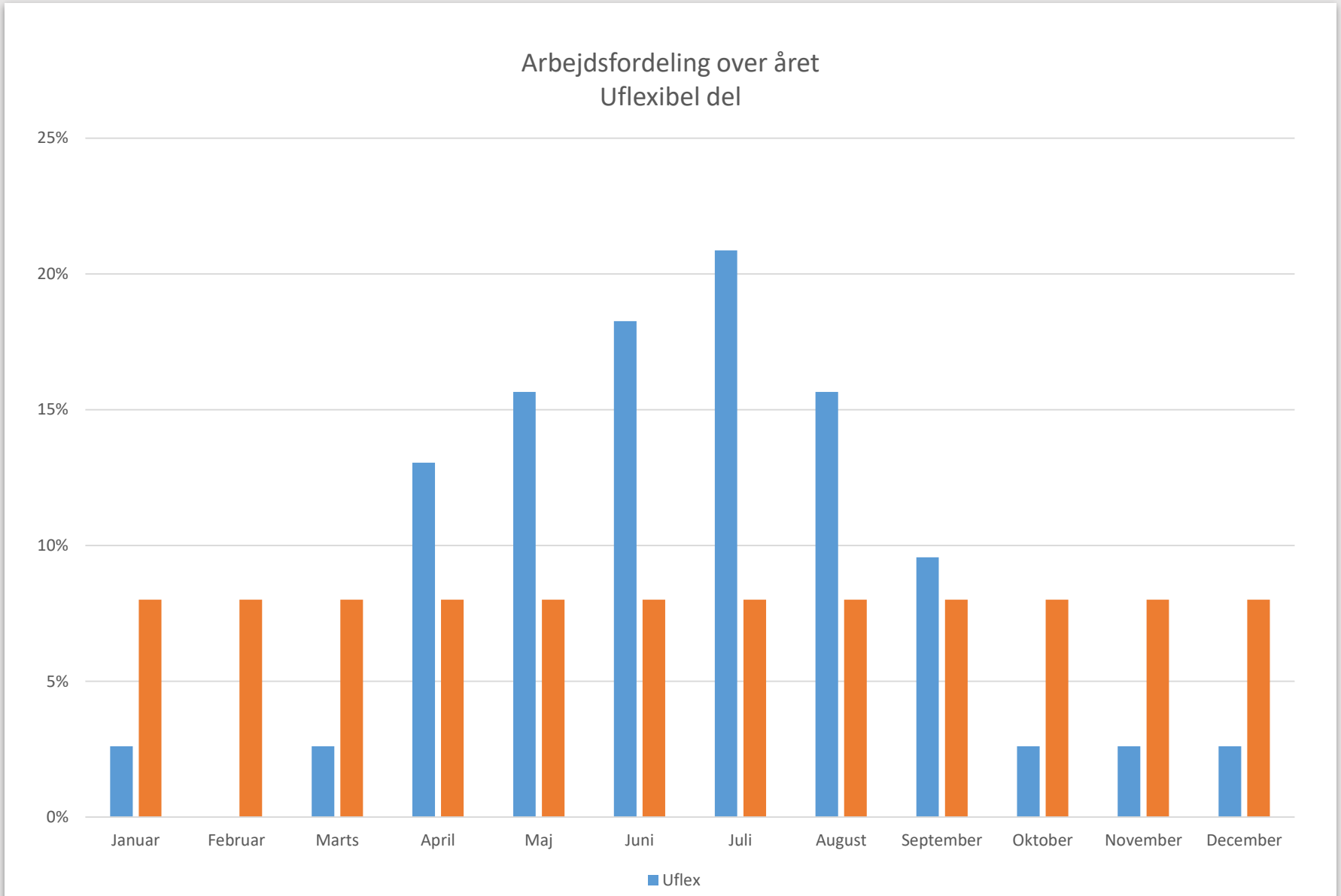
Hvad nu ?

- No mites => No virus ??

”Huset” 2/3-2018

Hygiejnisk adfærd,
varroa og virus ?


Arbejdsfordeling over året
Uflexibel del
25%
20%
15%
10%
5%
0%
Januar
Februar
Marts
April
Maj
Juni
Juli
August
September
Oktober
November
December
Uflex

Forsvarsmekanismer mod varroamider:

- Grooming
- VSH
- Hyg ?

Forsvarsmekanismer mod varroamider:

- Grooming

Ikke testbar

Forsvarsmekanismer mod varroamider:

- VSH

Vanskeligt testbar

Forsvarsmekanismer mod varroamider:

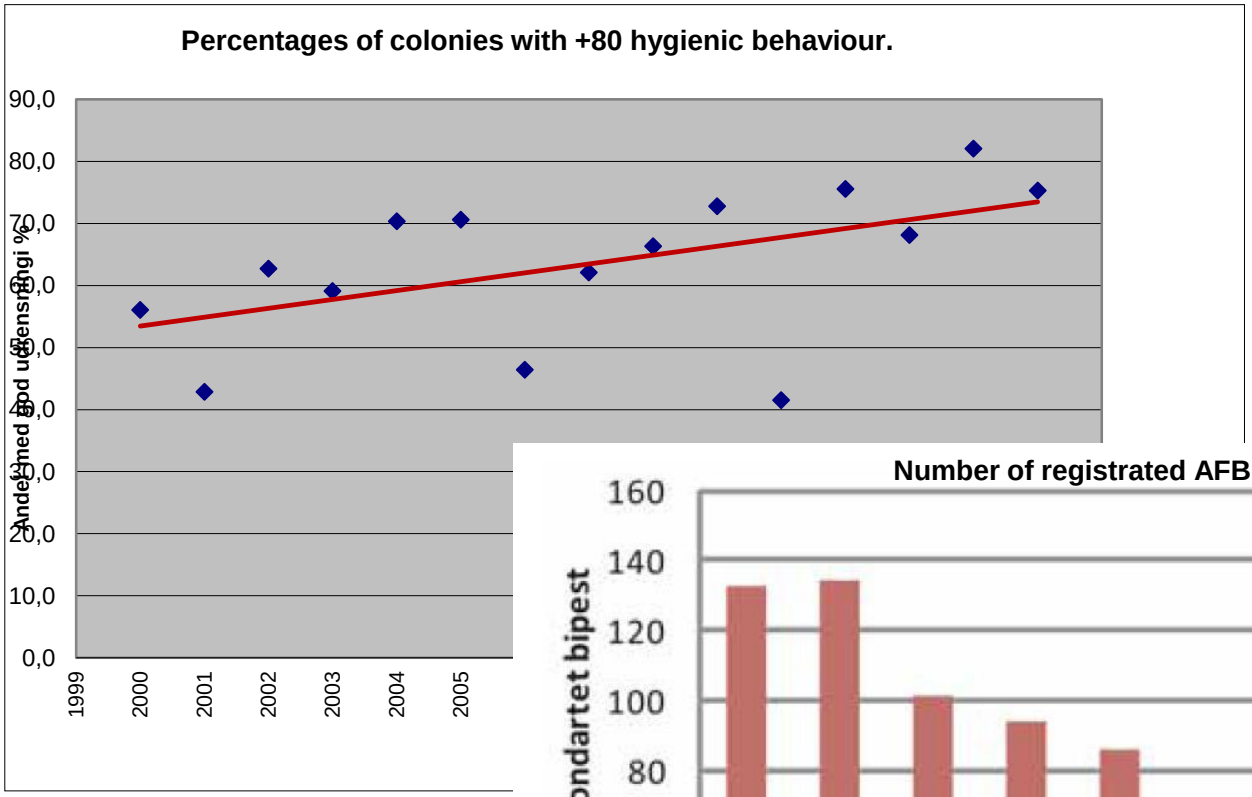
- HYG ?

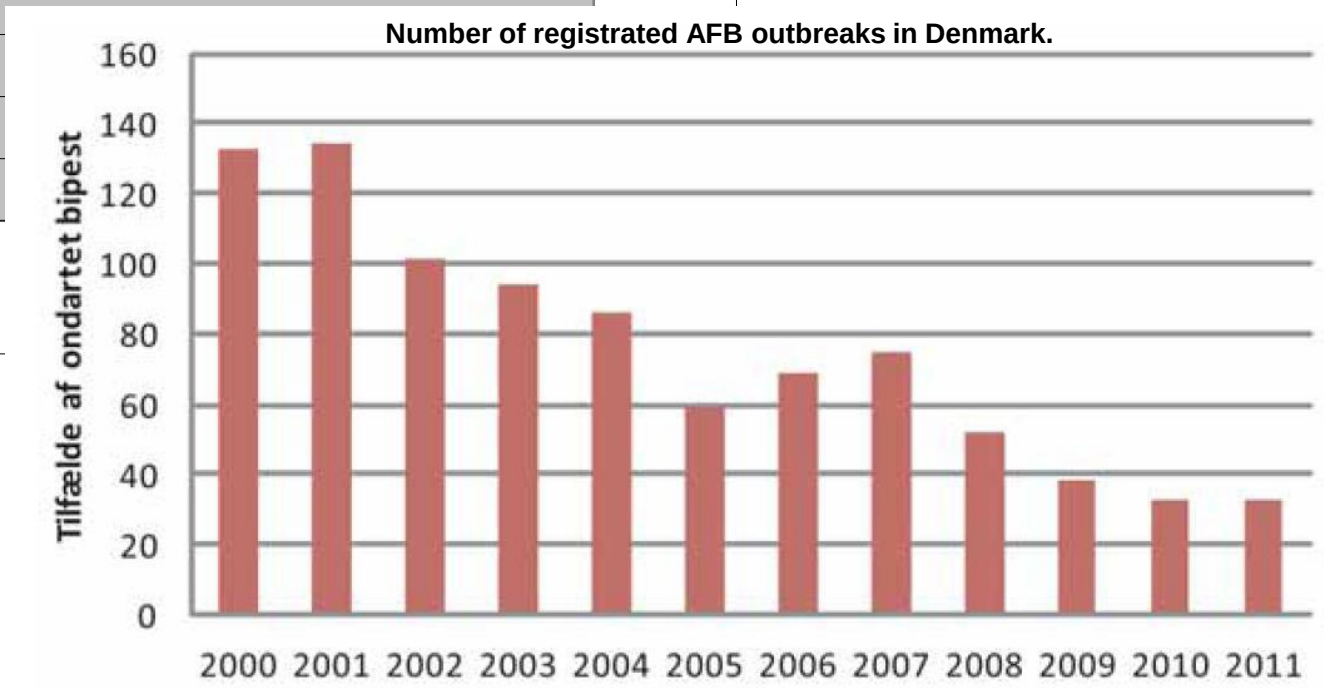
Hygiejnisk adfærd
er evnen til at fjerne
død eller
beskadiet yngel

Hygiejnisk adfærd er virksom mod yngelsygdomme som feks.:

Ondardet bipest & kalkyngel

Hygienic behaviour and AFB.





The Journal of Experimental Biology 215, 264-271

doi:10.1242/jeb.062562

RESEARCH ARTICLE

Evidence for damage-dependent hygienic behaviour towards *Varroa destructor*-parasitised brood in the western honey bee, *Apis mellifera*

Caspar Schöning[1,*], Sebastian Gisder[1], Sven Geiselhardt[2], Ivonne Kretschmann[1], Kaspar Bienefeld[1], Monika Hilker[2] and Elke Genersch[1]

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Original article

Field trial of honey bee colonies bred for mechanisms of resistance against *Varroa destructor**

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Received 16 March 2006 – Revised 9 June 2006 – Accepted 14 June 2006

Avlsparameter(HYG)

* MN-HYG 1996

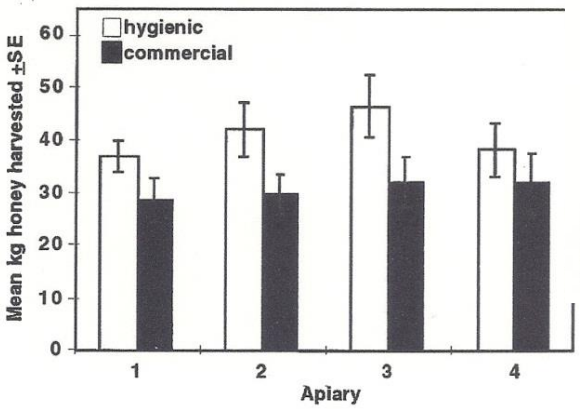


Figure 3. Honey production by 49 hygienic and 46 commercial colonies, distributed among four apiaries, in early September 1996. The hygienic colonies produced significantly more honey than the commercial colonies ($P = 0.002$).

