PARASITES
AND
SKIN DISEASES

Peter Gray
MVB, MRCVS

J. A. Allen
London
To the memory of
Molly
whose 93 years were eminently worthwhile
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Note that many subjects have been enlarged or reduced and are therefore not to scale.

J. A. Allen & Co. Ltd.: p. 31, p. 93.
Colin K. Peace: p. 100 (two).
Peter D. Rossdale: p. 176.
Introduction

Parasites and skin diseases of horses are two subjects about which the average horse owner knows little. The difficulty lies in that they are specialist subjects, filled with their own technical terminology and therefore hard to interpret.

However, the clinical importance of these fields is evident in everyday horse management. Worms and other parasites have a significant ongoing effect on growth and production. Skin conditions, be they contagious or not, are a familiar form of equine disease and a regular reason why horses cannot be ridden.

In attempting to make these subjects understandable to the lay person, therefore, it is necessary in this book to begin at the practical base. For example, common names, like ‘redworm’ and lungworm’, are used in conjunction with the generic names, Strongylus and Dictyocaulus. For correctness, however, the generic names will be used in parentheses in section headings, but every effort is made to enable the reader to gain the information he or she requires without being overcome by the technical nomenclature which is vital to the scientist/veterinarian.

Similarly, in discussing the effects of parasite infection, it is not intended to delve into the complexities of equine pathology. Yet it should be understood that pathology means the study of diseases, or, more properly, the study of the changes in body tissues that result from disease. Thus, a worm is not just an undesirable resident of the digestive system; it may damage the lining to the bowel, it may migrate through other tissues, causing damage to remote organs. It may also interfere with digestion, preventing the absorption of food elements from the bowel; this may lead to weight loss, stunted growth, and improper development of the horse's skeleton. Pathology therefore is a vital part of our discourse
2 Parasites and Skin Diseases

here; anyone who has an interest in horses and responsibility for their welfare will be better for an understanding of pathology, and more able to understand the wider practical effects of a given disease.

This book is, then, organised in a way that should make most sense to such a reader. It is not the way in which parasites and skin diseases are dealt with in professional literature, but that need not be of concern. Any reader who digests the contents of this book and wants more information might well be ready to tackle the complexities of specialist professional texts. In order to help the reader with the more technical terms, a glossary is included at the end of the book.

A parasite is a living organism that lives upon or within another living organism from whence it ekes its existence. Its affect on the host varies but may occur directly through invasion of tissues, or through the ingestion of blood as the redworm does. Mange mites live on surface cells, some even burrowing within the skin. Some parasites live within the bowel, in the lumen (centre of the tract) unattached, obtaining their food from the bowel contents.

Parasites that exist within the animal are called endoparasites. Those that live on the skin are called ectoparasites.

The animal that supports the parasite is referred to as the host. In this book, the host in all cases is the horse and we will at times distinguish between the influence parasites have on horses at different stages of growth.

In the main we are dealing with helminth parasites among which are the common worms (divided into nematodes, cestodes and trematodes) of the horse's bowel and arthropod parasites (ticks, mites, lice and flies).

Many parasites are what is known as 'host-specific', meaning they confine themselves to a single species. Others are not and can be found in different animals. It is evident that a worm which is common to cattle, sheep and horses would therefore have a special significance where each of these species were grazed on the same piece of land.

Each parasite has a specific location within a host where it is most commonly found – called a predilection site – and which may play a part in the technical naming of the parasite. Needless to say parasitic infestation may cause interference with the horse's body defences and thus pave the way for secondary infection with bacteria and viruses. A further problem (associated mainly with ectoparasites) is the ability of some parasites to transmit disease (e.g. encephalitis virus and swamp fever, transmitted by biting flies and mosquitoes; human malaria is a protozoan disease, transmitted by mosquitoes).
Other factors which may influence disease are the age of the host and physical condition, also matters like season, climate, geographic location, and so on. Internal worm burdens have a more insidious effect in cold, wet conditions and external parasites may irritate most in warmer weather.

Climatic factors also dictate the manner in which parasites survive outside the host. Most endoparasites lay eggs which pass onto pasture in the faeces. These may hatch into larvae which are ingested by the next host. The capacity of larvae to survive externally is influenced by heat and cold, the quality of the pasture, exposure to sunlight, and so on. Because of this life cycle, horses which are stabled are less likely to encounter parasites than when kept at grass. However, parasitic risk is not completely eliminated by stabling, and stable hygiene is important in preventing spread of disease.

Of course, very few infections are caused by a single parasite. The type and number involved may vary, and there may be external and internal parasites occurring at the same time. This, naturally, will influence the effect on the host. The most important aspect of all this is the daily influence parasites have on management. What are the risks of your horse being affected by diseases which are not altogether evident on the surface? How can you recognise a worm infection? What is the life cycle? What is the prevention? What is the treatment?

Horses, being animals which are kept for pleasure, not food, suffer because research on their diseases is often deemed uneconomical. We must rely therefore to some extent on information from other sources, like research into cattle and sheep diseases. Yet this does not reduce the value of the information as long as it is understood that principles applying to parasitic infection in general may be diluted in certain circumstances because of the nature of the horse. The horse owner is, of course, more interested in bone development, or diseases of bone that may ensue from nutritional problems. He or she is also interested in weight gain, in the full, normal physical development of an athletic animal; of its ability to perform, to stand up to training and to carry weight. But our primary interest must be in the soundness of our horses, not weight gain per se. We simply wish for the animal to reach its natural potential without due hindrance.

Skin diseases are also complex and have a variety of causes besides external parasites. For example, modern medicine recognises such diverse causes as infection, diet, contact with irritant or allergenic substances, allergies, hereditary and auto-immune disease. Each of these are dealt
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with in some detail in this book, hopefully thus making it easier for the reader to understand and recognise the different expressions of skin disease. There is a great deal that horse owners themselves can do to minimise the problems related to them.

In a book combining these two subjects, parasites and skin diseases, it is inevitable that there might be some duplication or variation from an ideal line. For example, the botfly parasitises the horse's stomach in its larval stages; the warble fly, when it affects horses, is most significant when a developing larva appears under the skin of the back. In this book, both are included with other conditions caused by flies, and are therefore treated as external parasites. The reader should not suffer on that account.
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>abrasion</td>
<td>skin graze, as with rope burn, grazed knee</td>
</tr>
<tr>
<td>abscess</td>
<td>cavity filled with pus</td>
</tr>
<tr>
<td>acarasis</td>
<td>infestation with ticks or mites</td>
</tr>
<tr>
<td>acne</td>
<td>skin condition marked by pustules</td>
</tr>
<tr>
<td>albinism</td>
<td>inherited absence of pigment in hair, skin and eyes</td>
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<tr>
<td>allergen</td>
<td>substance capable of causing allergy</td>
</tr>
<tr>
<td>allergy</td>
<td>hypersensitivity to an antigen</td>
</tr>
<tr>
<td>allergic</td>
<td>skin inflammation caused by allergy</td>
</tr>
<tr>
<td>urticaria</td>
<td>hives, of allergic origin</td>
</tr>
<tr>
<td>alopecia</td>
<td>hair loss</td>
</tr>
<tr>
<td>alopecia areata</td>
<td>focal patches of alopecia</td>
</tr>
<tr>
<td>anaemia</td>
<td>lowered red blood cells and/or haemoglobin</td>
</tr>
<tr>
<td>aneurysm</td>
<td>dilatation of blood vessel wall</td>
</tr>
<tr>
<td>angioedema</td>
<td>condition marked by painless swellings under the skin and mucous membranes</td>
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<tr>
<td>anhidrosis</td>
<td>chronic dry coat</td>
</tr>
<tr>
<td>annular lesion</td>
<td>ring-shaped or circular lesion</td>
</tr>
<tr>
<td>antenna</td>
<td>head appendage of arthropod</td>
</tr>
<tr>
<td>antibiotic</td>
<td>chemical that inhibits or kills bacteria</td>
</tr>
<tr>
<td>antibody</td>
<td>body defence, produced by lymphocyte cells</td>
</tr>
<tr>
<td>antigen</td>
<td>causes antibody production (virus, bacterium, etc.)</td>
</tr>
<tr>
<td>antiseptic</td>
<td>inhibits or destroys organisms</td>
</tr>
<tr>
<td>aplasia cutis</td>
<td>hereditary absence of skin (as epitheliogenesis imperfecta)</td>
</tr>
<tr>
<td>arthropod</td>
<td>family that includes arachnids and insects</td>
</tr>
<tr>
<td>atheroma</td>
<td>cyst containing porridge-like exudate</td>
</tr>
<tr>
<td>aural plaque</td>
<td>ear lesion, raised and circumscribed, said to be form of papillomatosis</td>
</tr>
</tbody>
</table>
autoantibody antibody against animal's own tissues
autoogenous derived from same animal; autogenous vaccine is produced from organisms taken from an affected animal
autoimmune antibodies produced against own tissues
basal cell tumour rare, benign tumour of skin
\textit{Basidiobolus}
\textit{haptosporus} cause of fungal skin disease
biopsy sample from living tissue for diagnostic purposes
blowfly strike invasion of skin by blowfly larvae
bulla large blister
bullous pemphigoid autoimmune skin disease
burn tissue injury resulting from heat, cold, chemicals, etc.
bursa fluid-filled sac often between bone and tendon/muscle (false bursa – forms on the knee, etc., as a result of injury; spinous bursitis – fistulous withers)
calcinosis
\textit{circumscripta} localised nodule of calcium
callus local thickening of skin due to friction, etc.
\textit{Candida} fungal organism that may be associated with disease
Canadian
horsepox pustular skin disease
cellulitis inflammatory reaction spreading beneath the skin
cercaria larval stage of liver fluke
\textit{Cestoda} class to which tapeworms belong
chemotherapy treatment by chemical substances or drugs
\textit{Coccidia} protozoan cause of enteric disease
coital exanthema viral venereal disease
colic pain of abdominal origin
collagen structural protein of white fibres of skin, etc.
complement a body defensive substance
congenital a mark or condition present at birth
\textit{Conidiobolus}
\textit{coronatus} fungal infection of nasal cavities.
crust dried skin exudate
cryosurgery surgery by freezing, either with dry ice (liquid nitrogen) or carbon dioxide
cutaneous
\textit{habronemiasis} see habronemiasis
cutis the skin
cytology diagnostic examination of cells
decubital ulcer skin ulcer due to lying down
depigmentation loss of colour from skin
dermatology study of skin disease
**Dermatophilus** bacterial cause of rain scald and greasy heel

**dermatophyte** organism that causes fungal infection of skin

**dermis** skin area between epidermis and fat layers

**dermoid cyst** hereditary lesion often seen on skin

**dorsal shield** plate or scutum on hard ticks

**eczema** inflammation of the outer skin layer

**electrosurgery** surgery by use of an electric current

**embolus** clot in blood, blocking artery (usually part of thrombus)

**emollient** agent that soothes irritation

**endocrinology** study of hormones

**eosinophil** a type of white blood cell

**eosinophilic granuloma** subcutaneous nodules containing eosinophils

**epidermal collarette** circular epidermal lesion

**epidermis** outer layer of skin

**epitheliogenesis imperfecta** see aplasia cutis

**erosion** a shallow surface skin lesion

**erythema** redness of skin

**erythema multiforme** immune complex disease with annular lesions

**erythroderma** redness of skin over wide area

**EVA** equine viral arteritis

**excoriation** superficial graze, as from scratching

**exfoliate** to shed

**exfoliative dermatitis** increased skin scaling

**exudate** discharge like pus or serum

**fibroma** benign fibrous tissue tumour

**fibrosarcoma** malignant fibrous tissue tumour

**fissure** skin crack

**fistula** open skin tract, possibly from deep infection

**foul odor (fomites)** inanimate object capable of spreading infection

**furunculosis** inflammation of hair follicles

**furunculosis** skin boils

**gangrene** death of body tissue with invasion by saprophytic bacteria (dry gangrene occurs with arterial damage at peripheral sites, such as the ear; gas gangrene infection caused by anaerobic organisms; moist gangrene caused by loss of blood supply, as in torsion)

**granuloma** tumour-like mass of granulation tissue

**guard hairs** long hairs of body coat

**habronemiasis** disease caused by *Habronema* species (also called summer
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>haematoma</td>
<td>subcutaneous swelling consisting of blood</td>
</tr>
<tr>
<td>haemangioma</td>
<td>benign tumour of blood vessels</td>
</tr>
<tr>
<td>helminth</td>
<td>parasitic worm</td>
</tr>
<tr>
<td>hereditary</td>
<td>genetically transmitted trait</td>
</tr>
<tr>
<td>hirsutism</td>
<td>hairy state</td>
</tr>
<tr>
<td>histology</td>
<td>microscopic study of tissue</td>
</tr>
<tr>
<td>histopathology</td>
<td>microscopic study of abnormal tissue</td>
</tr>
<tr>
<td>histoplasmosis</td>
<td>fungal infection with primary focus in lungs (also cause of epizootic</td>
</tr>
<tr>
<td></td>
<td>lymphangitis, pseudoglanders or African farcy)</td>
</tr>
<tr>
<td>horsepox</td>
<td>a benign disease caused by a poxvirus.</td>
</tr>
<tr>
<td>hyperhidrosis</td>
<td>excessive sweating, often seen after prostaglandin injection</td>
</tr>
<tr>
<td>hyperkeratosis</td>
<td>hypertrophy of skin horny layer</td>
</tr>
<tr>
<td>hypertrichosis</td>
<td>hirsutism</td>
</tr>
<tr>
<td>hypodermis</td>
<td>subcutis</td>
</tr>
<tr>
<td>hypopigmentation</td>
<td>reduction in normal pigmentation</td>
</tr>
<tr>
<td>hypotrichosis</td>
<td>alopecia</td>
</tr>
<tr>
<td>hyperpigmentation</td>
<td>increased skin pigmentation</td>
</tr>
<tr>
<td>immuno-pathology</td>
<td>study of immune diseases</td>
</tr>
<tr>
<td>immuno-therapy</td>
<td>therapy designed to aid or stimulate immunity</td>
</tr>
<tr>
<td>induration</td>
<td>hardening of skin</td>
</tr>
<tr>
<td>infection</td>
<td>disease caused by microorganisms or internal parasites</td>
</tr>
<tr>
<td>infestation</td>
<td>parasitic disease of the skin</td>
</tr>
<tr>
<td>inflammation</td>
<td>tissue reaction to insult or infection</td>
</tr>
<tr>
<td>Insecta</td>
<td>class of arthropods</td>
</tr>
<tr>
<td>intradermal</td>
<td>within the skin</td>
</tr>
<tr>
<td>ischaemic</td>
<td></td>
</tr>
<tr>
<td>necrosis</td>
<td>local tissue loss on ears, etc., a symptom of ergot poisoning</td>
</tr>
<tr>
<td>keratin</td>
<td>protein of epidermis, etc.</td>
</tr>
<tr>
<td>larvicidal</td>
<td>kills larvae</td>
</tr>
<tr>
<td>leimyosarcoma</td>
<td>malignant tumour of smooth muscle</td>
</tr>
<tr>
<td>lesion</td>
<td>pathological tissue</td>
</tr>
<tr>
<td>leukoderma</td>
<td>depigmentation after injury, etc.</td>
</tr>
<tr>
<td>leukotrichia</td>
<td>whitening of hair after injury</td>
</tr>
<tr>
<td>lichenification</td>
<td>thickening and folding of the skin</td>
</tr>
<tr>
<td>lipoma</td>
<td>a benign tumour of fat</td>
</tr>
<tr>
<td>lymphocyte</td>
<td>a white blood cell</td>
</tr>
<tr>
<td>lymphoedema</td>
<td>oedema due to lymphatic obstruction</td>
</tr>
<tr>
<td>lymphoma</td>
<td>tumour of lymphoid tissue</td>
</tr>
</tbody>
</table>
Glossary

macrophage  scavenger cell of tissue
macule  skin spot
mange  disease caused by mites
mast cell  body defensive cell
mastocytoma  mast cell tumour
melanoma  tumour common in grey horses
melanosarcoma  malignant melanoma
metacercaria  larval stage of liver fluke
metastasis  spread of disease from one organ to another
microfilaria  larval stage of worms like Onchocerca and Setaria
Microsporum  fungus causing ringworm
miracidium  larval stage of liver fluke
molloscum contagiosum  skin disease caused by a poxvirus
monocyte  a white blood cell
mycetoma  subcutaneous bacterial or fungal growth
mycosis  disease caused by fungi
myiasis  body invasion by fly larvae
necrosis  process of cell death
Nematoda  roundworm class
neoplasia  growth formation
neoplasm  new growth, usually refers to tumour
neurofibroma  benign tumour of peripheral nerve
neutrophil  a white blood cell
nodule  solid lump of skin
nodular necrobiosis  multiple nodules of skin in horse
oedema  fluid accumulation under skin or in body cavity
otoscope  instrument for ear examination
panniculitis  inflammatory condition of subcutaneous fat
papillomatosis  refers to multiple wart growth
papule  small elevation of skin
paresis  partial paralysis, often of hind legs
patch  defined skin lesion
pemphigus foliaceus  general scaling disease
phaeohyphomycosis  diffuse fungal dermatitis
photodermatitis  condition of skin due to sunlight exposure
photodermatitis sensitisation  acquired reaction of skin to sunlight
plaque  large patch
polydypsia  abnormal thirst
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- **polyphagia**: abnormal hunger
- **polyuria**: excessive urination
- **predilection site**: situation parasite lives in/on body
- **proboscis**: sucking mouthpart of insect
- **prognosis**: likely disease outcome
- **Protozoa**: single-cell family of organisms (includes *Coccidia*)
- **proud flesh**: exuberant wound granulation
- **pruritis**: itchiness
- **pustule**: pimple filled with pus
- **pyoderma**: purulent skin disease
- **redia**: larval stage of liver fluke
- **reservoir host**: animal that acts as source of infection for others, usually without showing signs of disease
- **resistance**: ability to withstand disease, or drug
- **ringworm**: a fungal infection of skin
- **sarcoid**: skin tumour
- **scale**: skin flake
- **scar**: repaired (skin) after wound
- **schirrous cord**: enlargement of spermatic cord after castration
- **sclerosis**: hardening from inflammation
- **seborrheoa**: increase of sebum production with scaling and crusts
- **sebum**: oily product of sebaceous glands
- **sensitivity**: open to disease, or organism susceptible to drug
- **serpiginous lesion**: having wavy outline
- **serum**: fluid part of blood after clotting
- **sinus**: cavity, as in paranasal sinus, or open discharging tract
- **sitfast**: sore on withers caused by saddle
- **sporotrichosis**: fungal skin disease
- **squamous cell carcinoma**: malignant tumour of skin/mucous membrane junction
- **St John's wort**: a plant cause of photodermatitis
- **strangles**: a bacterial disease marked by abscess formation
- **stratum**: layer
- **stratum corneum**: outer layer of the skin
- **subcutis**: layer beneath the skin
- **subcutaneous emphysema**: air or gas under skin
- **sweet itch**: skin disease due to fly bites (also called Queensland itch, dhobie itch, Kasen, summer eczema)
- **sweat gland adenoma**: benign tumour of sweat gland
- **tardive**: late, inherited trait appearing after birth
- **tetanus**: bacterial disease caused by *Clostridium tetani*
thermo-regulation: regulation of body temperature
thrombus: clot within vessel, may include worm larvae
titre: serum level measured against specific entity, like a virus
topical: application of drug, etc., to local skin area
toxin: a poison
*Trematoda*: parasitic family that includes fluke
*Trichophyton*: fungal cause of skin disease
trypanosomiasis: protozoan disease caused by *Trypanosoma* species
tumefaction: a skin swelling
tumour: a mass or swelling, synonymous with neoplasm
thermal injury: burn (including firing marks, cryosurgery)
ulcer: a lesion that penetrates the skin (or other tissues)
ulcerative lymphangitis: bacterial infection of lymphatics in lower limbs
unilateral papular dermatitis: papules that appear on one side only of horse, cause unknown
urticaria: hives
vellus hairs: smaller hairs of body coat
vesicle: small blister
vibrissae: sensory hairs or whiskers
vitiligo: local loss of skin pigment
wart: papilloma
weal: urticarial lesion
zoonosis: disease transmitted from animal to man
zygomycosis: fungal skin disease
### Parasites and Skin Diseases

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<td>Coleoptera</td>
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<tr>
<td>collagenolytic granuloma</td>
<td>(equine eosinophilic granuloma, or EEG)</td>
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<td>complement fixation test</td>
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<td>congenital disease</td>
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<td><strong>Corynebacterium pseudotuberculosis</strong></td>
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<td><strong>Culicoides</strong></td>
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Fungal skin diseases usually occur in puppies. Hair loss and skin lesions are common symptoms of such infection. If it is left untreated for too long, it extends and the symptoms get worse. This type of infection may occur anywhere on your dog’s body and it requires medical treatment. Since puppies are more vulnerable than adult dogs, you should pay extra attention to any change that occurs in their behavior or on their bodies. All these parasites can infect your pet with various diseases that they carry. If your dog starts scratching more than usual and it has different rashes or bumps on its body, then you should take it to the vet as soon as possible. Most treatments against parasites consist in ointments that are applied externally. Allergic reactions.