

# Blauwtong serotype 3 in the Netherlands

Experiences of the 2023 outbreak

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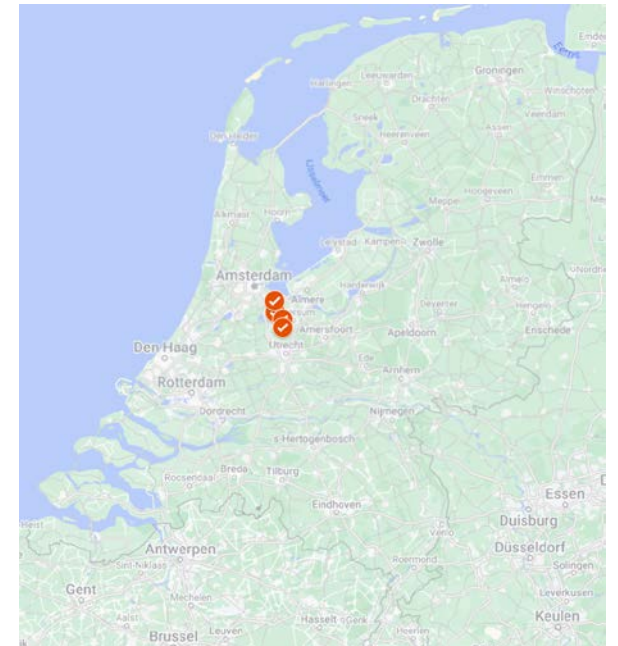
# Blauwtongvirus (BTV)

- RNA-virus (family Reoviridae; genus Orbivirus)
- >30 different serotypes, 1<sup>e</sup> 24 notifiable
  - Listed as category C in the AHR (2021)
- Pathogenicity differs per serotype
- ‘Vectorborne disease’: transmission by *Culicoides* spp., but also through needles, embryos and sperm
- All ruminant species are susceptible
- Cattle is the most important reservoir, but signs remain mild and subclinical for most serotypes



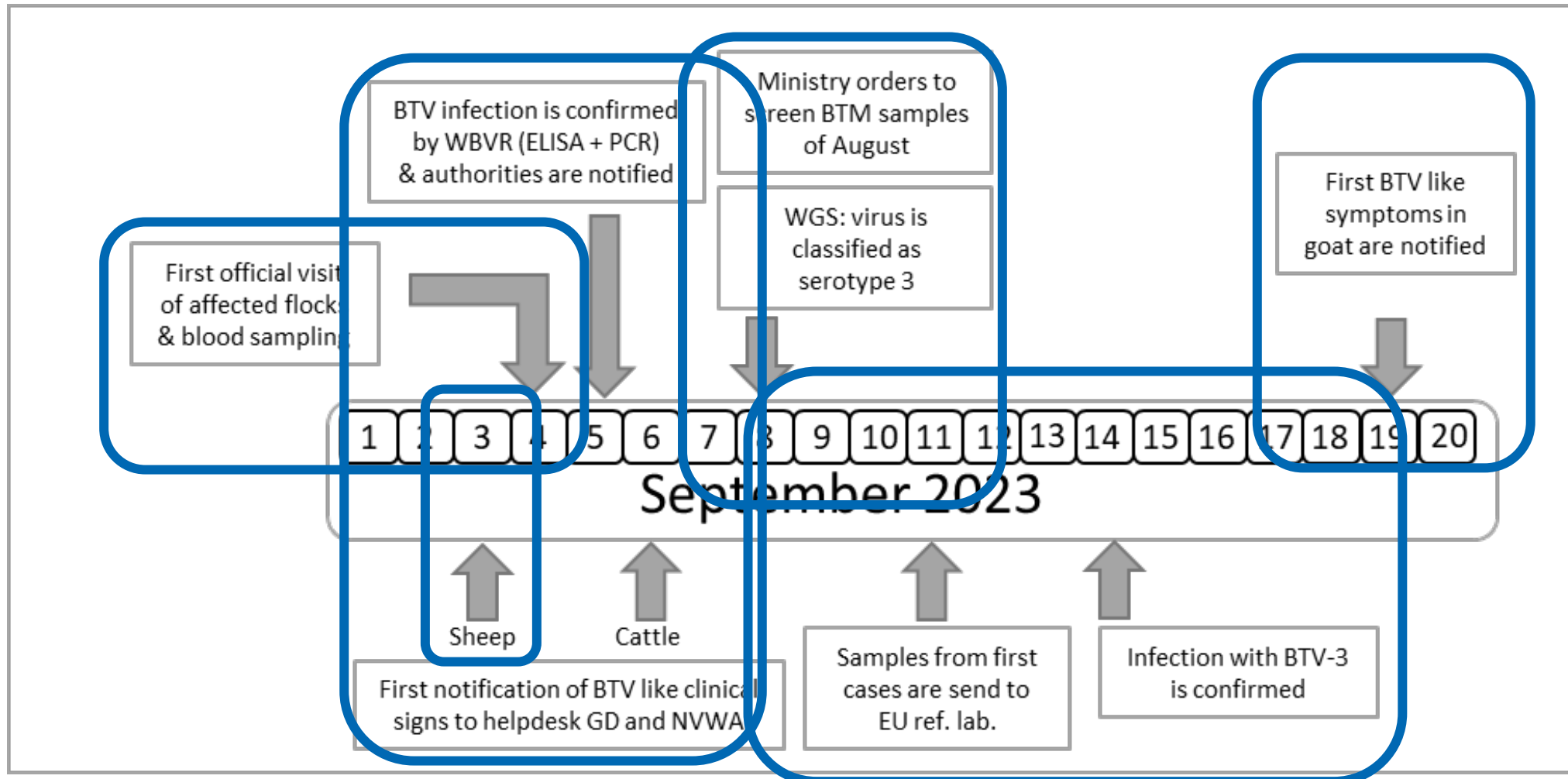
# First cases of BTV-3 in the Netherlands

- Sunday 3 September: 2 Vet practices notify BT like symptoms in five sheep flocks to NVWA & GD
- 4 September: 5 sheep flocks are visited and samples were taken
- Samples submitted to the veterinary reference lab in the Netherlands (WBVR)
- 5 September BTV is confirmed





# Vervolgens:





How fast will it spread?

**Spread through time and space**

**(Source: Dutch food and safety authority)**

# How it spread:

- Period: 3 September
- Number of confirmed cases:
  - Sheep: 4
  - Cattle: 0
  - Goats: 0
  - Alpaca/llama: 0
  - Moeflon: 0

**Total: 4**



## What followed: wk 1

- Period: 4-10 September
  - Number of confirmed cases:
    - Sheep: 29 (+25)
    - Cattle: 12 (+12)
    - Goats: 0
    - Alpaca/llama: 0
    - Moeflon: 0
- Total: 41 (+37)**



## What followed: wk 2

- Period: 11-17 September
  - Number of confirmed cases:
    - Sheep: 55 (+26)
    - Cattle: 18 (+ 6)
    - Goats: 0
    - Alpaca/llama: 0
    - Moeflon: 0
- Total: 73 (+32)**





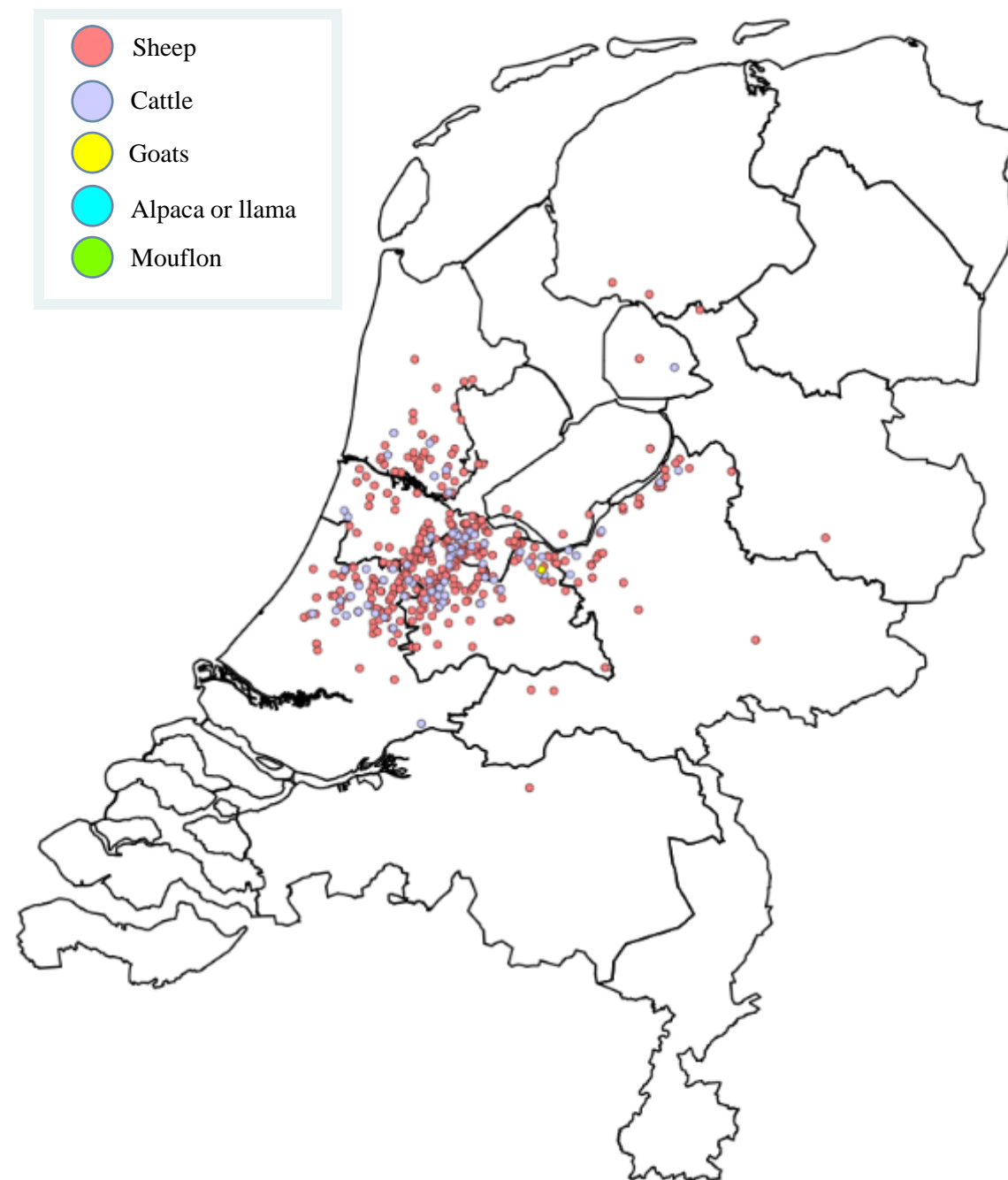
## What followed: wk 3

- Period: 18-24 September

- Number of confirmed cases:

• Sheep:	353	(+298)
• Cattle:	72	(+ 54)
• Goats:	1	(+ 1)
• Alpaca/llama:	0	
• Moeflon:		0