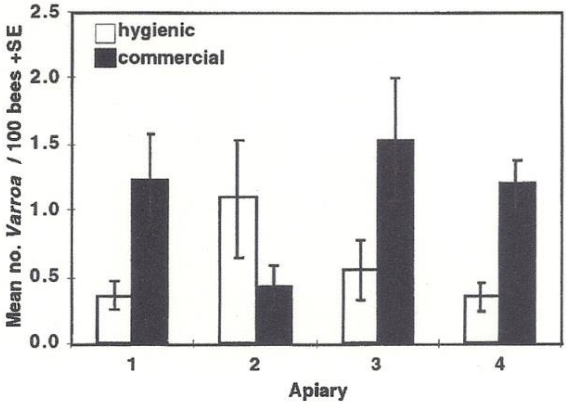
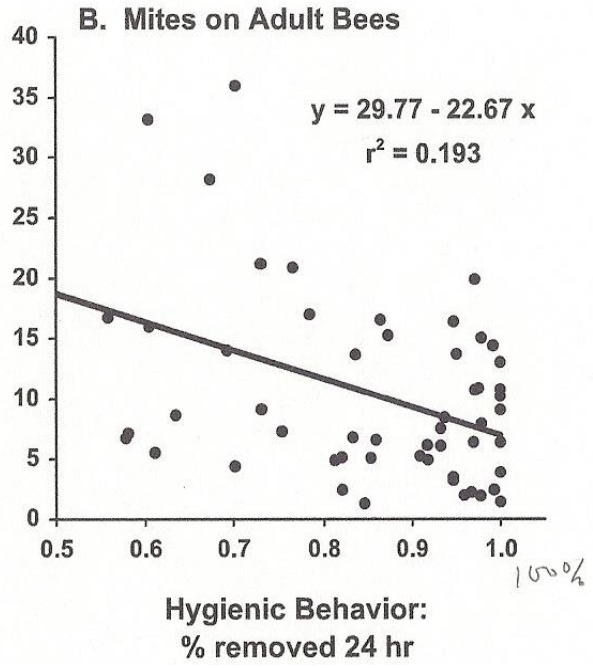
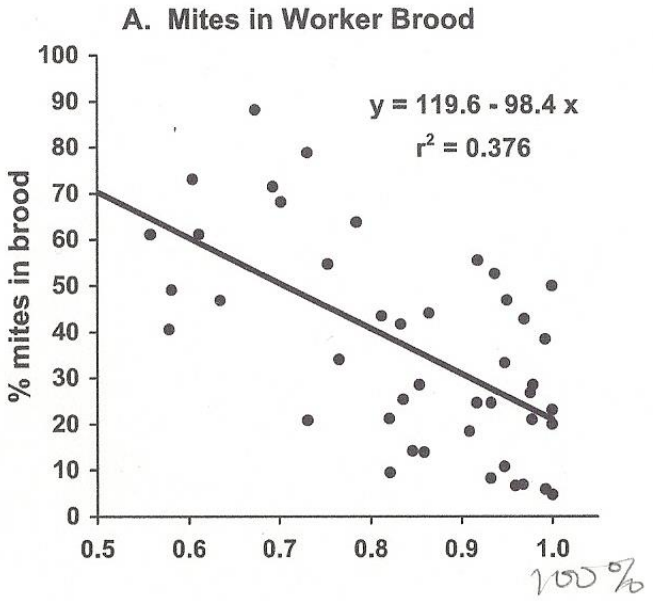


Figure 4. Abundance of *Varroa* mites per 100 adult bees from each of 49 hygienic and 46 commercial colonies in 1996. The hygienic colonies had fewer *Varroa* mites than the commercial colonies in all apiaries except the second one ($P = 0.013$)

Avlsparameter(HYG)

* MN-HYG 2003 (marts til september)





Avlsparameter(HYG)

* MN-HYG 2009

Colony Source	Colonies tested	Liberal Test: Average ± s.d. score % removed+ partials	Liberal Test: % colonies scoring ≥95% removed+ partials	Strict Test: % colonies scoring ≥95% completely removed
1. MN Hygienic Breeders, University MN (2004-2008)	171	96% ± 8% a	75%	36%
2. MN Beekeeper 1 (2009)	118	96% ± 6% a	79%	29%
MN Beekeeper 2 (2009)	123	92% ± 11% a	63%	24%
MN Beekeeper 3 (2009)	87	92% ± 12% a	62%	24%
3. Hygienic Q + unselected drones (1999)	61	82% ± 18% b	38%	2%
Unselected Q + unselected drones (1999)	47	75% ± 19% c	13%	0%

TX 3x 2000 bifam – stikprøve. Der er så 3x 500 potentielle Q som udrenser 95 % på 24 timer

Journal of Apicultural Research 53(5): 555-562 (2014)
DOI 10.3896/IBRA.1.53.5.10

ORIGINAL RESEARCH ARTICLE

Towards integrated control of varroa: effect of variation in hygienic behaviour among honey bee colonies on mite population increase and deformed wing virus incidence

Hasan M Al Toufailia [1*], Esmaeil Amiri[2], Luciano Scandian[1], Per Kryger[2], Francis L W Ratnieks[1]

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[2]Department of Agroecology, Århus University, 4200 Slagelse, Denmark.

Received 12 May 2014, accepted subject to revision 1 October 2014, accepted for publication 19 November 2014.

