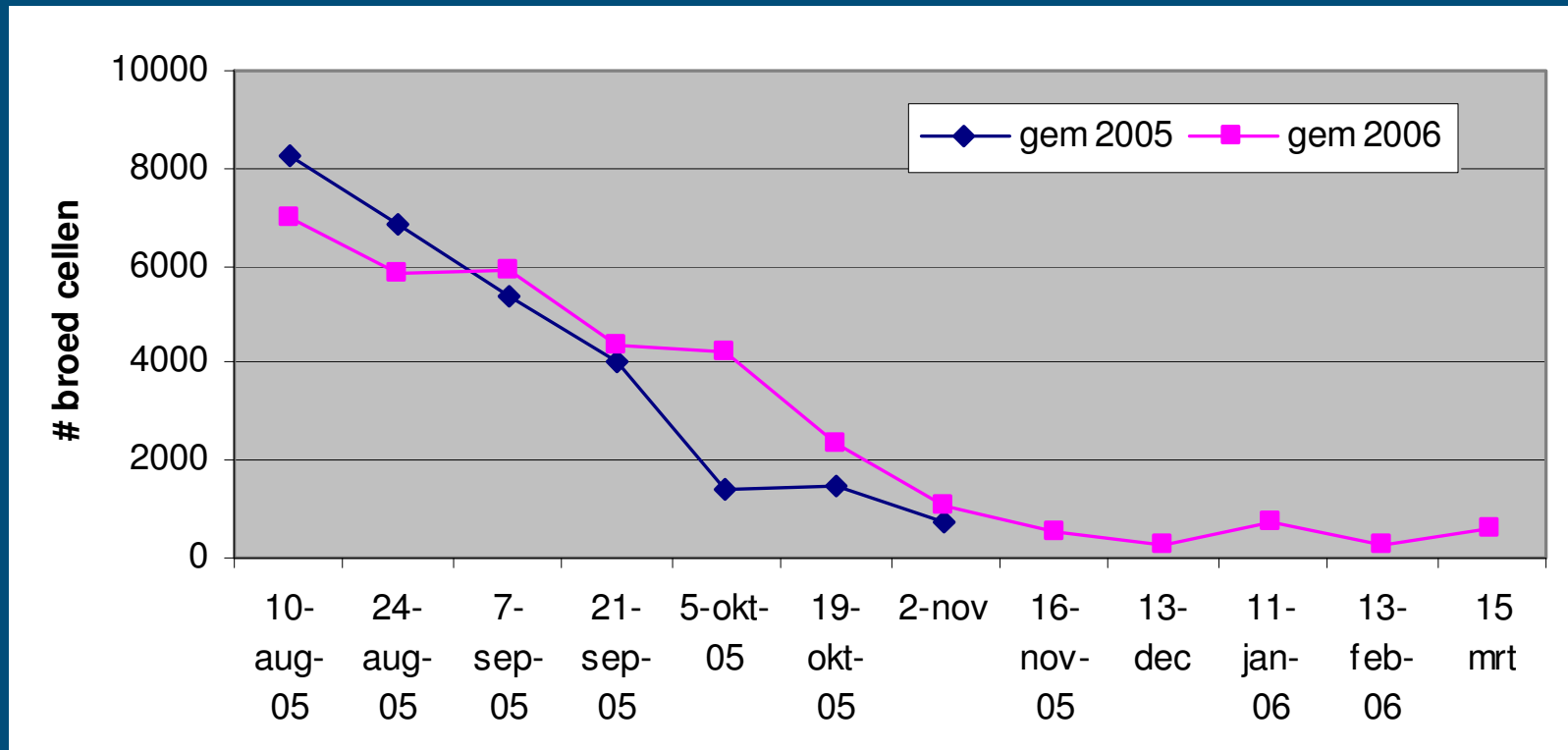
mijtval per groep per dag



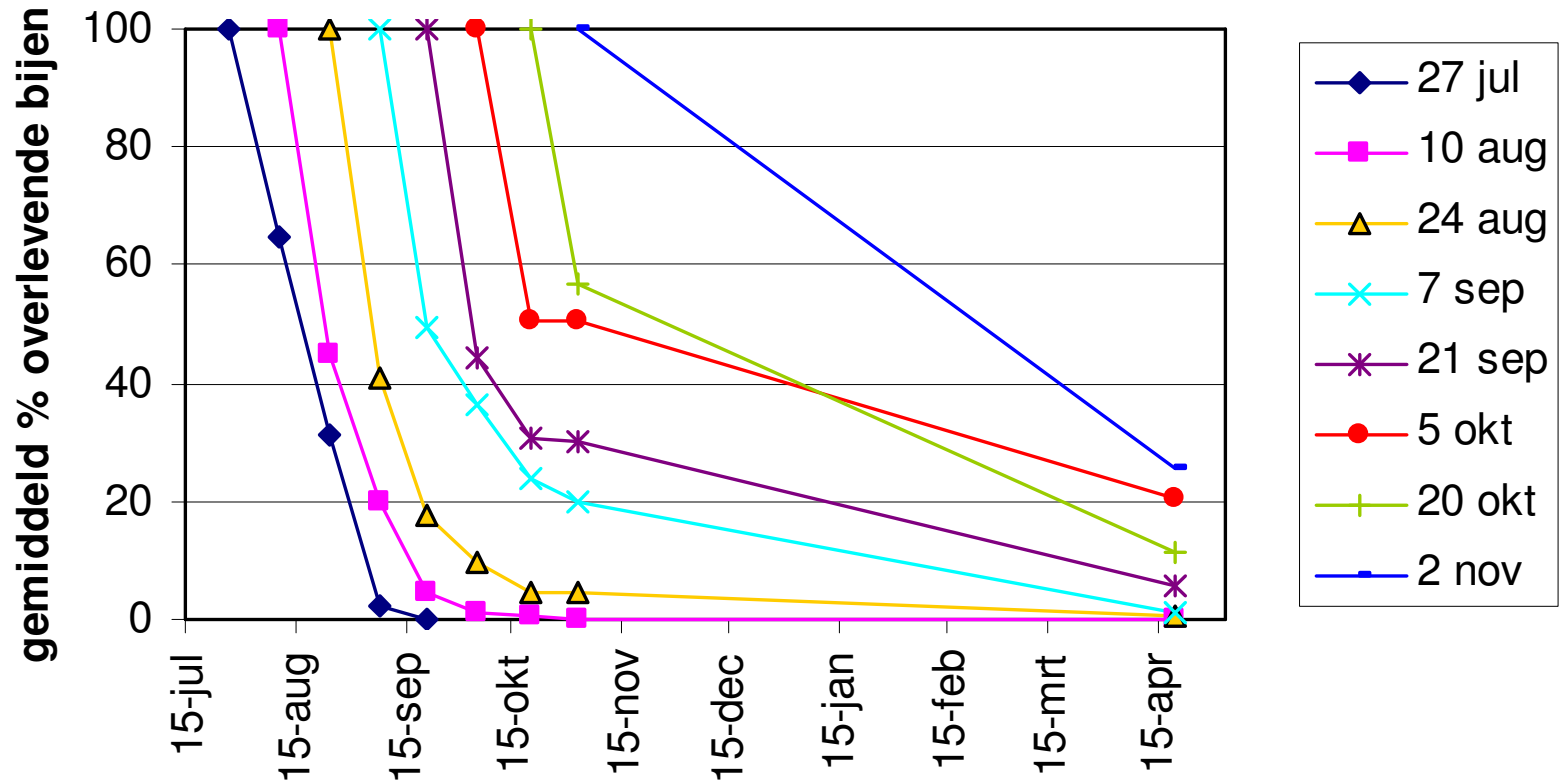
Sealed brood cells



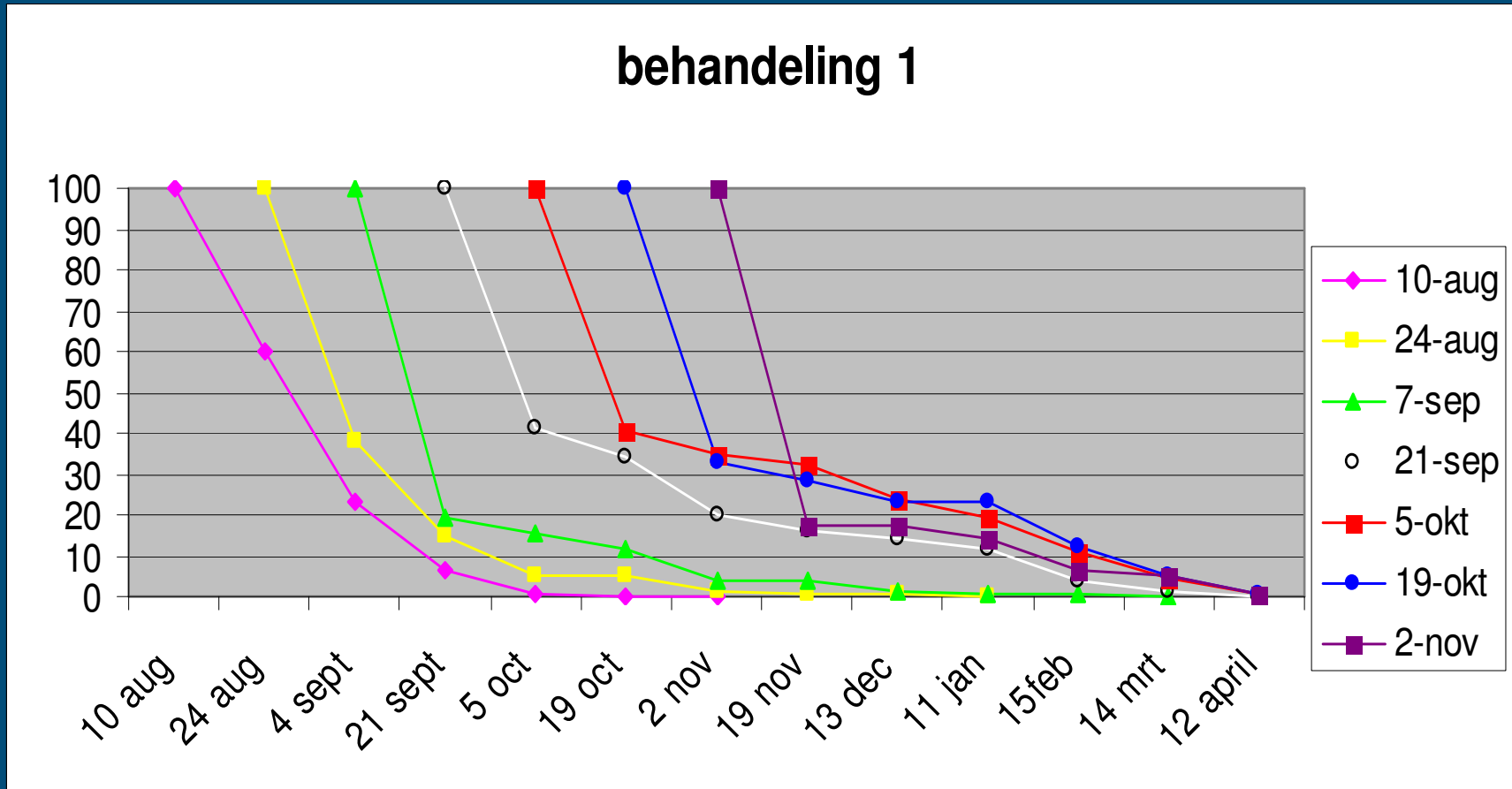
Sealed cells winter 2005-06 and 2006-07



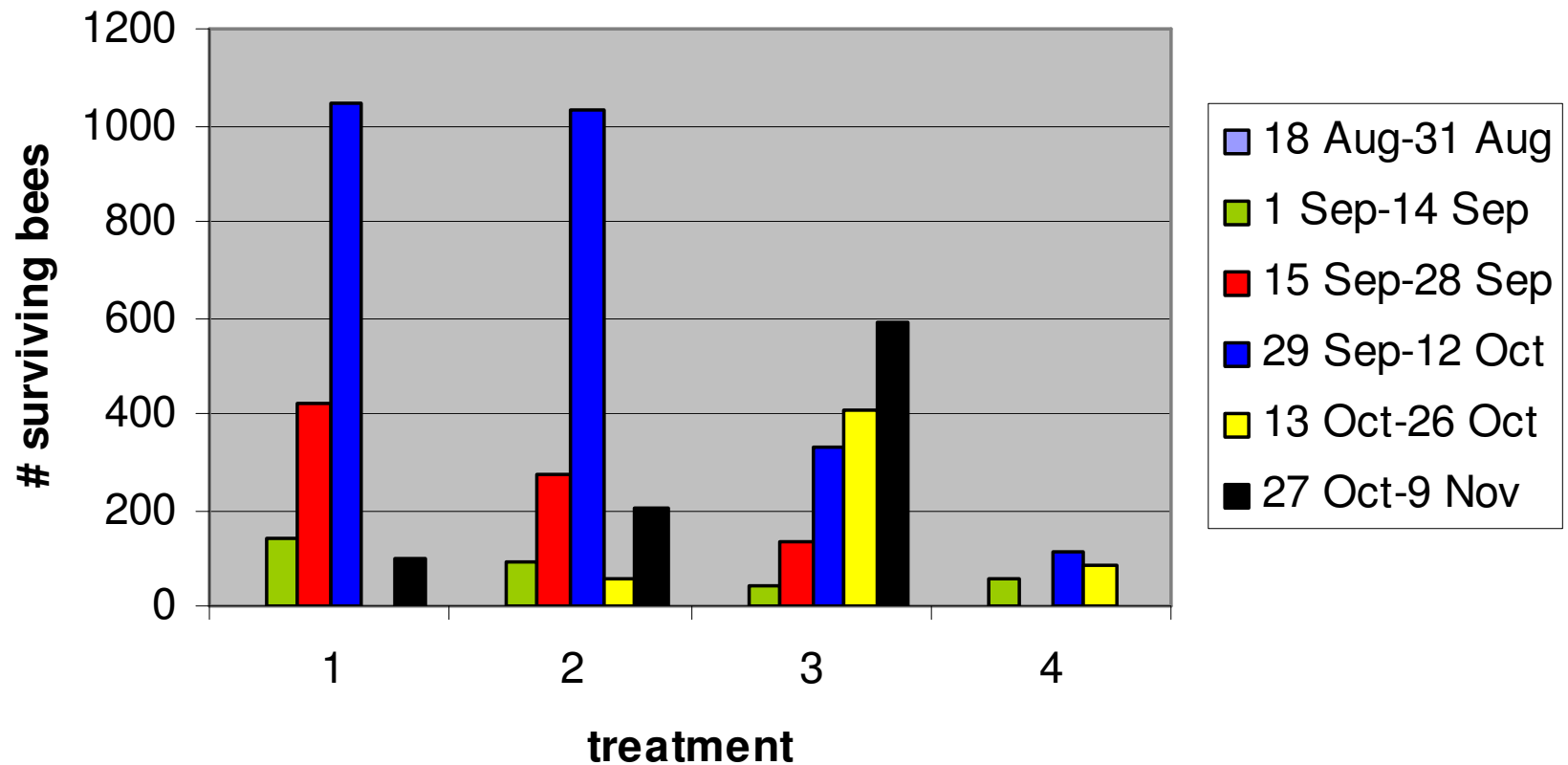
Survival of cohorts hatched Aug – Nov 05



Survival of cohorts hatched Aug – Nov 06



Survivors in April 2006