**Total: 426 (+353)**



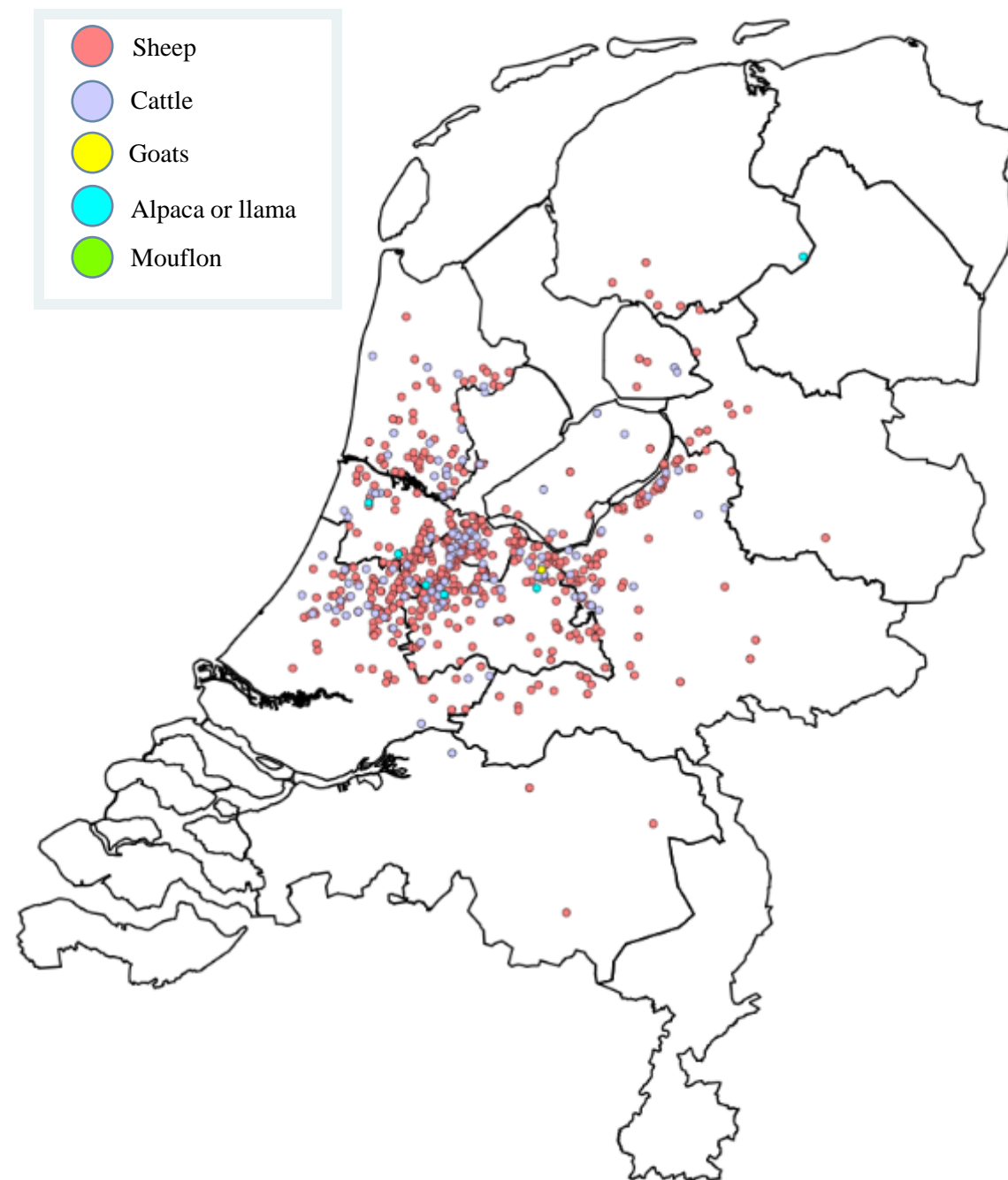
## What followed: wk 4

- Period: 25 September-1 October

- Number of confirmed cases:

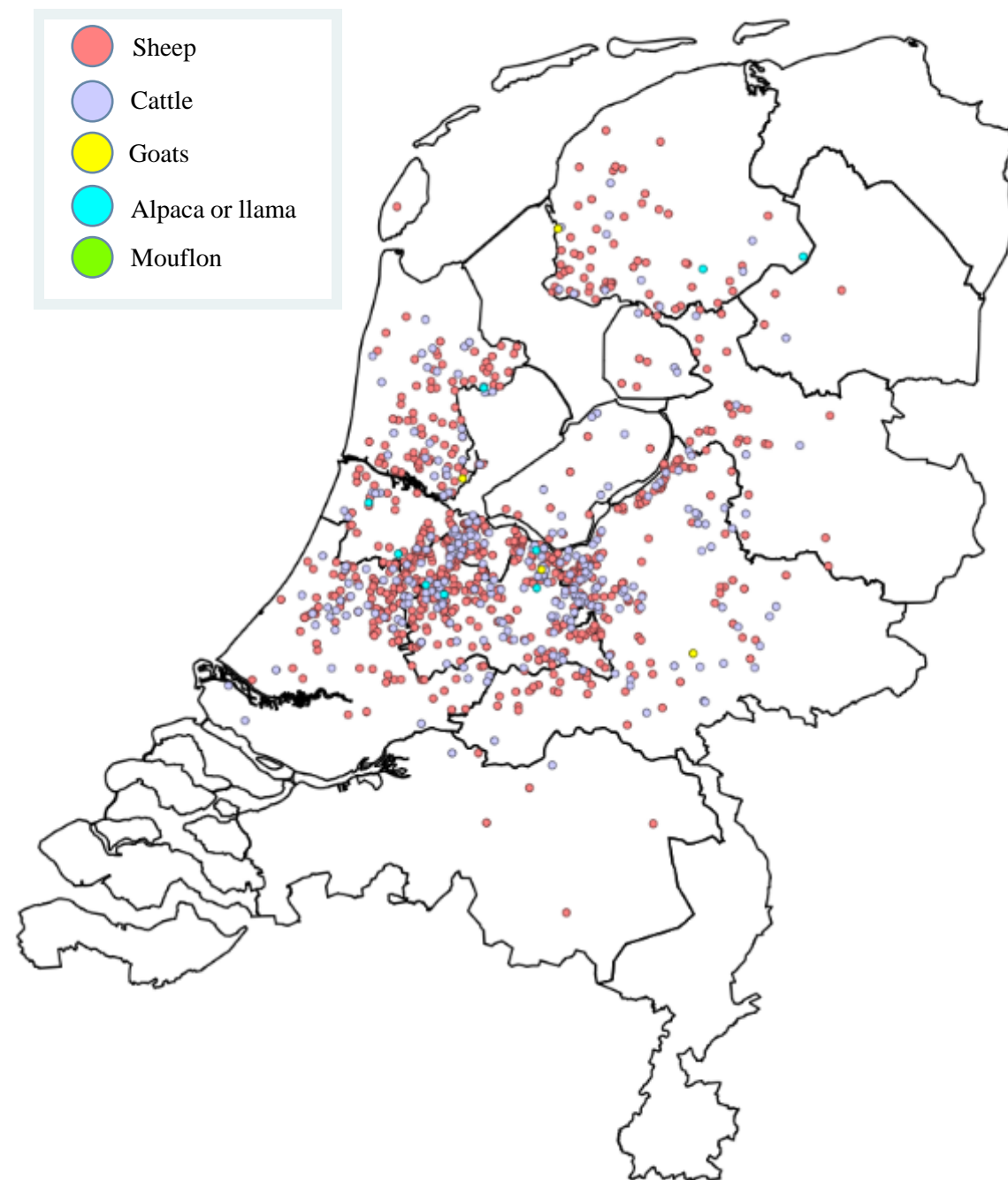
• Sheep:	493	(+140)
• Cattle:	118	(+ 46)
• Goats:	1	(+ 0)
• Alpaca/llama:	6	(+ 6)
• Moeflon:		0

**Total: 618 (+192)**



## What followed: wk 5

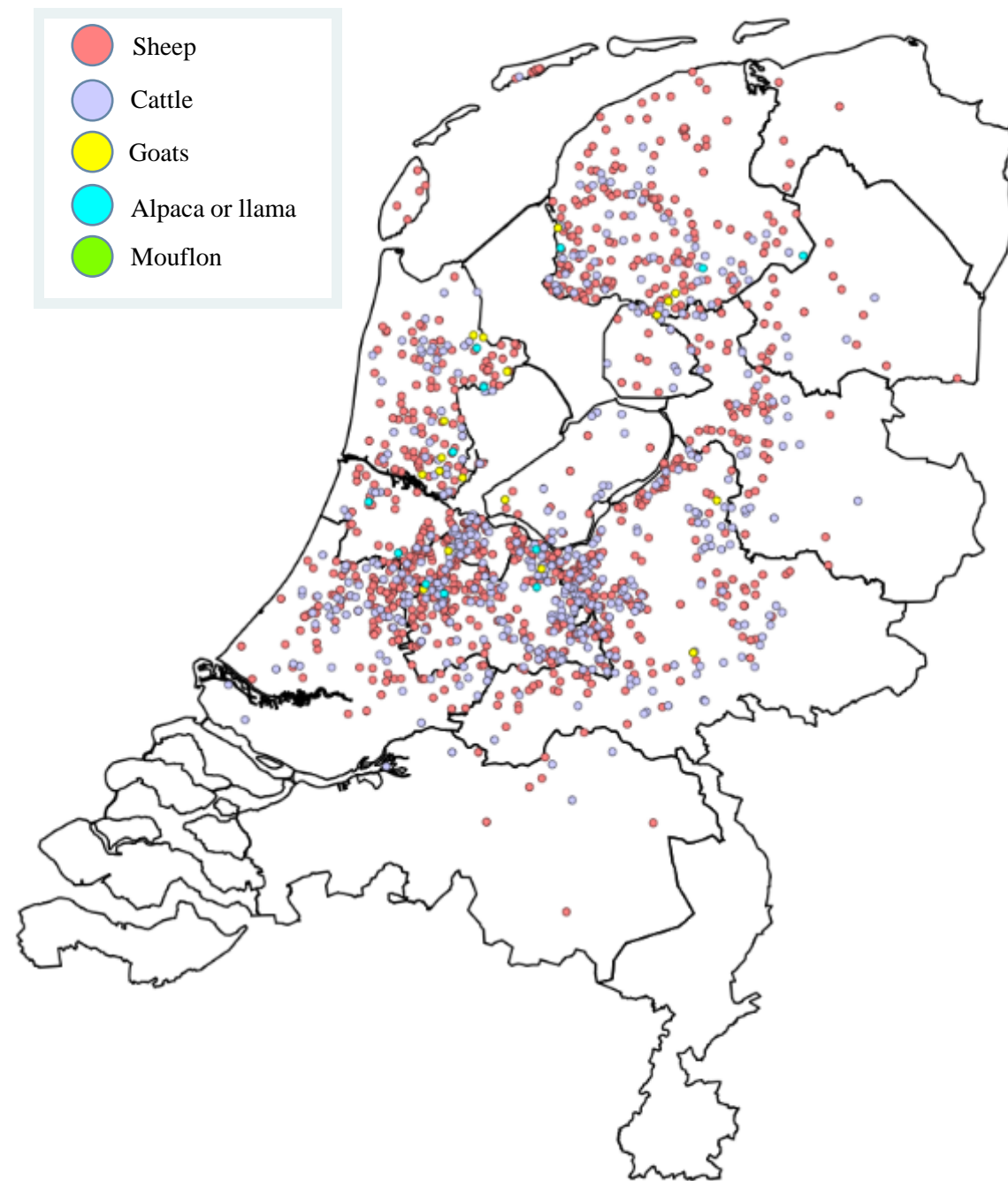
- Period: 02-09 October
  - Number of confirmed cases:
    - Sheep: 743 (+250)
    - Cattle: 282 (+164)
    - Goats: 4 (+ 3)
    - Alpaca/llama: 9 (+ 3)
    - Moeflon: 0
- Total: 1,038 (+420)**



