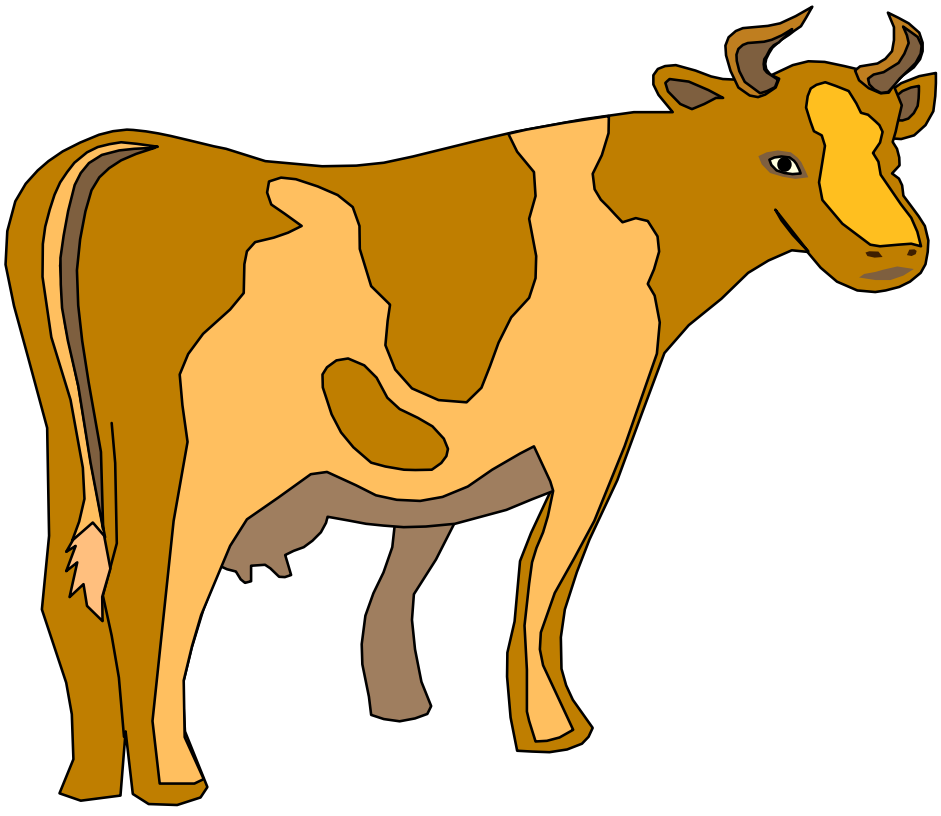
English Book

for Veterinary Schools



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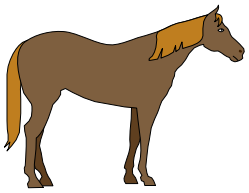
INDEX



UNIT 2

THE SCIENCE OF VETERINARY MEDICINE

Veterinary science deals with the anatomy, physiology, and pathology of animals other than man. It includes the diagnosis, prophylaxis, and treatment of their diseases and infirmities; their relationship to man with regard to intercommunicable diseases and to the use of their flesh and other products, and their scientific breeding, feeding and handling.

Historical evidence, like that from currently developing nations, indicates that veterinary medicine originally developed in response to the needs of pastoral and agricultural man along with human medicine. It seems likely that a veterinary profession existed throughout a large area of Africa and Asia from at least 4 000 years ago. Veterinary science flourished in ancient India, where separate treatises on the diseases of horses and elephants were written, and there were hospitals for various species of animal.

EXERCISES

1. Select the correct alternative:
   a) Veterinary is a ____ subject
      ____ science
      ____ item
   b) Veterinary deals with ____ animals
      ____ man
      ____ birds

a) Select the main idea of the text.
   a) ____ The importance of veterinary.
   b) ____ The science of veterinary.
   c) ____ The development of veterinary.

2. Say true or false
   a) ____ Veterinary deals with different sciences.

b) ____ Veterinary includes the treatment of different illnesses.
c) ____ There are many diseases common for animals and men.

3. Chronological order
   a) ____ Veterinary includes the diagnosis and prophylaxis of different diseases.
   b) ____ Veterinary developed in response to the necessities of agricultural man along with human medicine.
   c) ____Veterinary science flourished in ancient India.
4. Select the main idea of the text.
5. Answer these questions in Spanish or English.
   a) Is veterinary important for man?
   b) What does veterinary include?
   c) Do you like veterinary?
6. Find in the reading.
   a) A pronoun
   b) A sentence in simple present
   c) A verb to be
   d) A word that means diagnóstico.
   e) A synonym of illness.
   f) The antonym of undeveloped.
7. Give your Spanish version to the following sentences.
   a) Veterinary science deals with the anatomy, physiology, and pathology of animals other than man.
   b) The students of veterinary study English everyday.
   c) Veterinary includes the treatment of different illnesses.
   d) Cuba has a great development in veterinary medicine.
8. Make a summary of the text with your own words.
9. Give your Spanish version to the text.

UNIT 3

Treatment of diseases communicable to man

The protection of public health is constituting an integral part of all aspects of veterinary medicine in this moment. The inspection of meat food products, the recognition and eradication of communicable diseases, research in diseases causing great economic losses, and vaccination of individual animals are helping veterinarians to safeguard the public health.

In the protection of public health from the menace of diseases of animals communicable to man, the practicing veterinarian is occupying the first line of defense. His vaccination and immunization programs are preventing uncounted cases of communicable diseases. The diagnosis of diseases which may spread depends on the veterinarian. The arrest of infectious diseases before they can assume epidemic proportions is usually done in cooperation with investigators and veterinarians.

There are more than 80 animal diseases transmissible between animals and man, the more common include: tuberculosis, brucellosis, anthrax, rabies, psittacosis, encephalomyelitis (several kinds), typhus, plague, Q fever, trypanosomiasis, amoebic dysentery, leptospirosis, and salmonellosis.

EXERCISES

1.- Say true or false

a) ____ The protection of public health is an integral part of all aspects of veterinary medicine.

b) ____ Veterinarians don't safeguard the public health.

c) ____ Its vaccination and immunization programs prevent countless cases of communicable diseases.

2. - Select the main idea of the text.

a) Many diseases and their preventions.

b) Treatment of different diseases than can be communicable to man.

c) The protection of public health.

3. - Add these words to your vocabulary. What do you call.

a) the science treating injuries by operations?

a) surgical b) surgery c) surgeon.

b) the absence of disease?

a) health b) head c) help.

c) a widespread disease among animals?

a) Health b) zoology c) zoonoses.

4. - Read the paragraph 1

a) In the context, the word safeguard means:

a) escolta b) salvaguardia c) proteger

b) Read the paragraph 2

In this context, the word arrest means:

a) detener b) prisión c) aprenhensión.

5. - Match the statements that summarizes the paragraph.

A	B
a) paragraph 1	____ The protection of public health
b) paragraph 2	is an integral part of all aspects of veterinary medicine
c) paragraph 3	____ One of the most important disease is bovine tuberculosis.
	____ There are more than 80 animal diseases transmissible between animals and man
	____The practicing veterinarian occupies the first line of defense.

