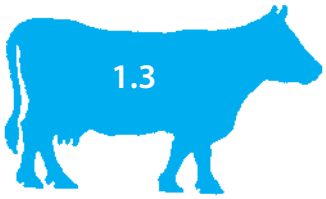

Parasitic Skin Diseases

Chorioptic Mange
Psoroptic Mange
Sarcoptic Mange
Demodectic Mange
Pediculosis
Stephanofilariasis
Miscellaneous Parasitic Diseases
- Psorergatic Mange
- Trombiculidiasis
- *Dermanyssus gallinae* Dermatitis
- *Raillietia auris* Infestation
- Ticks
- Gotch Ear
- Fleas
- *Tunga penetrans* Infestation
- Biting Flies
- Louse Flies
- Hypodermiasis
- *Hydrotaea irritans* Flies
- *Dermatobia hominis* Infestation
- Calliphorine Myiasis
- Screw-worm Myiasis
- Parafilariasis
- Onchocerciasis
- Strongyloidosis
- *Pelodera* Dermatitis
- Rhabditic Otitis Externa
- Hookworm Dermatitis
- Stephanofilariasis

Figure 1.3-1 Chorioptic mange. Crust and alopecia on proximal tail.

Chorioptic Mange

Features

Chorioptic mange ("foot mange," "leg mange," and "tail mange") is common and cosmopolitan. It is caused by the mites *Chorioptes bovis* and, less commonly, *C. texanus*. There are no apparent breed, age, or sex predilections. The disease is especially common in stabled dairy cattle. Mite populations are usually much larger during cold weather. Thus, clinical signs are usually seen, or are more severe, in winter. Transmission occurs by direct and indirect contact.

Lesions are most commonly seen on the rump, tail, perineum, caudomedial thigh, caudal udder, and scrotum, and occasionally the distal hind legs and teats (Figs. 1.3-1 through 1.3-6). Erythema and papules progress to scaling, oozing, crusts, and alopecia.

Color Atlas of Farm Animal Dermatology, Second Edition. Danny W. Scott.

Figure 1.3-2 Chorioptic mange. Erythema, papules, crusts, and alopecia on caudal thighs.

Figure 1.3-3 Chorioptic mange. Erythema, alopecia, and excoriations on distal leg.

Pruritus varies from mild to intense. Stanchioned cattle exhibit restlessness, treading, violent swishing of the tail, and rubbing of the tail and perineum against stationary objects. Some infestations are asymptomatic. Typically, multiple animals are affected. Severe infestations can cause weight loss, hide damage,

Figure 1.3-4 Chorioptic mange. Erythema, crusts, and alopecia on udder and lateral hock.

Figure 1.3-5 Chorioptic mange. Crusts on teats.

and reduced milk and meat yields. Humans are not affected.

Differential Diagnosis

Sarcoptic mange, psoroptic mange, psorergatic mange, and pediculosis.

Diagnosis

1) Microscopy (skin scrapings and/or combings in mineral oil): Psoroptid mites, 0.3 to 0.5 mm in length (Figs. 1.3-7 and 1.3-8).
2) Dermatohistopathology: Hyperplastic eosinophilic perivascular-to-interstitial dermatitis with eosinophilic epidermal microabscesses and parakeratotic hyperkeratosis (mites rarely seen).

Psoroptic Mange

Features

Psoroptic mange ("body mange") is common to uncommon in most parts of the world. It is caused by the mite *Psoroptes ovis* (*bovis*). There are no apparent breed, age, or

Figure 1.3-6 Chorioptic mange. Erythema, alopecia, and excoriations on rump, tail, hind legs, perineum, and flank.

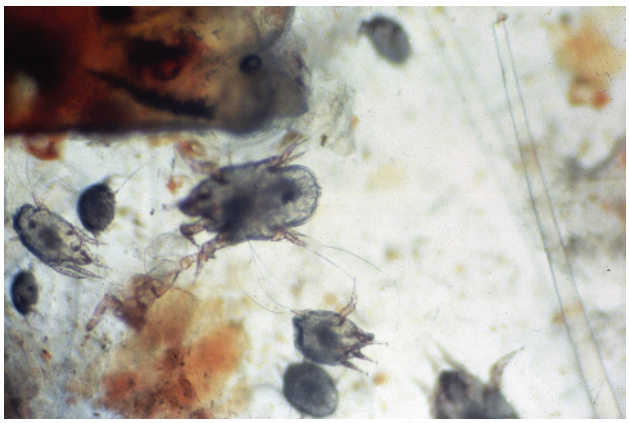

Figure 1.3-7 Chorioptic mange. Multiple mites in a skin scraping.

sex predilections. However, in the United States, psoroptic mange is mostly seen in range (beef) cattle in the western, southwestern, and central states. Transmission occurs by direct and indirect transmission. Mite populations are

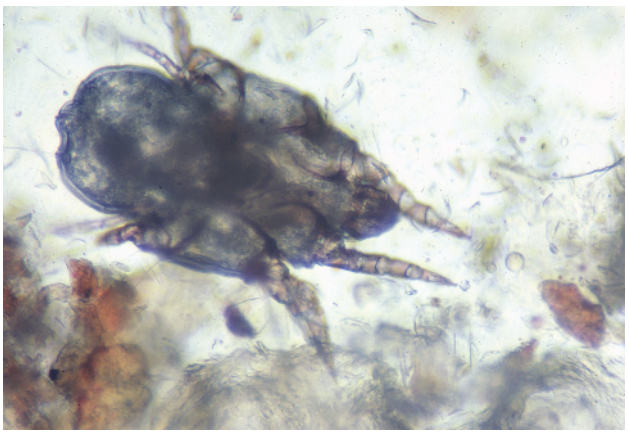

Figure 1.3-8 Chorioptic mange. Adult mite in a skin scraping.