## What followed: wk 6

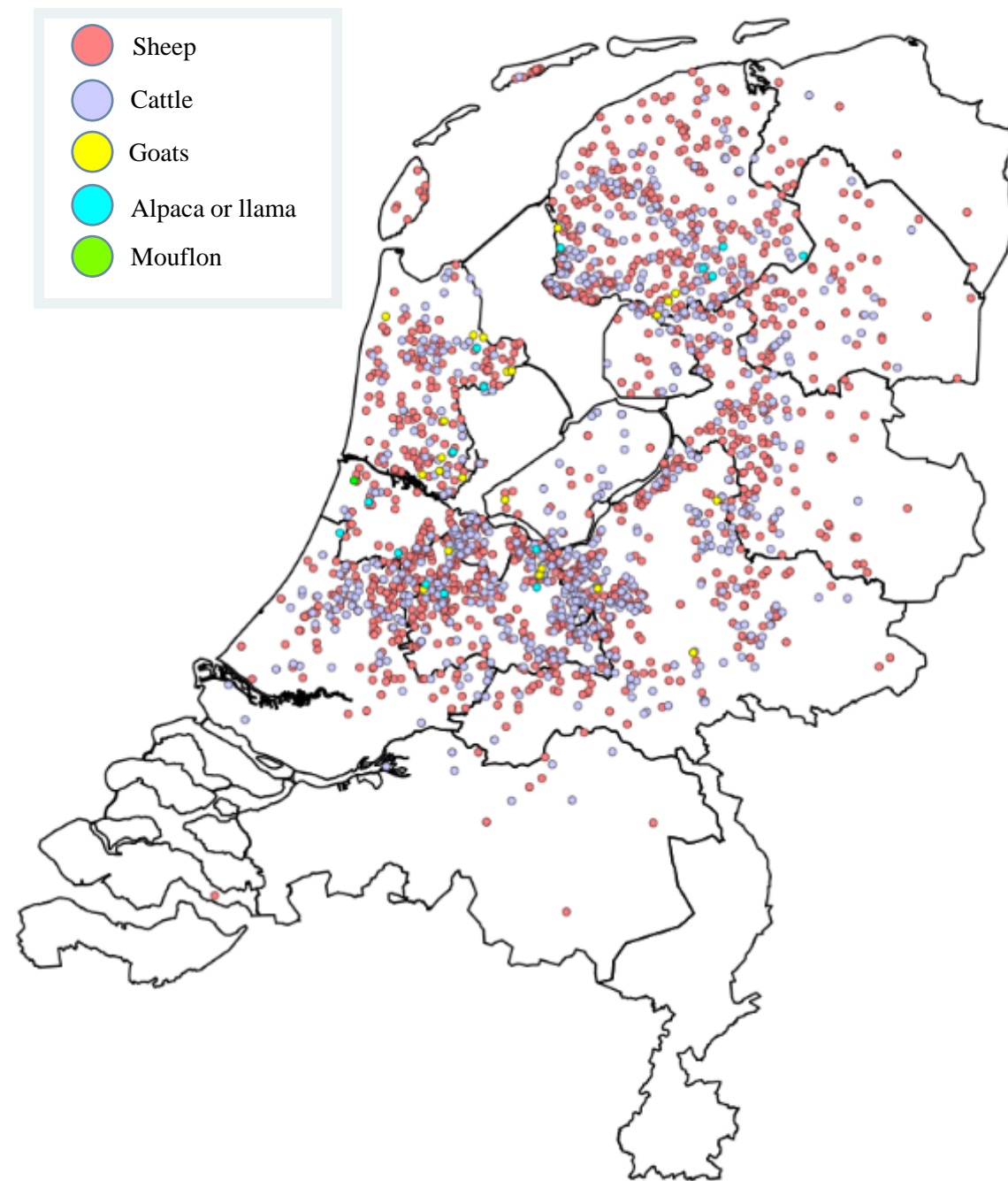
- Period: 10-16 October
- Number of confirmed cases:
  - Sheep: 1,001 (+258)
  - Cattle: 467 (+185)
  - Goats: 18 (+ 14)
  - Alpaca/llama: 12 (+ 3)
  - Moeflon: 0

**Total: 1,498 (+460)**



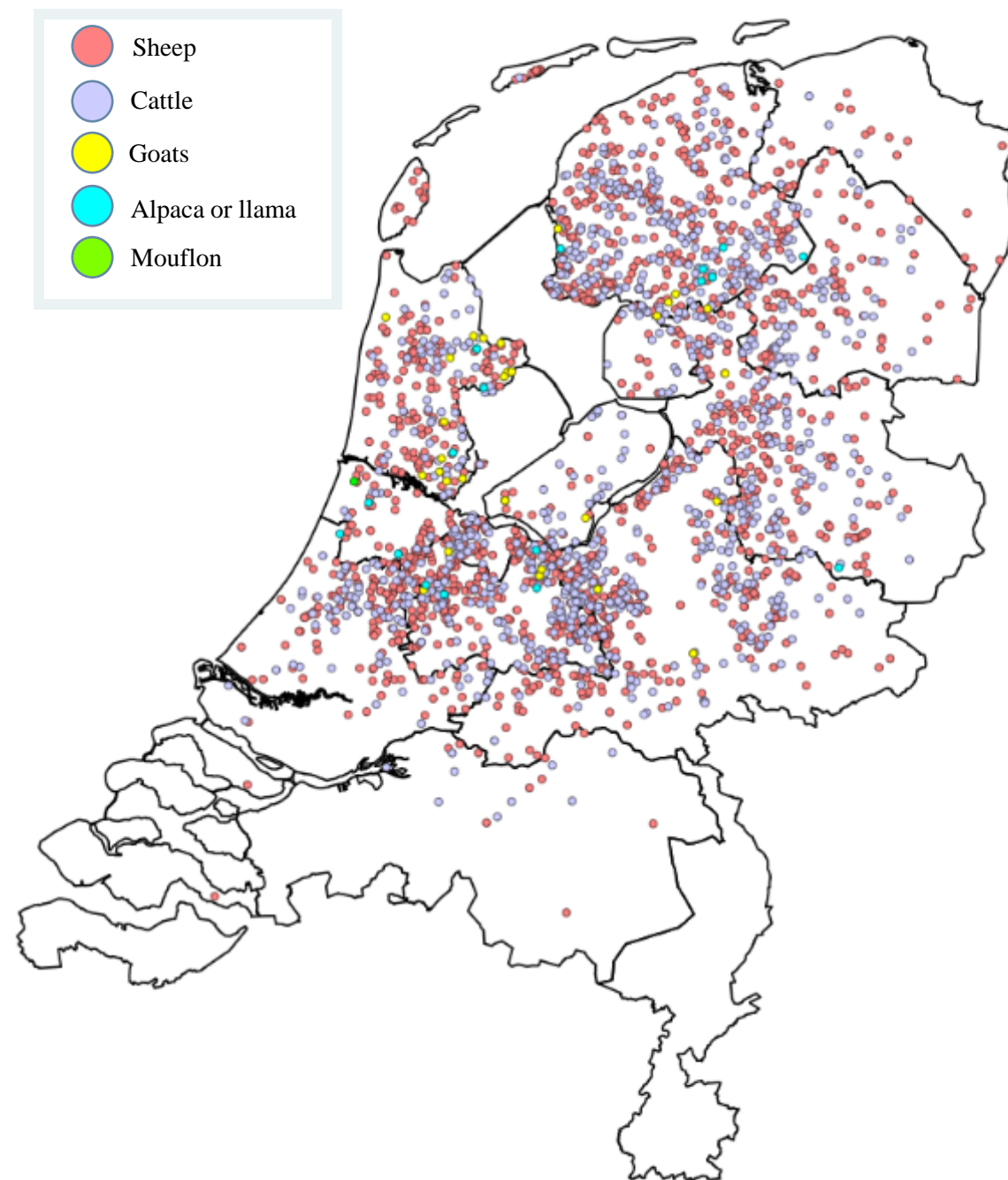
## What followed: wk 7

- Period: 17-23 October
  - Number of confirmed cases:
    - Sheep: 1,322 (+321)
    - Cattle: 648 (+181)
    - Goats: 23 (+ 5)
    - Alpaca/llama: 16 (+ 4)
    - Moeflon: 1 (+ 1)
- Total: 2,010 (+512)**



## What followed: wk 8

- Period: 24-30 October
  - Number of confirmed cases:
    - Sheep: 1,554 (+232)
    - Cattle: 936 (+288)
    - Goats: 31 (+ 8)
    - Alpaca/llama: 19 (+ 3)
    - Moeflon: 1 (+ 0)
- Total: 2,541 (+531)**



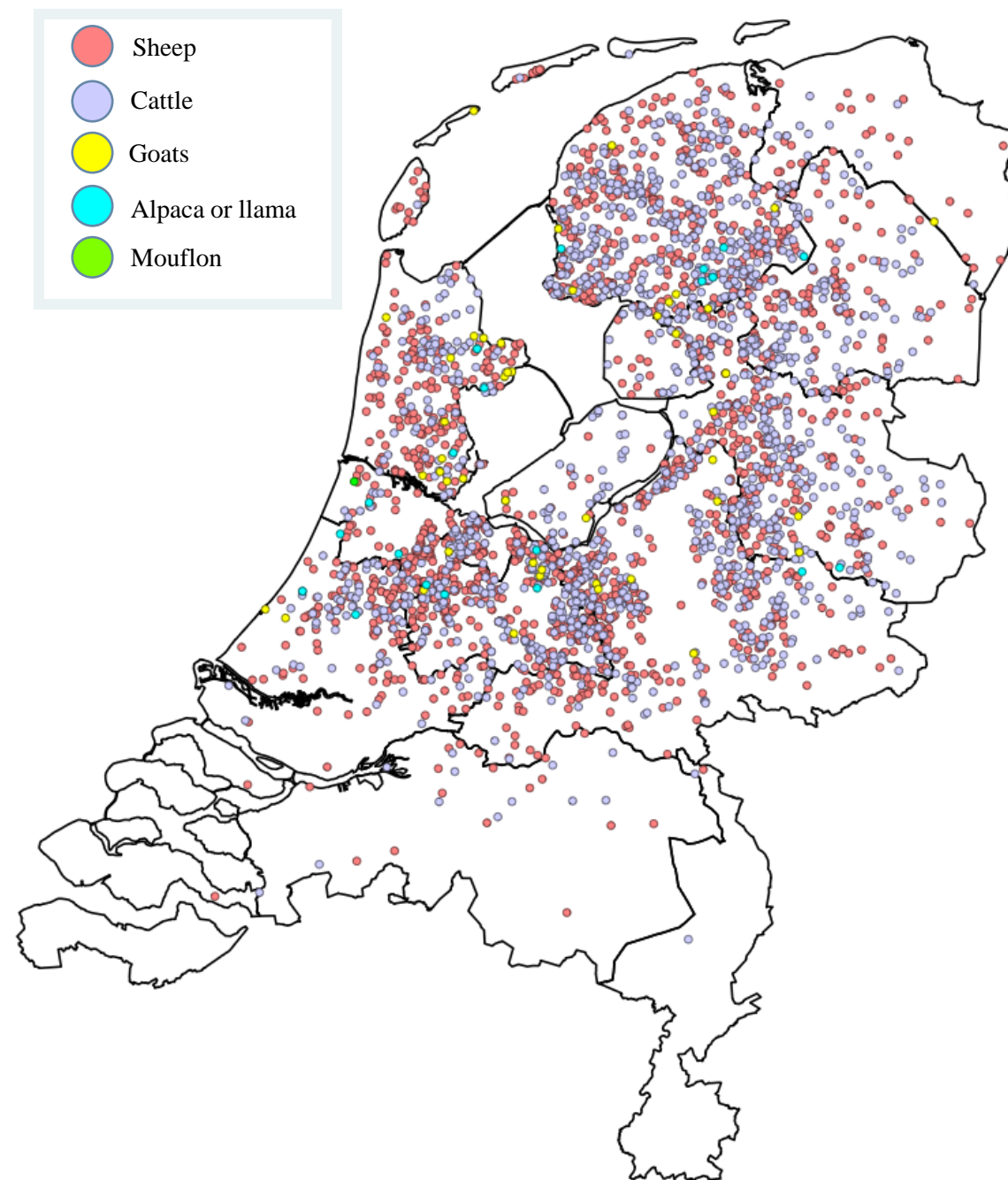
## What followed: wk 9

- Period: 31 October – 06 November

- Number of confirmed cases:

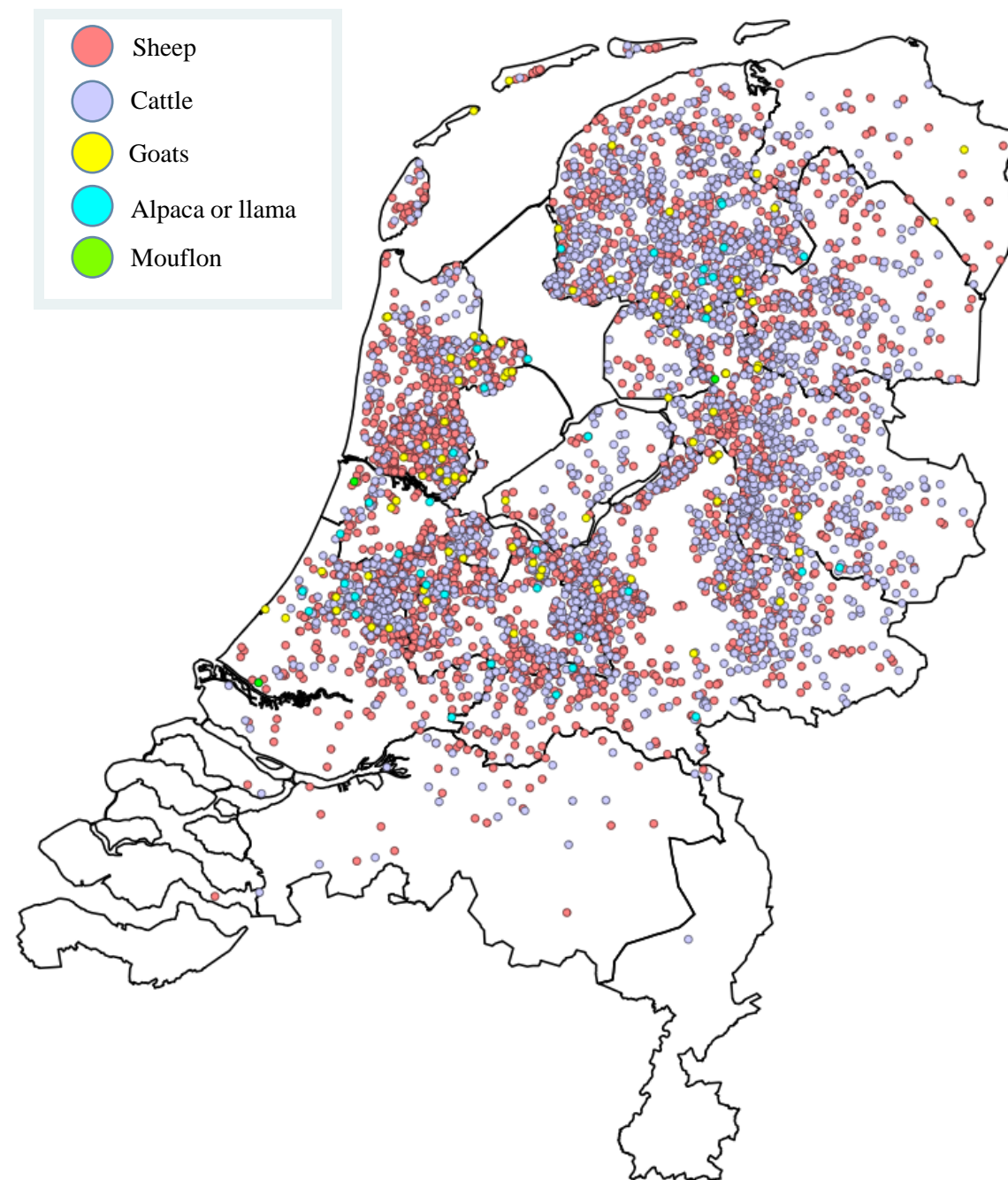
• Sheep:	1,757	(+203)
• Cattle:	1,406	(+470)
• Goats:	48	(+ 17)
• Alpaca/llama:	22	(+ 3)
• Moeflon/other:	2	(+ 1)

**Total: 3,235 (+691)**



## What followed: wk 10

- Period: 07–13 November
  - Number of confirmed cases:
    - Sheep: 1,870 (+113)
    - Cattle: 1,762 (+356)
    - Goats: 62 (+ 14)
    - Alpaca/llama: 25 (+ 3)
    - Moeflon/other: 3 (+ 1)
- Total: 3,722 (+487)**





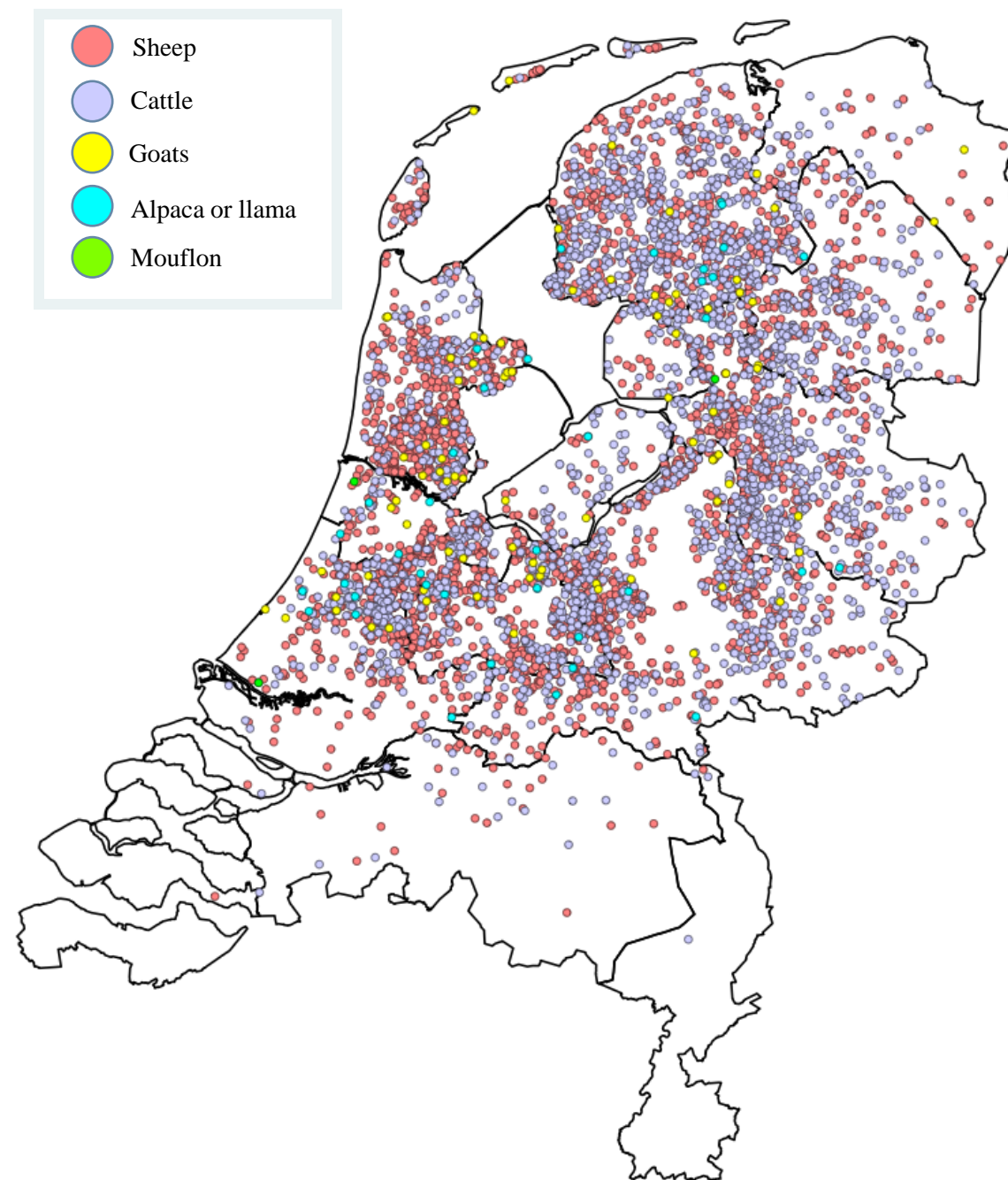
## What followed: wk 11

- Period: 14-20 November

- Number of confirmed cases:

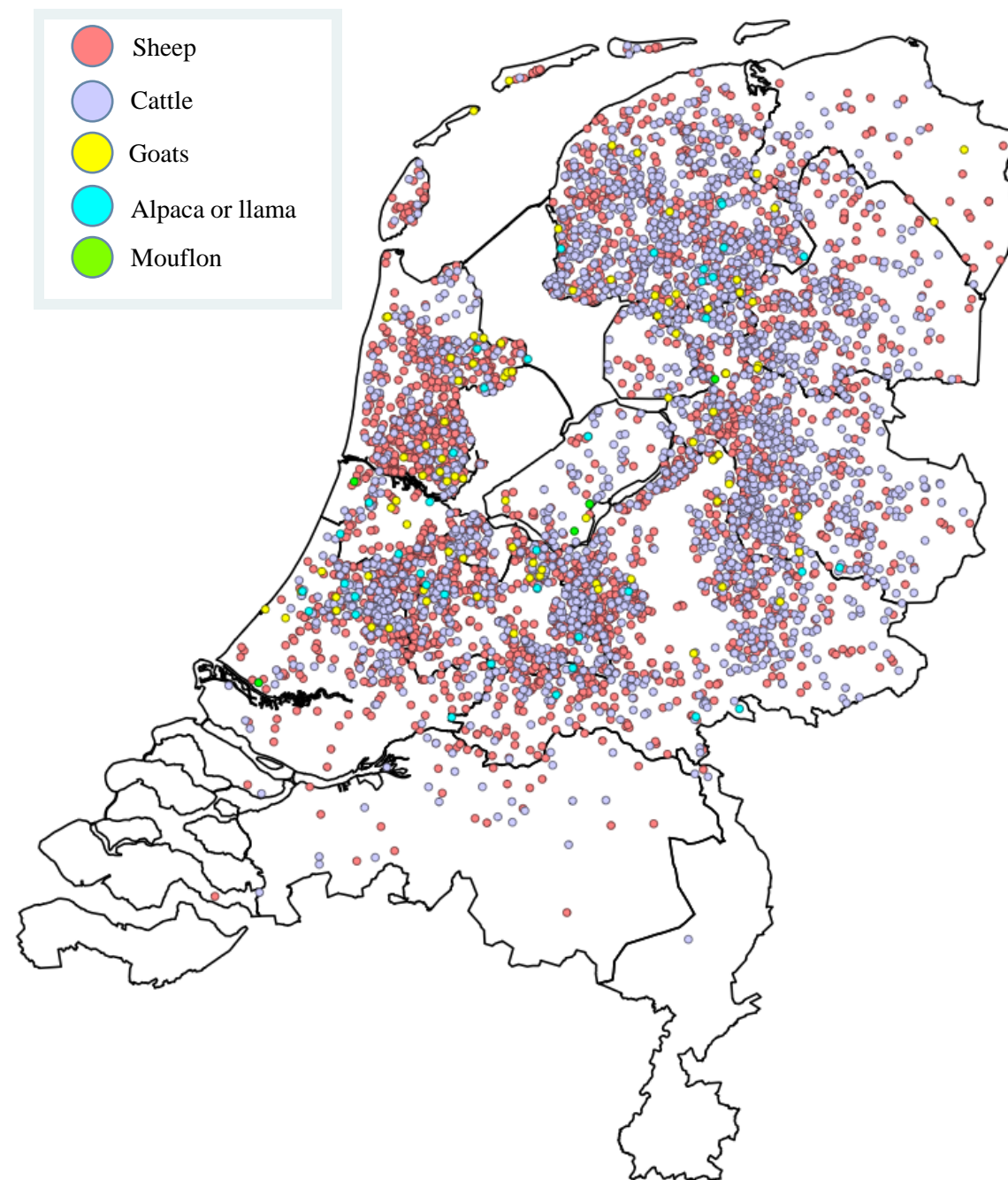
• Sheep:	1,884	(+ 14)
• Cattle:	1,851	(+ 89)
• Goats:	67	(+ 5)
• Alpaca/llama:	25	(+ 0)
• Moeflon/other:	3	(+ 0)

**Total: 3,830 (+108)**



## What followed: wk 12

- Period: 21-27 November
  - Number of confirmed cases:
    - Sheep: 1,887 (+ 3)
    - Cattle: 1,889 (+ 38)
    - Goats: 69 (+ 2)
    - Alpaca/llama: 26 (+ 1)
    - Moeflon/other: 4 (+ 1)
- Total: 3,875 (+ 45)**