6.- Answer these questions

a) Which are the veterinarian services?

b) Who can assume the responsibility of the infection disease?

c) Mention the most common diseases communicable to man?

7. - Complete the sentence with the correct form of the verb.

a) Veterinarians _____ hard now.

work

b) The students _____ veterinary in this moment

study

c) Cuban veterinaries _____ in different events.

participate

8. - Make a summary of the text.

10. - Give your Spanish version to the text.

UNIT 4 AND UNIT 5

Treatment of diseases communicable to man (second part)

Of all the diseases of animals, the most important was bovine tuberculosis. In the 1920's the daily list of surgical operations in large hospitals in many countries was made up of a considerable proportion of operations for the removal of tuberculous glands of the neck of children. This particular form of the disease was largely due to infection with the bovine type of tuberculosis contracted by drinking unpasteurized milk from tuberculous cows.

It was conceivable that this disease will be eradicated from cattle before it is eliminated from other species. As long as any type of tuberculosis exists, however, cattle will continue to be in danger of infection.

The successful control of undulant fever in human beings probably will be achieved when the control of brucellosis in cattle and swine becomes fully implemented. The disease is transmitted to man by his handling cattle and swine infected with brucellosis and by drinking unpasteurized milk from infected cows. Despite all the medical research on undulant fever, it remains the task of the veterinary profession to conquer this disease at its source.

Anthrax is a disease of all warm-blooded animals including man, and is characterized by a marked and acute septicemia. The name, splenic fever, was derived from observation that this disease was characterized by a typical enlargement of the spleen.

The most susceptible domestic animals were cattle, sheep, goats, horses and mules. At times horses and mules become infected through the bites of flies, while cattle in the same immediate area were not affected.

Anthrax does not, however, carry the threat of destruction to the whole livestock industry that it once did. The antibiotics have provided a means of combating anthrax and in nearly all sporadic Out-breaks infected animals can be treated successfully.

In some countries, bovine tuberculosis in man has been virtually eliminated by the work of veterinarians in the eradication of the disease in cattle, and much progress has been made in the eradication of brucellosis, anthrax and other diseases. However in many countries of the world zoonoses are still a mayor deterrent to economic development.

EXERCISES

1. - Chronological order

a) ____ Any type of tuberculosis exists.

b) ____ This particular form of the disease was largely due to infection with the bovine type tuberculosis.

c) ____ Tuberculosis was a very important disease.

d) ____ In many hospitals operations were done.

2. - Find in the reading the main idea of the text of the topic sentence.

3. - Choose the right alternative

a) Unpasteurized milk from tuberculous cows may cause….
   a) A considerable proportion of operations.
   b) The bovine type tuberculosis in man.
   c) Salmonellosis
   d) Undulant fever in human beings.

b) Eradication of diseases of cattle is a task for…
   a) the countryman.
   b) the physician.
   c) the medical researcher.
   d) the practicing veterinarian.

4. - Answer these questions.

a) What kind of operation was commonly done to children in 1920´s?

b) What is meant by undulant fever?

c) Tell the way brucellosis is spread.

d) Have zoonoses been eradicated all over the world?

e) How is brucellosis transmitted to man?

f) Why is it important to drink the pasteurized milk?

g) What is the source of undulant fever?

h) May anthrax attack human beings?

i) What is the characteristic of the disease called anthrax?

j) What effect do antibiotics have in anthrax?

k) Has bovine tuberculosis been eliminated in all countries?

5. - Match column A with B.

A	B
a) Antibiotics	____ cuello
b) Bites	____ afectados
c) Disease	____ picadura
d) Neck	____ enfermedad
	____ antibióticos.

6. - Select the correct form of the verb " to be ".

a) The students _____ in the school yesterday.

b) The most susceptible domestic animals _____ cattle, sheep, goats, horses and mules.

c) Of all the diseases of animals, the most important is bovine tuberculosis

7. - Find in the reading.

a) A verb to be in past.

b) A synonym of kids.

c) An opposite of small.

8. - Give your Spanish version to the text.

UNIT 6

THE SCIENCE OF VETERINARY MEDICINE

Veterinary medicine, before schools were established, was practiced by barbers and blacksmiths. Schools for training veterinarians did not come into existence until late in the 18th century. With veterinary medicine once again in the hands of educated men, the profession rapidly regained its lost status and its development closely paralleled that of medicine. The methods and techniques were readily adapted to the other, and with the recognition of the close interrelationship of many human and animal diseases, human and animal medicine came to be regarded as complementary.

The work of Pasteur was of fundamental significance to general medicine. Veterinarians became concerned with foods of animal origin after the discovery of micro organisms and their identification with diseases in man and other animals. Efforts were directed towards protecting humans from diseases of animal origin, primarily those transmitted through meat or dairy products.

Since World War II, the eradication of animal diseases, rather than their control, has been becoming increasingly important, and conducting basic research, combating zoonoses, and contributing to man's food supply have become indispensable services of veterinary medicine.

A major challenge to veterinary science is the supplying of adequate service to undeveloped areas of the world. The plains of Africa, for example, could produce vast quantities of much needed meat once the problems of animal diseases peculiar to these regions have been mastered.

The future of livestock farming depends on the efficient application of scientific knowledge in the breeding, rearing, feeding, health maintenance and general management of the animal.

EXERCISES

1. - Say true or false

a) ___Schools did not come into existence until late in the 18th century.

b) ___ The work of Pasteur was of fundamental significance to general medicine.

c) ___ Efforts were directed towards protecting humans from diseases of animal origin.

2. - Select from the titles given below the most appropriate for each paragraph.

1) Paragraph 1
- a) ____ Origin of veterinary medicine.
- b) ____ Development of veterinary medicine.
- c) ____ Relationship of human and animals diseases.

2) Paragraph 2
- a) ____ The importance of Pasteur for medicine.
- b) ____ The discovery of animals diseases.
- c) ____ The protection of humans from animals disease.

3) Paragraph 4
- a) ____ How to develop veterinary medicine.
- b) ____ The challenge to veterinary science.
- c) ____ The use of veterinary science.

3. - Match column A with B

A	**B**
a) Development	____ logro
b) Methods	____ reto
	____ desarrollo
c) Challenge	____ métodos

4. - Select the correct form of the verb.

a) Barbers and blacksmiths _____ veterinary medicine.
practice

b) Veterinarians _____ the methods and techniques.
adapt

c) Veterinarians _____concerned with foods of animal origin.
become

5. - Make a dialogue talking about an unforgettable event that happened to you in the past.
6. - Scramble words. Find the words that appear in the reading.

I H J K C
M U L T I
B M S S S
W A S O A
V N O L B
D A I R Y

7. – Write a summary of the text in Spanish.

UNIT 7

VETERINARY MEDICINE

THROUGHOUT THE WORLD

Disease will take heavy toll of our livestock not merely by causing their premature deaths or by lowering the yield and often the quality of meat, milk, eggs and other produce, but also by preventing the existence of large numbers of potential food-producing animals.

The future of livestock farming and its freedom from the ravages of disease will depend on the high standard of its labour, otherwise the careful application of the wide scientific knowledge concerned with the welfare and care of animals will be impossible. In other words livestock farming and its efficiency will only increase to the level that will require by the enlarged and better-fed human population of the near future if scientific knowledge concerning animals in health and disease is sought from every source and applied with understanding by all who have the care of animals.

It will remember that it is far more important, to prevent or avoid ill health than to cure it. To do this, a full understanding of management in all its aspects is essential. This includes an appreciation of breeding, rearing, feeding and hygienic management.

Exercises

1. - Select the correct alternative.

a) Diseases are the cause of ____ death

____ life

___ development

b) It is more important to ___ cure

___ prevent.

2. – Say true or false.

a) ____ Diseases influence in the quality of meat, milk and eggs.

b) ____ The future livestock farming will depend on the high standard of its labour.

c) ____ The scientists are not paying attention to the most important element.

3. - Chronological order

a) ____ Premature death will affect the quality of meat.

b) ____ It is more important to prevent a disease.

c) ____ It is applied by who have to care of animals.

d) ____ The future livestock farming will depend on the high standard of its labour.

4. - Find the spanish equivalent.

a) The future livestock farming

b) Welfare

c) Appreciation of breeding.

d) Hygienic management.

5. - Add these words to your vocabulary. What do you call.

a) a place from which anything is obtained?

1) Surge 2) source 3) sorcery

b) the mean value of several quantities?

1) Yill 2) yell 3) yield

c) farm animals kept for use or profit?

1) Livesteam 2) livery 3) livestock.

6. - Select the words closest in meaning.

a) Source: organ – origin – order – obtain

b) Yield: process – propagate – product - profound

c) Quality: amount – amort – among – amoral

7. - Answer these questions

a) Mention three effects of disease in our livestock.

b) Why is it said that a high standard of livestock farming labour is becoming more important everyday?

c) What is the importance of scientific knowledge in farming?

d) Why is it a necessity a full understanding of management?

e) Write a summary in Spanish of the lesson you have just studied.

UNIT 8

DISEASE PREVENTION, CONTROL AND ERADICATION

Disease may be defined as any abnormal structural of functional change in the tissues of the body. The direct or indirect causes of disease include a variety of environmental and organic influences acting upon a genetically resistant or susceptible host. The modern concept of morbidity holds that a multiplicity of factors usually is involved in the production of disease. Though many factors may be involved to a lesser or greater extent in the causation of disease in cattle, we may condense them info traumatism, chemical causes, faulty nutrition, organic poisons, internal and external parasites, infectious agents, and genetic effects.

Prevention is the first line of defense against an infectious or a noninfectious disease. At least three preventive techniques are available for use in the prevention of disease in an animal population.

One is the exclusion of causative agents of disease from specific geographical areas or quarantine. The restriction of movement of animals suffering from or exposed to infections such as rabies in dogs is one of the oldest tools known to preventive medicine. The principle of quarantine of domesticated animals was applied as early as Roman times. It is possible that aircraft may pose new problems regarding livestock-disease quarantine since many disease carriers (e.g. insects and viruses) may be accidentally carried by plane into a country.

A second preventive tool utilizes control methods as immunization, environmental control; and chemical agents to protect specific animal populations from endemic diseases (diseases normally present in an area.)

Mass immunization as a preventive technique has the advantage of allowing the resistant animal freedom of movement, unlike environmental control, in which the

animal is confined to the controlled area; immunization may, however, provide only short-lived and partial protection.

Exercises

1. - Say true or false

a) ____ Disease may be defined as any abnormal structural or functional change in the tissues of the body.

b) ____ A few factors are involved in the production of disease.

c) ____ Prevention is the first line of defense against an infection.

2. - Select the main idea of the text.

a) ____ The direct or indirect causes of disease include a variety of environmental and organic influences.

b) ____ The environmental control.

c) ____ How disease can be prevented, controlled and eradicated.

3. – Add these words to your vocabulary. What do you call.

a) any instrument used in doing work?

1) toil 2) told 3) tool

b) the external conditions and influences affecting the life and development of an organism?

1) envelopment 2) environment 3) envy

c) farm animals kept for profit?

1) livestock 2) lifeboat 3) livery

d) a state of enforced isolation?

1) quantity 2) quandary 3) quarantine

4. - Select the words closest in meaning.

a) livestock : animal – annual – animate – arrival

b) carrier : compose – computer – conveyer – conceal

c) available: accessible – acceptable – accession

d) environment: surrender – survival – surroundings

e) unlike: different – difficult – diffidence

f) provide: support – supper – supply – suppose

5. - Find in the reading

a) A sentence with a modal verb

b) A synonym of benefit

c) The opposite of a few

d) A word that means control

6. - Answer these questions

a) Define a disease.

b) How may be the causes of disease?

c) Mention the most important factors involved in the causation of disease in cattle?

d) Why is disease prevention so important?

e) Is there only one preventive technique used in the prevention of animals population?

f) Mention some disadvantages of the preventive tool quarantine?

7. - Write a summary of the text in Spanish. Give your Spanish version to the text.

UNIT 9

VETERINARY MEDICINE

THROUGHOUT THE WORLD

About 50 percent of the world's population suffers from chronic malnutrition and hunger. Inadequate diet claims many thousands of lives each day. When the lack of adequate food to meet present needs for an estimated world population of about 4,000,000,000 is coupled with prediction that the population may increase to 7,000,000,000 by the year 2000, it becomes obvious that animal-food supplies must be increased.

One way in which this might be accomplished is by learning to control the diseases that afflict animals throughout the world, especially in the developing nations of Asia

and Africa, where the population is expanding most rapidly. Most of the information concerning animal diseases, however, applies to domesticated animals such as pigs, cattle, and sheep, which are relatively unimportant as food sources in these nations.
Remarkably little is known of the diseases of the goat, the water buffalo, the camel, the elephant, the yak, the llama or the alpaca; all are domesticated animals upon which the economics of many developing countries depend. It is in these countries that increased animal production resulting from the development of methods for the control and eradication of diseases affecting these animals is most urgently needed.

UNIT 10

ANIMALS IN RESEARCH: THE BIOMEDICAl MODEL

Although in modern times the practice of veterinary medicine has been separated from that of human medicine, the observations of the physician and the veterinarian continue to add to the common body of medical knowledge.
Of the more than 1 200 000 species of animals thus far identified, only a few have been utilized in research, even though it is likely that, for every known human disease an identical or similar disease exists in at least one other animal species.
Veterinary medicine has played an ever-increasing role in the health of man through the use of animals as biomedical models with similar disease counterparts in man. The use of animals as models has been important because research on many genetic and chronic diseases of man cannot be carried out using humans.
Animal studies are used in the development of new surgical techniques (e.g., organ transplantations), in the testing of new drugs for safety and in nutritional research. Animals have been especially valuable in research involving chronic degenerative diseases because they can be induced experimentally in them with relative ease. The importance of chronic degenerative diseases, such as cancer and cardiovascular diseases, has increased in parallel with the growing number of communicable diseases that have been brought under control.

Examples of animal diseases that are quite similar to commonly occurring human diseases include chronic emphysema in the horse; leukemia in cats and cattle; muscular dystrophies in chickens and mice; arteriosclerosis in pigs and pigeons; blood- coagulation disorders and nephritis in dogs; gastric ulcers in swine; vascular aneurysms (permanent and abnormal blood- filled area of a blood vessel) in turkeys; diabetes mellitus in Chinese hamsters; milk allergy in rabbits; favus which is an infectious disease of the surface of the skin and hair caused by the fungus Achorian and which usually seen in young rabbits.

Exercises

1. - Chronological order
   a) ___ Veterinary medicine has been separated from that of human medicine.
   b) ___ Animal studies are used in the development of new surgical techniques
   c) ___ Veterinary medicine has played an ever-increasing role
   d) ___ For every known human disease an identical or similar disease exists in at least one other animal species.

2. - Select the word closest in meaning.
   a) Physician: doctor of medicine – doctor in veterinary.
   b) Play: represent – reproduce – reduce – retain
   c) Utilize: udder – under – use – unique
   d) Role: fusion – flow – face – function
   e) Safety: security – sad – soil – sanity
   f) Valuable: useless – universal – useful – unity
   g) Swine: pain – pig – pin – pride

3. – Choose the correct synonyms among the alternatives.

   a) The *physician* accompanied the veterinarian (Physicist – medicine doctor - agronomist
   b) Medicine plays an important *role* in the health of people (fundamental - function – portion)
   c) We *tested* the new drug (tried – trapped – tripped)

4. - Polysemy
   a) Read paragraph 2
      1) In this context, the phrase thus far means:
         a) hasta aquí
         b) así lejos
         c) a distancia
      2) In this context, the word like means:
         a) placentero

b) probable
c) bien parecido

b) Read paragraph 3

1) In this context, the word plays means:
   a) manipula
   b) mueve
   c) juega

5. - Give your Spanish equivalent to these statements.
   a) Veterinary medicine has played an ever- increasing role in the health man.
   b) Animals have been valuable in research involving chronic generative diseases.
   c) Blood- coagulation disorders and nephritis in dogs is an example of animal disease.

6. - Complete the following sentences
   a) The students _____ Veterinary for 2 years.
      Study
   b) Parasites _____ diseases in animals and man.
      Cause
   c) The teacher _____ veterinary since 1999.
      Teach

7. - Answer these questions.
   a) Explain the interrelation between veterinary medicine and human medicine.
   b) Are all species of animals commonly used in research?
   c) Why do scientists make use of animals in research concerning human health?
   d) Are most human diseases found in animals?
   d) Mention some of the fields where animals studies have been successful.

UNIT 11

Veterinary Specialties:

II) Obstetrics and Gynecology

In veterinary medicine, this specialty is of greatest importance in cattle practice. All animal species had had occasional reproductive problems, but the specialist had devoted a large portion of his time to cow The service of veterinarians specializing in this field include breeding advice, treatment of sterility, artificial insemination, pregnancy diagnosis, assisting the animal in difficult delivery, and postnatal care.

The causes of sterility or difficult conception in animals are numerous. In animals of economic importance sterility reduces the value of the individual animal to the market value of its flesh for food. Sterility is not a complete lack of reproducing ability, but frequently only a temporary or partial failure, and in correcting the condition the veterinarian renders a valuable service. Diagnosis of the cause of sterility had been highly technical and had required evaluation of the anatomy hormone balance, sterility-producing disease agents, and general condition of the animal. Use of the appropriate techniques and drugs may often result in conception and successful completion of pregnancy.

Infectious diseases, among them brucellosis, trichomoniasis, and viral equine abortion, are responsible for economic losses through interference with reproduction. Abortion or failure to conceive may result also from numerous diseases not primarily of the reproductive system, but which disturb the health of the animal seriously.

The techniques of artificial insemination have been greatly improved, allowing more general and successful use. They have now been used in the cow, horse, pig, sheep, dog, and various breeds of poultry. The implantation of the fertilized ova from purebred females into foster "scrub" females has been carried out successfully in cattle, sheep, and rabbits. However, this procedure of implantation remains in the experimental stage.

UNIT 12

VACCINATION METHODS

Prevention of disease constitutes a large and important portion of any veterinarian's efforts. Advice on nutrition, sanitation, breeding, and other husbandry practices is valuable, as is the vaccination of animals against many infectious diseases, for example, rabies, brucellosis, and hog cholera.

There are various types of vaccines. Sometimes the organisms in the vaccine are killed; sometimes they are treated with a disinfectant such as formalin; sometimes they are attenuated by giving them heat or chemical treatment, and sometimes they are modified in their virulence by passing through another species of animal for which

they are not so pathogenic. By whatever method it is prepared, the vaccine is always a preparation of the pathogenic organism, either live or dead.

We may say that vaccination may be employed to produce two forms of immunity, active and passive.

Active immunity results when the agent or some modification of the agent which causes the disease is introduced into the animal, stimulating it to produce antibodies. The antibodies produced against a modified or attenuated disease agent in the vaccine are also effective in protecting the animal against the virulent agent. An animal retains the ability to produce a specific antibody for varying periods of time. For some diseases it is a year; for others it is the balance of the animal's life.

In passive immunity, antibodies produced in another animal's body are introduced and serve t6 protect the recipient against that disease. This form of immunity is of only about two week’s duration.

Vaccines are injected into susceptible animals with the object of developing their resistance against, or immunity to, a virulent attack of the disease.

UNIT 13

VETERINARY SPECIALTIES:

PATHOLOGY

Under what appears to be entirely comparable conditions one animal survives an infection and one succumbs. We pass these things off as biological variations or differences in resistance and tell ourselves that such irregularities must be expected even in carefully con-ducted biological experiments. But it is not so.

To the extent that our limited knowledge permits any biological science to be precise, pathology is that branch of medical studies, which tries to relate specific effects to definite causes. The things that occur in health and disease are fully related to each other and are founded upon chemical and physical laws as constant as any in science. In order to accomplish his purposes, the pathologist must study the effects of disease producing agents upon the body tissues by every means at his command.

The postmortem examination of animals is called a necropsy in veterinary medicine as distinguished from the autopsy, or human postmortem examination. As an aid in the diagnosis of obscure causes of death the necropsy is of great value.

The necropsy is also used to determine the extent of spread of a specific disease when large numbers of animals are dying in a region. Specific diseases cause characteristic postmortem appearances, and rapid recognition is possible if there is a trained veterinary pathologist.

The necropsy is also of value to the future diagnosis and treatment of difficult cases. Veterinary pathologists examine tumor biopsy material to determine whether it is malignant. Comparing pathologic processes and lesions in the various species of animals as well as humans increases knowledge concerning basic principles of disease. He may get information about gross and minute changes in the tissues, including information about the presence of disease producing germs. Clearly a post-mortem examination is of no service to the particular animal.

MOST COMMON DISEASES

AFRICAN SWINE FEVER

African swine fever (ASF) is a highly contagious virus disease of pigs which may occur in an acute, sub-acute or chronic form.

Aetiology

ASF virus is an icosohedral DNA virus which is a member of the Iridoviridae family, - other members of which infect amphibians, fish and insects. Distinct virus serotypes cannot he demonstrated by complement-fixation, agar gel diffusion or fluorescent antibody tests, but experimental studies in pigs indicate that cross-protection between different virus isolates may not always occur.

There is a considerable variation in virulence between Strains of ASF virus.

The virus is resistant to inactivation: a factor of considerable importance in the epizootiology of the disease. ASF virus is stable over a wide pH range. It is very stable at low temperatures and is resistant to putrefaction and drying. It is inactivated by heating at 609C for 20 minutes in blood and is sensitive to lipid solvents such as ether.

ASF virus can persist in frozen or chilled pig carcasses for many years and in cured hams for up to five months. The virus can remain viable in contaminated pens for up to a month in winter.

Natural Hosts

Domestic pigs, warthogs, bushpigs and giant forest hogs.

World Distribution

African swine fever was first described in Kenya, but is now recognized in most countries of Africa, south of the Sahara. It spread to Portugal in 1957 and 1960; Spain in 1960; Italy (Sardinia only) in 1978; Brazil in 1975 and Haiti in 1979. Other occurrences have been in France (1964, 1967, 1974) mainland Italy (1967, 1983), Cuba (1971, 1980), Malta (1978) and the Dominican Republic (1978) but on each occasion the disease has been eradicated from these countries.

Epizootiology

African swine fever is readily transmitted by direct contact. All secretions and excretions of infected pigs contain large amounts of virus. Although recovered pigs can remain infected for long periods transmission from chronic cases does not commonly occur.

Affected pigs become weak, huddle together and are reluctant to move but, if forced will rise with difficulty and stand swaying with their backs arched. Their appetite is usually maintained until toward the end of the clinical course. Incoordination is progressive and within 24-48 hours the pigs are moribund. The pulse and respiration are accelerated. Cyanotic blotching is prominent in light-skinned pigs. Other signs occasionally seen include mucopurulent nasal and conjunctival discharges, coughing, vomiting, blood-stained diarrhoea, abortion and terminal convulsions or tremors. Death usually occurs within 3-4 days of the onset of clinical signs. The mortality rate approaches 100 percent and the few survivors develop chronic disease.

Sub-acute. There is an initial fever, which may persist irregularly throughout the clinical course. The symptoms are similar to those of the acute disease although less severe. The clinical course may last 3-4 weeks. Survivors become chronic cases.

Chronic. Clinical signs are variable and difficult to recognize. There may be transient recurring fever. Stunting and emaciation may be the only obvious signs. Pneumonia frequently occurs. Lameness and large cutaneous ulcers are sometimes seen. Secondary infections are common. Deaths may occur at any time.

Pathology

In acute ASF, the carcass is usually in good condition. Haemorrhages throughout internal organs are the outstanding feature. Petechial haemorrhages may occur in any location, but occur most frequently in the renal cortex, bladder, lungs and myocardial, epicardial and sub-endocardial surfaces of the heart. Echymotic and t1paintbrush" haemorrhages are often present on serosal surfaces. Lymph nodes are markedly swollen, reddened and haemorrhagic and they may look like blood clots. Renal, mesenteric and hepato-gastric glands are most commonly affected. Similar lesions are seen in the tonsils. The lungs are sometimes oedematous and there is excessive fluid in body cavities. The spleen is enlarged and congested, but infarction is rare.

In chronic ASF, lesions may include enlarged lymph nodes; chronic fibrinous pericarditis and pleuritis; hard, nodular white masses in the lungs; and arthiritis in one or more joints.

Differential Diagnosis

Classical swine fever - these two diseases cannot be reliably differentiated on clinical or pathological grounds

Acute erysipelas or salmonellosis

Where there is provision for disinfection of staff, treatment of effluents and incineration of carcasses.

The inoculum consists of a 10-20 percent suspension of pooled tissue specimens. The test pigs should he examined daily for clinical signs and fever. In a positive test, some or all of the pigs will die 4-15 days after inoculation, with typical lesions. Tissue specimens should be collected for confirms-tory laboratory tests.

Reference Laboratory. If the diagnosis cannot be confirmed in the national laboratory, a similar range of specimens should he forwarded to the reference laboratory in an insulated container with dry ice.

Control and Eradication

There is no vaccine available for ASF.

The only method to eradicate the disease is by the slaughter and safe disposal of carcasses, preferably by burning, of all pigs on infected premises, combined with strict zoo-sanitary measures. Neighbouring properties should be quarantined and all pig movements in a larger area around infected premises must be restricted. A total ban should he placed on swill feeding. Depopulated premises should be thoroughly cleaned and disinfected and only restocked if sentinel pigs fail to become infected.

The disease has been successfully eradicated from island countries by the total depopulation of the pig population, with restocking after a suitable rest period.

ASF-free countries should protect their disease-free status by prohibiting the entry of live pigs and any of their products which are not suitably treated from countries in which the disease occurs. Particular attention should be paid to safe destruction, preferably by incineration, of garbage from aircraft and ships at ports of entry.

In those parts of Africa where ASF has not become endemic in domestic pigs, the disease can be effectively prevented by a system of double pig-proof fencing around piggeries.

AFRICAN HORSE SICKNESS

African horse sickness (AES) is an acute or sub-acute insect-borne virus disease affecting mainly horses, mules and donkeys. It is highly fatal in susceptible horses, producing clinical signs associated with respiratory and circulatory impairment.

Aetiology

An orbivirus. This is a genus of double stranded ENA viruses which also includes bluetongue virus. There are nine serotypes of AHS virus, which can be identified by serum neutralization or haemagglutination-inhibition tests. All virus strains share a group antigen which can be demonstrated by complement fixation tests.

Natural Hosts

Horses and mules are highly susceptible, but the mortality rate is higher in horses. In general, donkeys have a low susceptibility. Antibody titres have been found in zebras and elephants in enzootic areas. Dogs are susceptible.

World Distribution

Enzootic in Africa, south of the Sahara, but may only become apparent in some areas in this region when susceptible horses are introduced.

Periodically, the disease spreads further north in epizootic form. Epizootics occurred in the Middle East in 1944 and 1953. In 1959, AHS appeared in Iran, Afghanistan and Pakistan. In the spring of 1960 the disease reappeared and further spread east to India and west as far as Cyprus. AHS disappeared from the region by the end of 1963, but not before an estimated 300 000 equines had died in this major epizootic.

In 1965-66 there was an epizootic of AHS in northern Africa (Algeria, Morocco, and Tunisia) and southern Spain.

Epizootiology

African horse sickness is transmitted by Culicoides spp, which are small, blood-feeding midges. The main vector in Africa is Culicoides imicola (C. pallidipenis. These insects feed on horses between dusk an awn. There is some evidence of biological transmission by mosquitoes and mechanical transmission by biting flies, but his is of minor importance. The disease is not directly contagious between horses.

In South Africa AHS is seasonal, with outbreaks commencing in late summer and ceasing abruptly with the onset of frosts in autumn. The overwintering mechanism is not clearly understood. The disease is more prone to occur in warm, moist lowlying or coastal regions or in valleys, swamps or river basins.

The incidence is highest in years when there is a higher than average rainfall.

In east Africa MIS may occur at any time of the year but is most likely to be associated with the rainy seasons.

Recovered horses have a durable immunity to the serotype that infected them, but remain susceptible to infection by other serotypes. Some horses may have a viraemia for up to 60 days after infection and are thus capable of transmitting the infection to culicoides insects for this period.

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Dogs become infected by eating virus-contaminated horse ment.
Spread of MIS over long distances may be due to the transport of infected horses. However, wind-borne dispersal of infected culicoides insects is also thought to be an important means of spreading the disease.

Clinical Signs

The incubation period is usually 4-9 days. Four clinical syndromes are described in horses.

Pulmonary form. This is a peracute form which is usually fatal and occurs when susceptible horses are infected with virulent strains of virus. Fever (to 410C) and clinical signs appear suddenly. There is an increasing acute dyspnoea, with rapid abdominal breathing, paroxysms of coughing and copious discharge of frothy fluid from the nostrils. Auscultation of the chest reveals a severe pulmonary oedema. Typically the animal stands with its forelegs spread apart, head extended, ears drooping and the nostrils dilated. There is profuse sweating. The animal attempts to eat until the terminal stages. The animal collapses and dies within 4-24 hours of the onset of signs, literally drowning in its own fluids.

Cardiac form. This is a less acute form. The incubation period and clinical course is longer than for the pulmonary form. There is a fever of 39-410C which persists for 3-4 days. Signs appear towards the end of this period. There is a pronounced and very

characteristic oedematous swelling of the supra-orbital fossae. The eyelids are tense and warm and oedematous swelling may cause them to close and the mucous membranes to evert. The oedema frequently extends to lips, cheeks, tongue and laryngeal region. In severe cardiac cases, oedema of the brisket, thorax or ventral abdomen may also occur. In horses that recover the oedematous swelling gradually subsides in 3-7 days.

The mortality rate is variable. In severe cases there is an increasing dyspnoea. Affected animals usually remain standing, unless colic intervenes. Death is preceded by a sudden increase in respiration without the passage of fluid, together with a prolonged period of recumbency and muscular trembling.
Mixed form. The clinical signs may be manifest either by cardiac involvement to be suddenly terminated by acute paroxysms of coughing, discharge of frothy fluid or collapse or alter-natively mild signs of pulmonary involvement which are superceded by oedematous infiltrations. This form is generally fatal.

Horse sickness fever. This is the mildest form of the disease and is frequently subclinical. It is typically seen in partially immune horses in enzootic areas. The temperature may be above 400c for a day or two. The conjunctiva may be inflamed, and there may be some dyspnoea and an increased pulse rate. Dullness and anorexia occasionally occur late in the reaction. There is usually a rapid recovery.

Pathology

The gross lesions are quite variable. In peracute cases there may be few obvious changes. The pulmonary form is characterized by extensive oedema of the lungs. The pleura have an uneven surface due to infiltration of a clear yellow fluid into the subpleural and interlobular tissue. The colour of the surface of the lung varies from pale pink to bright red. On palpation the lung appears to have lost is elasticity. On incision, copious white frothy fluid exudes on pressure. A large volume of clear yellow fluid is present in the thoracic cavity. The mediastinum and pleura are oedematous and show petechial haemorrhages. The thoracic lymph glands are markedly swollen. The pharyax trachea and bronchi are filled with a white frothy fluid and there may be petechial haemorrhages in their mucosae. The stomach, small and large intestine show a diffuse reddening and oedema. The liver is frequently congested and the kidneys hyperaemic.

In the cardiac form the striking lesion is a gelatinous infiltration of the subcutaneous and intermuscular tissue, particularly around the head and throat but sometimes extending to the abdomen and forelegs. The pericardium is extended by a clear yellow to reddish brown fluid. There are extensive haemorrhages of the epicardium and myocardium. The lesions in the stomach and intestines are similar to those in the pulmonary form except that the petechial haemorrhages in the mesentery, peritoneum and serosa are very extensive.

Control an Eradication

Attenuated vaccines, containing up to nine serotypes, are available for the immunization of horses. Horses should be vaccinated annually, preferably 1-2 months before expected AHS seasons. A mild febrile reaction and transient clinical signs may occur after vaccination.

SHEEP POX

Sheep pox is a generalized skin infection of sheep. It is the most serious of the pox diseases of livestock.

Aetiology

Sheep pox is caused by a virus that belongs to the capripox genus of the Poxviridae. It is closely related to the other two members of this genus - lumpy skin disease and goat pox viruses. The three viruses show considerable cross-protection.

Sheep pox virus is ether-sensitive and acid labile. The virus is very resistant to inactivation in the environment. It survives desiccation, and can remain viable in dried scabs for up to three months and in sheep pens for up to six months. There is little loss in virus titre when infected material is held at up to 379C for long periods, but the virus is rapidly inactivated at 550C.

Natural Hosts

In general, the disease occurs only in sheep, with Merino and European breeds being highly susceptible and some native African and Middle East breeds being less susceptible. In certain areas the virus is said to be less host-specific and also to affect goats.

World Distribution

North, West and East Africa; the Middle East; Central Asia and the Indian sub-continent.

Epizootiology

The virus is spread by the respiratory route and trans-mission is most likely to occur by direct contact when sheep are herded together at watering places, yards and markets. Because of the resistance of the virus to inactivation, environmental contamination is also important. Mechanical transmission by biting insects is suspected to occur.

Infected animals do not become chronic carriers. However the virus may remain viable on the wool or hair of recovered sheep and such animals may spread the virus. Recovered animals have a durable immunity and thus, in enzootic areas, most cases occur in young animals. Ma]or outbreaks with high mortality rates may occur when the disease is introduced into susceptible populations.

Clinical Signs

The disease may be peracute, acute or sub-acute and the mortality may range from 5-50 percent. The disease is severer in lambs than in adult sheep. The incubation period is 5-7 days.

Control and Eradication

Standard zoo-sanitary procedures, such as quarantine of infected flocks and movement controls, are difficult to implement in many of the areas in which- sheep pox is enzootic because of nomadic and communal grazing husbandry systems. Systematic vaccination programmes have been found to provide the most effective control over the disease.

Attenuated and inactivated vaccines are available, but the former are most widely used. Vaccination should he carried out annually. The live vaccine frequently produces a mild reaction in inoculated sheep, which consists of a febrile response and some systemic disturbance. However, on occasions the reaction can be quite severe and deaths can occur.

In an outbreak, diseased sheep should be destroyed and their carcasses buried or burnt if possible. In-contact sheep should be vaccinated and movement controls applied.

EQUINE VIRAL ENCEPHALOMYELITIS

Eastern (EEE), Western (WEE) and Venezuelan (VEE) equine viral encephalomyelitis are arthropod-borne virus diseases of horses in the Western Hemisphere. They are also serious zoonoses. Other equine viral encephalitides include Japanese encephalitis and Borna disease, each of which is described separately.

Aetiology

EEE, WEE, and VEE viruses are classified in the alphavirus group of the Togaviridae, and as such have some antigenic relationship to each other and to the other members of the alpha-virus group. The viruses are, however, separable by complement fixation and serum neutralization tests.

Each of the three viruses contains a complex of antigenic subtypes and variant strains. In the case of the VEE complex, four antigenic subtypes are recognized (I-IV). Only three variants in subtype I (namely IA, lB and IC) are important causes of disease in horses and man. Infections by these viruses are referred to as epidemic VEE. The other viruses in the VEE complex are regarded as causing sylvatic or endemic infection.

Natural Hosts

From the point of view of clinical disease, horses and man are the most important natural hosts for each of the viruses. EEE virus has also caused mortalities in exotic pheasants in the USA. WEE virus occasionally causes clinical disease in pigs (encephalitis).

Each of the viruses infects a wide range of other animal species subclinically, and these infections have a greater epizootiological significance.

World Distribution

EEE. The eastern half of North America, from Canada to the Caribbean, Central and South America.
WEE. North, Central and South America.
VEE. Epidemic VEE virus strains occur in northern South America (Colombia, Ecuador, Venezuela, and Trinidad). In the period 1969-72 an epizootic spread north through Central America and as far as Texas. Endemic or sylvatic virus strains, which are non-path6genic for horses, have a wider distribution in Central and South America and in Florida.

Epizootiology

EEE and WEE. The natural cycle of infection for both these viruses is between water birds and mosquitoes in fresh water swamps. Culex melanura is the main vector species in the enzootic cycle. Outbreaks or sporadic cases occur in horses and man typically in late summer after hot and excessively rainy weather. Other mosquito species are responsible for transmission of virus to mammals. Human being may also become infected, most commonly with EEE virus, through handling infected horses and equine tissues. Horses and man generally do not develop sufficient viraemia to infect mosquitoes and are therefore regarded as dead-end hosts. Contact transmission of EEE occurs in pheasants.

Both viruses have also been isolated from rodents and other small mammals, amphibians and reptiles. It has been suggested that one or more of these animals act as overwintering might hosts.

VEE. Epidemics of VEE in horses and man occur at irregular intervals of about 6-10 years. In contrast to the other viruses, epidemic VEE viruses cycle between horses

and mosquitoes, and the horse is in fact the main amplifying host during epidemics. The maintenance host species and survival mechanisms for the virus during inter-epidemic periods are largely unknown. Sylvatic VEE viruses circulate between birds, rodents and mosquitoes. Horses are not infected. However, some infections, with clinical disease, occur in human beings.

Clinical Signs

The clinical signs of EEE and WEE in horses are indistinguishable, although the mortality rate is higher for EEE, up to 90 percent, than for WEE in which it is of the order of 20-30 percent. Subclinical infections occur in horses with both viruses.
There is a diphasic fever, with clinical signs appearing during the second temperature peak. Affected horses show hypersensitivity to sound and touch; there are involuntary muscle movements, especially tremor of the shoulder and facial muscles and erection of the penis. Animals may walk aimlessly in circles and into 0b3ects, while occasionally a transient period of excitement may ensue there may also be an intense pruritus. The acute phase is followed by marked depression with increased uncoordination, paralysis, coma and death. Death occurs within 2-4 days of the onset of clinical signs.

The mortality rate for VEE in horses is lower than for the other two viruses. The clinical signs for encephalitis, when it occurs, is similar to that for EEE and WEE. However, there is a second form with most clinical signs attributable to generalized infection rather than neurological involvement. Clinical signs include fever, weakness, depression, anorexia, colic and diarrhoea.

Pathology

There are no characteristic gross lesions. Histologically there is a diffuse encephalomyelitis affecting principally the grey matter of the cerebral cortex, thalamus and hypothalamus.

Control and Eradication

Inactivated and attenenuated vaccines, either monovalent or polyvalent, are available for each of the equine viral encephalomyelitis. Annual vaccination should be undertaken in enzootic areas. An EEE vaccine has also been used to protect pheasants.

RABIES

Rabies is usually fatal encephalitis of warm-blooded animals with a variable and often very long incubation period. In many circumstances it is not of great economic significance in livestock, but it is a highly important disease from a veterinary public health viewpoint.

Aetiology

Rabies is caused by a Rhabdovirus. The Rhabdoviridae are bullet-shaped, enveloped RNA viruses, about 200 x 7Onm in size. Rabies virus strains show only minor antigenic variations. However, five viruses found in Africa (Lagos Bat, Mokola, Duvenhage, Kotonkan and Obodhiang), have been shown to have some relatedness to rabies viruses and these viruses together with rabies are classified together in the Lyssa virus genus.

The virus is readily inactivated by lipid solvents (soap solution, either, chloroform, acetone), 45-75 percent ethanol, iodine preparations, quarternary ammonium compounds and ultra-violet light. It is relatively stable at pH 5-10 and can remain viable in tissue suspensions for several weeks if not:
exposed to sunlight or excessively high temperatures.

Natural Hosts

All mammalian and avian species are, to a greater or lesser extent, susceptible to rabies. A number of species are "dead-end" hosts. The main vector and reservoir species are carnivores of the orders Canidae (dogs, jackals, wolves). Mustelidae (skunks, weasels, stoats, badgers, etc.), Viverridae (mongooses and meerkats) and Chiroptera (bats).

World Distribution

Africa, Europe (except Scandinavia, United Kingdom and Ireland), the Middle East, Asia, North, Central and South America. Some island countries are free. These include Australia, New Zealand, Pacific island nations, Japan and Iceland.

Epizootiology

Rabies is transmitted by contamination of a fresh wound with infected saliva, usually by the bite of a rabid animal. Fifty-ninety percent of rabid animals excrete virus in their saliva, depending on the species and virus strain. Animals may excrete virus for up to a few days before onset of signs and throughout the clinical course. Aerosol infection can also occur in very exceptional circumstances. Oral infection also occurs rarely.

Two epizootiological cycles are recognized, urban and sylvatic. Urban rabies is a transmission cycle sustained in domestic and semi-feral dogs.

Pathology

There are no characteristic gross lesions. The microscopic lesions of rabies are variable. On occasions they are severe, but often they are disappointingly sparse. Lesions in the central nervous system consist of a non-suppurative encephalomyelitis

and ganglioneuritis. Lesions may occur in the cerebral cortex, hippocampus, pons, medulla, cerebellum and in the cervical spinal cord.

There is perivascular cuffing and gliosis. Glial nodules (termed Babes nodules) occur in both white and grey matter. Diffuse gliosis is also present. Neuronal degeneration occurs to a greater or lesser extent. The most diagnostic lesions are Negri bodies. These inclusions are intra-cytoplasmic, surrounded by a clear thin halo, and are from 2-8 in size and have a well defined inner matrix, with basophilic granules. They are usually round or oval but may be moulded to the shape of the neurone. Negri bodies are usually found in greatest abundance in the hippocampus of carnivores and in the Purkinje cells of herbivores.

Ganglioneuritis is particularly prominent in the Gasserian ganglia and cervical region of the spinal cord.

Control and Eradication

Urban rabies can be effectively controlled by registration, identification and compulsory vaccination of owned dogs and elimination of stray dogs and cats. Safe live attenuated and inactivated vaccines are available, which provides an effective immunity for three years.

FOWL PLAGUE (AND OTHER AVIAN INFLUENZA INFECTIONS)

Fowl plague is a highly lethal disease of poultry, caused by specific strains of avian influenza virus. Additionally, avian influenza virus infections, encompassing a wide range of virulence, occur in many domestic and wild species.

Aetiology

Fowl plague is caused by certain strains of avian influenza virus. Influenza viruses are classified into three broad types - A, B and C - on the basis of the antigenic nature of their internal proteins. All avian influenza viruses belong to type A. Virus strains are further differentiated into subtypes by antigenic analysis of their surface haemagglutinins and neuraminidases. Fowl plague is defined as a lethal infection caused by an avian influenza A HAvl (avian haemagglutinin 1) strain. Other avian influenza viruses show considerable antigenic diversity. Twelve sub-types have been proposed.

Natural Hosts

Fowl plague occurs in chickens, turkeys and occasionally ducks and geese. A wide range of domestic and wild birds are susceptible to other influenza infections, but

clinical disease is most prone to occur in chickens, ducks and turkeys. Avian influenza infections in wild birds are generally subclinical.

World Distribution

Outbreaks of fowl plague have been very uncommon throughout the world in recent years and it is not known with certainty whether the disease is enzootic in any country. However, outbreaks can occur anywhere without warning or obvious source. On the other hand other avian influenza viruses are more ubiquitous and cause significant losses in turkey and duck flocks in several regions.

Epizootiology

The source of fowl plague outbreaks can rarely be determined, but presumably it is introduced to domestic poultry by wild birds. Infected birds excrete the virus in their droppings and ocular and nasal secretions and the virus spreads rapidly within a flock by close direct contact between birds. However, because of its high mortality, fowl plague outbreaks sometimes tend to be rather self-limiting, and spread to other flocks may not occur readily.

Clinical Signs

Fowl plague. The disease appears suddenly in a flock and many birds die either without premonitory signs or with minimal signs of depression, inappetence, ruffled feathers and fever. Other birds stop laying and show weakness and a staggering gait. Sick birds often sit or stand in a semicomatose state with their heads touching the ground.

Pathology

There is extensive subcutaneous oedema. Petechial and ecchymotic haemorrhages are found throughout the body, but particularly in the larynx trachea, proventriculus, epicardial fat and serosal surfaces adjacent to the sternum. Yellow –grey necrotic foci may be present in the lungs. Gross lesions may be minimal in hyper-acute cases.

Control and Eradication

Although vaccines have been used in the past, they have not proven very effective. A slaughter policy is recommended. Affected flocks should be slaughtered and the carcasses buried or burned. The premises should be thoroughly cleaned and disinfected and should not be stocked for at least one month.

IRREGULAR VERBS

INGLESES

Infinitive	*past*	past participle
abide	abode	abode
arise	arose	arisen
awake	awoke	awoken
be	was	been
bear (producir)	bore	born
bear (llevar soportar)	bore	borne
beat	beat	beaten
become	became	become
befall	befell	befallen
beget	begot	begotten
begin	began	begun
bend	bent	bent
bereave	bereft	bereft
beseech	besought	besought
beset	beset	beset
bespeak	bespoke	bespoken
bespread	bespread	bespread
bestride	bestrode	bestriden, bestrid
bet	bet	bet
betake	betook	betaken
bethink	bethought	bethought
betide	betid, betided	betid
beweep	bewept	bewept
bid	bid, bade	bid, bidden
bind	bound	bound, bouden
bite	bit	- bit, bitten
bleed	bled	bled
blow	blew	blown
break	broke	broken
breed	bred	bred
bring	brought	brought
browbeat	browbeat	browbeaten
build	built	built
burn	burnt	burnt
burst	burst	burst
buy	bought	bought
cast	cast	cast
catch	caught	caught
chide	chid	chid, chidden
choose	chose	chosen
cleave	cleft, clove	cleft, cloven

cling	clung	clung
clothe	clad	clad
come	came	come
cost	cost	cost
creep	crept	crept
crow	crew, crowed	crowed
curse	curst	curst
cut	cut	cut
dare	durst	durst
deal	dealt	dealt
dig	dug	dug
do	did	done
draw	drew	drawn
dream	dreamt	dreamt
drink	drank	drunk
drive	drove	driven
dwell	dwelt	dwelt
eat	ate	eaten
fall	fell	fallen
feed	fed	fed
feel	felt	felt
fight	fought	fought
find	found	found
flee	fled	fled
fling	flung	flung
fly	flew	flown
forget	forgot	forgotten
forsake	forsook	forsaken
freeze	froze	frozen
get	got	got, gotten
gild	gilt	gilt
gird	girt	girt
give	gave	given
go	went	gone
grave	graved	graved, graven
grind	ground	ground
grow	grew	grown
have	had	had
hang	hung	hung
hear	heard	heard
heave	hove	hoven
hew	hewed	hewn
hide	hid	hid, hidden
hit	hit	hit
hold	held	held
hurt	hurt	hurt
keep	kept	kept

knit	knit	knit
know	knew	known
lade	laded	laden
lay	laid	laid
lead	led	led
leap	leapt	leapt
learn	learned	learned, learnt
leave	left	left
lend	lent	lent
let	let	let
lie	lay	lain
light	lit	lit
lose	lost	lost
make	made	made
mean	meant	meant
meet	met	met
mix	mixt	mixt
mow	mowed	mown
pay	paid	paid
put	put	put
quit	quit	quit
read	read	read
rend	rent	rent
rid	rid	rid
ride	rode	ridden
ring	rang, rung	rung
rise	rose	risen
rive	rived	riven
run	ran	run
saw	sawed	sawn
say	said	said
see	saw	seen
seek	sought	sought
seethe	sod	sodden
sell	sold	sold
send	sent	sent
set	set	set
shake	shook	shaken
shave	shaved	shaven
shear	(shore)	shorn
shed	shed	shed
shew, show	shewed, showed	shewn, shown
shine	shone	shone
shoe	shod	shod
shoot	shot	shot
shred	shred	shred
shrink	shrank	shrunk

shut	shut	shut
sing	sang, sung	sung
sink	sank, sunk	sunk
sit	sat	sat
slay	slew	slain
sleep	slept	slept
slide	slid	slid, slidden
sling	slung	slung
slink	slunk, slank	slunk, slank
slit	slit	slit
smell	smelt	smelt
smite	smote	smitten
sow	sowed	sown
speak	spoke	spoken
speed	sped	sped
spell	spelt	spelt
spend	spent	spent
spill	spilt	spilt
spin	spun	spun
spit	spit, spat	spit, spat
split	split	split
spread	spread	spread
spring	sprang, sprung	sprung
stand	stood	stood
stave	stove	stove
steal	stole	stolen
stick	stuck	stuck
sting	stung	stung
stink	stank, stunk	stunk
strew	strewed	strewn
stride	strode	stridden
strike	struck	struck, stricken
string	strung	strung
strive	strove	striven
swear	swore	sworn
sweat	sweat	sweat
sweep	swept	swept
swell	swelled	swollen
swim	swam	swum
swing	swung	swung
take	took	taken
teach	taught	taught
tear	tore	torn
tell	told	told
think	thought	thought
thrive	throve	thriven
throw	threw	thrown

thrust	thrust	thrust
tread	trod	trodden
wear	wore	worn
weave	wove	woven
weep	wept	wept
wet	wet	wet
win	won	won
wind	wound	wound
work	wrought	wrought
wring	wrung	wrung
write	wrote	written
writhe	writhed	written