Causes of Spontaneous Bovine Abortions and Stillbirths in Missouri

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BACKGROUND

- Spontaneous bovine abortions and stillbirths have a significant economic impact on the dairy and beef industries.
- The determination of the cause of spontaneous bovine abortions and stillbirths can be frustrating to veterinarians, diagnosticians and cattle producers, alike, as a definitive etiology is often identified and/or reported in less than half of the cases.
- Bovine abortion is the delivery of a dead calf before it reaches a viable stage of life (i.e. 260 days of gestational age). When the fetus is near term and born dead it is often called a stillbirth; however, there can be overlapping usage of these terms.

RESEARCH OBJECTIVE

- To review the cases of spontaneous bovine abortions and stillbirths submitted to the University of Missouri Veterinary Medical Diagnostic Laboratory (MU VMDL) over a 12-year period.

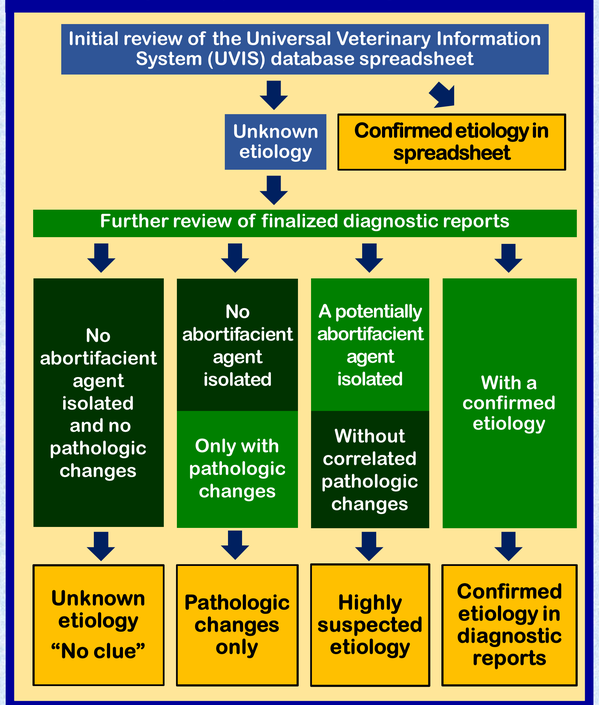
SPECIFIC AIMS

- To investigate how the causes of abortions and stillbirths were reported in database and diagnostic reports.
- To review the main causes of spontaneous bovine abortions and stillbirths.
- To evaluate the importance of submissions of the fetal membranes for the determination of etiologies.

MATERIALS AND METHODS

- This study was based on 635 cases of bovine abortions and stillbirths submitted to MU VMDL between 2004 and 2015, including 414 complete necropsies of fetuses and 221 submissions of fresh and fixed tissues.

Summary of Steps to Review Diagnostic Results



RESULTS

Summary of Review of Diagnostic Results

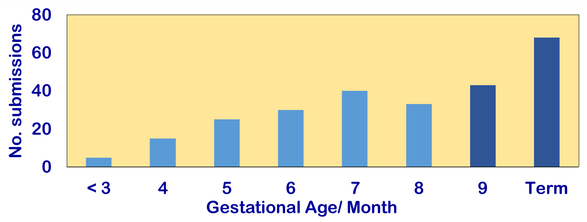


Figure 1: Gestational ages were provided in 259 aborted fetuses and stillbirths. 260 days or more (i.e. 9 months and term in this study) of gestational age were denoted as stillbirth.

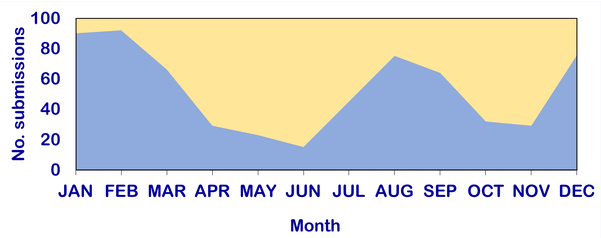
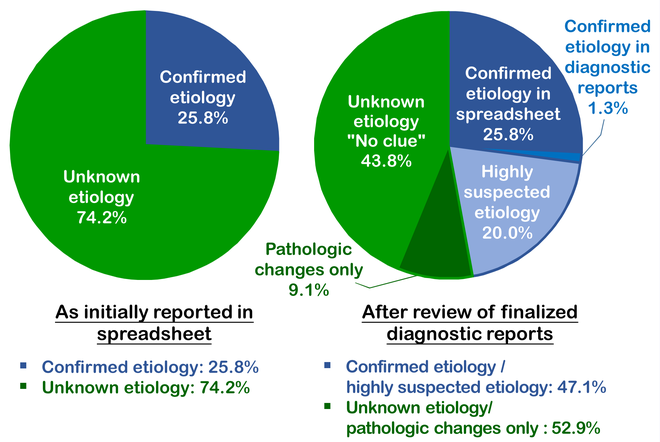


Figure 2: Trend in monthly incidence of spontaneous bovine abortions and stillbirths reported between 2004 and 2015.



- Confirmed etiology: 25.8%
- Unknown etiology: 74.2%

- Confirmed etiology / highly suspected etiology: 47.1%
- Unknown etiology/ pathologic changes only : 52.9%

Figure 3: An additional 21.3% of total cases were found to be consistent with a specific etiology after review.