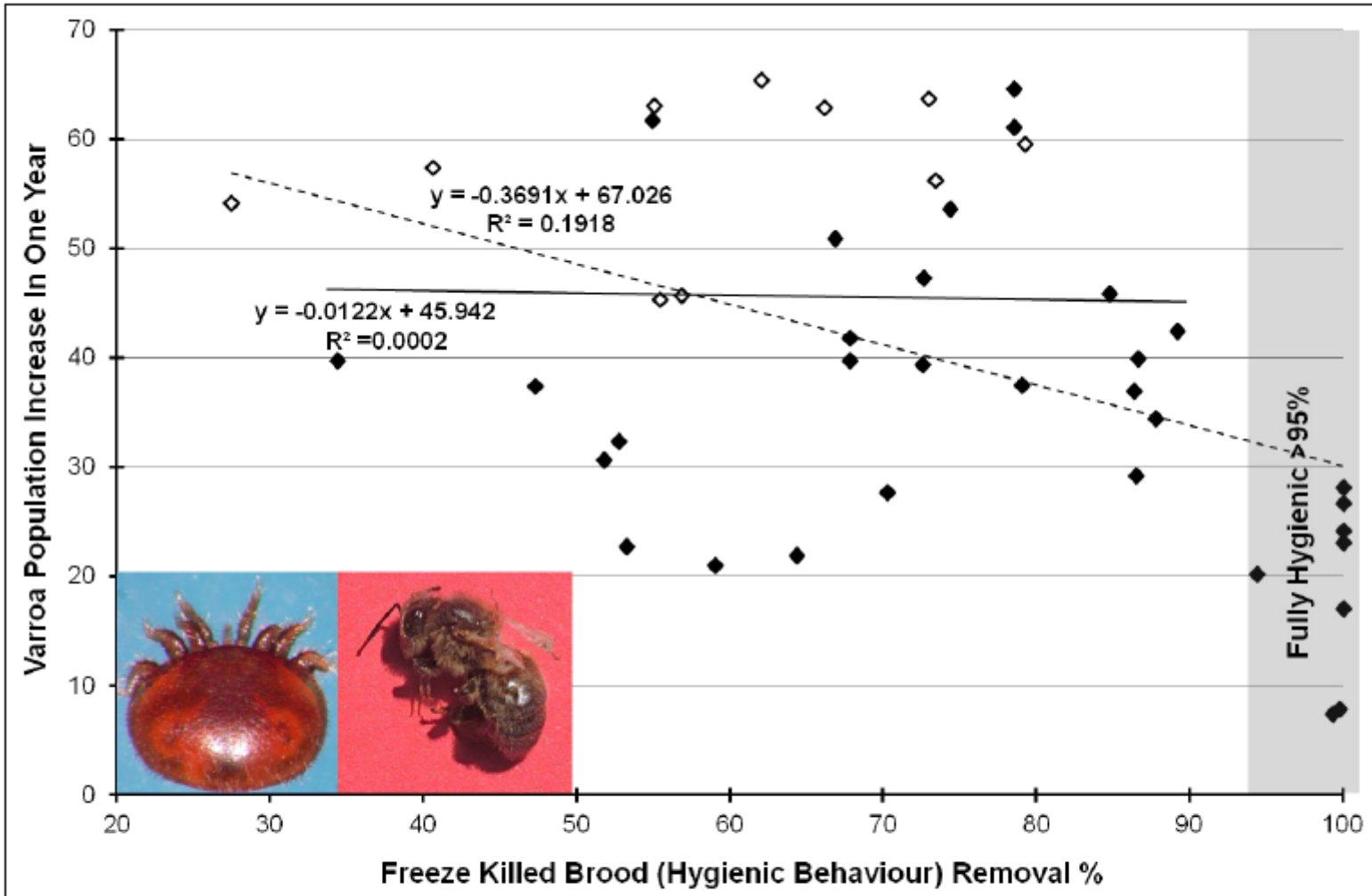


Fig. 1. Proportional increase of varroa population from 12 January to 12 December 2013 in the 42 study colonies as a function of Freeze Killed Brood removal. Colonies with workers showing symptoms of deformed wing virus are shown as open symbols. The photos show (left) an adult female varroa mite and (right) an adult worker bee with shrivelled wings, an overt symptom of DWV.

