COMMON ZOONOSES - FOOT-AND-MOUTH DISEASE, BRUCELLOSIS, AND TUBERCULOSIS

Infectious diseases are diseases caused by pathogenic microorganisms, such as bacteria, viruses, parasites or fungi which subsequently grow and multiply in the body. Due to their potential of transmission from one person or species to another by a replicating agent they are also called communicable diseases or transmissible diseases. The infectious agents can be spread directly through physical contact with infected individuals or indirectly through liquids, food, contaminated objects, or through vector-borne spread. Zoonotic diseases are infectious diseases of animals maintained in nature by animals and directly or indirectly transmissible to humans. The diseases dealt with in this chapter - foot-and-mouth disease, brucellosis, and tuberculosis are all typical zoonoses; however, each time caused by different pathogen. While foot-and-mouth disease is caused by a virus, tuberculosis and brucellosis are caused by bacteria.

Foot-and-mouth disease (FMD)

Foot-and-mouth disease, also known as hoof-and-mouth disease, is described as a highly contagious viral disease, affecting mainly cloven-hoofed animals such as cattle, sheep, pigs, goats, or deer. Other animals susceptible to the disease are camelids (camels, llamas etc.). However, these animals show only mild symptoms and do not transmit the disease to other animals of the same species. FMD is currently endemic in parts of Asia, Africa, the Middle East and South America, with sporadic outbreaks in disease-free areas.

Although humans can be affected by the disease through the contact with an infected animal, it happens extremely rarely. The virus cannot be spread to people via consumption of infected food, because it is sensitive to acid stomach juices and thus destroyed in the stomach.

For animal health and for the economics of the livestock industry FMD may be a disaster as it can spread in a rapid or even uncontrolled way. Seven different **serotypes** of FMD as O, A., C, SAT1, SAT2, SAT3, and Asia 1 have been identified in laboratory serological tests. The frequency of occurrence is dependent on region, whereas O serotype is the most common. All of them are characterized by similar symptoms.

The after-effects of FMD are severe. In addition to treating and nursing a herd of sick animals, a reduction in the milk production in a dairy herd will certainly appear, at least until the next lactation. Mastitis may develop and the value of a cow is permanently reduced due to possible sterility. The disease is usually fatal to young animals, adult animals die rarely. But those who survive are often debilitated and suffering from chronic heart disease and lameness.

The **clinical signs** in the first stage of the disease include a quick rise in temperature, sudden severe lameness, and reduction in yield of milk. Usually within a few hours blisters on the dental pad, inside the lips, and sometimes on the muzzle, will be found, as well as those on the upper surface of the tongue. At first the blisters resemble small raised areas, whitish in colour and containing fluid but they quickly increase in size; they may be as big as half a walnut. Two or more blisters may join together and form a larger one. The lips of the affected animals quiver, they hardly move the lower jaw and they salivate excessively. About the same time there is evidence of pain in the feet caused by painful blisters. Later, the blisters in the mouth burst and collapse, sometimes forming aphthae. After this phase the animals usually make recovery: the temperature decreases, pain is lessened and the animals are able to start eating again.

As regards **the spread of the disease**, it is very easy and quick as the virus is fast-moving in the air and under favourable conditions it can survive for long periods. Animals are affected by the virus either by direct contact with an infected animal or by contact with foodstuffs or other things which have been contaminated. The boots, clothing, and hands of a stockman or a farmer who has been in contact with the infected animals can harbour the virus of the disease: the virus is found in great quantity in the fluid from the blisters, and it can also occur in the saliva, milk and dung. Heat, sunlight and disinfectants work against the virus, whereas cold and darkness tend to keep it alive.

Since the usage of **vaccination** against FMD is problematic, certain rules and laws have to be obeyed on a farm. Farmers and cattlemen should know who is on their property at all times. They should

immediately report any suspicious and unusual signs pointing to the disease. Moreover, basic hygienic rules as washing hands, clothes and footwear when travelling from farm to farm should be observed.

Brucellosis

Brucellosis of cattle, also called "contagious abortion", is a notifiable disease caused by infection with various species of the bacterium of the genus Brucella, which can also be the cause of a human disease known as "undulant fever". These bacteria are primarily spread among animals and they very often affect sheep, goats, cattle, deer, pigs, dogs, etc. A gram-negative bacterium *Brucella abortus* infects cattle and humans, *Brucella suis* infects pigs. Other species of the genus Brucella *Brucella melitensis* infects sheep and goats and can cause a disease in humans known as "Malta fever".

The **clinical signs** are represented by abortion or premature calving of recently infected animals; the fetus, placenta and uterine fluid contain large amount of *Brucella abortus* bacteria which can infect other cattle coming into contact with an infected animal around the time of calving. The pathogenic organism continues to be excreted in the milk; in the past people would be frequently infected due to drinking unpasteurised milk. Infected breeding bulls can transmit the disease to cows via inserting infected semen.

There are no characteristic post mortem signs of brucellosis of cattle. **Diagnosis** is made by laboratory testing of blood or bone marrow samples to detect antibodies against bacteria. Additionally, examination of laboratory culture of bacteria from the placenta, vaginal discharge or the milk of infected cows is possible.