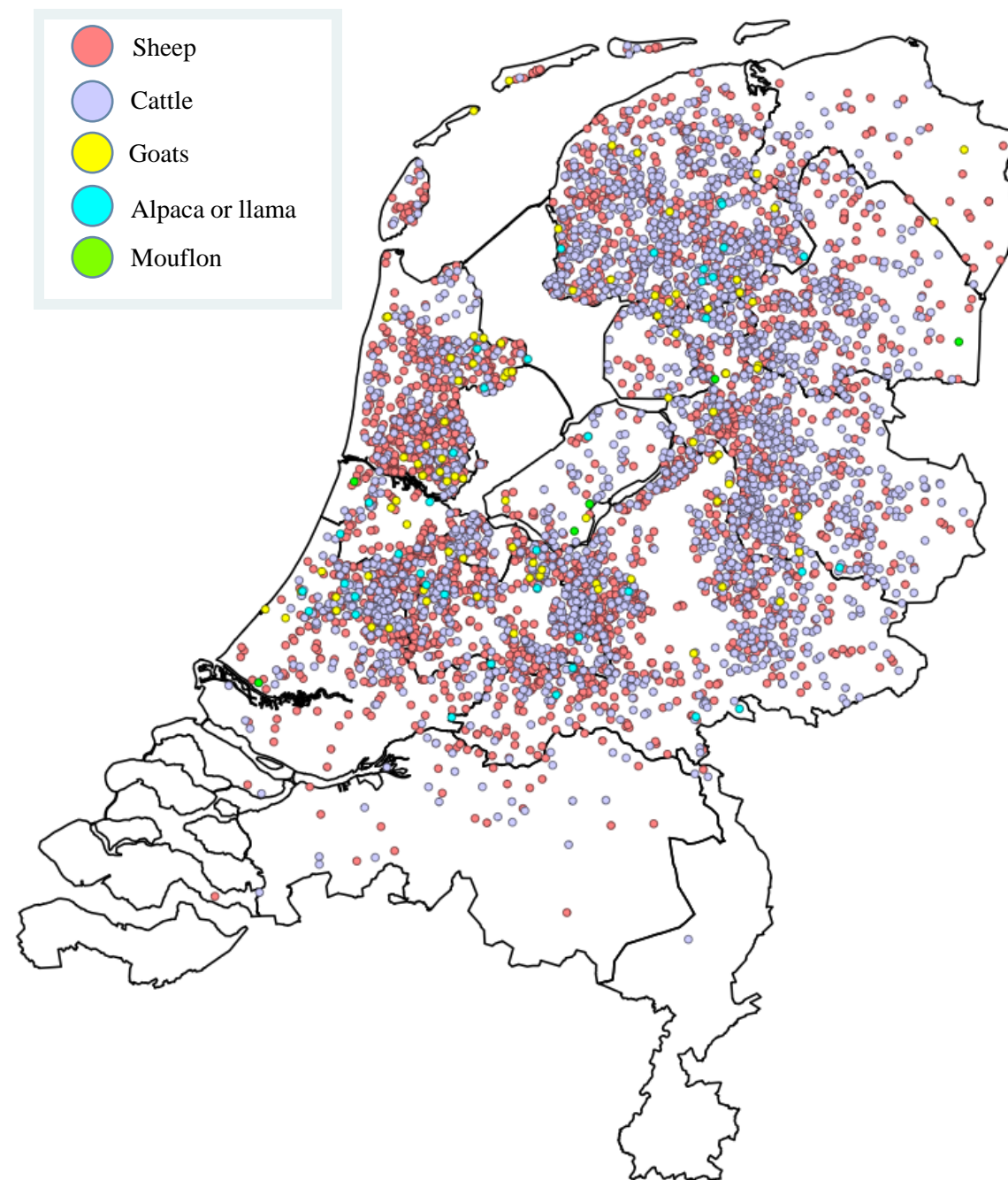
## What followed: wk 13

- Period: 28 November – 04 December

- Number of confirmed cases:

• Sheep:	1,890	(+ 3)
• Cattle:	1,932	(+ 43)
• Goats:	69	(+ 0)
• Alpaca/llama:	26	(+ 0)
• Moeflon/other:	4	(+ 0)

**Total: 3,921 (+ 46)**

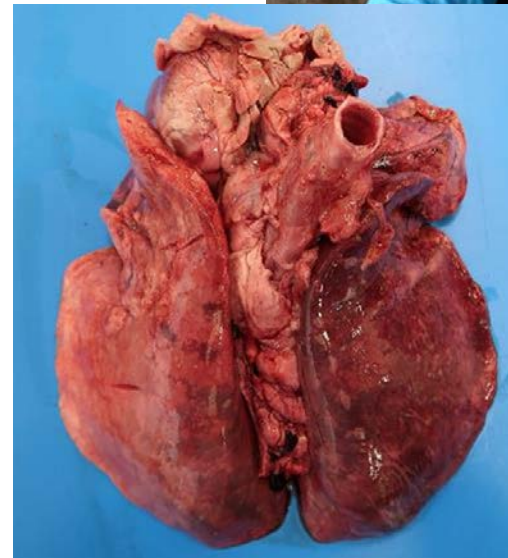
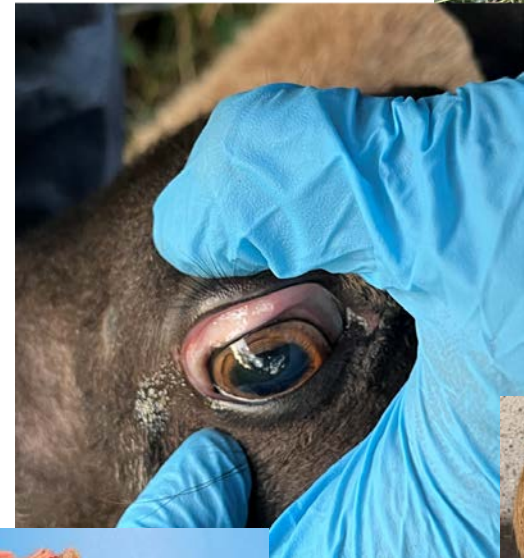


# Clinical signs and impact of BTV-3 in sheep



# Sheep

- Fever
- Lesions and/or ulcerations mucous membranes
  - mouth/ nose/ eye
- Excessive salivation and nasal discharge
- Oedema head
- Apathy
- Lameness and tightness
- Periarthritis and deshoeing
- Death
- Recovery may take months



# Mortality

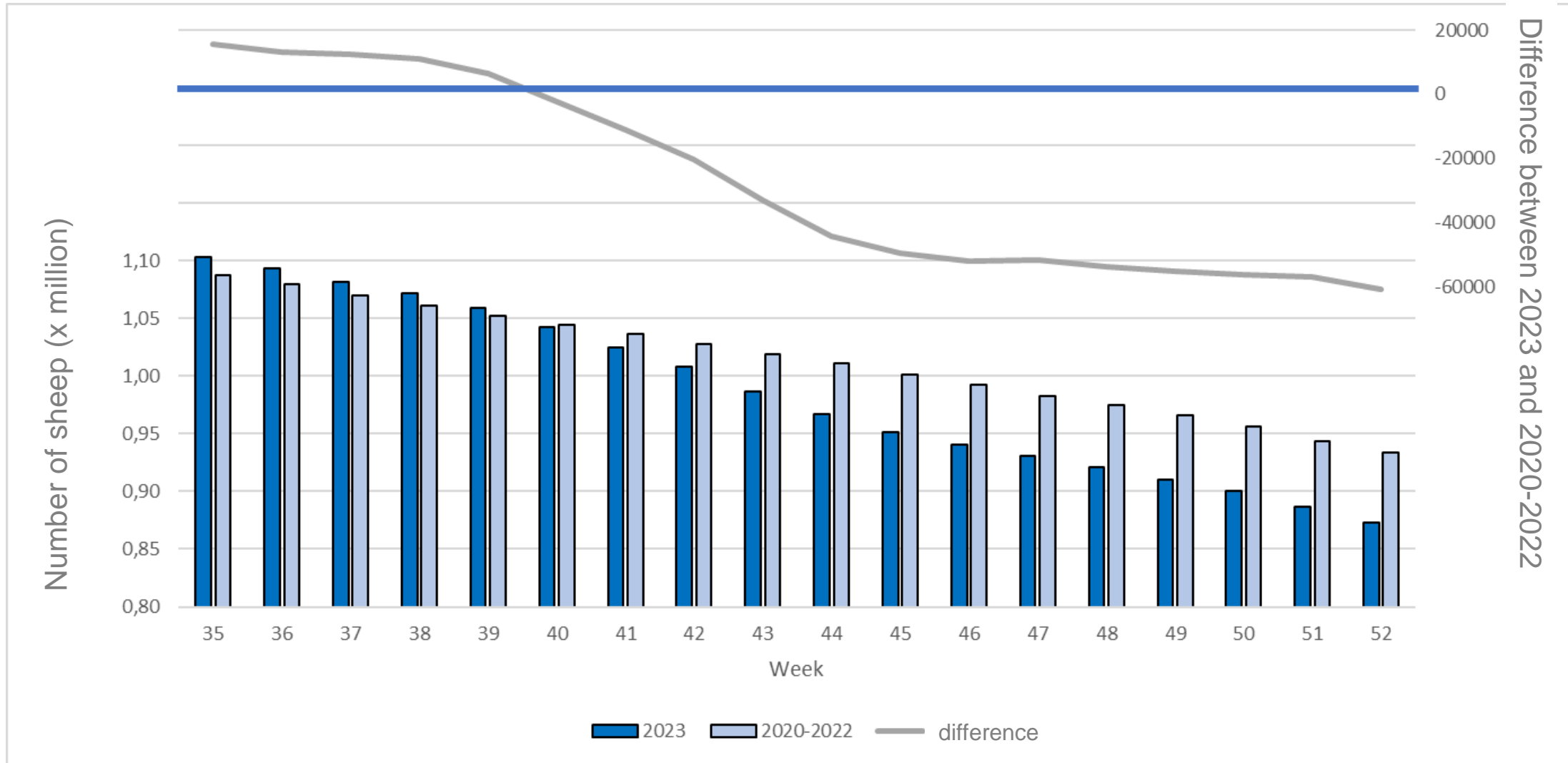


	2023 before BTV-3	BTV-3	2023 before BTV-3	BTV-3
# animals (*1000) (wk 35, 2023)	505	505	599	599
# dead 2023	29,350	35,451	39,480	46,183
# dead 2020-2022	31,551	14,904	38,657	11,573

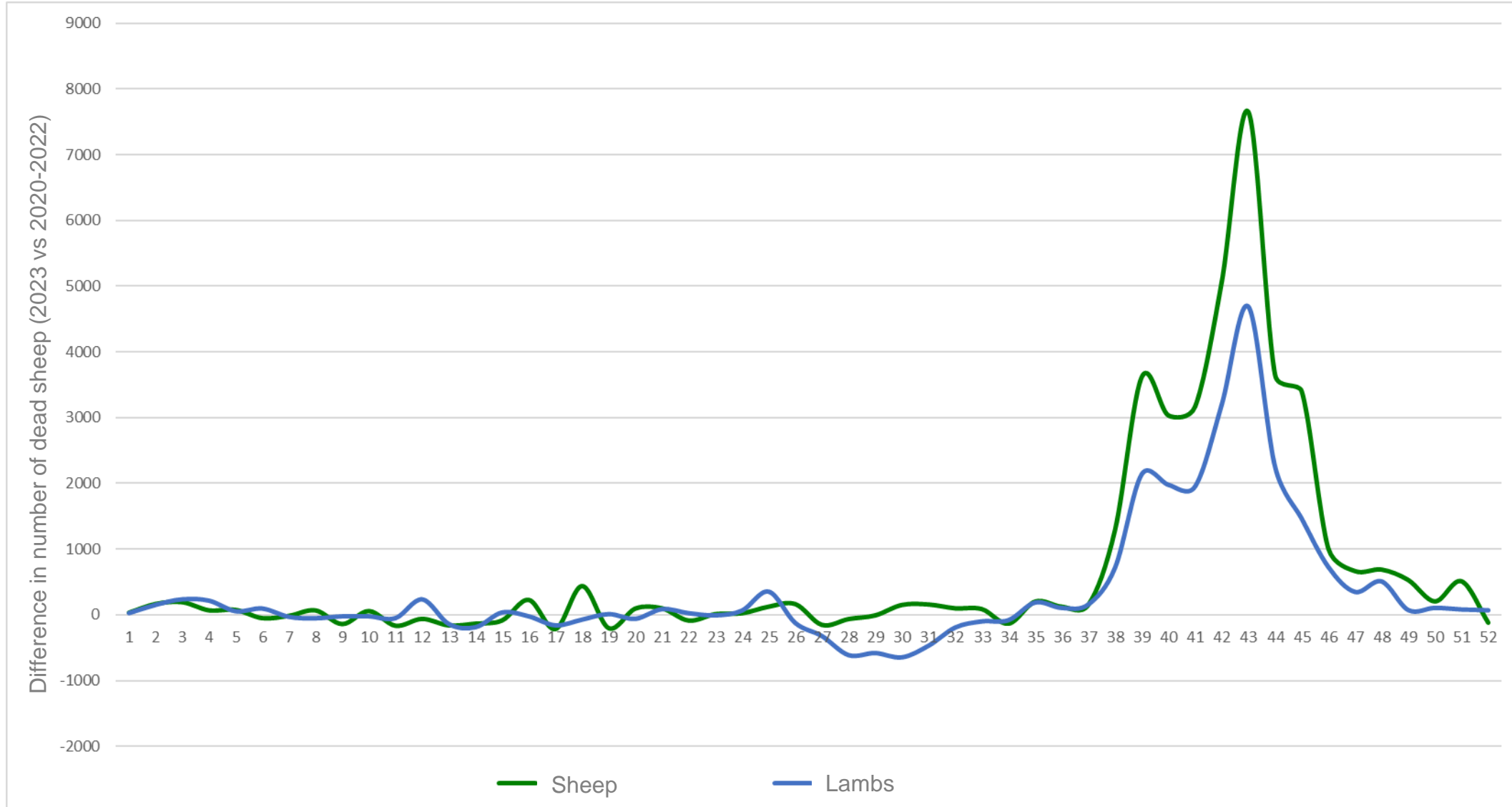
<b>Difference between 2023 &amp; 2020-2022</b>	-2,201	<b>20,547</b>	823	<b>34,610</b>
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before BTV-3: wk 1-35  
 BTV-3: wk 36-52