Figure 1.3-9 Psoroptic mange. Generalized alopecia, erythema, crusts, excoriation, and bleeding. *Source*: Courtesy of J. Gourreau.

usually larger during cold weather. Thus, clinical signs are usually more severe in winter.

Lesions typically begin on the shoulders and rump (Fig. 1.3-9). Papules, pustules, exudation, crusts, alopecia, and excoriations are seen, and pruritus is intense. Bleeding from the skin is common. Skin becomes lichenified and thickened with chronicity. Generalized skin involvement and secondary bacterial infections are common. Intense, unremitting pruritus results in annoyance, irritability, decreased food intake, decreased weight gains or weight loss, decreased milk production, hide damage, difficulty in estrus detection, secondary bacterial (usually staphylococcal) pyoderma, and myiasis. Animals with 40% or more of their body involved may die. Typically, multiple animals are affected. Humans are not affected.

Differential Diagnosis

Sarcoptic mange, chorioptic mange, psorergatic mange, and pediculosis.

Figure 1.3-10 Psoroptic mange. Adult *Psoroptes* mite.

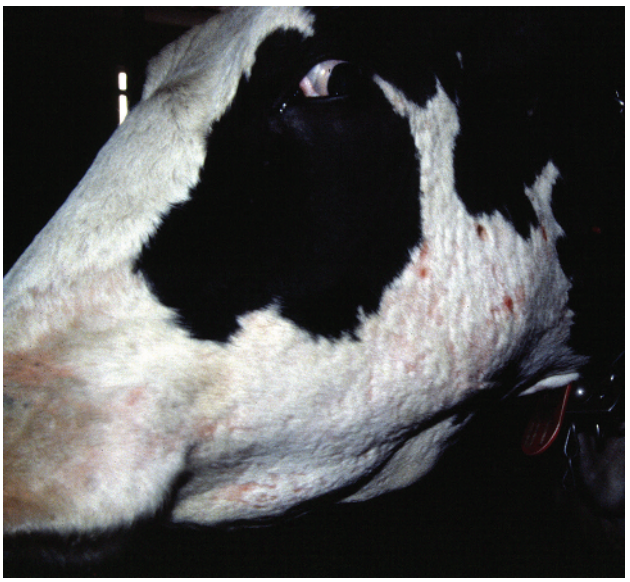

Figure 1.3-11 Sarcoptic mange. Erythema, papules, crusts, and alopecia on face and muzzle.

Diagnosis

1) Microscopy (skin scrapings in mineral oil): Psoroptid mites, 0.4 to 0.8 mm in length (Fig. 1.3-10). Skin scrapings should be taken from the margin of lesions.
2) Dermatohistopathology: Hyperplastic eosinophilic perivascular-to-interstitial dermatitis with epidermal microabscesses and parakeratotic hyperkeratosis (mites uncommonly seen).

Sarcoptic Mange

Features

Sarcoptic mange (also called "scabies" and "head mange") is uncommon to rare in most parts of the world. It is caused by the mite *Sarcoptes scabiei var bovis*. There are no apparent breed, age, or sex predilections. Transmission occurs by direct and indirect contact.

Lesions are most commonly seen on the face, pinnae, neck, shoulders, and rump, and can involve the udder cleft (Figs. 1.3-11 through 1.3-15). Erythema and papules progress to scaling, oozing, crusts, and alopecia. Pruritus is intense. Excoriation, lichenification, and hyperkeratosis are prominent in chronic cases. Peripheral lymphadenopathy is usually moderate to marked. Typically, multiple animals are affected. Decreased feed

Figure 1.3-12 Sarcoptic mange. Severe crusting of pinna. *Source*: Courtesy of J. King.

Figure 1.3-13 Sarcoptic mange. Alopecia, crusts, and lichenification over face, pinna, neck, and shoulder.

Figure 1.3-14 Sarcoptic mange. Alopecia, lichenification, and crusts on face, pinna, neck, and shoulder.

Figure 1.3-15 Sarcoptic mange. Alopecia, erythema, and crusts on perineum, caudal thighs, and udder.

intake, weight loss, decreased milk production, hide damage, difficulty in estrus detection, secondary bacterial (usually staphylococcal) pyoderma, and myiasis can occur due to the intense pruritus and irritation.

Sarcoptic mange is a potential zoonosis. Affected humans develop pruritic erythematous papules with crusts and excoriations on the arms, chest, abdomen, and legs (Fig. 1.3-16).

Differential Diagnosis

Psoroptic mange, chorioptic mange, psorergatic mange, and pediculosis.

Diagnosis

1) Microscopy (skin scrapings in mineral oil): Sarcoptic mites, 0.25 to 0.6 mm in length (Figs. 1.3-17 and 1.3-18). Ova (eggs) and scyballa (fecal pellets) may also be found (Fig. 1.3-19). Mites are often difficult to find, especially in chronic cases. In these cases, a presumptive diagnosis is made by response to treatment.
2) Dermatohistopathology: Hyperplastic eosinophilic perivascular-to-interstitial dermis with eosinophilic epidermal microabscesses and parakeratotic hyperkeratosis (mites rarely seen).