Treatment for brucellosis of cattle may be difficult. Animals can be given effective antibiotics as doxyciclyne and rifampin. Sometimes all infected cattle and those which have been exposed to infection must be slaughtered.

Since brucellosis of cattle is still present in many countries including Ireland and several other countries of the European Union, prevention of brucellosis relies on careful checks of imported cattle and continuing surveillance which is based on regular testing of bulk milk samples from dairy herds and investigation of cattle abortions.

Bovine Tuberculosis Detected At Fresno County Dairy

Published on Feb 2, 2008 - 9:10:00 AM

By: California Department of Food and Agriculture

> *"SACRAMENTO, February 1, 2008 - A detection of Bovine Tuberculosis (TB) has occurred at a dairy in Fresno County. State and federal animal health officials are working closely with the dairy farmer and his veterinarians to implement control strategies to eradicate the disease.*
>
> *The diagnosis of TB was made after a cow with suspicious lesions was found during routine slaughter inspection. This week, CDFA and USDA veterinarians completed tests on some herds that may have been exposed based on animal tracing records and determined that, to date, TB is present in just one herd. The tracing of related animal movement will continue, as will TB testing.*
>
> *Tuberculosis does not threaten the quality and safety of milk and meat products in California. Almost all milk sold in California is pasteurized, which destroys organisms that could be harmful to humans, including TB organisms. The state's two raw milk dairies are regularly tested for TB. All cattle processed for meat are inspected for signs of TB infection and rejected for consumption if they show signs of the disease.*

Tuberculosis is a chronic, slow-spreading disease that can remain undetected for years. Infected animals, even those that appear healthy, can spread infection to other animals. The state of California has been involved in TB eradication programs since 1917. The last known case of Bovine TB in California was in 2003.

The best way for farmers and ranchers to prevent bovine tuberculosis is to follow animal import regulations, require TB testing of new cattle before purchase, maintain permanent identification of animals, keep records of animal movements into and out of their herd, prevent contact of breeding cattle with cattle of unknown origin, and cooperate with government officials on TB investigations.

The California Department of Food and Agriculture protects and promotes California's agricultural industry. California's farmers and ranchers produce a safe, secure supply of food, fiber and shelter; marketed fairly for all Californians; and produced with responsible environmental stewardship."

ACTIVITIES

1. Reading comprehension
Answer these questions in full sentences

What is an infectious disease?
Name some possible pathogens and characterize them in brief.
What animals are most frequently affected by FMD?
Where is FMD most spread at the present time?
Why is brucellosis of cattle sometimes called “contagious abortion”?
How can brucellosis be diagnosed?
Can you name some preventive hygienic rules that should be obeyed at animal farms to prevent infectious diseases?

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2. Essay writing
The last article in the text deals with concrete occurrence of bovine tuberculosis in California. Write its summary in your own words (max. 80 words).

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3. Symptoms
Match the features on the left side with the symptoms on the right

Feature		Symptom
Main site		Is there anything else affected by the rash?
Time of onset		How would you describe the behaviour?
Severity		How often does the pig get this pain?
Relieving factors		Where are the blisters?
Frequency		When the cow did start limping?
Associated features		How serious was the bleeding?
Character		Does anything make the nausea better?

4. Lexis
Form the proper word form and translate the new word into Czech

Noun	Verb	Czech
protect		
promote		
maintain		
move		
trace		
originate		
breed		

5. Translation
Translate the expressions in Czech into English. The first letters have been given.

nemoc podléhající hlášení n_____ d_____
vzorky kostní dřeně b_____ m_____ s_____
stálý dozor c_____ s_____
děložní mléko u_____ f_____
mléčné stádo d_____ h_____
podezřelé známky s_____ s_____
nepřímo přenosný t_____ i_____
bolestivé puchýře p_____ b_____
náchylná zvířata s_____ a_____
pokles teploty t_____ d_____

6. Pronunciation
Rewrite the words as they are spelled below

/kən'sʌmpʃ(ə)n/ _____ /dɪ'ziːz/ _____
/'sælɪveɪt/ _____ /'lɑːmə/ _____
/'lɑːmə/ _____ /'fʊtˌweə(r)/ _____
/ɪ'miːdiətli/ _____ /ɪn'kluːdɪŋ/ _____
/ɪˌrædɪ'keɪʃ(ə)n/ _____ /ɪnˌvestɪ'geɪʃ(ə)n/ _____

7. Grammar

Find grammatical mistakes in these sentences and correct them. Each sentence contains one mistake.

Tuberculosis is a chronic disease that can remain undetect for many years.

_____

Almost all milk in the Czech Republic is pasteurized that kills organisms that can be harmful to humans.

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The cow is suffering of FMD.

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I expect the treatment will improve the state of the horse and he may recover completely.

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The pigs have lost on weight recently.

