

## **Control of Bovine Reproductive Pathogens**

### **M. Daniel Givens, DVM, PhD**

Bovine reproductive pathogens can cause infertility, early embryonic death, mummification of fetuses, abortions, or the birth of weak or malformed calves.

Infertility is the diminished or absent capacity to produce viable offspring. Infections that reduce ovulation rates, fertilization rates, embryonic survival rates, fetal survival rates or perinatal survival rates result in observed infertility in beef cows. Reproductive pathogens include *Leptospira*, *Campylobacter*, *Hemophilus*, *Brucella*, bovine herpesvirus 1, bovine viral diarrhea virus, *Tritrichomonas foetus*, and *Neospora caninum*. Infectious infertility can be minimized with appropriate surveillance, biosecurity, and/or vaccination.

Early embryonic death is defined as loss of the conceptus during the first 42 days of pregnancy which is the window of time from conception to differentiation of organ systems. Approximately 30% of embryos do not survive to birth. Of this 30% loss, 80% is estimated to occur before day 17, 15% from day 17 to day 42, and 5% after day 42.

Abortions are certainly a frequent diagnostic frustration for bovine clinicians. Under optimal conditions, submission of ideal diagnostic samples, and sensitive testing at a proficient veterinary diagnostic laboratory, only 40% of bovine abortions will be associated with an infectious cause. The following worksheets are designed to facilitate a work-up of bovine abortions and optimize discussions with producers and stakeholders.

## ***Bovine abortion diagnosis and management***

Attending veterinarian: \_\_\_\_\_

Farm \_\_\_\_\_

Contact Name \_\_\_\_\_

Date \_\_\_\_\_

Contact Phone # \_\_\_\_\_

Physical Exam

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<b>Rule outs</b>	<b>Samples</b>	<b>Results</b>	<b>Diagnosis</b>	<b>Management</b>
Lepto	<ul style="list-style-type: none"> <li>• Maternal serum</li> <li>• Fetal serum</li> <li>• Fetal kidney &amp; fluids (on ice)</li> <li>• Maternal urine- culture</li> <li>• Maternal urine- fluorescent antibody test</li> <li>• Paired serum samples from in contact herdmates (10)</li> <li>Convalescent sampling date _____</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Antibiotics</li> <li>• Vaccination</li> <li>• Animal movement</li> <li>• Environment</li> </ul>
Brucella	<ul style="list-style-type: none"> <li>• Maternal serum</li> </ul>		<ul style="list-style-type: none"> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Contact State Veterinarian</li> </ul>
Listeria	<p>Send all samples on ice.</p> <ul style="list-style-type: none"> <li>• Fetal abomasal contents- stain &amp; culture</li> <li>• Fetal tissues- stain &amp; culture</li> <li>• Maternal vaginal discharge-stain &amp; cult.</li> <li>• Observe fetal liver for pinpoint foci</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Antibiotics</li> <li>• Evaluate feedstuffs</li> </ul>
Campylobacter	<p>Send all samples in anaerobic transport media.</p> <ul style="list-style-type: none"> <li>• Herd history- repeat breeding &amp; infertility</li> <li>• Fetal abomasal contents- stain &amp; culture</li> <li>• Fetal tissues- stain &amp; culture</li> <li>• Maternal vaginal discharge-stain &amp; cult.</li> <li>• Cervical mucus (10 cows) in Port-A-Cul's</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Vaccination</li> <li>• Bull management</li> </ul>
Salmonella	<ul style="list-style-type: none"> <li>• Fetal abomasal contents- stain &amp; culture</li> <li>• Fetal tissues- stain &amp; culture</li> <li>• Maternal vaginal discharge-stain &amp; cult.</li> </ul>		<p>Requires pure culture for significance.</p> <ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Antibiotics</li> </ul>
Histophilus	<p>Send all samples on ice.</p> <ul style="list-style-type: none"> <li>• Fetal abomasal contents- stain &amp; culture</li> <li>• Fetal tissues- stain &amp; culture</li> <li>• Maternal vaginal discharge-stain &amp; cult.</li> </ul>		<p>Requires pure culture for significance.</p> <ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Antibiotics</li> <li>• Vaccination</li> </ul>