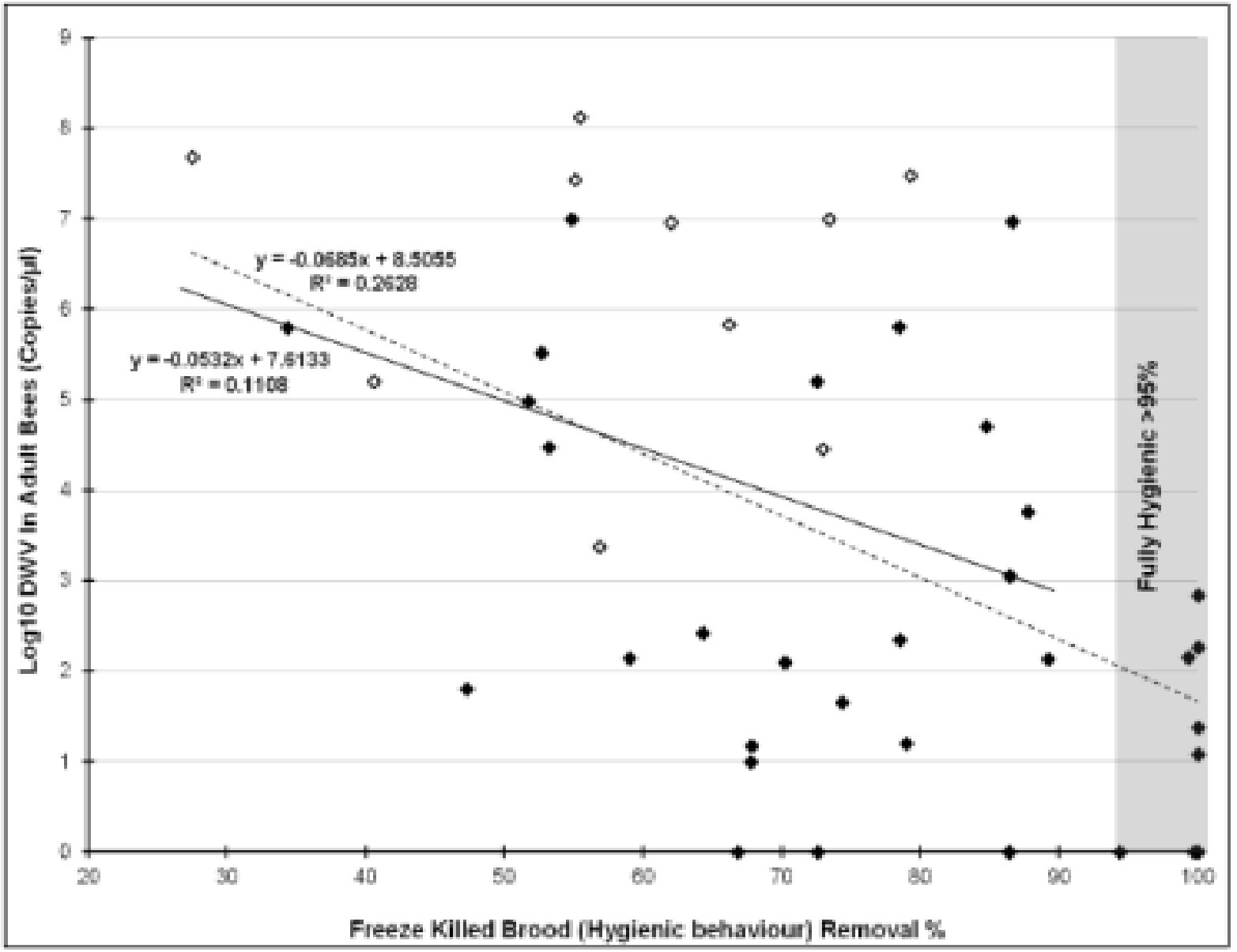


Fig. 2. Number of deformed wing virus RNA copies in adult bee samples collected on 12 December 2013, 11 months after treating with oxalic acid, in the 42 study colonies. Colonies that had some workers with overt symptoms of DWV (shrivelled wings) are shown as open symbols.