Demodectic Mange

Features

Demodectic mange ("demodicosis" and "follicular mange") is an uncommon, cosmopolitan dermatosis caused by the mite *Demodex bovis*. This mite is a normal resident of hair follicles, transmitted from the dam to nursing neonates during the first few days of life. It is assumed that all animals experiencing disease due to the excessive replication of this normal resident mite are in some way immunocompromised (e.g., by concurrent disease, poor nutrition, debilitation, stress, or genetic

Figure 1.3-16 Sarcoptic mange. Erythematous and crusted papules on the leg of a human with animal-origin scabies.

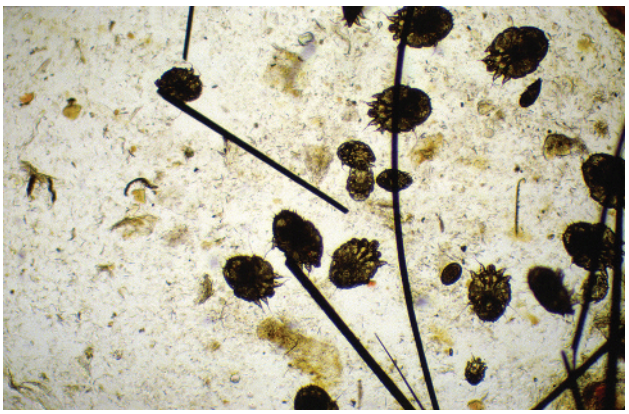

Figure 1.3-17 Sarcoptic mange. Multiple mites in a skin scraping.

Figure 1.3-18 Sarcoptic mange. Adult mite in a skin scraping.

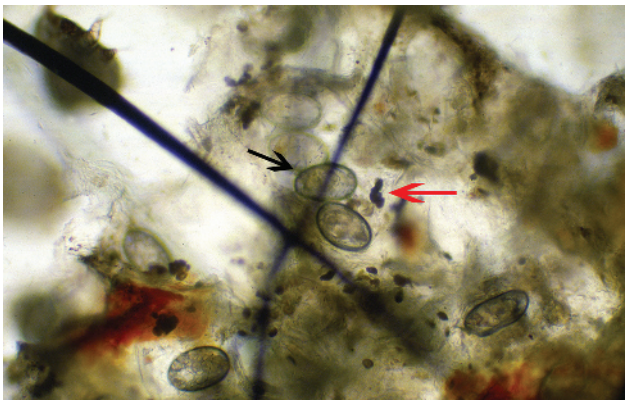

Figure 1.3-19 Sarcoptic mange. Multiple eggs (black arrow) and fecal pellets (red arrow) in a skin scraping.

predilection). There are no apparent breed, age, or sex predilections. Demodectic mange is not a contagious disease. Although cattle harbor other demodicid mites (e.g., *D. ghanensis* and *D. tauri*), it is not clear if these mites are associated with skin disease. The disease appears to be more common in tropical climates.

Lesions consist of multiple (from ten to hundreds) dermal papules and nodules, 0.5 to 2 cm in diameter (Figs. 1.3-20 through 1.3-22). The overlying hair coat and skin surface are normal, and the lesions are neither painful nor pruritic. There is often a seasonal (spring and summer) increase in the number of lesions. Occasionally, draining tracts, ulcers, abscesses, crusts, and alopecia may be seen when follicular rupture and/or secondary bacterial (usually staphylococcal) infection have occurred. Lesions are most commonly seen over the face, neck, shoulders, brisket, and forelegs, and occasionally on the back, flanks, head, and hind legs. Widespread lesions are associated with hide damage and a loss of condition.

Figure 1.3-20 Demodectic mange. Multiple papules over withers.

Figure 1.3-21 Demodectic mange. Multiple papules on brisket. *Source*: Courtesy of J. Gourreau.

Figure 1.3-22 Demodectic mange. Multiple papules, some of which have ulcerated, over thorax. *Source*: Courtesy of M. Sloet.

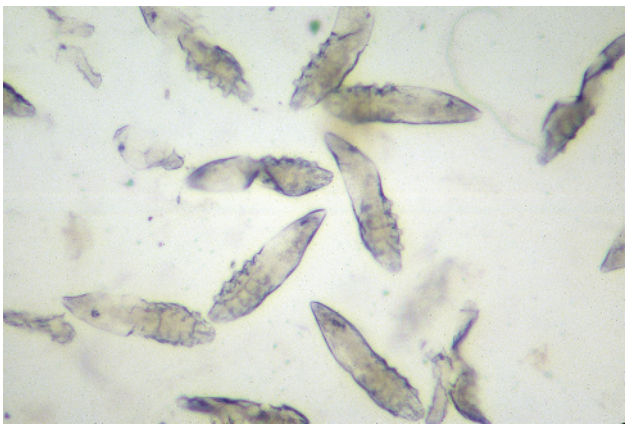

Figure 1.3-23 Demodectic mange. Numerous mites from an incised and squeezed lesion.

Differential Diagnosis

Insect bites, adverse cutaneous drug reaction, and lymphoma.

