INFECTIOUS DISEASES

Pathogen-specific prevalence and pathogen associations during outbreaks of Bovine Respiratory Disease in calves in Flanders.

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INTRODUCTION

Bovine respiratory disease (BRD) is a major health problem during calf rearing in many farms.

OBJECTIVE

The objective of this study was to obtain further insights into the importance of different pathogens involved and possible pathogen associations during outbreaks of BRD in calves in Flanders.

MATERIALS AND METHODS

- A cross-sectional study, January 2019 - December 2021.
- The target population: cattle herds from the northern part of Belgium (Flanders) with a current acute outbreak of BRD.
- Respiratory samples: either nasopharyngeal swabs, broncho-alveolar lavage fluid or lung tissue, from affected calves.

Pathogen detection: Semiquantitative real-time PCR test[1].

Pathogens targeted:

- Bovine respiratory syncytial virus (BRSV),
- Bovine Parainfluenza virus type 3 (PI3V),
- Bovine Coronavirus (BCoV),
- *Mannheimia haemolytica*,
- *Pasteurella multocida*,
- *Mycoplasma bovis*,
- *Histophilus somni*.

Statistics: Multiple logistic regression models

BRSV and Bovine Coronavirus were the most frequently isolated viral pathogens, acting predominantly as single viral agents. Season influenced the frequency of BRSV and *M.haemolytica* isolation with higher risk of disease in winter and spring.

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RESULTS

In 245 outbreaks of BRD : 75.5% - at least one pathogen detected; 31.8% - single pathogen detected, 43.7% - multiple pathogens detected.

Pathogen detection rate in the outbreaks is shown in **Fig.1**.

Results of the multiple logistic regression models revealed several associations **(Table 1)**:

- **BRSV** associated with increased detection rate of PI3V and *M.bovis*.
- ***M.haemolytica*** associated with increased detection rate of PI3V, *M.bovis* and *P.multocida*.
- **BCoV** associated with higher risk for detection of PI3V.
- ***M.bovis*** higher risk for detection of BRSV, *P.multocida* and *H.somni*.
- **BRSV & *M.haemolytica*** - seasonal association

FIGURE 1. Frequency of respiratory pathogen detection by PCR in the investigated BRD outbreaks.

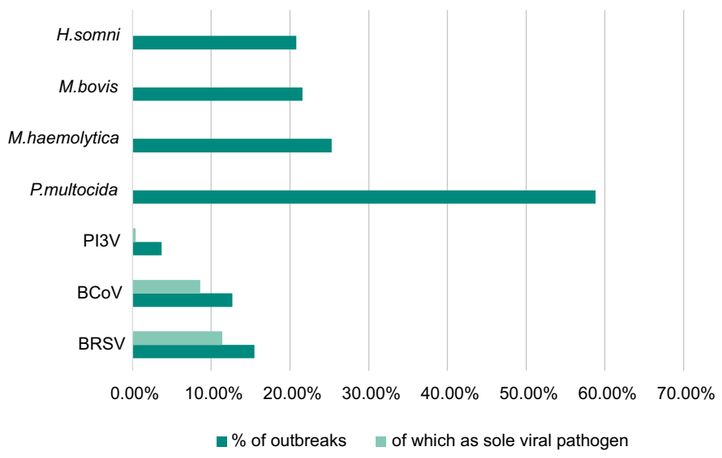

TABLE 1. Results of the multiple logistic regression models.

Outcome Bovine Respiratory Syncytial Virus			
Parameter	**OR[1]**	**95% CI[1]**	**p-value**
Season			
Summer-Autumn	ref.	—	—
Winter-Spring	4.85	2.09-12.7	<0.001
PI3-virus	6.83	1.61-35.2	0.012
M. bovis	2.33	1.04-5.14	0.037

Outcome Bovine Parainfluenza 3 virus			
Parameter	**OR[1]**	**95% CI[1]**	**p-value**
BRSV	9.63	2.14-52.5	0.004
BCoV	5.96	1.24-29.8	0.024
M. haemolytica	7.36	1.51-53.9	0.021

Outcome Bovine Coronavirus			
Parameter	**OR[1]**	**95% CI[1]**	**p-value**
PI3-virus	11.2	2.72-50.4	<0.001
P. multocida	2.4	1.03-6.23	0.053

Outcome Mannheimia haemolytica			
Parameter	**OR[1]**	**95% CI[1]**	**p-value**
Season			
Summer-Autumn	ref.	—	—
Winter-Spring	3.09	1.54-6.37	0.002
Sample type			
Nasal swab	ref.	—	—
BAL	7.90	1.29-153	0.061
Lung tissue	1.80	0.25-35.0	0.596
PI3-virus	6.88	1.20-57.8	0.044
P. multocida	2.35	1.13-5.16	0.026
M. bovis	2.97	1.37-6.53	0.006

Outcome Mycoplasma bovis			
Parameter	**OR[1]**	**95% CI[1]**	**p-value**
BRSV	3.47	1.57-7.64	0.002
M. haemolytica	2.97	1.50-5.90	0.002
H. somni	3.34	1.62-6.90	0.001

Outcome Pasteurella multocida			
Parameter	**OR[1]**	**95% CI[1]**	**p-value**
Season			
Autumn - Winter	ref.	—	—
Spring - Summer	1.86	1.08-3.27	0.027
M. haemolytica	2.65	1.36-5.41	0.005
M. bovis	2.53	1.24-5.46	0.013

1OR = Odds Ration, CI = Confidence Interval

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REFERENCES

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