_____

VOCABULARY LIST

abortion (n)	/əˈbɔː(r)ʃ(ə)n/	potrat
antibody (n)	/ˈæntɪˌbɒdi/	protilátka
as regards (phr)	/əz rɪˈgɑːds/	co se týče, pokud jde o
bacteria (n)	/bækˈtɪəriə/	bakterie
blister (n)	/ˈblɪstə/	puchýř
breeding bull	/ˈbriːdɪŋ bʊl/	plemenný býk
brucellosis (n)	/bruːsəˈləʊsis/	brucelóza
burst (v)	/bɜːst/	prasknout
calving (n)	/kɑːvɪŋ/	telení
camelid (n)	/ˈkæm(ə)lɪd/	camelid
cloven-hoofed (adj)	/ˌkləʊv(ə)n ˈhuːfd/	sudokopytný
collapse (v)	/kəˈlæps/	sklesnout, stáhnout se
communicable (adj)	/kəˈmjuːnɪkəb(ə)l/	přenosný, nakažlivý
contagious (adj)	/kənˈteɪdʒəs/	nakažlivý, infekční
dairy herd (n)	/ˈdeəri hɜːd/	mléčné stádo
debilitate (v)	/dɪˈbɪlɪteɪt/	oslabit, zeslabit
disinfectant (n)	/ˌdɪsɪnˈfektənt/	definfekční prostředek
dung (n)	/dʌŋ/	trus
eradicate (v)	/ɪˈrædɪkeɪt/	vymýtit, vyhubit
fairly (adv)	/ˈfeəli/	slušně, poměrně, docela
fatal (adj)	/ˈfeɪt(ə)l/	fatální
favourable (adj)	/ˈfeɪv(ə)rəb(ə)l/	příznivý, příhodný
fiber (n)	/ˈfaɪbə/	vlákno
fungus (n)	/ˈfʌŋgəs/	houba
harbour (v)	/ˈhɑːbə/	skrývat v sobě, obsahovat
herd (n)	/hɜːd/	stádo
implement (v)	/ˈɪmplɪˌment/	provést, uskutečnit
infectious (adj)	/ɪnˈfekʃəs/	infekční
lameness (n)	/ˈleɪmnəs/	chromost
lesion (n)	/ˈliːʒ(ə)n/	poranění, léze
livestock (n)	/ˈlaɪvˌstɒk/	dobytek, skot
mastitis (n)	/mæˈstaɪtɪs/	mastitida
microorganism (n)	/ˌmaɪkrəʊˈɔːgənɪz(ə)m/	mikroorganizmus
muzzle (n)	/ˈmʌz(ə)l/	čumák, tlama, mulec
nurse (v)	/nɜːs/	ošetřovat
occurrence (n)	/əˈkʌrəns/	výskyt
outbreak (n)	/ˈaʊtˌbreɪk/	propuknutí
parasite (n)	/ˈpærəsaɪt/	parazit
pathogenic (adj)	/ˌpæθəˈdʒenɪk/	patogenní
placenta (n)	/pləˈsentə/	placenta
promote (v)	/prəˈməʊt/	podporovat, propagovat
purchase (n)	/ˈpɜːtʃəs/	nákup, koupě
quiver (v)	/ˈkwɪvə(r)/	chvět se, třást se
rarely (adj)	/ˈreəli/	zřídka

recovery (n)	/rɪ'kʌv(ə)ri/	uzdravení, zotavení
reject (v)	/rɪ'dʒekt/	odmítnout
replicating agent	/'replɪkeɪtɪŋ 'eɪdʒ(ə)nt/	replikační agens
semen (n)	/'siːmən/	sperma
serological test	/sɪrɒ'lɒdʒɪkl test/	serologický test
severe (adj)	/sɪ'vɪə/	vážný
shelter (n)	/'ʃeltə/	úkryt, útočiště
slaughter (v)	/'slɔːtə/	porážet (dobytek)
sporadic (adj)	/spə'rædɪk/	sporadický
sterility (n)	/stə'rɪləti/	sterilita
stewardship (n)	/'stjuːədʃɪp/	správcovství
stockman (n)	/'stɒkmən/	dobytkář
sudden (adj)	/'sʌd(ə)n/	náhlý
supply (n)	/sə'plaɪ/	zásoba
surface (n)	/'sɜːfɪs/	povrch
surveillance (n)	/sə'veɪləns/	dohled, dozor
susceptible (adj)	/sə'septəb(ə)l/	citlivý, náchylný
threaten (v)	/'θret(ə)n/	hrozit, ohrožovat
transmissible (adj)	/træns'mɪsəbl/	přenosný
treat (v)	/triːt/	léčit
tuberculosis (n)	/tjuːˌbɜːkjʊ'ləʊsɪs/	tuberkulóza
vaginal discharge	/və'dʒaɪnəl dɪs'tʃɑːdʒ/	vaginální výtok
vector-borne spread	/'vektə bɔːn/	šíření přenašečem
viral (adj)	/'vaɪrəl/	virový
virus (n)	/'vaɪrəs/	virus
walnut (n)	/'wɔːlnʌt/	vlašský ořech
yield (n)	/jiːld/	výnos
zoonosis (n)	/zuː'nəʊsis/	zoonóza

Zdroj:

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