Survivors: number of sealed cells X Percentage of surviving marked bees



Colony losses and individual bee survival

Group	% lost colonies	N bees from 2005, on April 19, 2006*	Mean N bees per colony **
1	0	1758	7200
2	0	1651	6300
3	0	1499	5800
4	67	420***	4000***

* percentage recovered marked bees X number of brood cells before hatching period

** counted (estimated) bee numbers present on April 19, 2006

*** only surviving colonies



PLANT RESEARCH INTERNATIONAL

WAGENINGEN UR

Colony losses 2nd experiment

- Colonies lost April 4, 2007:
 - Group 1: 0 % (N=7)
 - Group 2: 0 % (N=6)
 - Group 3: 0 % (N=6)
 - Group 4: 30 % (N=10)



Conclusion Results 2005-06-07

- Winter bees raised in September – November
- Timing varroa control:
 - early control (before July): → no losses
 - intermediate (August): → no losses, but more decline bees
 - late control (Sept): → some colonies lost, bees decline faster
 - no control until Dec: → most / many colonies lost, strong decline bees in surviving colonies
 - late control → longer brood production, later winter bees
- Similar results in 2005-07 survey Dutch beekeepers:
 - less losses when controlling varroa early
 - → Focus on varroa control
 - → Focus on Bee Quality (proteins age cohorts)