Table 1: Lesions in 58 aborted or stillborn bovine fetuses (9.1%), with no etiologic agent determined.

	No. cases	% of total
Epicarditis	23	39.7%
Pneumonia	13	22.4%
Placentitis	9	15.5%
Fetal wastage	6	10.3%
Arthrogryposis	4	6.9%
Hydrocephalus	4	6.9%
Mummification	3	5.2%
Congenital skeletal abnormalities	3	5.2%
Myositis	2	3.4%
Nephritis	1	1.7%

Confirmed or Highly Suspected Etiologies

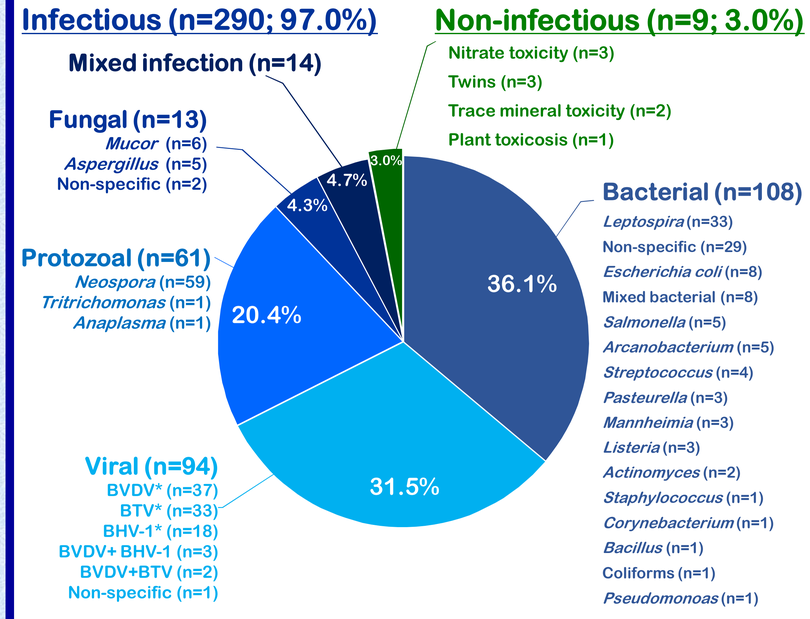


Figure 4: Summary of definitive and highly suspected etiologies.

*BVDV: Bovine Viral Diarrhea Virus; BTV: Bluetongue Virus; BHV-1: Bovine Herpesvirus-1

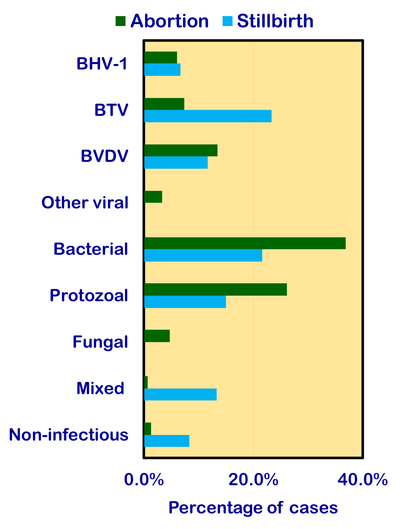
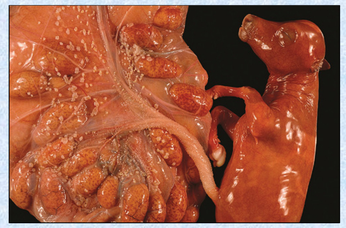


Figure 5: Bacterial, fungal, and protozoal infections appeared to be more common in abortions; while bluetongue virus (BTV) infections, mixed infections and non-infectious causes appeared to be more associated with stillbirths.

Do the Fetal Membranes Matter?



- The submissions of aborted fetuses and stillbirths with fetal membranes, especially for the fresh and fixed tissues, yielded a higher rate of determination of etiologies (Fig.6).

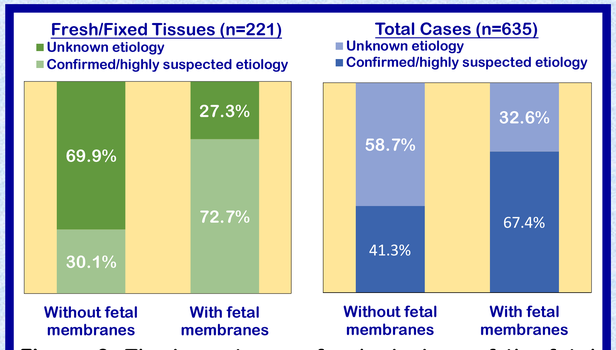


Figure 6: The importance of submissions of the fetal membranes for the determination of etiologies of bovine abortions and stillbirths is shown above.

CONCLUSIONS

- Careful review of the UVIS database elucidated a confirmed or highly suspected cause in an additional 21.3% of the total cases.
- Failure to determine a definitive etiology might be indicative of the poor quality of samples submitted or another etiology not being investigated, such as nutritional deficiencies.
- Infectious etiologies were the most frequently reported causes of spontaneous bovine abortions and stillbirths in this retrospective study, with some etiologies being more commonly associated with abortions or stillbirths.
- Prompt submission of the entire fetus with fetal membranes increased the likelihood of the determination of etiologies.

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