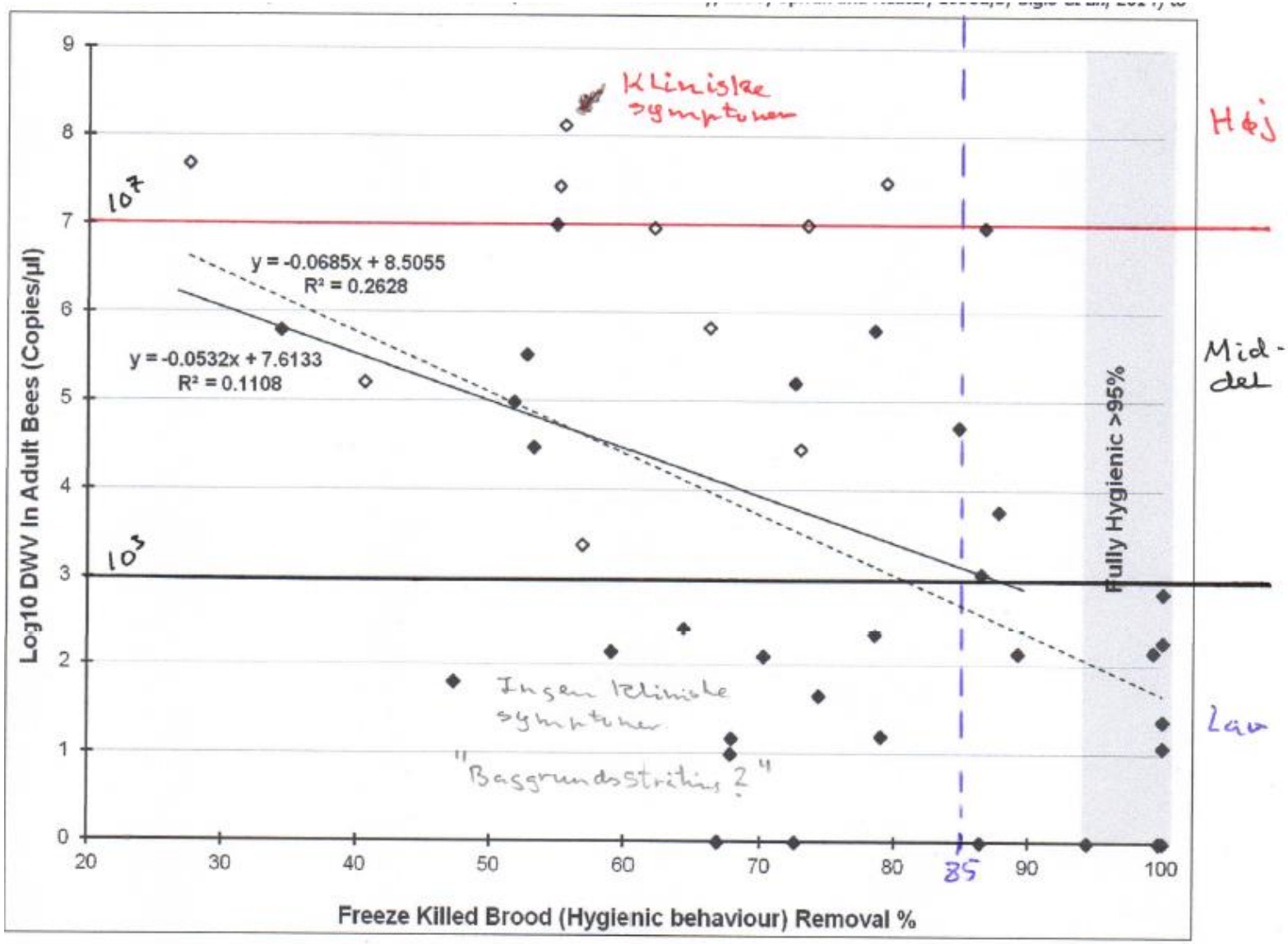


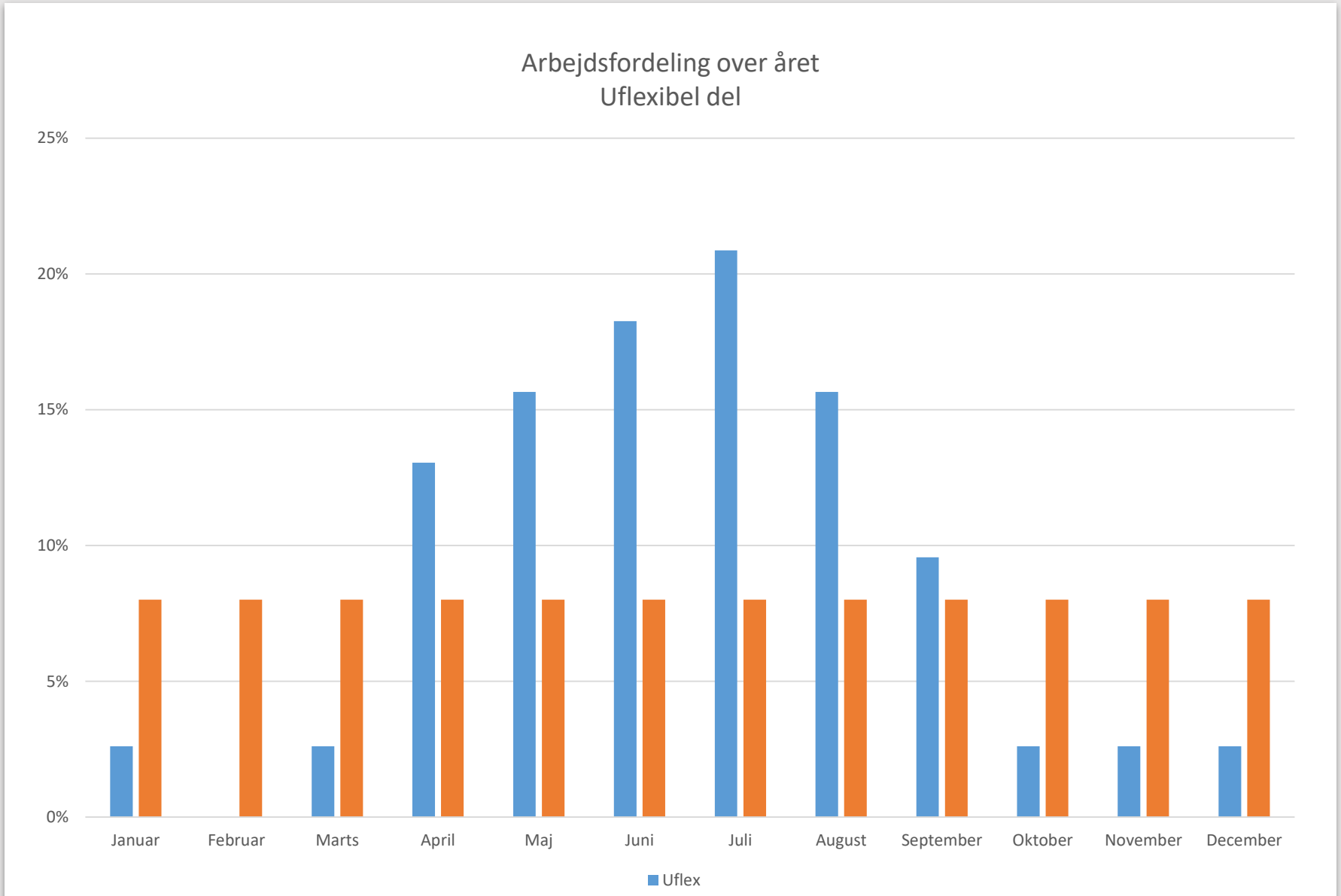
Fig. 2. Number of deformed wing virus RNA copies in adult bee samples collected on 12 December 2013, 11 months after treating with oxalic acid, in the 42 study colonies. Colonies that had some workers with overt symptoms of DWV (shrivelled wings) are shown as open symbols.

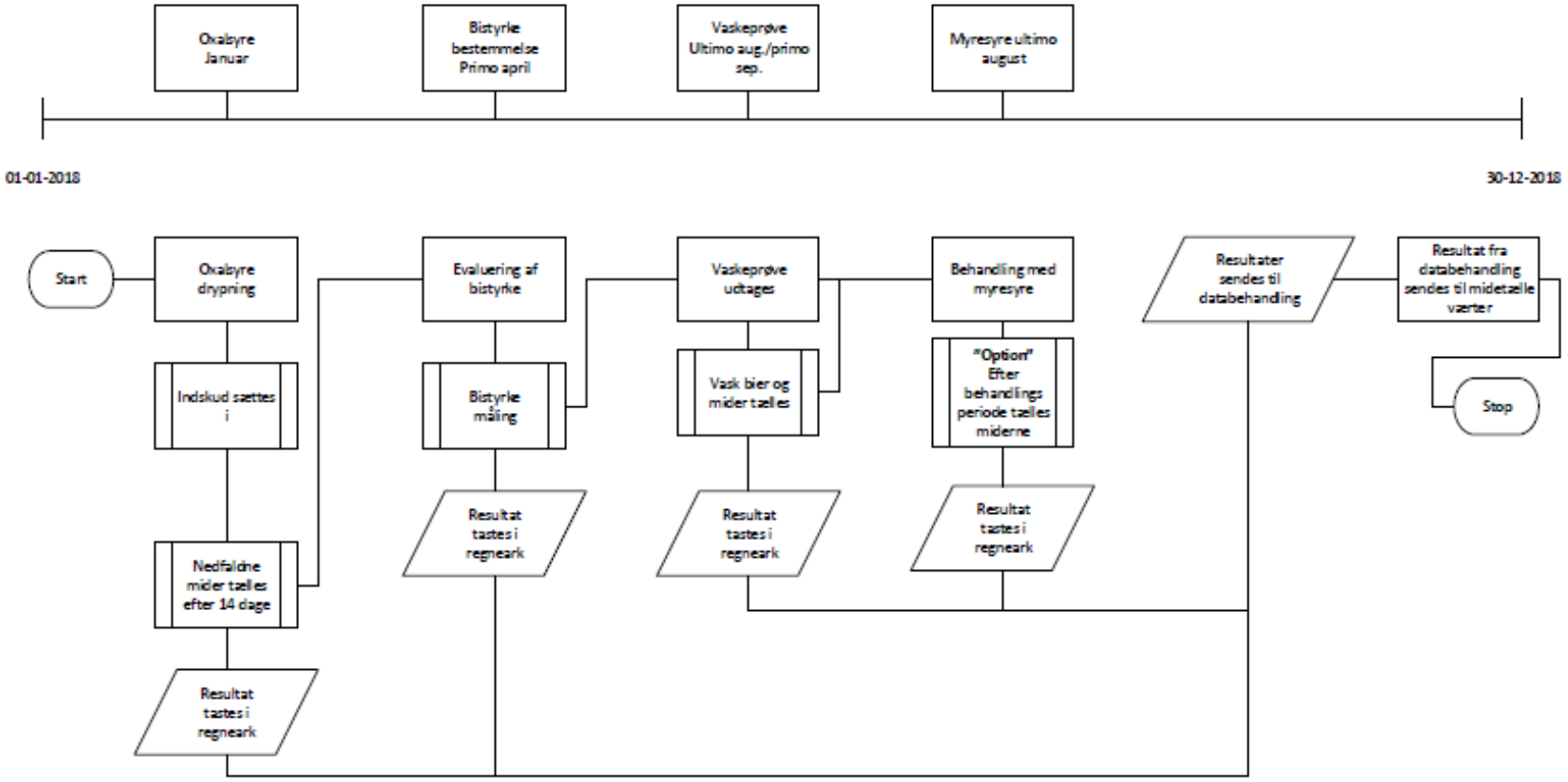
Hvad så nu ?

