



Viral and Protozoal Skin Diseases

Pseudocowpox
 Bovine Papular Stomatitis
 Herpes Mammillitis
 Malignant Catarrhal Fever
 Bovine Viral Diarrhea
 Infectious Bovine Rhinotracheitis
 Vesicular Stomatitis
 Foot-and-Mouth Disease
 Lumpy Skin Disease
 Besnoitiosis
 Miscellaneous Viral and Protozoal Diseases
 Bluetongue
 Bovine Ephemeral Fever
 Bovine Spongiform Encephalopathy
 Cowpox
 Herpes Mammary Pustular Dermatitis
 Jembrana Disease
 Pseudolumpy Skin Disease
 Pseudorabies
 Rift Valley Fever
 Rinderpest
 Sarcocystosis
 Theileriosis
 Vaccinia
 Trypanosomiasis

Pseudocowpox

Features

Pseudocowpox is a common, cosmopolitan infectious disease caused by *Parapoxvirus bovis-2*. It is the most common infectious cause of teat lesions. Transmission occurs via contamination of skin abrasions. There are no apparent breed or age predilections, and milking cows and heifers are most commonly affected.

Initial signs include focal areas of erythema and edema, and pain of affected teats. Vesicles are not commonly

seen. Orange papules evolve into dark red crusts. These lesions undergo progressive peripheral enlargement and become umbilicated (Figs. 1.4-1 through 1.4-3). When the central crust falls off, the classical “ring” or “horse-shoe” lesion – pathognomonic for pseudocowpox – is formed. The udder is often affected. The medial thighs, perineum, and scrotum are occasionally involved (Figs. 1.4-4 and 1.4-5). Typically, 5 to 10% of the animals in a herd are affected at any given time.

Pseudocowpox is a zoonosis. In humans, the condition is often called “milker’s nodule” or “farmyard pox.” Transmission can be direct, indirect, and even human-to-human. Lesions are often solitary, and they occur



Figure 1.4-1 Pseudocowpox. Umbilicated, crusted papules on teat.



Figure 1.4-2 Pseudocowpox. Umbilicated papules and annular-to-crescentic red crusts on teat.



Figure 1.4-3 Pseudocowpox. Horseshoe-shaped red crust on teat.

most commonly on the fingers, arm, face, and leg (Fig. 1.4-6). Erythematous papules evolve into nodules with a red center, a white middle ring, and a red periphery. The lesions initially have a red, oozing surface, then develop a dry crust through which black dots may be seen. Lastly, the lesions develop a papillomatous surface and a thick crust, then regress. There is variable pain and pruritus.



Figure 1.4-4 Pseudocowpox. Multiple crusted papules between anus and vulva.

Differential Diagnosis

Staphylococcal dermatitis, insect bites, traumatized viral papillomas, herpes mammillitis, and cowpox (Table 1.4-1).

Diagnosis

- 1) Histopathology and electron microscopy: Eosinophilic intracytoplasmic inclusion bodies in epidermal keratinocytes.
- 2) Virus isolation.
- 3) Viral antigen detection.

Bovine Papular Stomatitis

Features

Bovine papular stomatitis is a common, cosmopolitan infectious disease caused by Parapoxvirus bovis-1. Transmission occurs via contamination of skin abrasions. There are no breed or sex predilections, and the disease is seen more commonly in animals less than 1 year of age.



Figure 1.4-5 Pseudocowpox. Multiple crusted and umbilicated papules on scrotum. *Source:* Courtesy of J. Gourreau.



Figure 1.4-6 Pseudocowpox. Umbilicated pustule with erythematous halo ("milker's nodule") on dairyman's finger.