Diagnosis

1) History and physical examination.
2) Microscopy (incision and manual evacuation of caseous exudate from a lesion placed in mineral oil): Multiple demodicid mites, 0.2 to 0.3 mm in length (Fig. 1.3-23).

Pediculosis

Features

Pediculosis (lice) is a common, cosmopolitan infestation caused by various lice. In the United States, recognized cattle lice include *Damalinia (Bovicola) bovis* (biting louse, order Mallophaga) and *Haematopinus eurysternus*, *Linognathus vituli*, and *Solenopotes capillatus* (sucking lice, order Anoplura). There are no apparent breed, age, or sex predilections. Louse populations are usually much larger during cold weather. Thus, clinical signs are usually seen, or are more severe, in winter. Apparent carrier animals within a herd maintain lice populations during the "off" season and serve as a source of re-infestation of the herd in the fall. Transmission occurs by direct and indirect contact.

D. bovis is most commonly seen over the neck, withers, and tail head (Fig. 1.3-24). Sucking lice are commonly found on the poll, pinnae, muzzle, periocular region, neck, brisket, withers, tail, axillae, and groin (Figs. 1.3-25 through 1.3-27). Some animals will show no clinical signs. Most animals will have variable combinations of scaling, crusting, erythema, excoriation, and hair loss. Pruritus is variable, but often moderate to marked, with affected animals constantly rubbing, licking, and scratching. Lick marks created by the tongue that resemble marks left by a

Figure 1.3-24 Pediculosis. Crusts and scales on pinnae, head, and dorsal neck.

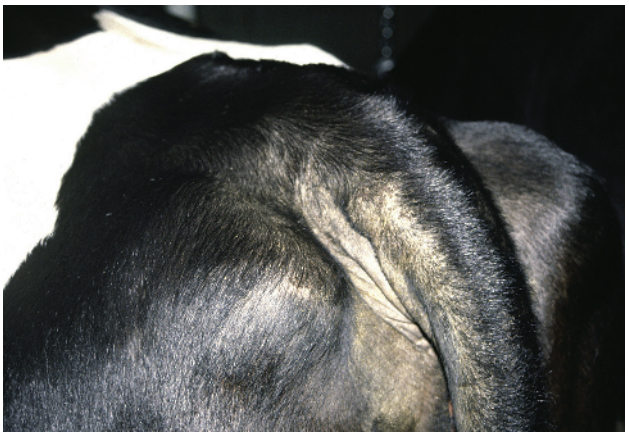

Figure 1.3-25 Pediculosis. Alopecia and scale on rump and tail. *Source*: Courtesy of M. Sloet.

wet paintbrush are classic on animals with lice (Fig. 1.3-28). Stanchioned cattle are very restless because their restraint limits their ability to lick or scratch. They tend to "rattle" the stanchions and rub vigorously back and forth or up and down in the stanchion, causing areas of hair loss on the neck and shoulders. Calves may develop hairballs. Louse infestations can be heavy in debilitated animals. Large populations of lice can cause anemia, especially in calves. Heavy infestations can cause unthriftiness, restlessness, decreased growth, decreased food intake, weight loss, and damage to hides. Typically, multiple animals are affected. Humans are not affected.

Differential Diagnosis

Sarcoptic mange, chorioptic mange, psoroptic mange, and psorergatic mange.

Diagnosis

1) History and physical examination: Sucking lice are bluish-gray in color. Biting lice are pale to brownish in color.

Figure 1.3-26 Pediculosis. Alopecia, scales, and crusts on base of pinna, muzzle, and periocular area. *Source*: Courtesy of M. Sloet.

Figure 1.3-27 Pediculosis. Multiple lice over thorax. *Source*: Courtesy of M. Sloet.

2) Microscopy (lice and hairs placed in mineral oil): Adult lice are large, 3 to 6 mm in length (Figs. 1.3-29 and 1.3-30). Ova (nits) are 1 to 2 mm in length and may be found attached to hair shafts (Fig. 1.3-31).

Figure 1.3-28 Pediculosis. Lick marks on the lateral aspect of the body. *Source*: Courtesy of M. Smith.

Figure 1.3-29 Pediculosis. Chewing louse. *Source*: Courtesy of M. Sloet.

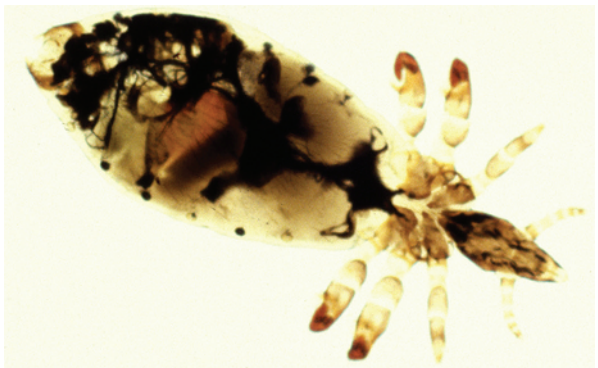

Figure 1.3-30 Pediculosis. Sucking louse. *Source*: Courtesy of M. Sloet.