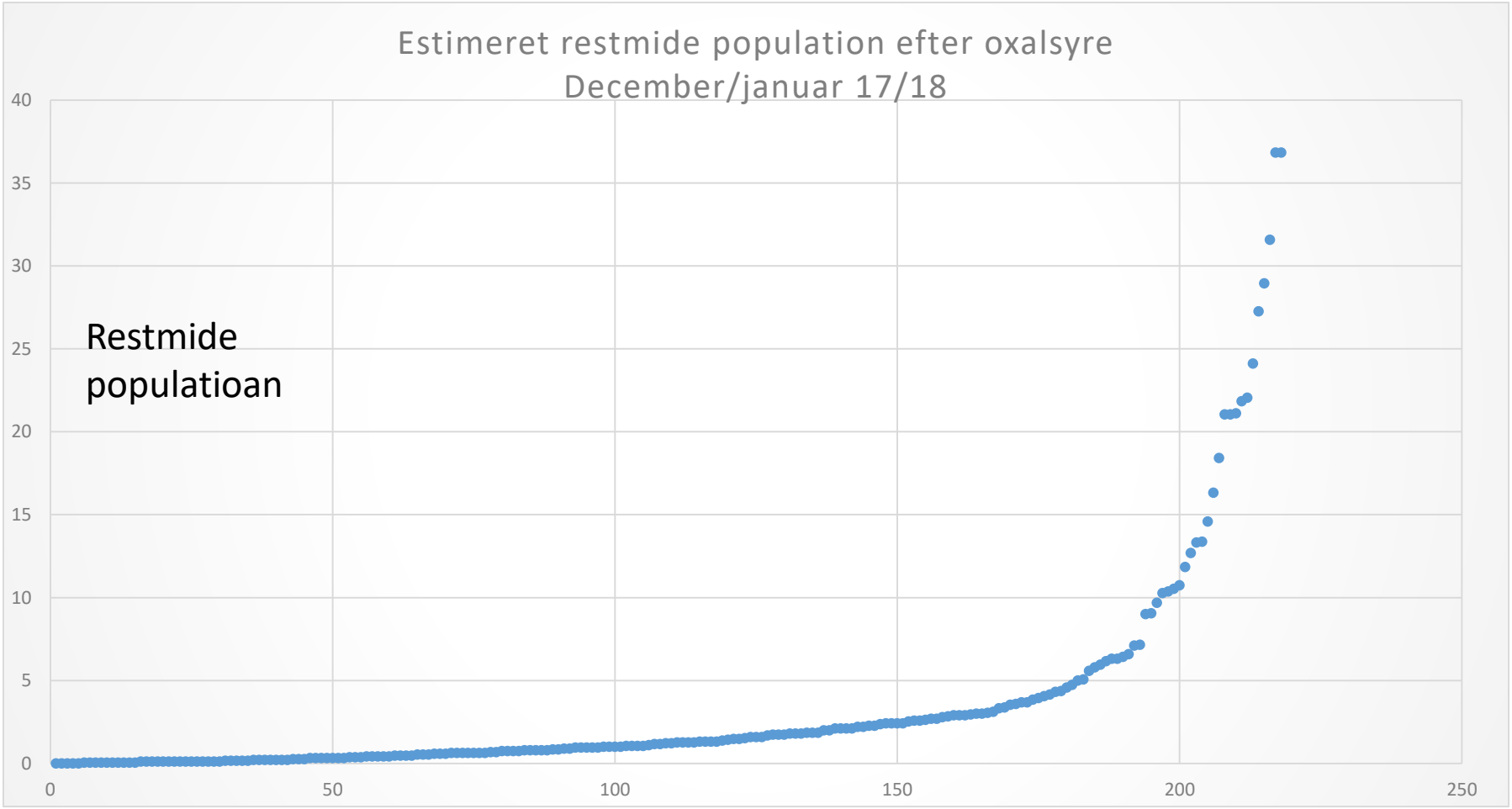
Tilvækst estimat !!

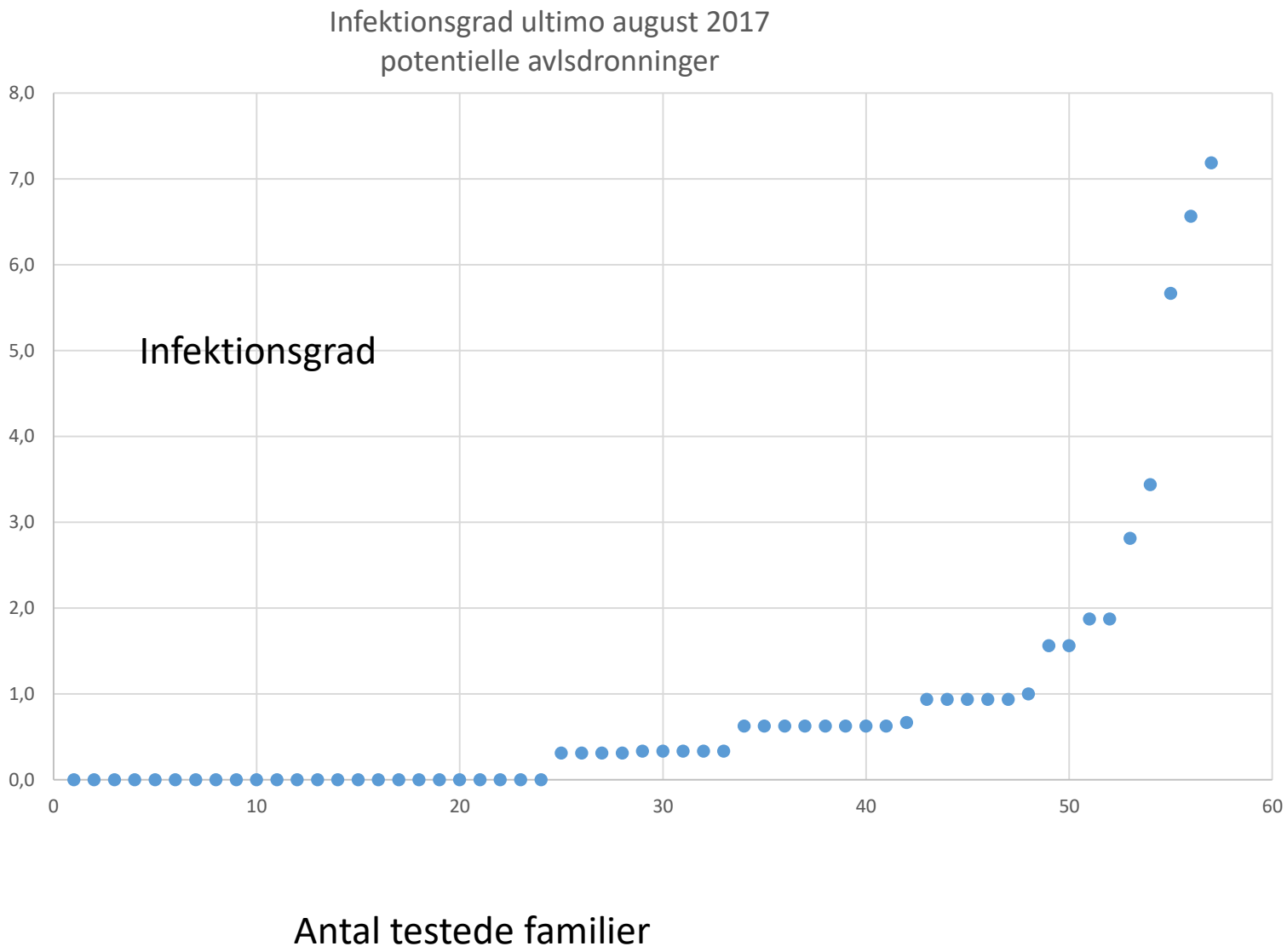
Tilvækst (normal metode)

- tilvæksten pr. dag =
- r = lnχ/d
-
- d = måleperiodens varighed i dage
-
- $\chi = \frac{\text{mideantallet medio juli}}{\text{mideantallet primo maj}}$
-
- χ = tilvækstraten (en multiplikator)
-


Arbejdsfordeling over året
Uflexibel del
25%
20%
15%
10%
5%
0%
Januar
Februar
Marts
April
Maj
Juni
Juli
August
September
Oktober
November
December
Uflex


Oxalsyre Januar
Bistyrke bestemmelse Primo april
Vaskeprøve Ultimo aug./primo sep.
Myresyre ultimo august
01-01-2018
30-12-2018
Start
Oxalsyre drypning
Indskud sættes i
Nedfaldne mider tælles efter 14 dage
Resultat tastes i regneark
Evaluering af bistyrke
Bistyrke måling
Resultat tastes i regneark
Vaskeprøve udtages
Vask bier og mider tælles
Resultat tastes i regneark
Behandling med myresyre
"Option" Efter behandlings periode tælles miderne
Resultat tastes i regneark
Resultater sendes til databehandling
Resultat fra databehandling sendes til midetælle værter
Stop


Estimeret restmide population efter oxalsyre
December/januar 17/18
Restmide
populatioan
40
35
30
25
20
15
10
5
0
0
50
100
150
200
250
Antal testede familier


Infektionsgrad ultimo august 2017
potentielle avlsdronninger
Infektionsgrad
8,0
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,0
0
10
20
30
40
50
60
Antal testede familier

Beregn baseret på konc. måling

Haven

Dato: 26-sep

	Mide rest 23/1	Mider/300	Mider/100	mider i 20000	χ	lnχ	lnχ/190	% tilvækst/dag	
579	16	3	1,0	200	12,66667	2,538974	0,01336302	1,34	579
577	11	1	0,3	66,66667	6,333333	1,845827	0,009714877	0,97	577
598	10,5	1	0,3	66,66667	6,333333	1,845827	0,009714877	0,97	598
562	5	2	0,7	133,3333	26,66667	3,283414	0,017281128	1,73	562
584	5	1	0,3	66,66667	13,33333	2,590267	0,013632985	1,36	584

Jeksen

Dato: 15-08-2017

	Mide rest 23/1	Mider/300	Mider/100	mider i 35000	χ	lnχ	lnχ/150	% tilvækst/dag	
589	5,3	1	0,3	116,6667	22,16667	3,09859	0,020657264	2,07	589
564	3,2	1	0,3	116,6667	36,3388	3,592886	0,023952573	2,40	564