Table 1.4-1 Differential Diagnosis of Bovine Teat and Udder Lesions

Viral

- Bluetongue
- Bovine papular stomatitis
- Bovine viral diarrhea
- Cowpox
- Foot-and-mouth disease
- Herpes mammary pustular dermatitis
- Herpes mammillitis
- Infectious bovine rhinotracheitis
- Lumpy skin disease
- Malignant catarrhal fever
- Pseudocowpox
- Pseudolumpy skin disease
- Rinderpest
- Vaccinia
- Vesicular stomatitis
- Viral papillomatosis

Bacterial

- Bacterial pseudomycetoma
- Dermatophilosis
- Impetigo
- Necrobacillosis
- Nodular thelitis

Fungal

- Dermatophytosis

Parasitic

- Chorioptic mange
- Insect bites
- Onchocerciasis
- Pelodera* dermatitis
- Sarcoptic mange
- Stephanofilariasis
- Trombiculosis

Protozoal

- Besnoitiosis

Miscellaneous

- Black pox
- Burns
- Chapping
- Contact dermatitis
- Dermatitis, pyrexia, and hemorrhage syndrome
- Frostbite
- Intertrigo
- Neoplasms
- Photodermatitis
- Trauma



Figure 1.4-7 Bovine papular stomatitis. Multiple erythematous flat-topped papules and plaques on muzzle.



Figure 1.4-8 Bovine papular stomatitis. Orange papillomatous lesions on lips.

Initial lesions are erythematous macules and papules that may become papillomatous, or may undergo central necrosis and become crusted. Mature lesions vary in color from red to brownish to yellowish-orange. These lesions are most common on the muzzle, nostrils, and lips (Figs. 1.4-7 and 1.4-8). Lesions in the oral cavity may be papular or flat and plaque-like. Occasionally, lesions can be widespread and involve the abdomen, prepuce, scrotum, teats (Fig. 1.4-9), udder, hind legs, and sides. A chronic form of bovine papular stomatitis in calves is characterized by a proliferative and necrotic stomatitis, a generalized necrotic and exudative dermatitis, and marked hyperkeratosis around the mouth, anus, and ventral tail.



Figure 1.4-9 Bovine papular stomatitis. Crusted and umbilicated papules on teats. *Source:* Courtesy of A. Mayr, coll. J. Gourreau, AFSSA.



Figure 1.4-10 Bovine papular stomatitis. Bruised, pustular lesion on finger (lesion has been lanced).

A necrotic dermatitis of the tail of feedlot cattle (“rat-tail syndrome”) has been associated with bovine papular stomatitis. Affected cattle lose the tail switch, leaving an eroded to ulcerated area.

Bovine papular stomatitis is a zoonosis. In humans, the condition is often called “milker’s nodule” or “farmyard pox.” Transmission can be direct, indirect, and even human-to-human. Lesions are often solitary, and they occur most commonly on the fingers, arm, face, and leg (Fig. 1.4-10). Erythematous papules evolve into nodules

with a red center, a white middle ring, and a red periphery. The lesions initially have a red, oozing surface, which then develops a dry crust through which black dots may be seen. Lastly, the lesions develop a papillomatous surface and a thick crust, then regress. There is variable pain and pruritus.

Differential Diagnosis

Bovine viral diarrhoea, bluetongue, malignant catarrhal fever, rinderpest, vesicular stomatitis, and foot-and-mouth disease.

Diagnosis

- 1) Histopathology and electron microscopy: Eosinophilic intracytoplasmic inclusion bodies in epidermal keratinocytes.
- 2) Viral isolation.
- 3) Viral antigen detection.

Herpes Mammillitis

Features

Herpes mammillitis is a cosmopolitan infectious disease caused by bovine herpesvirus-2. Transmission occurs via contact and insect vectors. This disease occurs in lactating cattle, and heifers tend to be more severely affected. It is most common in summer and fall.

Most cattle show no signs of systemic illness. Lesions may be confined to one teat, or involve all teats. Disease is typically sudden in onset, with swollen, tender teats. Irregularly shaped vesicles may be seen (Fig. 1.4-11), but usually sloughing and ulceration of the lesions are noted. Serum oozing and thick dark red-to-brown crusting follow (Fig. 1.4-12). The severity of lesions varies: from (1) lines of erythema, often in circles, which enclose dry skin or papules with occasional ulceration; to (2) annular red-to-blue plaques that evolve into ulcers, 0.5 to 2 cm in diameter; to (3) large areas of bluish discoloration, necrosis, slough, ulceration, and serum exudation. These lesions are painful, and cows often kick at milking machines or their operators. Lesions may extend to the udder (Fig. 1.4-13), perineum, and vulva. Occasionally, lesions occur on the muzzle and in the oral cavity of nursing calves.

Morbidity varies from 18 to 96%, but mortality is rare. However, economic losses can be severe as a result of decreased milk production and an increased incidence of mastitis.



Figure 1.4-11 Herpes mammillitis. Irregularly shaped vesicles on teat.

Differential Diagnosis

Trauma, photodermatitis, bluetongue, malignant catarrhal fever, foot-and-mouth disease, vesicular stomatitis, cowpox, and pseudocowpox.

Diagnosis

- 1) Virus isolation.
- 2) Viral antigen detection.

Malignant Catarrhal Fever

Features

Malignant catarrhal fever (“malignant head catarrh,” “bovine malignant catarrh,” and “snotsiekte”) is an



Figure 1.4-12 Herpes mammillitis. Crusted ulcers on teat.



Figure 1.4-13 Herpes mammillitis. Linear areas of necrosis, ulceration, and crust on udder.



Figure 1.4-14 Malignant catarrhal fever. Erythema, necrosis, and ulcers on muzzle.

uncommon, cosmopolitan, highly fatal, pansystemic infectious disease. There are two forms of the disease: (1) wildebeest-associated (alcelaphine herpesvirus-1) in Africa, and (2) sheep-associated (ovine herpesvirus-2) worldwide. Details of transmission are incomplete. There are no apparent breed, age, or sex predilections.

Initial clinical signs include fever, nasal discharge, anorexia, and severe depression. Bilateral photophobia, excessive lacrimation, and conjunctivitis develop into severe panophthalmitis and corneal opacity. The muzzle is crusted and burnt in appearance (Fig. 1.4-14) and may become necrotic, cracked, and slough. Similar lesions occasionally occur on the udder, teats (Fig. 1.4-15), vulva, and scrotum. There is a copious nasal discharge that is frequently fetid. The mucosa of the nasal septum becomes fiery red, then purple, and may necrose. The oral mucosa is hyperemic, and the hard palate and tongue develop punched-out ulcers.

Erythematous-to-purplish macules and papules ooze, crust, and may become superficially necrotic and slough. These lesions are most easily seen in the axillae, groin, perineum, coronets, and interdigital spaces (Fig. 1.4-16). In haired skin – especially the ears, trunk, face, and neck – these lesions are covered by characteristically tufted hairs that epilate, leaving heavily crusted areas (Figs. 1.4-17 through 1.4-19). Occasionally, the hooves may slough. Rarely, a generalized exudative and crusting dermatitis, resembling dermatophilosis, is seen in the absence of systemic signs.

Most animals have neurologic signs, such as stupor, head jerking, and periods of extreme irritability and mania.



Figure 1.4-15 Malignant catarrhal fever. Erythema, necrosis, and crusting on teats.



Figure 1.4-16 Malignant catarrhal fever. Coronitis.



Figure 1.4-17 Malignant catarrhal fever. Tufted hairs and thick crusts on face.



Figure 1.4-18 Malignant catarrhal fever. Thick crusts periorcularly.



Figure 1.4-19 Malignant catarrhal fever. Erythema and crusting on pinna.

Differential Diagnosis

Bovine viral diarrhea, infectious bovine rhinotracheitis, rinderpest, and bluetongue.

Diagnosis

- 1) Necropsy examination.
- 2) Viral isolation.
- 3) Viral antigen detection.

Bovine Viral Diarrhea

Features

Bovine viral diarrhea is a cosmopolitan, infectious disease caused by a *Pestivirus*. Transmission occurs via direct and indirect contact. There are no apparent breed, age, or sex predilections.

Acute infections are characterized by fever, diarrhea, cough, nasal and ocular discharges, and erosions and ulcers of the oral cavity. Chronic infections (“mucosal disease”) are characterized by diarrhea, nasal and ocular discharge, progressive weight loss, necrosis and ulceration of oral mucosa, and erosion and ulceration and crusting of the muzzle (Fig. 1.4-20), lips, nostrils, coronet (Fig. 1.4-21), interdigital spaces (Fig. 1.4-22), teats (Fig. 1.4-23), vulva (Fig. 1.4-24), and prepuce. Scales,



Figure 1.4-20 Bovine viral diarrhea. Erythema and ulceration of muzzle.



Figure 1.4-21 Bovine viral diarrhea. Coronitis. Source: Courtesy of M. Sloet.

crusts, hyperkeratosis, and alopecia may occur on the neck, medial thighs, and perineum. A generalized crusting dermatitis may occur. *In utero* infections may cause generalized hypotrichosis that may spare the head, tail, and distal legs.



Figure 1.4-22 Bovine viral diarrhea. Interdigital ulceration and crusting. Source: Courtesy of J. Gourreau.

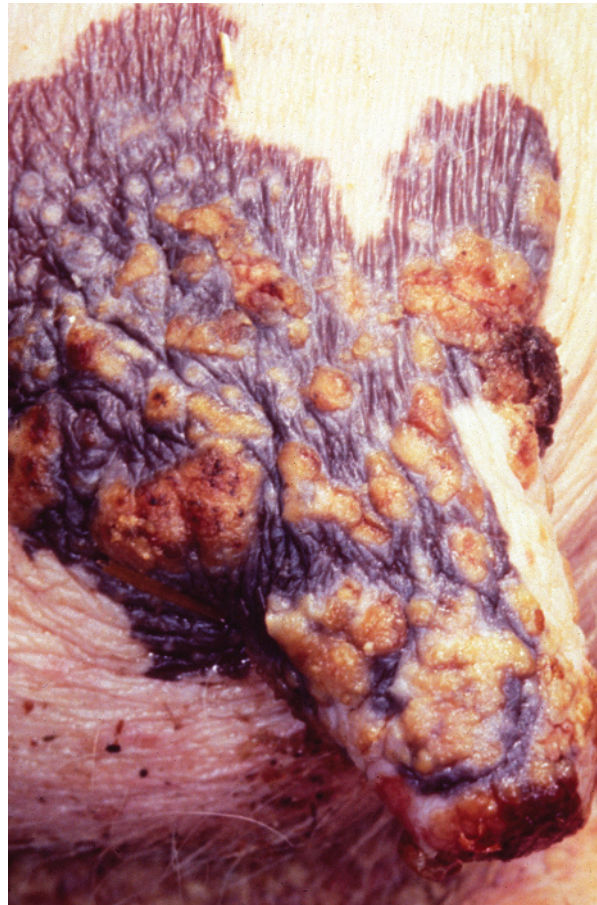


Figure 1.4-23 Bovine viral diarrhea. Ulcers and crusts on teat.

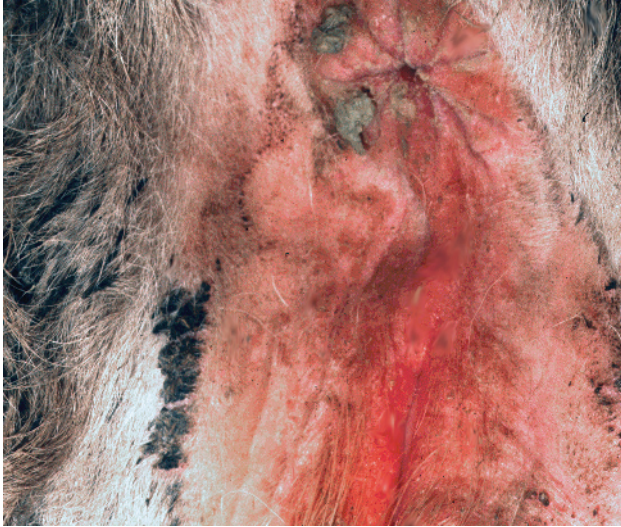


Figure 1.4-24 Bovine viral diarrhea. Erythema and ulceration of vulva. *Source:* Courtesy of J. Gourreau.

Differential Diagnosis

Malignant catarrhal fever, rinderpest, bovine papular stomatitis, infectious bovine rhinotracheitis, bluetongue, vesicular stomatitis, and foot-and-mouth disease.

Diagnosis

- 1) Virus isolation.
- 2) Viral antigen detection.

Infectious Bovine Rhinotracheitis

Features

Infectious bovine rhinotracheitis (IBR) is a cosmopolitan, infectious disease caused by bovine herpesvirus-1. Transmission occurs via aerosol and venereal methods. There are no apparent breed, age, or sex predilections.

Respiratory IBR is characterized by fever, decreased appetite, dyspnea, and erythema and crusting of the muzzle (“red nose”) (Fig. 1.4-25). The muzzle may become necrotic and ulcerated. Conjunctivitis and abortion occur frequently.

Genital IBR (infectious pustular vulvovaginitis [IPV] and infectious pustular balanoposthitis [IPB]) is characterized by pustules and necrotic white plaques on the vulva, vagina, prepuce, and penis. Lesions are often painful. Rarely, pustules, crusts, alopecia, and lichenification are seen on the perineum, udder (Fig. 1.4-26), and scrotum.



Figure 1.4-25 Infectious bovine rhinotracheitis. Erythema and crusts on muzzle. *Source:* Courtesy of J. Gourreau.



Figure 1.4-26 Infectious bovine rhinotracheitis. Erythema and crusts on udder.

Differential Diagnosis

Pasteurellosis, pinkeye (*Moraxella bovis*), necrotic vaginitis from parturition injuries or sadism, irritation from caustic materials, and granular vaginitis.

Diagnosis

- 1) Virus isolation.
- 2) Viral antigen detection.

Vesicular Stomatitis

Features

Vesicular stomatitis is an uncommon infectious disease caused by a *Vesiculovirus*. The disease is enzootic in North, Central, and South America, and is most common between late spring and early fall. Transmission occurs via aerosols and insect vectors (especially simuliids [black flies]). There are no apparent breed, age, or sex predilections.

Vesicles and bullae progress to painful erosions and ulcers. Lesions are often confined to one of three body regions: (1) the muzzle, lips, and oral cavity (Fig. 1.4-27); (2) the teats, udder, and prepuce (Fig. 1.4-28); and (3) the coronets and interdigital spaces (Fig. 1.4-29). Fever, depression, inappetence, and lameness are variable findings. Mastitis is a potential sequela of teat lesions, and hooves may rarely slough. Morbidity varies from 10 to 95%, but mortality is rare.

Vesicular stomatitis is a potential zoonosis. Humans develop influenza-like symptoms and occasionally



Figure 1.4-27 Vesicular stomatitis. Ulcers on lips. *Source:* Courtesy of J. Gourreau.

mucocutaneous vesicles and erosions. Swine, sheep, goats, and horses are also affected.

Differential Diagnosis

Foot-and-mouth disease is clinically indistinguishable from vesicular stomatitis. Other differentials include bovine viral diarrhea, rinderpest, malignant catarrhal fever, bluetongue, and bovine papular stomatitis.

Diagnosis

- 1) Virus isolation.
- 2) Viral antigen detection.



Figure 1.4-28 Vesicular stomatitis. Ulcers and crusts on teats. *Source:* Courtesy of J. Gourreau.



Figure 1.4-29 Vesicular stomatitis. Ulceration of coronet and interdigital space. *Source:* Courtesy of J. Gourreau.

Foot-and-Mouth Disease

Features

Foot-and-mouth disease (“aphthous fever”; Greek: painful vesicles and ulcers in mouth) is a highly contagious infectious disease of cattle, sheep, goats, and swine caused by an *Aphthovirus* with seven principal serotypes: A, O, C, South African Territories (SAT) 1, SAT 2, SAT 3, and Asia 1. It is the most dreaded of cattle diseases. The disease is endemic in Africa, Asia, and South America, and sporadic in Europe. Transmission occurs via aerosol, contact, insect vectors, and fomites. There are no breed, age, or sex predilections.

Fever, depression, and inappetence are usually the first signs of infection. As vesicle formations begin, hypersalivation and nasal discharge are evident, and cattle may exhibit lip smacking, a classic early sign. Lameness becomes obvious. Vesicles and bullae (up to 10 cm in diameter) develop into painful erosions and ulcers. Lesions are most commonly seen on the muzzle, nostrils, lips, oral mucosa, teats, coronets, and interdigital spaces and heels of the feet (Fig. 1.4-30 through 1.4-32). Pregnant animals may abort. In severe cases, the hooves may detach or severe laminitis may be followed by deformed hooves.

Morbidity varies from 50 to 100%, and mortality is usually low (less than 5%), although occasional outbreaks are characterized by over 50% mortality. Economic losses can be devastating: quarantine, slaughter, embargoes, and loss of trade. Foot-and-mouth disease is the number-one foreign animal disease threat in the United States, and the most significant disease affecting free trade in animals and animal products internationally. Humans may rarely develop vesicles on the hands and/or in the mouth (Fig. 1.4-33).



Figure 1.4-30 Foot-and-mouth disease. Ulcers on oral mucosa. Source: Courtesy of L. Dhennin, coll. J. Gourreau, AFSSA.



Figure 1.4-31 Foot-and-mouth disease. Ulcers on tongue. Source: Courtesy of L. Dhennin, coll. J. Gourreau, AFSSA.



Figure 1.4-32 Foot-and-mouth disease. Ulceration of teat.



Figure 1.4-33 Foot-and-mouth disease. Ruptured vesicle on finger of a human. Source: Courtesy of J. Gourreau.

Differential Diagnosis

Vesicular stomatitis is clinically indistinguishable from foot-and-mouth disease. Other differentials include bovine viral diarrhea, rinderpest, malignant catarrhal fever, bluetongue, and bovine papular stomatitis.

Diagnosis

- 1) Virus isolation: Vesicular fluid, epithelial lesions, and heparinized blood.
- 2) Viral antigen detection.
- 3) Serology: Clotted blood.

Lumpy Skin Disease

Features

Lumpy skin disease (“knopvelsiekte”) is a chronic infectious disease caused by a *Capripoxvirus* (“neethling virus”). Transmission occurs via insect vectors (especially *Stomoxys calcitrans*). There are no apparent breed, age, or sex predilections. Severe, generalized, lumpy skin disease–like lesions have occurred in dairy cattle vaccinated with a sheeppox virus strain meant to prevent the naturally occurring disease.

Initial clinical signs include fever, anorexia, ocular discharge, nasal discharge, hypersalivation, and lymphadenopathy. Firm papules and nodules (0.5 to 5 cm in diameter) are initially recognized as erect tufts of hair. Lesions are often confined to the head, neck, legs, perineum, teats, udder, scrotum, and tail, but may be generalized (Fig. 1.4-34). Some lesions ooze and ulcerate (Figs. 1.4-35 through 1.4-37); others only develop a dry crust. Larger lesions undergo necrosis, wherein a “moat” develops around them and separates them from surrounding normal skin. These so-called “sitfasts” then slough, leaving crateriform ulcers – often full skin thickness – which heal by scar (Fig. 1.4-38).

Edema is evident in the legs (sometimes swollen to 3 to 4 times their normal size), dewlap, brisket, and



Figure 1.4-34 Lumpy skin disease. Generalized tufted papules and nodules. Source: Courtesy of H. Meyer, coll. J. Gourreau, AFSSA.



Figure 1.4-35 Lumpy skin disease. Ulcerated nodules on face. Source: Courtesy of H. Meyer, coll. J. Gourreau, AFSSA.



Figure 1.4-36 Lumpy skin disease. Small papules and ulcerated nodules on muzzle. Source: Courtesy of H. Meyer, coll. J. Gourreau, AFSSA.



Figure 1.4-37 Lumpy skin disease. Ulcerated nodules on teat. Source: Courtesy of J. Gourreau.



Figure 1.4-38 Lumpy skin disease. Full-thickness ulcer on leg. Source: Courtesy of D. Thiaucourt, coll. J. Gourreau, AFSSA.

genitalia. Severely swollen limbs may develop areas of necrosis, sloughing, and ulceration, leading to secondary bacterial infection and/or myiasis. Yellowish-white papules and nodules that slough, leaving erosions and ulcers, occur in the nasal and oral mucosae. Weight loss, reduced milk production, and abortion occur. Hide damage can be extensive, and teat lesions may lead to mastitis. Morbidity varies from 5 to 80%, but mortality rarely exceeds 3%.

Differential Diagnosis

Pseudolumpy skin disease.

Diagnosis

- 1) Necropsy examination.
- 2) Dermatohistopathology: Eosinophilic intracytoplasmic inclusion bodies in epidermal keratinocytes.
- 3) Virus isolation.
- 4) Viral antigen.



Figure 1.4-39 Besnoitiosis. Edema, erythema, crusting, and alopecia of distal leg. Source: Courtesy of M. Franc, coll. J. Gourreau, AFSSA.

Besnoitiosis

Features

Besnoitiosis (“globidiosis”) is an uncommon to common, protozoal disease caused by *Besnoitia besnoiti*. Transmission occurs by ingestion (vegetation contaminated with cat or vole feces containing oocysts) or by biting arthropods and insects (bradyzoites). The disease is most common in summer, and the risk is greater in animals on pasture. Besnoitiosis occurs in Africa, Asia, and parts of Europe and South America. There are no apparent breed or sex predilections, and animals 2 to 4 years of age are most commonly affected.

Initial clinical signs include fever, depression, anorexia, photophobia, epiphora, nasal discharge, and reluctance to move. Hair is seen standing on end, especially on the perineum, pinnae, and face, and the underlying skin is hot and painful. Marked edema then develops, especially on the head, legs, udder (Fig. 1.4-39), and scrotum (Fig. 1.4-40). Edematous skin is hot and painful, and it



Figure 1.4-40 Besnoitiosis. Edema, thickening, and folding of scrotal skin. *Source:* Courtesy of M. Franc, coll. J. Gourreau, AFSSA.



Figure 1.4-41 Besnoitiosis. Alopecia, crusting, thickening, and folding of skin over face and neck. *Source:* Courtesy of P. Bland.



Figure 1.4-42 Besnoitiosis. Small, white parasitic cysts on sclera (arrow). *Source:* Courtesy of M. Franc, coll. J. Gourreau, AFSSA.

loses its elasticity. Peripheral lymphadenopathy is pronounced. Edema gradually recedes, but the skin becomes thick, folded and wrinkled (“elephantiasis”), alopecic, and hyperkeratotic (Fig. 1.4-41). The skin over limb joints becomes fissured and secondarily infected. Small (1 mm in diameter), shiny, white parasitic cysts occur in the conjunctival (Fig. 1.4-42) and genital mucosa, and are virtually pathognomonic. In males, a painful orchitis is usually present. Weight loss is progressive.

Typically, multiple animals are affected. In enzootic areas, prevalence of infected animals may approach 10%. Economic losses are heavy because of emaciation, decreased fertility, carcass condemnation, and death.

Diagnosis

- 1) Physical examination: Parasitic cysts in conjunctiva.
- 2) Microscopy (direct smear of scraped conjunctival cysts): Numerous crescent- or banana-shaped bradyzoites (2 to 7 μm in length by 1 to 2 μm in width).
- 3) Dermatohistopathology: Parasitic cysts (up to 800 μm in diameter) containing numerous crescentic or banana-shaped bradyzoites (2 to 7 μm long).
- 4) Antigen detection.
- 5) Serology (enzyme-linked immunosorbent assay [ELISA]).