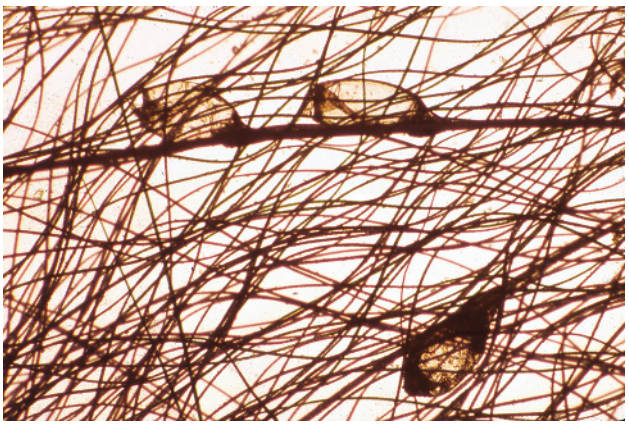

Figure 1.3-31 Pediculosis. Nits on hair shaft.

Stephanofilariasis

Features

Stephanofilariasis is an uncommon disorder in many parts of the world. Many species of the genus *Stephanofilaria* are associated with skin disease in cattle (see Table 1.3-1). Stephanofilariasis is a nonseasonal disease, although it is often worse in warm weather, presumably the result of the activity of fly intermediate hosts (*Haematobia* and *Musca*). There are no apparent age or sex predilections. Range (beef) cattle are more commonly affected than dairy cattle.

In North America—especially in the west and southwest—stephanofilariasis is caused by *Stephanofilaria stilesi*. *Haematobia (Lyperosia) irritans* is the intermediate host. Lesions consist of papules, crusts, ulcers, alopecia, hyperkeratosis, and thickening of the skin. Pruritus is variable. The ventral chest and abdomen, flanks, udder, teats, and scrotum are most commonly affected (Figs. 1.3-32 through 1.3-35). Lesions are occasionally seen over the face and neck. Teat lesions may predispose to mastitis, and scrotal lesions to orchitis. Typically, multiple animals are affected.

Differential Diagnosis

Contact dermatitis, chorioptic mange, trombiculosis, and *Pelodera* dermatitis.

Diagnosis

1) History and physical examination.
2) Dermatohistopathology: Adult nematodes in cyst-like structures at the base of hair follicles and microfilariae in surrounding dermis.

Figure 1.3-32 Stephanofilariasis. Alopecia, erythema, crusts, and excoriations on ventral midline.

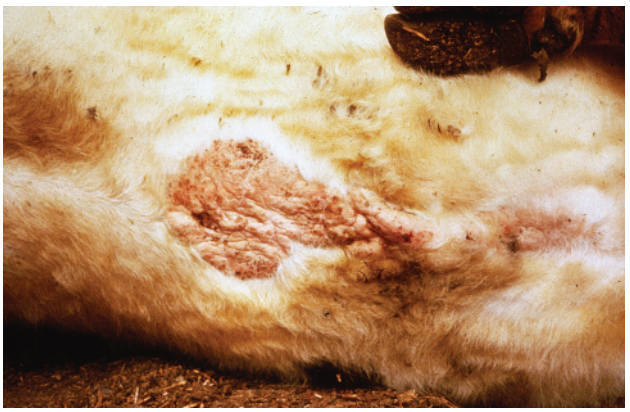

Figure 1.3-34 Stephanofilariasis. Annular areas of alopecia, erythema, and lichenification on ventrum. *Source*: Courtesy of A. Stannard.

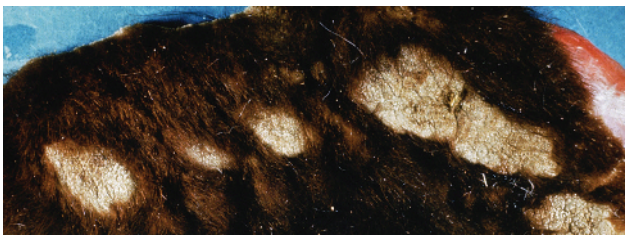

Figure 1.3-33 Stephanofilariasis. Annular areas of alopecia and crusting on ventral abdomen.

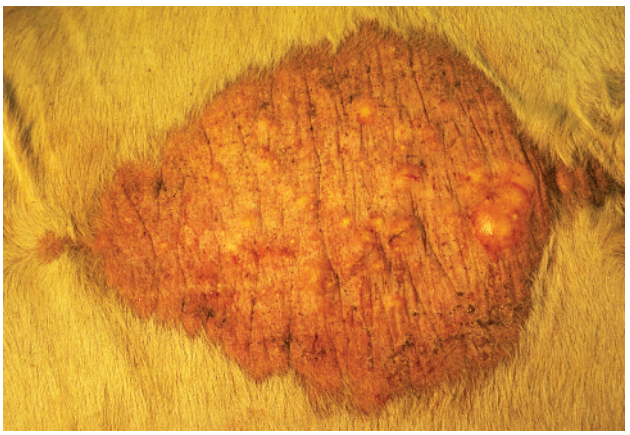

Figure 1.3-35 Stephanofilariasis. Alopecia, erythema, crusts, and lichenification on ventrum. *Source*: Courtesy of A. Stannard.

Miscellaneous Parasitic Diseases

Table 1.3-1 Miscellaneous Parasitic Diseases

Psorergatic mange	Uncommon; North America and Africa; *Psorergates (Psorobia) bos*, 0.1 to 0.2 mm in length; no breed, age, or sex predilections; varies from no clinical signs to severe alopecia, scaling, and pruritus over dorsum (head, neck, shoulders, back, and rump); may require several skin scrapings
Trombiculidiasis ("trombiculosis," "chiggers," and "harvest mite") (Figs. 1.3-36 and 1.3-37)	Uncommon to rare and cosmopolitan; late summer and fall; infested woods, fields, grass, and hay; legs, face, pinnae, axillae, and groin; papulocrustous dermatitis and variable pruritus; trombiculid larvae (0.2 to 0.4 mm in length, red to orange in color); e.g., *Trombicula (Eutrombicula) alfreddugesi*, *T. (Neotrombicula) autumnalis*, and *T. sarcina*
Dermanyssus gallinae dermatitis ("poultry mite")	Rare and cosmopolitan; proximity to poultry roosts; especially late summer; especially legs and ventrum; pruritic, papulocrustous dermatitis; *D. gallinae*; 0.6 to 1 mm in length
Raillietia auris infestation ("ear mites")	Uncommon; Africa, Australia, Europe and northern South America; *R. auris*; 0.5 to 0.8 mm in length; often no clinical signs, but occasionally erythema, ulceration, and bleeding of ear canal with blockage by paste-like wax and suppurative otitis externa; can lead to perforation of the ear drum, otitis media, head shaking and rubbing, deafness, head tilt, facial paralysis, anorexia, and emaciation

(*Continued*)

Table 1.3-1 (Continued)

Ticks (Figs. 1.3-38 through 1.3-40)	Common and cosmopolitan, most in spring and summer; especially ears, face, neck, axillae, groin, and legs; minimal lesions or papules and nodules centered around attached ticks; variable pain and pruritus; e.g., *Amblyomma americanum*, *A. cajenense*, *Otobius megnini*, *Ixodes scapularis*, *I. cookei*, *I. pacificus*, *Rhipicephalus sanguineous*, *Dermacentor andersonii*, and *D. variabilis* in the United States. Tick-associated diseases include babesiosis, anaplasmosis, ehrlichiosis, epizootic bovine abortion, and tick paralysis
Gotch ear	Uncommon; Gulf Coast area of United States; associated with *Amblyomma maculatum* (Gulf Coast tick) attachment to pinna; erythema, swelling, yellowish exudate, crusts, alopecia, and excoriation of pinna; pinnae become thickened, curled, and drooped, and may necrose and slough
Fleas	Uncommon and cosmopolitan; *Ctenocephalides felis strongylus*; brown in color; 2 to 4 mm in length; especially summer and fall; variable degrees of pruritus and papulocrustous dermatitis; especially trunk and legs; heavy infestations in calves and debilitated animals may cause anemia and even death
Tunga penetrans infestation ("sand flea" and tungiasis)	Rare to common in semitropical and tropical climates (South and Central America, Africa, India, and Italy); mainly sandy soils and dry weather; proliferative and ulcerative lesions, especially feet, teats, and prepuce; intense pruritus and pain; obstruction of teat canal can lead to decreased milk production, mastitis, and resultant loss of condition and death of calves; chronic foot involvement may result in hoof deformities; economic losses associated with anorexia, lameness, weight loss, decreased reproductive indices, and culling; dermatohistopathology
Biting flies (Fig. 1.3-41)	Uncommon to common and cosmopolitan; *Haematobia irritans* ("horn fly"), *Stomoxys calcitrans* ("stable fly"), *Simulium* spp. ("black fly"), and *Tabanus* spp. ("horse fly"); spring, summer, and fall; painful/pruritic papules, wheals, and plaques with central crusts and bleeding; especially legs, head, pinnae, abdomen, shoulders, and back
Louse flies ("forest flies") (Fig. 1.3-42)	Uncommon; *Hippobosca equina* (cosmopolitan), *H. maculata* (Africa and South America), and *H. rufipes* (Africa); 4 to 7 mm in length; especially summer; tend to cluster and suck blood in perineum and groin; source of irritation and fly-worry
Hypodermiasis ("cattle grubs") (Figs. 1.3-43 through 1.3-45)	Common in many parts of the Northern Hemisphere (North America, Europe, Africa, and Asia); even where clinical disease prevalence is rare, seroprevalence is often high; younger cattle more frequently and more severely affected; *Hypoderma bovis* and *H. lineatum*; swarms of adult flies ("heel flies" and "gad flies") cause annoyance, fright, and stampeding ("gadding"), often resulting in self-injury, and decreased feed consumption and milk production; larval-associated asymptomatic-to-painful subcutaneous nodules and cysts ("warbles") over back from shoulders to tail head in spring; lesions develop central pore that exudes yellowish serum in which larvae may be seen (about 25 mm in length); carcass and hide depreciation; occasional esophageal, spinal cord, toxic, or anaphylactic complications associated with larvae
Hydrotaea irritans flies ("head fly")	Common; Europe and Australia; especially summer; swarming flies initiate head shaking, rubbing, and scratching; excoriations progress to nonhealing ulcers and black crusts ("brown head" and "black cap"); possible secondary bacterial infections and myiasis
Dermatobia hominis infestation	Uncommon; Central and South America; painful subcutaneous nodules with a central pore containing third-stage larvae (about 20 mm in length)
Calliphorine myiasis ("maggots," "flystrike," and "blowfly strike") (Fig. 1.3-46)	Common and cosmopolitan; especially *Lucilia* spp., *Calliphora* spp., *Phaenicia* spp., and *Phormia* spp.; especially late spring, summer, and early fall; any wounded or damaged skin; foul-smelling ulcers with scalloped margins and a "honeycombed" appearance, teeming with larvae ("maggots"); usually painful and pruritic
Screw-worm myiasis	Uncommon; Central and South America (*Cochliomyia hominivorax* [*Callitroga americana*]), and Africa and Asia (*Chrysomyia bezziana* [*C. megacephala*]); especially late spring, summer, and early fall; any wounded or damaged skin (e.g., from branding, castration, or dehorning); foul-smelling ulcers with scalloped margins and a "honeycombed" appearance, teeming with larvae; painful and pruritic; humans are also susceptible (e.g., skin, genitalia, ears, and sinuses)
Parafilariasis (Figs. 1.3-47 and 1.3-48)	Uncommon; Africa, Asia, and Europe; *Parafilaria bovicola* (adults, 30 to 70 mm in length, in subcutaneous nodules); various *Musca* spp. serve as vectors or intermediate hosts; especially spring and summer; one to several painful 1 to 5 cm diameter subcutaneous nodules that discharge a bloody exudate that streaks and mats surrounding hair; especially neck, shoulder, and trunk, and occasionally udder and teats; exudate contains larvae and 0.2 mm thin-shelled and embryonated eggs; substantial economic losses due to trimming of carcasses and downgrading of hides; in some endemic areas, disease prevalence can be greater than 50%
Onchocerciasis	Uncommon; *Onchocerca gutturosa* produces asymptomatic, firm, subcutaneous nodules over shoulder, hip, and stifle (North America, Europe, Africa, and Australia; *Simulium* spp. and *Culicoides* spp. are intermediate hosts); *O. gibsoni* produces asymptomatic, firm, subcutaneous nodules over brisket, hip, and stifle (Africa, Asia, and Australia; *Culicoides* spp. are intermediate hosts); *O. ochengi* produces asymptomatic, firm, dermal and subcutaneous papules and nodules over scrotum, udder, flanks, and head (Africa; *Simulium* spp. are intermediate hosts); a number of *Onchocerca* spp. (especially *O. gutturosa* and *O. lienalis*) microfilariae may be associated with teat lesions (papules, plaques, and ulcers); dermatohistopathology

Table 1.3-1 (Continued)

Strongyloidosis	Rare and cosmopolitan; no breed, age, and sex predilections; *Strongyloides papillosus*; pruritic dermatitis of feet, legs, and ventrum; fecal flotation
Pelodera dermatitis ("rhabditic dermatitis") (Figs. 1.3-49 and 1.3-50)	Rare and mostly North America; no breed, age, or sex predilections; *Pelodera (Rhabditis) strongyloides*; crowded, moist, filthy environment; up to 25% of cattle in a herd affected; variably pruritic dermatitis of feet, legs, ventrum, udder, and teats; nematode larvae are 0.4 to 0.8 mm in length; skin scrapings and dermatohistopathology
Rhabditic otitis externa	Uncommon; Africa; *Rhabditis bovis* from contaminated soil; no breed, age, or sex predilections; painful, putrid otitis externa with brownish-to-yellowish purulent discharge; 0.3 to 0.6 mm in length larvae in otic discharge
Hookworm dermatitis	Rare and cosmopolitan; no breed, age, or sex predilections; *Bunostomum phlebotomum*; pruritic dermatitis of feet, legs, and ventrum; fecal flotation
Stephanofilariasis (Fig. 1.3-51)	Uncommon; *Stephanofilaria dedoesi* produces a papulocrustous dermatitis ("cascado") over the face, neck, and brisket (Indonesia); *S. kaeli* produces a papulocrustous dermatitis ("filarial" or "Krian sore") over the pinnae and distal limbs (Malaysia); *S. assamensis* produces a papulocrustous dermatitis ("hump sore") over the shoulders, neck, pinnae, and distal limbs (India and Russia): *S. okinawaensis* produces a papulocrustous dermatitis over the muzzle and teats (Japan); dermatohistopathology

Figure 1.3-36 Trombiculosis. Erythema and crusts on face.

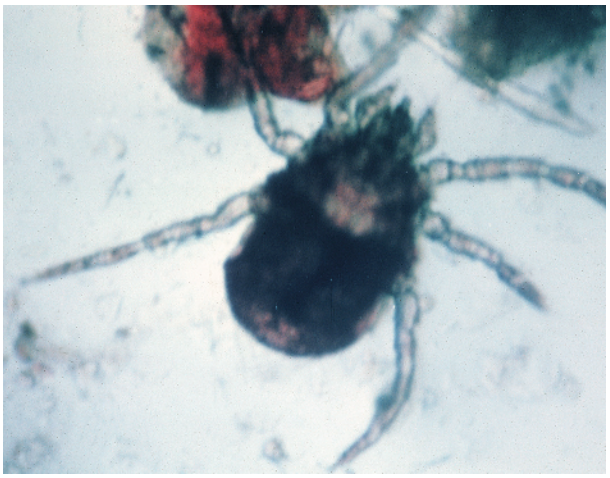

Figure 1.3-37 Trombiculosis. *E. alfreddugesi* in skin scraping.

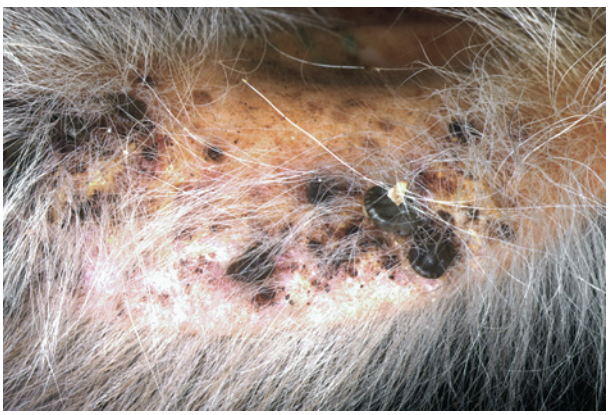

Figure 1.3-38 Ticks. Engorged *Boophilus* ticks and areas of erythema and crusting. *Source*: Courtesy of J. Gourreau.

Figure 1.3-39 Ticks. Multiple engorged *Boophilus* ticks. *Source*: Courtesy of J. Gourreau.

Figure 1.3-40 Ticks. Multiple engorged ticks and areas of erythema and hemorrhage (sites of previous tick attachment). *Source*: Courtesy of J. MacDonald.

Figure 1.3-41 Biting flies. Erythematous periorbital papules and plaques. *Source*: Courtesy of J. Gourreau.

Figure 1.3-42 Louse flies. *Hippobosca equina* on perineum. *Source*: Courtesy of J. Gourreau.

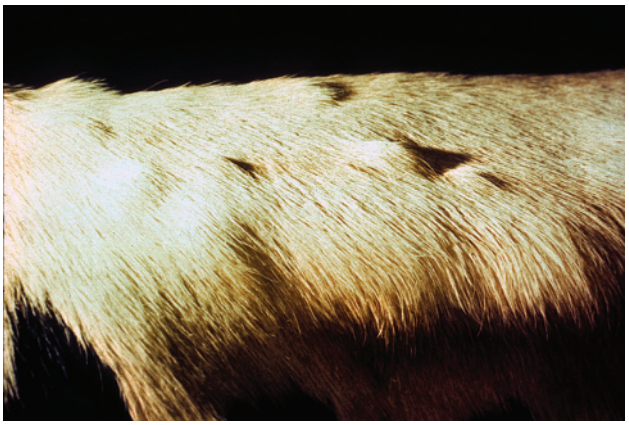

Figure 1.3-43 Hypodermiasis. Multiple subcutaneous nodules over back.

Figure 1.3-44 Hypodermiasis. Multiple nodules with pores and visible larvae (area has been clipped).

Figure 1.3-45 Hypodermiasis. Multiple nodules with pores. One larva has been extracted (area has been clipped).

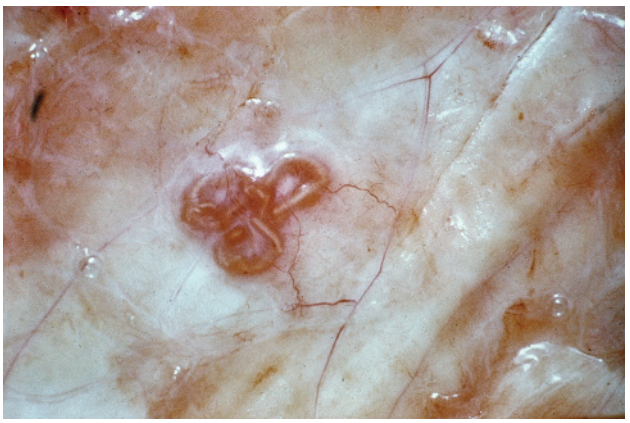

Figure 1.3-48 Parafilariasis. Adult nematode in subcutis. *Source*: Courtesy of P. Bland.

Figure 1.3-46 Calliphorine myiasis. Ulceration and hemorrhagic exudate on foot. *Source*: Courtesy of J. Gourreau.

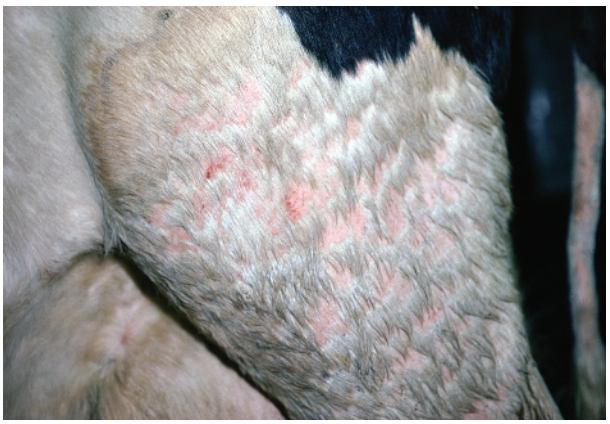

Figure 1.3-49 *Pelodera* dermatitis. Annular areas of alopecia and erythema on lateral thigh.

Figure 1.3-47 Parafilariasis. Multiple bleeding sores over lateral neck, shoulder, and thorax. *Source*: Courtesy of P. Bland.

Figure 1.3-50 *Pelodera* dermatitis. *P. strongyloides* in a skin scraping.

Figure 1.3-51 Stephanofilariasis. Erythema, crusts, and alopecia on pastern due to *S. assamensis*. *Source*: Courtesy of A. Chatterjee.

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