# Dutch sheep population in 2023

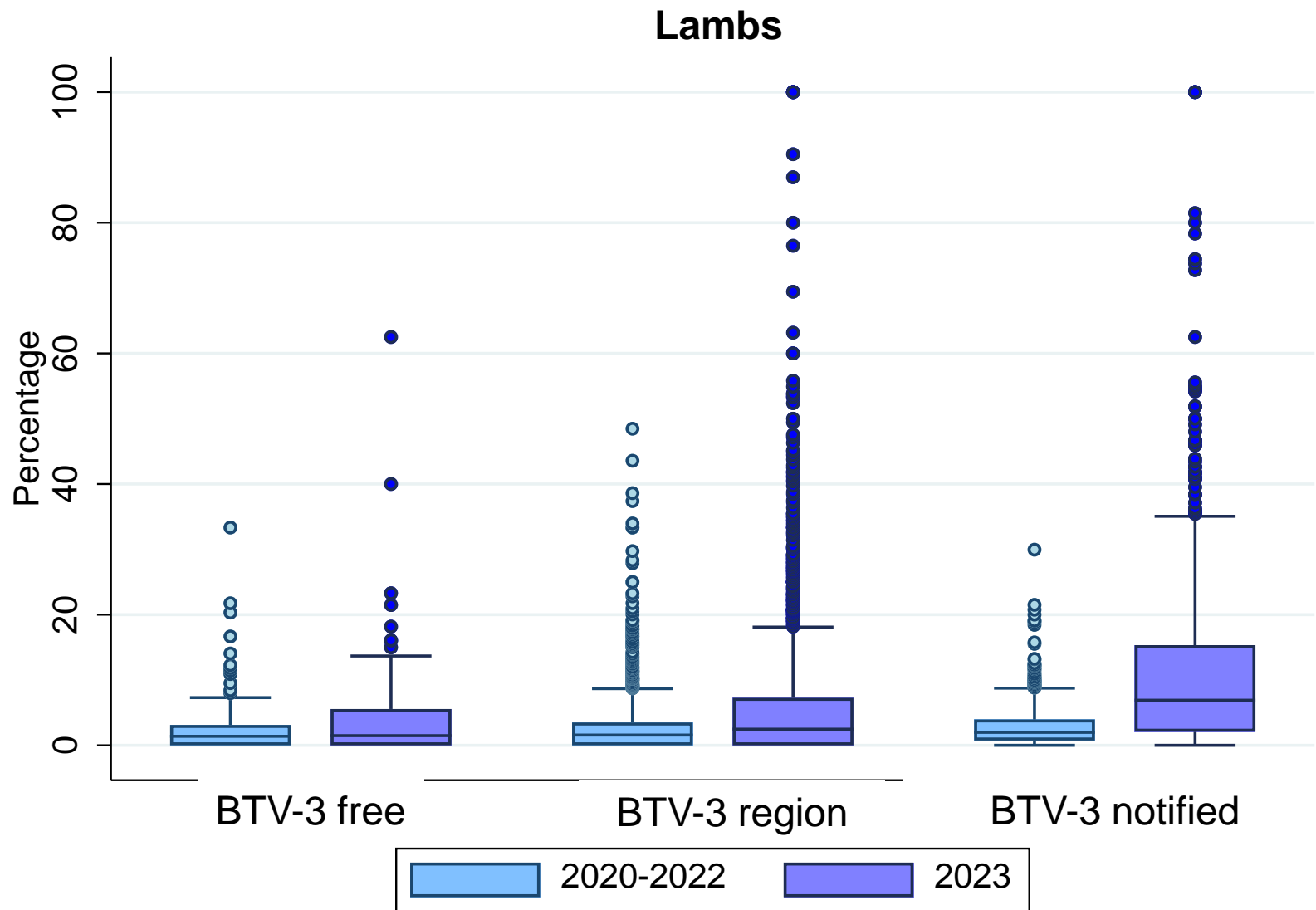


# Difference in mortality per week in 2023 vs 2020-2022



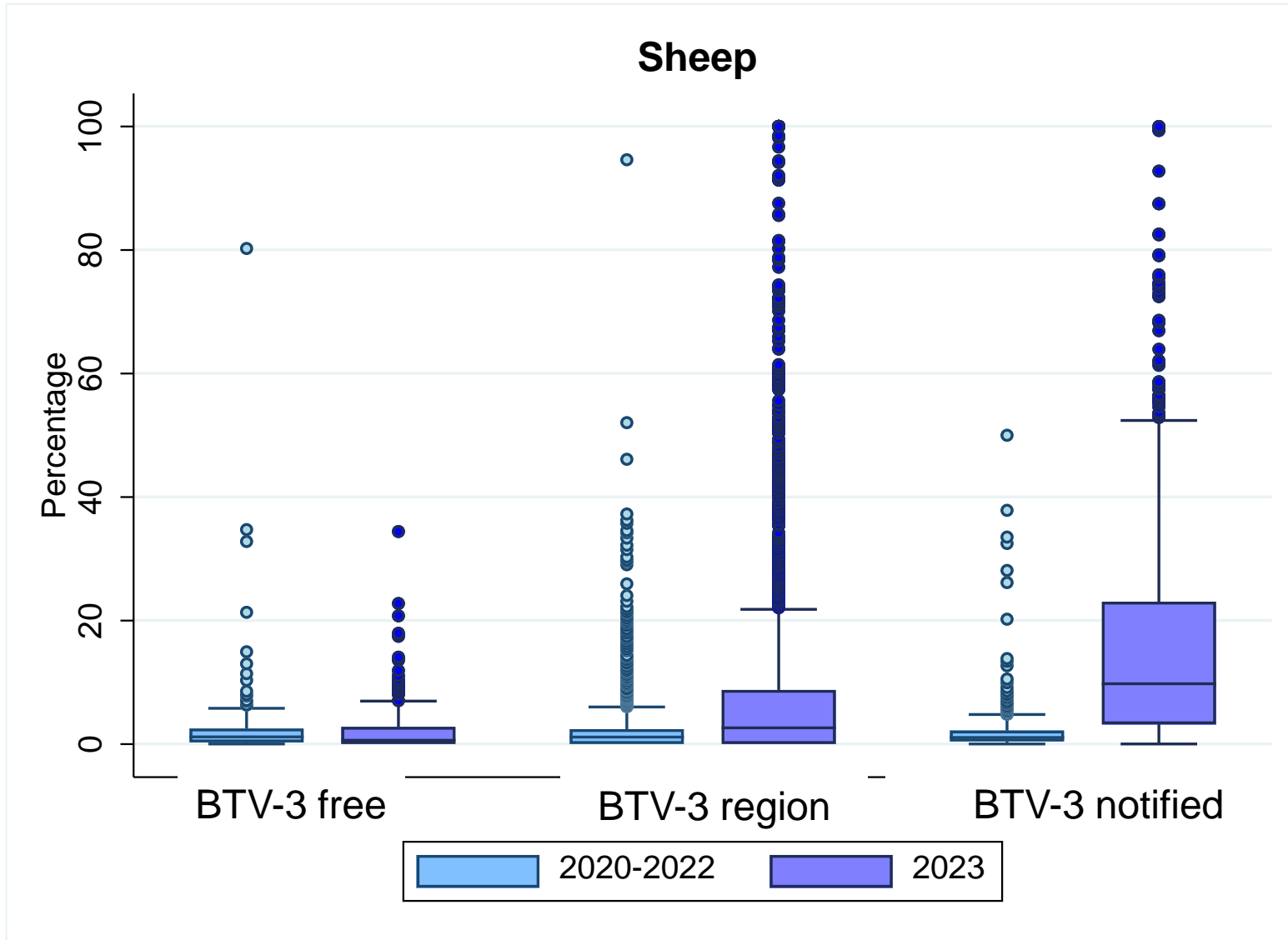


# Lamb mortality per flock in BTV-3 period



	Mean
BTV-3 free	4.5%
BTV-3 region	7.0%
BTV-3 notified	13.8%
2020-2022	2.9%









# Sheep mortality per flock in BTV-3 period



	Mean
BTV-3 free	2.3%
BTV-3 region	8.7%
BTV-3 notified	16.6%
2020-2022	2.1%

# Result PA multivariable regression model



Sheep (>1 yr)	Model 1 (IRR +95% CI)	Model 2 (IRR +95% CI)	Lamb (<1 yr)	Model 1 (IRR +95% CI)	Model 2 (IRR +95% CI)
 free	Reference	Reference	 Free	Reference	Reference
 infected region	4.1 (3.9-4.3)	4.1 (3.9-4.3)	 Infected region	4.0 (3.8-4.2)	4.0 (3.8-4.2)
 Notified	7.3 (6.8-7.8)	5.0 (4.6-5.5)	 Notified	6.6 (6.1-7.2)	4.5 (4.1-4.9)
 Notified in Sept		13.7 (12.4-15.1)	 Notified in Sept		12.5 (11.2-14.0)

- Sheep
  - Major increase in mortality
  - Mortality is increased in sheep and lambs
  - Highest increase in mortality in notified but also in flocks that were located in infected regions (no notification).
  - Highest mortality in herds that notified in September, month with higher temperatures were cullicoides was no limiting factor
- Goats
  - Slight increase in mortality in adult goats
  - No increased mortality in lambs



RUNDVEE

# **BTV-3 in cattle herds**

Clinical signs and impact

# Cattle

- Fever
- Milkproduction drop
- Lesions and/or ulcerations mucous membranes
  - mouth/ nose/ eye
- Excessive salivation and nasal discharge
- Red nose
- Conjunctivitis
- Lesions udder and/or teats
- Lameness and tightness
- Red, swollen coronary band
- Swollen legs
- Vertical transmission
  