Rule outs	Samples	Results	Diagnosis	Management
Ureaplasma	Refrigerate if same day submission. Freeze and submit frozen if > 24 hours. <ul style="list-style-type: none"> <li>• Fetal fluid (amniotic)</li> <li>• Fetal lung</li> <li>• Caruncle &amp; cotyledon</li> <li>• Fetal stomach contents</li> </ul>		Requires pure culture, characteristic lesions, and no other causes. <ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Double sheath AI</li> <li>• Isolate aborting cow</li> <li>• IU antibiotics</li> </ul>
Mycoplasma	Refrigerate if same day submission. Freeze and submit frozen if > 24 hours. <ul style="list-style-type: none"> <li>• Fetal fluid (amniotic)</li> <li>• Fetal lung</li> <li>• Fetal stomach contents</li> </ul>		Requires pure culture, characteristic lesions, and no other causes. <ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Double sheath AI</li> <li>• Isolate aborting cow</li> <li>• IU antibiotics</li> </ul>
Chlamydia	Send all samples on ice. <ul style="list-style-type: none"> <li>• Fetal abomasal contents- stain &amp; inoc.</li> <li>• Fetal tissues- stain &amp; culture</li> <li>• Maternal vaginal discharge-stain &amp; inoc.</li> <li>• Maternal serum</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Environment</li> <li>• Available vaccines</li> </ul>
Anaplasma	<ul style="list-style-type: none"> <li>• Individual animal history- pyrexia &amp; anorexia</li> <li>• Maternal PCV</li> <li>• Blood smear- Wright's, Giemsa or NMB</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Tetracyclines</li> <li>• Isolate aborting cow</li> <li>• Vaccination</li> </ul>
IBR	Send all samples on ice or frozen. <ul style="list-style-type: none"> <li>• Herd history- respiratory disease</li> <li>• Fetal kidney &amp; adrenal</li> <li>• Fetal lung, spleen, liver &amp; thymus</li> <li>• Caruncle &amp; cotyledon</li> <li>• Maternal serum</li> <li>• Paired serum samples from in contact herdmates (10) Convalescent sampling date _____</li> <li>• Serum samples from 10 unvaccinated calves</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Maintain biosecurity</li> <li>• Vaccination</li> </ul>
BVD	Send all samples on ice or frozen. <ul style="list-style-type: none"> <li>• Herd history- weak calves</li> <li>• Fetal spleen</li> <li>• Fetal kidney, brain, lung, thymus, lymph nodes</li> <li>• Caruncle &amp; cotyledon</li> <li>• Maternal serum</li> <li>• Paired serum samples from in contact herdmates (10) Convalescent sampling date _____</li> <li>• Serum samples from 10 unvaccinated calves</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Maintain biosecurity</li> <li>• Vaccination</li> <li>• Test &amp; remove PIs</li> </ul>
Bluetongue	Cool samples but do not freeze. <ul style="list-style-type: none"> <li>• Fetal blood, spleen, lung and brain</li> <li>• Maternal serum for serology</li> <li>• Fetal serum for serology</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Maintain biosecurity</li> </ul>
Trichomonas	Contact lab for recommended transport media. <ul style="list-style-type: none"> <li>• History- repeat breeders</li> <li>• Pyometral discharge</li> <li>• Placental fluids</li> <li>• Fetal abomasal contents</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Maintain biosecurity</li> <li>• Cull old bulls</li> <li>• Sexual rest of cows</li> <li>• Vaccination</li> </ul>
Neospora	Send all samples on ice. <ul style="list-style-type: none"> <li>• Fetal blood, spleen, lung or brain</li> <li>• Maternal serum for serology</li> <li>• Fetal serum for serology</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Maintain biosecurity</li> </ul>

Rule outs	Samples	Results	Diagnosis	Management
Sarcocystis	<ul style="list-style-type: none"> <li>• Fetal brain</li> <li>• Maternal serum for serology</li> <li>• Fetal serum for serology</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Maintain biosecurity</li> </ul>
Fungal causes	<ul style="list-style-type: none"> <li>• Fetal skin</li> <li>• Caruncle &amp; cotyledon</li> <li>• Fetal abomasal contents</li> <li>• Fetal lung</li> </ul>		Requires placentitis, skin lesions, or broncho-pneumonia associated with mycotic elements. <ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Isolate aborting cow</li> <li>• Environment</li> </ul>
Toxins Nitrate poisoning Poison hemlock Lupines Tobacco Ponderosa Pine	<ul style="list-style-type: none"> <li>• Exposure to toxic agents</li> <li>• Characteristic signs</li> </ul>		<ul style="list-style-type: none"> <li>• Presumptive</li> <li>• Confirmed</li> <li>• Ruled out</li> </ul>	<ul style="list-style-type: none"> <li>• Remove toxic agent</li> </ul>

Additional Notes: