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, \textit{Strongylus} and \textit{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
4 Parasites and Skin Diseases

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.
Glossary

abrasi0n          skin graze, as with rope burn, grazed knee
abscess          cavity filled with pus
acariasis        infestation with ticks or mites
acne             skin condition marked by pustules
albinism          inherited absence of pigment in hair, skin and eyes
allergen          substance capable of causing allergy
allergy           hypersensitivity to an antigen
allergic          skin inflammation caused by allergy
allergist         hives, of allergic origin
alopecia         hair loss
alopecia areata   focal patches of alopecia
anaemia           lowered red blood cells and/or haemoglobin
aneurysm         dilatation of blood vessel wall
angioedema        condition marked by painless swellings under the skin and mucous membranes
anhidrosis        chronic dry coat
annular lesion    ring-shaped or circular lesion
antenna           head appendage of arthropod
antibiotic        chemical that inhibits or kills bacteria
antibody          body defence, produced by lymphocyte cells
antigen           causes antibody production (virus, bacterium, etc.)
antiseptic        inhibits or destroys organisms
aplasia cutis     hereditary absence of skin (as epitheliogenesis imperfecta)
arthropod         family that includes arachnids and insects
atheroma          cyst containing porridge-like exudate
aural plaque      ear lesion, raised and circumscribed, said to be form of papillomatosis
### Parasites and Skin Diseases

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>autoantibody</td>
<td>antibody against animal's own tissues</td>
</tr>
<tr>
<td>autogenous</td>
<td>derived from same animal; autogenous vaccine is produced from organisms taken from an affected animal</td>
</tr>
<tr>
<td>autoimmune</td>
<td>antibodies produced against own tissues</td>
</tr>
<tr>
<td>basal cell tumour</td>
<td>rare, benign tumour of skin</td>
</tr>
<tr>
<td>Basidiobolus</td>
<td>cause of fungal skin disease</td>
</tr>
<tr>
<td>biopsy</td>
<td>sample from living tissue for diagnostic purposes</td>
</tr>
<tr>
<td>blowfly strike</td>
<td>invasion of skin by blowfly larvae</td>
</tr>
<tr>
<td>bulla</td>
<td>large blister</td>
</tr>
<tr>
<td>bullous</td>
<td>autoimmune skin disease</td>
</tr>
<tr>
<td>burn</td>
<td>tissue injury resulting from heat, cold, chemicals, etc.</td>
</tr>
<tr>
<td>bursa</td>
<td>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)</td>
</tr>
<tr>
<td>calcinosis</td>
<td>localised nodule of calcium</td>
</tr>
<tr>
<td>callus</td>
<td>local thickening of skin due to friction, etc.</td>
</tr>
<tr>
<td>Candida</td>
<td>fungal organism that may be associated with disease</td>
</tr>
<tr>
<td>Canadian horsepox</td>
<td>pustular skin disease</td>
</tr>
<tr>
<td>cellulitis</td>
<td>inflammatory reaction spreading beneath the skin</td>
</tr>
<tr>
<td>cercaria</td>
<td>larval stage of liver fluke</td>
</tr>
<tr>
<td>Cestoda</td>
<td>class to which tapeworms belong</td>
</tr>
<tr>
<td>chemotherapy</td>
<td>treatment by chemical substances or drugs</td>
</tr>
<tr>
<td>Coccidia</td>
<td>protozoan cause of enteric disease</td>
</tr>
<tr>
<td>coital exanthema</td>
<td>viral venereal disease</td>
</tr>
<tr>
<td>colic</td>
<td>pain of abdominal origin</td>
</tr>
<tr>
<td>collagen</td>
<td>structural protein of white fibres of skin, etc.</td>
</tr>
<tr>
<td>complement</td>
<td>a body defensive substance</td>
</tr>
<tr>
<td>congenital</td>
<td>a mark or condition present at birth</td>
</tr>
<tr>
<td>Conidiobolus</td>
<td>fungal infection of nasal cavities.</td>
</tr>
<tr>
<td>coronatus</td>
<td>fungous infection of nasal cavities</td>
</tr>
<tr>
<td>crust</td>
<td>dried skin exudate</td>
</tr>
<tr>
<td>cryosurgery</td>
<td>surgery by freezing, either with dry ice (liquid nitrogen) or carbon dioxide</td>
</tr>
<tr>
<td>cutaneous</td>
<td>the skin</td>
</tr>
<tr>
<td>cytology</td>
<td>diagnostic examination of cells</td>
</tr>
<tr>
<td>decubital ulcer</td>
<td>skin ulcer due to lying down</td>
</tr>
<tr>
<td>depigmentation</td>
<td>loss of colour from skin</td>
</tr>
<tr>
<td>dermatology</td>
<td>study of skin disease</td>
</tr>
<tr>
<td><strong>Dermatophilus</strong></td>
<td>bacterial cause of rain scald and greasy heel</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------------------</td>
</tr>
<tr>
<td>dermatophyte</td>
<td>organism that causes fungal infection of skin</td>
</tr>
<tr>
<td>dermis</td>
<td>skin area between epidermis and fat layers</td>
</tr>
<tr>
<td>dermoid cyst</td>
<td>hereditary lesion often seen on skin</td>
</tr>
<tr>
<td>dorsal shield</td>
<td>plate or scutum on hard ticks</td>
</tr>
<tr>
<td>eczema</td>
<td>inflammation of the outer skin layer</td>
</tr>
<tr>
<td>electrosurgery</td>
<td>surgery by use of an electric current</td>
</tr>
<tr>
<td>embolus</td>
<td>clot in blood, blocking artery (usually part of thrombus)</td>
</tr>
<tr>
<td>emollient</td>
<td>agent that soothes irritation</td>
</tr>
<tr>
<td>endocrinology</td>
<td>study of hormones</td>
</tr>
<tr>
<td>eosinophil</td>
<td>a type of white blood cell</td>
</tr>
<tr>
<td>eosinophilic granuloma</td>
<td>subcutaneous nodules containing eosinophils</td>
</tr>
<tr>
<td>epidermal collarette</td>
<td>circular epidermal lesion</td>
</tr>
<tr>
<td>epidermis</td>
<td>outer layer of skin</td>
</tr>
<tr>
<td>epitheliogenesis imperfecta</td>
<td>see aplasia cutis</td>
</tr>
<tr>
<td>erosion</td>
<td>a shallow surface skin lesion</td>
</tr>
<tr>
<td>erythema</td>
<td>redness of skin</td>
</tr>
<tr>
<td>erythema multiforme</td>
<td>immune complex disease with annular lesions</td>
</tr>
<tr>
<td>erythroderma</td>
<td>redness of skin over wide area</td>
</tr>
<tr>
<td>EVA</td>
<td>equine viral arteritis</td>
</tr>
<tr>
<td>excoriation</td>
<td>superficial graze, as from scratching</td>
</tr>
<tr>
<td>exfoliate</td>
<td>to shed</td>
</tr>
<tr>
<td>exfoliative dermatitis</td>
<td>increased skin scaling</td>
</tr>
<tr>
<td>exudate</td>
<td>discharge like pus or serum</td>
</tr>
<tr>
<td>fibroma</td>
<td>benign fibrous tissue tumour</td>
</tr>
<tr>
<td>fibrosarcoma</td>
<td>malignant fibrous tissue tumour</td>
</tr>
<tr>
<td>fissure</td>
<td>skin crack</td>
</tr>
<tr>
<td>fistula</td>
<td>open skin tract, possibly from deep infection</td>
</tr>
<tr>
<td>folliculitis</td>
<td>inflammation of hair follicles</td>
</tr>
<tr>
<td>fomes (fomites)</td>
<td>inanimate object capable of spreading infection</td>
</tr>
<tr>
<td>furunculosis</td>
<td>skin boils</td>
</tr>
<tr>
<td>gangrene</td>
<td>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 anerobic organisms; moist gangrene caused by loss of blood supply, as in torsion)</td>
</tr>
<tr>
<td>granuloma</td>
<td>tumour-like mass of granulation tissue</td>
</tr>
<tr>
<td>guard hairs</td>
<td>long hairs of body coat</td>
</tr>
</tbody>
</table>
| habronemiasiosis | disease caused by *Habronema* species (also called summer
sores, bursatii, swamp cancer, kunkers, esponja and granular dermatitis

haematoma subcutaneous swelling consisting of blood

haemangioma benign tumour of blood vessels

helminth parasitic worm

hereditary genetically transmitted trait

hirsutism hairy state

histology microscopic study of tissue

histopathology microscopic study of abnormal tissue

histoplasmosis fungal infection with primary focus in lungs (also cause of epizootic lymphangitis, pseudoglanders or African farcy)

horsepox a benign disease caused by a poxvirus.

hyperhydrosis excessive sweating, often seen after prostaglandin injection

hyperkeratosis hypertrophy of skin horny layer

hypertrichosis hirsutism

hypodermis subcutis

hypopigmentation reduction in normal pigmentation

hypotrichosis alopecia

hyperpigmentation increased skin pigmentation

immunopathology study of immune diseases

immunotherapy therapy designed to aid or stimulate immunity

induration hardening of skin

infection disease caused by microorganisms or internal parasites

infestation parasitic disease of the skin

inflammation tissue reaction to insult or infection

Insecta class of arthropods

intradermal within the skin

ischaemic necrosis local tissue loss on ears, etc., a symptom of ergot poisoning

keratin protein of epidermis, etc.

larvicidal kills larvae

leiomyosarcoma malignant tumour of smooth muscle

lesion pathological tissue

leukoderma depigmentation after injury, etc.

leukotrichia whitening of hair after injury

lichenification thickening and folding of the skin

lipoma a benign tumour of fat

lymphocyte a white blood cell

lymphoedema oedema due to lymphatic obstruction

lymphoma tumour of lymphoid tissue
<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>macrophage</td>
<td>scavenger cell of tissue</td>
</tr>
<tr>
<td>macule</td>
<td>skin spot</td>
</tr>
<tr>
<td>mange</td>
<td>disease caused by mites</td>
</tr>
<tr>
<td>mast cell</td>
<td>body defensive cell</td>
</tr>
<tr>
<td>mastocytoma</td>
<td>mast cell tumour</td>
</tr>
<tr>
<td>melanoma</td>
<td>tumour common in grey horses</td>
</tr>
<tr>
<td>melanoma sarcoma</td>
<td>malignant melanoma</td>
</tr>
<tr>
<td>metacercaria</td>
<td>larval stage of liver fluke</td>
</tr>
<tr>
<td>metastasis</td>
<td>spread of disease from one organ to another</td>
</tr>
<tr>
<td>microfilaria</td>
<td>larval stage of worms like <em>Onchocerca</em> and <em>Setaria</em></td>
</tr>
<tr>
<td><em>Microsporum</em></td>
<td>fungus causing ringworm</td>
</tr>
<tr>
<td>miracidium</td>
<td>larval stage of liver fluke</td>
</tr>
<tr>
<td>molluscum</td>
<td></td>
</tr>
<tr>
<td>monocyte</td>
<td>a white blood cell</td>
</tr>
<tr>
<td>mycetoma</td>
<td>subcutaneous bacterial or fungal growth</td>
</tr>
<tr>
<td>mycosis</td>
<td>disease caused by fungi</td>
</tr>
<tr>
<td>myiasis</td>
<td>body invasion by fly larvae</td>
</tr>
<tr>
<td>necrosis</td>
<td>process of cell death</td>
</tr>
<tr>
<td><em>Nematoda</em></td>
<td>roundworm class</td>
</tr>
<tr>
<td>neoplasia</td>
<td>growth formation</td>
</tr>
<tr>
<td>neoplasm</td>
<td>new growth, usually refers to tumour</td>
</tr>
<tr>
<td>neurofibroma</td>
<td>benign tumour of peripheral nerve</td>
</tr>
<tr>
<td>neutrophil</td>
<td>a white blood cell</td>
</tr>
<tr>
<td>nodule</td>
<td>solid lump of skin</td>
</tr>
<tr>
<td>nodular</td>
<td></td>
</tr>
<tr>
<td>necrobiosis</td>
<td>multiple nodules of skin in horse</td>
</tr>
<tr>
<td>oedema</td>
<td>fluid accumulation under skin or in body cavity</td>
</tr>
<tr>
<td>otoscope</td>
<td>instrument for ear examination</td>
</tr>
<tr>
<td>panniculitis</td>
<td>inflammatory condition of subcutaneous fat</td>
</tr>
<tr>
<td>papillomatosis</td>
<td>refers to multiple wart growth</td>
</tr>
<tr>
<td>papule</td>
<td>small elevation of skin</td>
</tr>
<tr>
<td>paresis</td>
<td>partial paralysis, often of hind legs</td>
</tr>
<tr>
<td>patch</td>
<td>defined skin lesion</td>
</tr>
<tr>
<td>pemphigus</td>
<td></td>
</tr>
<tr>
<td>foliaceus</td>
<td>general scaling disease</td>
</tr>
<tr>
<td>phaeohypomycosis</td>
<td>diffuse fungal dermatitis</td>
</tr>
<tr>
<td>photodermatitis</td>
<td>condition of skin due to sunlight exposure</td>
</tr>
<tr>
<td>photo-sensitisation</td>
<td>acquired reaction of skin to sunlight</td>
</tr>
<tr>
<td>plaque</td>
<td>large patch</td>
</tr>
<tr>
<td>polydypsia</td>
<td>abnormal thirst</td>
</tr>
</tbody>
</table>
200 Parasites and Skin Diseases

polyphagia
polyuria
predilection site
proboscis
prognosis
Protozoa
proud flesh
pruritis
pustule
pyoderma
redia
reservoir host
resistance
ringworm
sarcoid
scale
scar
schirrous cord
sclerosis
seborrhoea
sensitivity
serpiginous
lesion
serum
sinus
sitfast
sporotrichosis
squamous cell
carcinoma
St John's wort
strangles
stratum
stratum corneum
subcutis
subcutaneous emphysema
sweet itch
sweat gland
adenoma
tardive
tetanus

abnormal hunger
excessive urination
situation parasite lives in/on body
sucking mouthpart of insect
likely disease outcome
single-cell family of organisms (includes Coccidia)
exuberant wound granulation
itchiness
pimple filled with pus
purulent skin disease
larval stage of liver fluke
animal that acts as source of infection for others, usually without showing signs of disease
ability to withstand disease, or drug
a fungal infection of skin
skin tumour
skin flake
repaired (skin) after wound
enlargement of spermatic cord after castration
hardening from inflammation
increase of sebum production with scaling and crusts
oily product of sebaceous glands
open to disease, or organism susceptible to drug
having wavy outline
fluid part of blood after clotting
cavity, as in paranasal sinus, or open discharging tract
sore on withers caused by saddle
fungal skin disease
malignant tumour of skin/mucous membrane junction
a plant cause of photodermatitis
a bacterial disease marked by abscess formation
layer
outer layer of the skin
layer beneath the skin
air or gas under skin
skin disease due to fly bites (also called Queensland itch, dhobie itch, Kasen, summer eczema)
benign tumour of sweat gland
late, inherited trait appearing after birth
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: 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
wheal: urticarial lesion
zoonosis: disease transmitted from animal to man
zygomycesis: fungal skin disease
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