- Recovery may take weeks



Foto: K. v.d. Brink

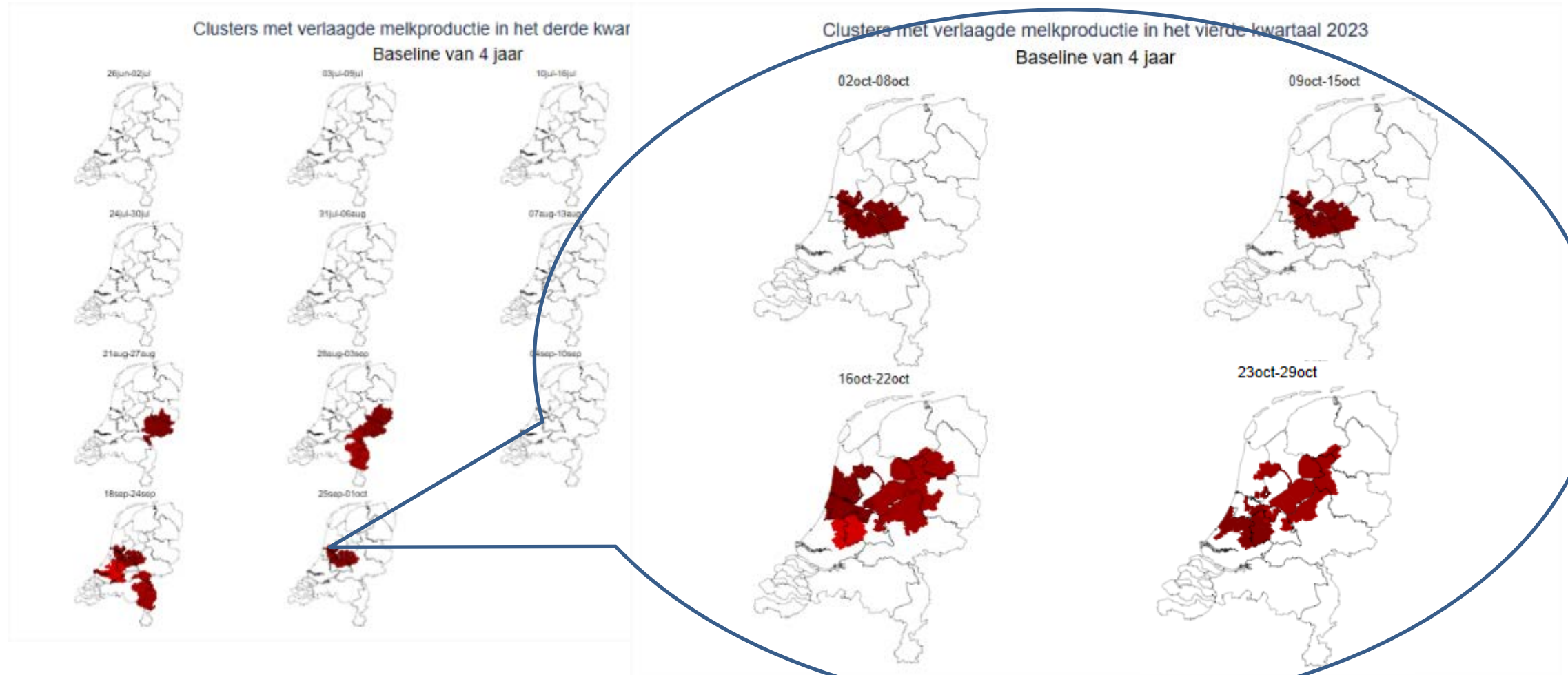


Foto: K. v.d. Brink

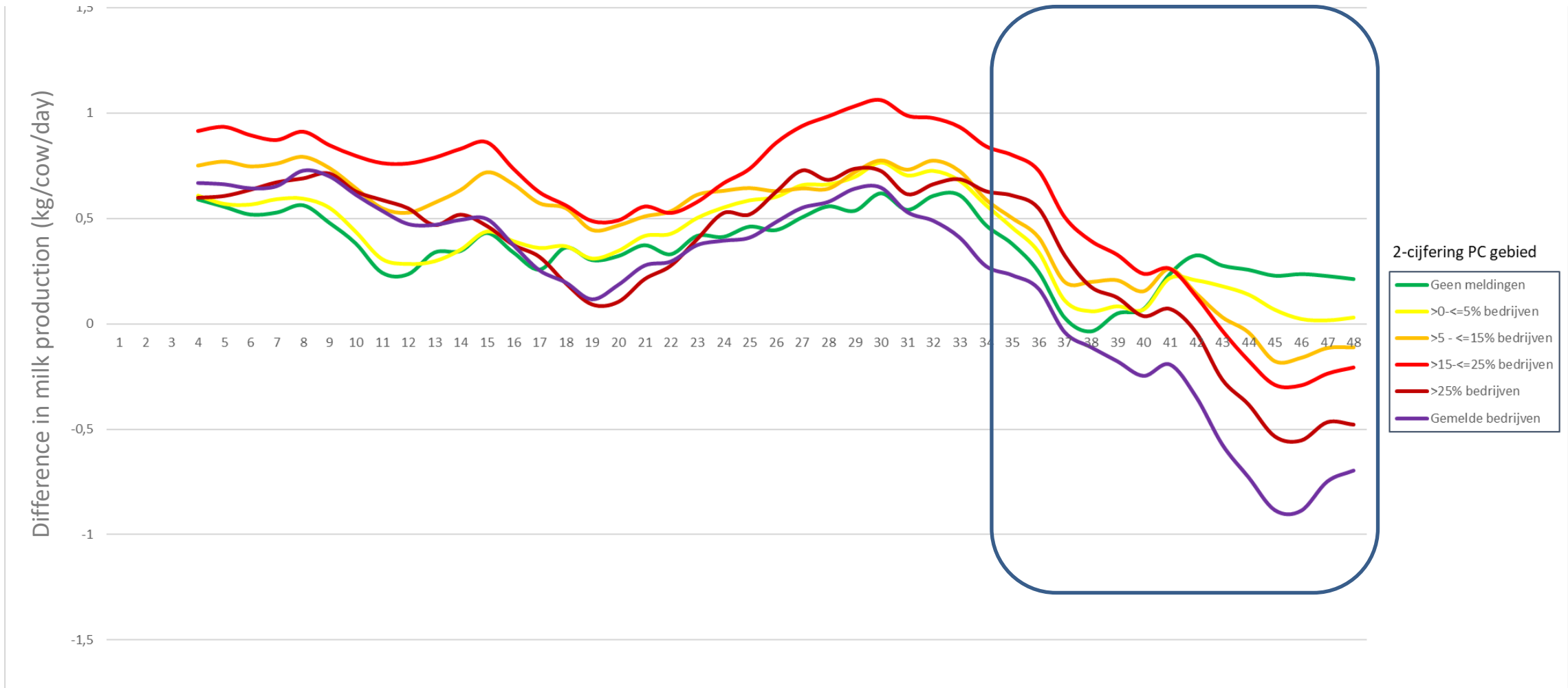


Foto: E. Strauss

# BTV-3 & milk production Syndromic surveillance



# Difference in milk production per week of the year: different groups of herds





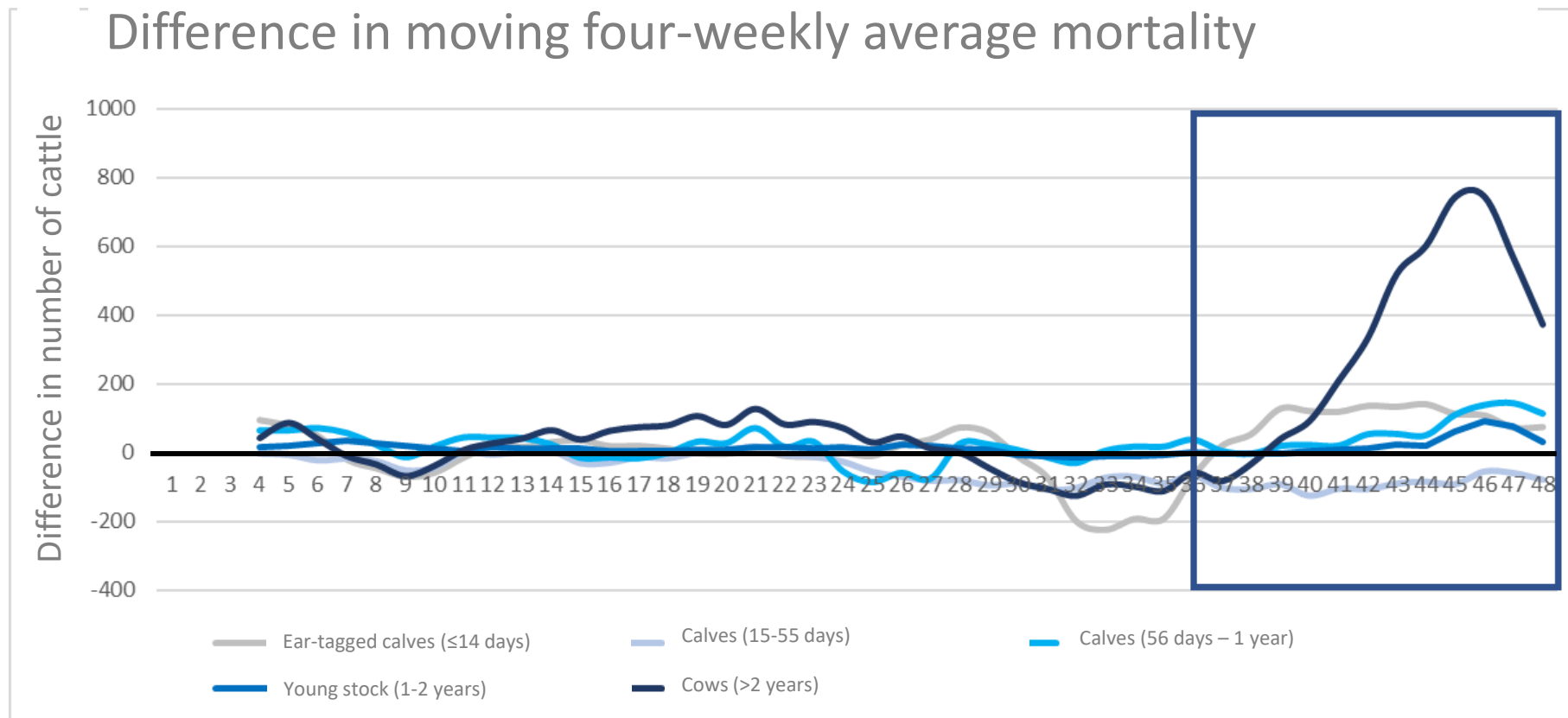
What is the  
impact?



**Impact evaluation:**

**Mortality**

# Mortality: difference 2023 vs 2020-2022



Adult cattle:  
>4300 deaths  
compared to  
same period in  
previous years

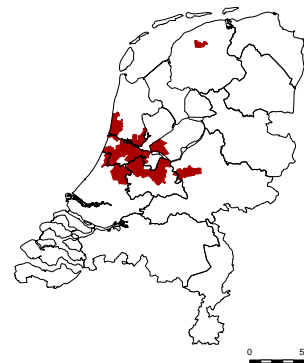
# Mortality cattle (>2 years)

## Dairy 2023 vs. 2020-2022

Week 39



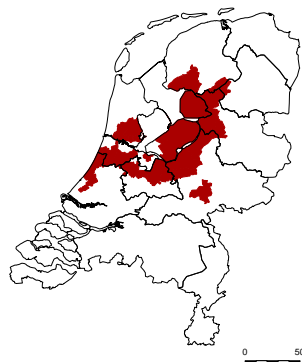
Week 40



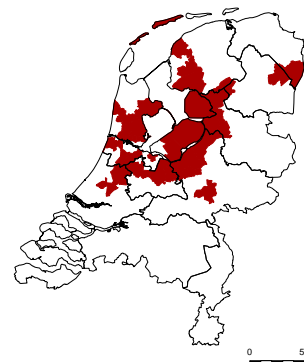
Week 41



Week 42



Week 43



Week 44



Week 45



Week 46

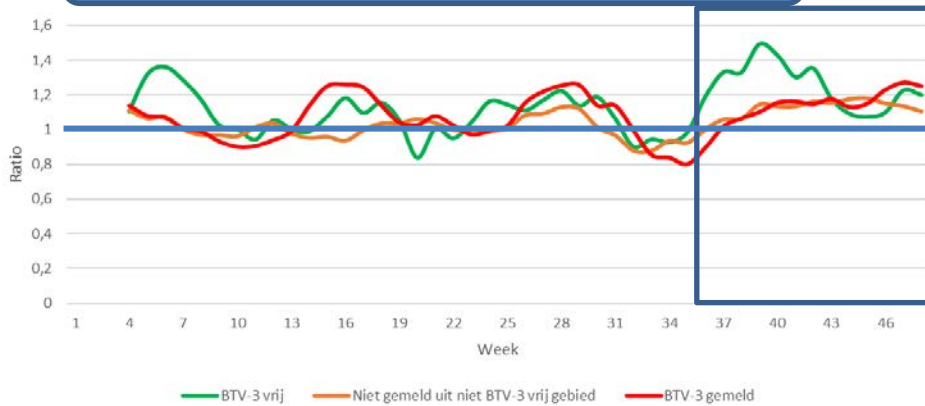


Week 47-48

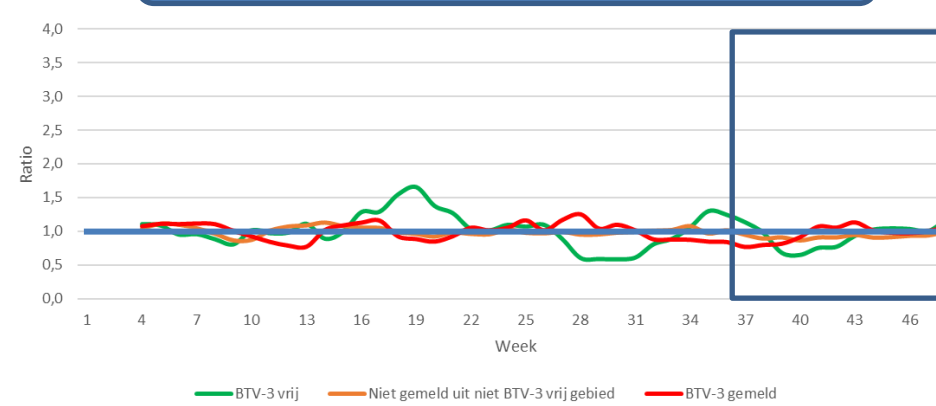


# Dairy: differences in notification type

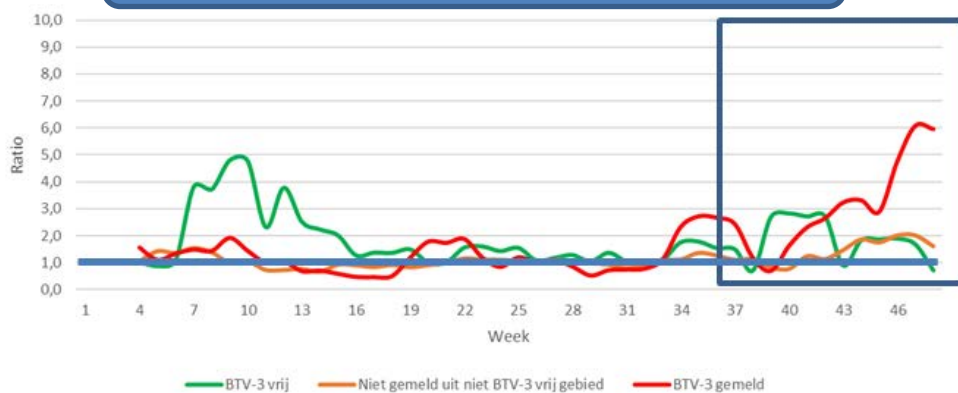
Calves ( $\leq 14$  days)



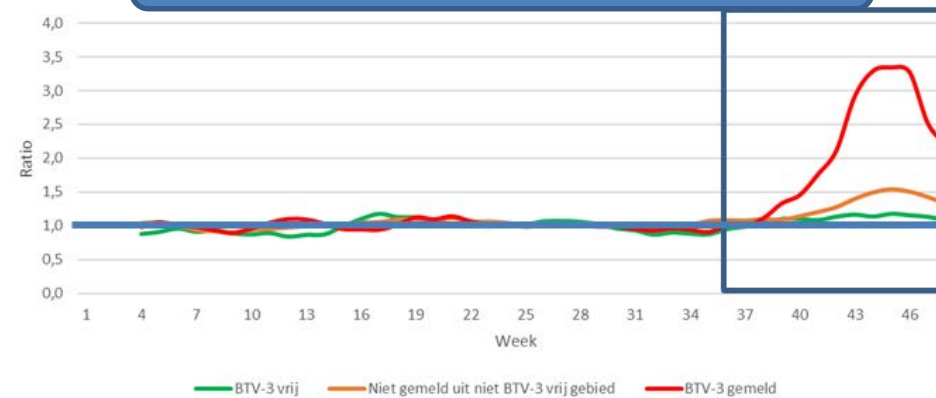
Calves (15-55 days)



Young stock (1-2 years)



Cows (>2 years)

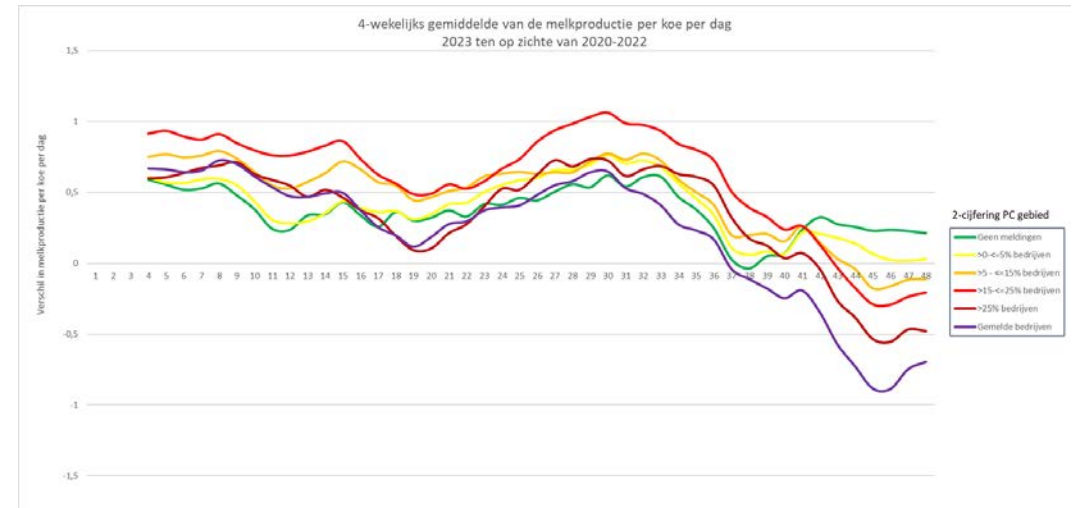


# Conclusions BTV-3 relating to milk production

- Decrease is observed regardless of notification
- Decrease more prominent in more severely affected herds
- Milk production loss of about 1 kg/cow/day
- Decrease has a duration of about 10 weeks

For estimate total impact: multivariable models with correction for weather, region, etc.

Plannen spring '24

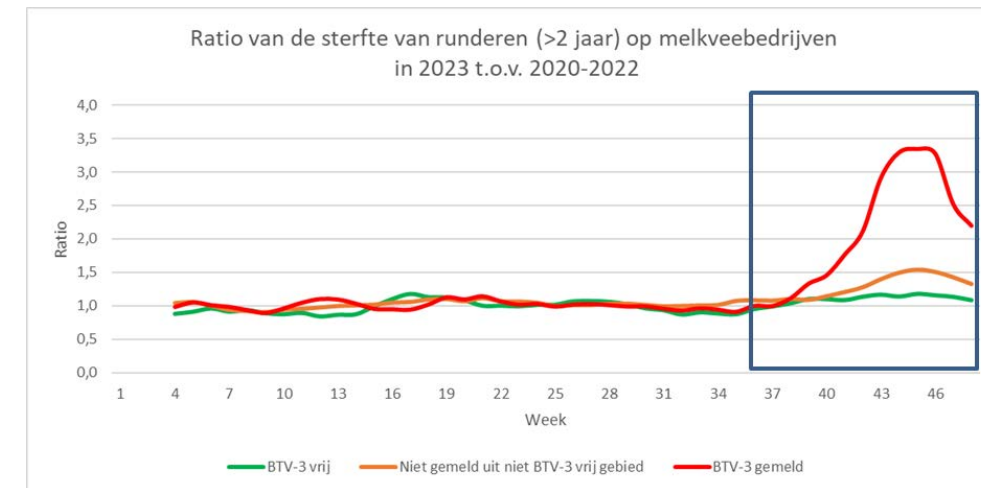


# Conclusions BTV-3 related to cattle mortality

- Calves: no clear effect
- Young-stock (1-2 years): **additional mortality observed**
- Cows (>2 years): **additional mortality observed**
- Increased mortality during prolonged period

For estimate total impact: multivariable models with correction purchase, health status, etc.

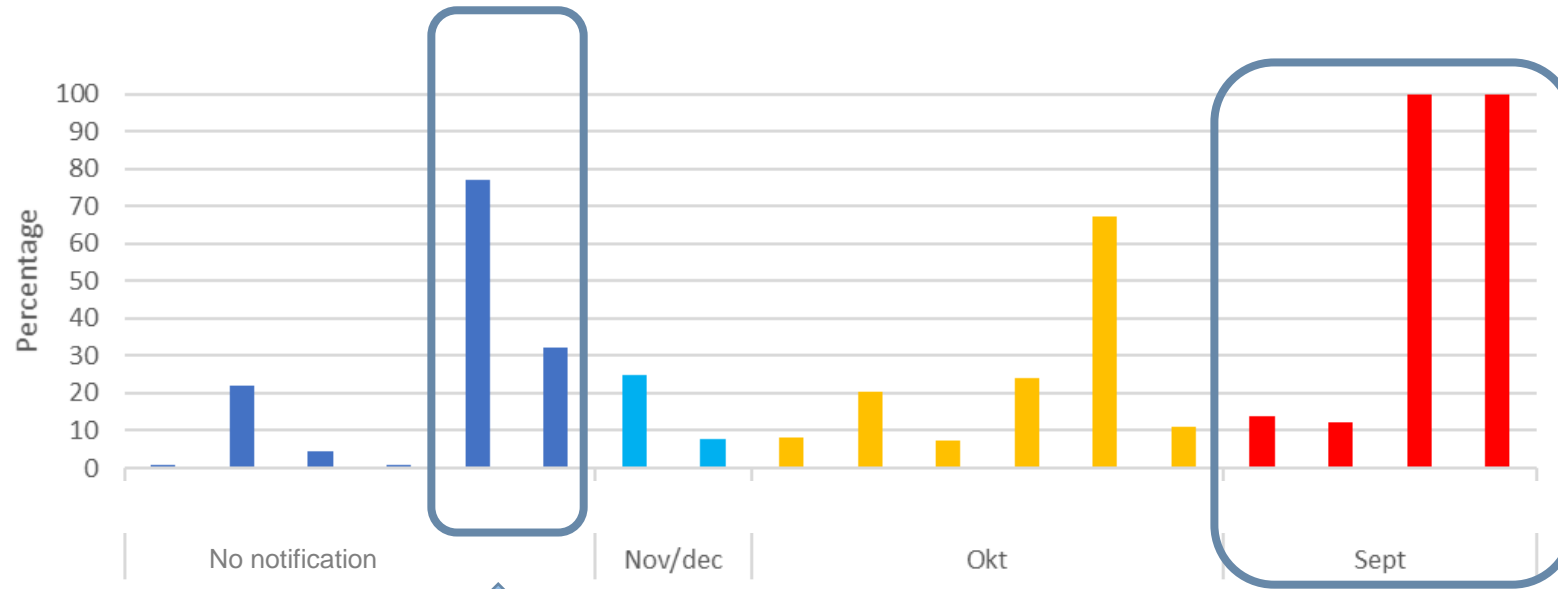
Planned spring '24



## Overall conclusion

- There is a large variation in impact depending on the region the farm is located in and, if infected, the moment of infection with BTV-3
- Need to estimate the herd and within herd prevalence to get more insight in impact and the risk for 2024
- In the Netherlands there is major concern for what happens in the coming year.....

# First estimates of within-herd prevalence: cattle



Subclinical infections, or did the farmer decide not to notify

What are the differences between these herds?



- BTV-3 has had major impact in the Netherlands in 2023
  - Antibody prevalences at the end of the year are low
  - A large proportion of the animals are still susceptible: possible major damage yet to come
  - No idea when spread will start again, but expect rapid spread after first detection
  - Vaccination is the only solution.
- 
- Conclusion: there is reason to worry for what may come!!

Thanks for the attention

Monitoring  
Diergezondheid