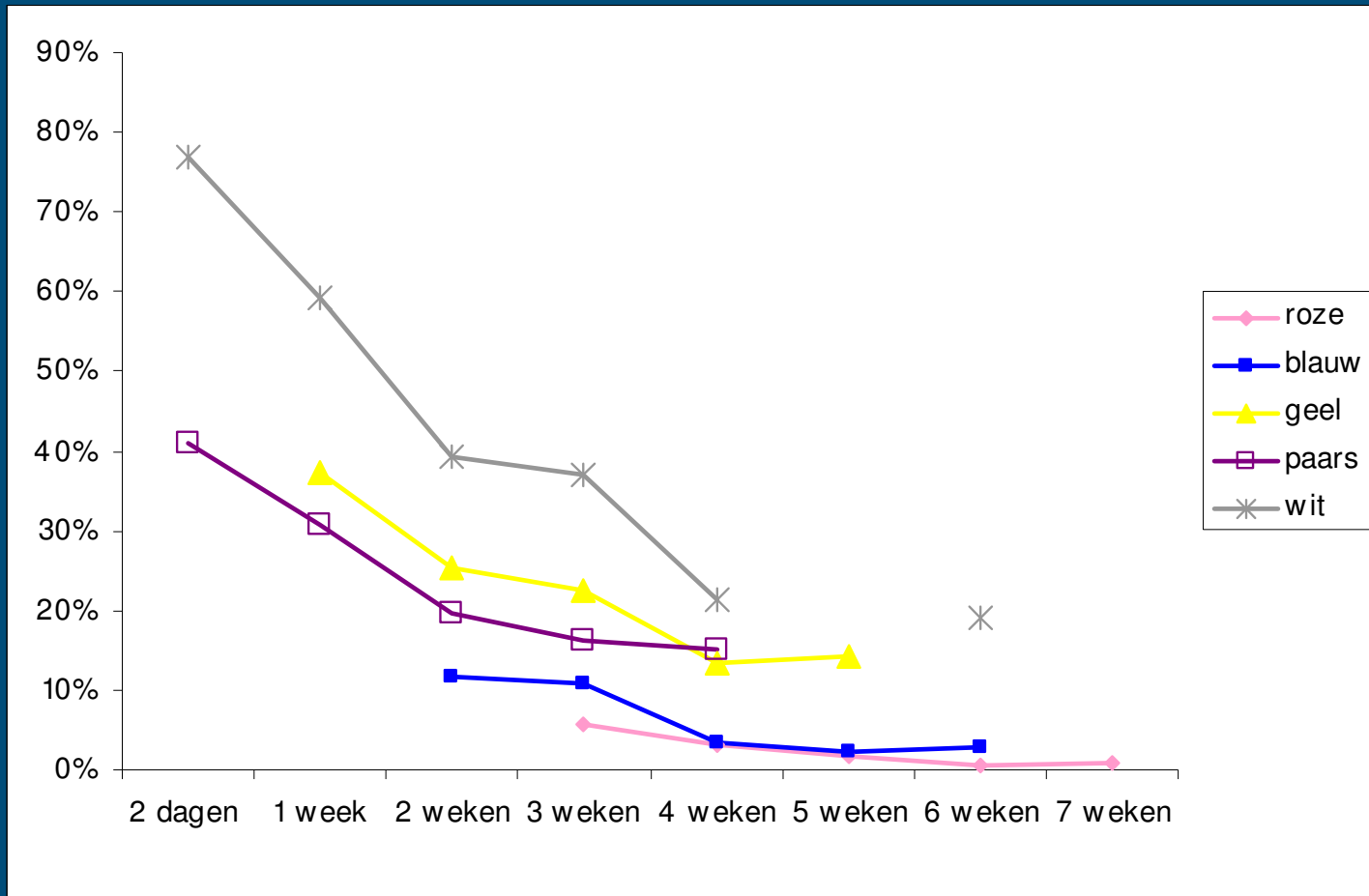
Thank you

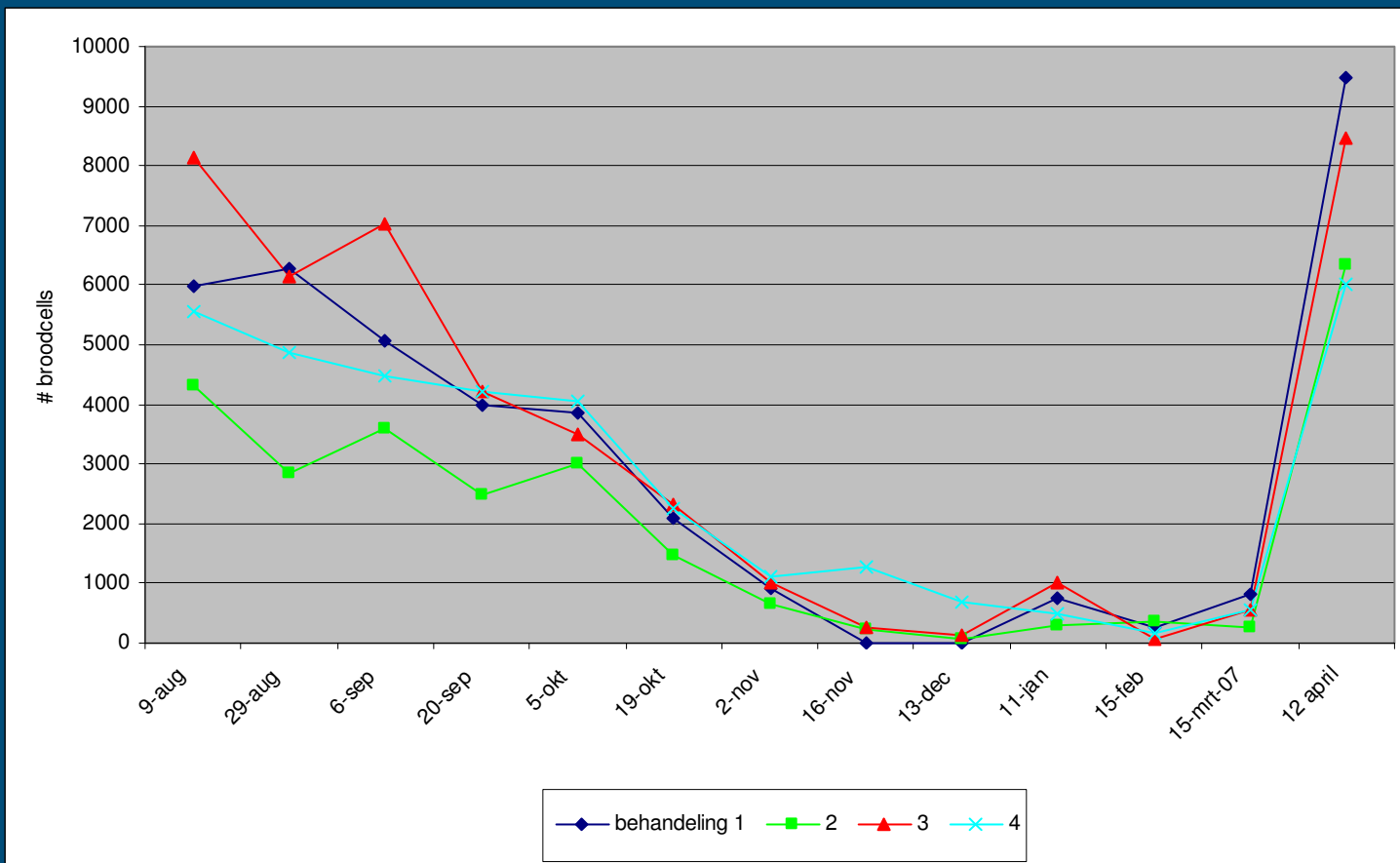
© Wageningen UR



PLANT RESEARCH INTERNATIONAL
WAGENINGEN UR

M&M: many bees lost in a few days





Experiments 2008

- Survey bee health status Dutch beekeeping
 - 150 bee keepers
 - all over country
 - coordinated by bees@wur and beekeepers organizations
 - 5 colonies sampled on each apiary
 - sample bees from first frame
 - samples split in the lab: determinations made in NL and UK (bijen@wur, CVI Lelystad, Central Science Lab York)



Experiments 2008 ctnd

- Determinations on bees:
 - varroa
 - AFB, EFB
 - Nosema (*apis & ceranae*)
 - viruses: KBV, DWV, BQCV, SBV, CPV, APV, IV
 - Chalk brood
 - Stone brood
 - Acarapis woodi

 - (heavy metals)
- Honey samples
 - pollen spectrum



Experiments 2008 & further

- Relation between varroa infestation rate and other pathogens (viruses, AFB,):
 - experiments
- 'Natural' selection varroa resistance
 - Island approach
 - nukes (every year new set up from surviving colonies)
 - varroa development in worker brood
 - no Bond
- Protein research (shown by Van der Steen)



Aim

- sustainable and disease preventing beekeeping
- good beekeepers practice (extension and education)
- Eventually: no colony losses