Miscellaneous Viral and Protozoal Diseases

Table 1.4-2 Miscellaneous Viral and Protozoal Diseases

Bluetongue (<i>Orbivirus</i>) (Figs. 1.4-43 through 1.4-46)	Uncommon; cosmopolitan; <i>Culicoides</i> spp. vectors; erythema, edema, necrosis, ulcerations, and crusts; especially muzzle (“burnt muzzle”), oral cavity, coronets, udder, and teats; rarely hooves slough; fever, nasal discharge, hypersalivation, and lameness; viral isolation, viral antigen detection, and serology
Bovine ephemeral fever (<i>Ephemerovirus</i>)	Uncommon; Africa, Asia, Australia, and Middle East; especially summer; mosquito and midge (especially <i>Culicoides</i> spp.) vectors; edema (especially head) and subcutaneous emphysema (especially back); fever, lameness, anorexia, depression, hypersalivation, nasal and ocular discharge, abortion, and decreased milk production; viral isolation and serology
Bovine spongiform encephalopathy (“mad cow disease”)	Rare; widespread; prion protein; licking, wrinkling nose, and head rubbing; neurological disorders; brain histopathology and various immunohistochemical and Western blot procedures
Cowpox (<i>Orthopoxvirus</i>)	Rare; Europe and Middle East; field mice and vole reservoirs, and cats infected; an identical syndrome was produced by <i>Vaccinia</i> virus; fever and tender teats are followed by the typical sequence of pox lesions on the teats and udder; the classic thick, red crust (1 to 2 cm in diameter) is said to be pathognomonic; in severe cases, lesions occur on the medial thighs, perineum, vulva, scrotum, and mouth of nursing calves; zoonosis (skin lesions in humans identical to those produced by pseudocowpox); virus isolation and viral antigen detection
Herpes mammary pustular dermatitis (bovine herpesvirus-4)	Rare; United States; lactating cattle; vesicles and pustules on the lateral and ventral aspects of the udder; viral isolation and viral antigen detection
Jembrana disease (<i>Lentivirus</i>)	Uncommon; Indonesia; blood oozes from skin (“blood sweating”); fever, anorexia, oculonasal discharge, oral erosions, diarrhea, and lymphadenopathy; serology
Leishmaniosis	Very rare; Switzerland; <i>Leishmania</i> sp.; ulcers and plaques 1–10 cm in diameter; muzzle, legs, base of ears, udder, and thorax; dermatohistopathology
Pseudolumpy skin disease (bovine herpesvirus-2 [“Allerton virus”]) (Figs. 1.4-47 through 1.4-49)	Uncommon; cosmopolitan; sudden appearance of firm, round, raised papules and nodules that develop a characteristic flat surface and slightly depressed center; superficial sloughing and alopecia occur – without scarring; lesions are usually widespread, especially on the head, neck, back, and perineum; nursing calves may develop ulcers of the muzzle and oral cavity; virus isolation
Pseudorabies (“Aujeszky’s disease” and “mad itch”) (porcine herpesvirus-1) (Figs. 1.4-50 and 1.4-51)	Uncommon; cosmopolitan; animals bite, lick, scratch, and rub, producing self-mutilation; especially flanks, hindquarters, anus, vulva, face, and neck; fever, depression, hypersalivation, anorexia, bellowing, and convulsing; necropsy examination and viral isolation
Rift Valley fever (<i>Phlebovirus</i>)	Uncommon; Africa; mosquito vectors; coronitis and dry, thick skin on unpigmented areas of teats, udder, and scrotum; fever, stomatitis, diarrhea, lameness, and abortion; humans: influenza-like disease, and occasional fatal encephalitis and hemorrhagic fever; viral isolation and serology
Rinderpest (“cattle plague”) (<i>Morbillivirus</i>) (Figs. 1.4-52 and 1.4-53)	Uncommon; Africa and Asia; gray-white necrotic foci that slough and ulcerate in oral cavity and on lips, and nasal, vulvar, and prepuccial mucosae with fetid smell; fever, depression, anorexia, nasal and ocular discharge, and diarrhea; rarely, a skin form (pustules and crusts on neck, withers, medial thighs, and scrotum) with mild systemic signs; viral isolation and viral antigen detection
Sarcocystosis (Fig. 1.4-54)	Common; cosmopolitan; <i>Sarcocystis cruzi</i> ; loss of tail switch (“rat tail”); may develop alopecia of pinnae, neck, rump, and distal limbs; fever, anorexia, hypersalivation, lameness, anemia, and abortion; necropsy examination
Theileriosis	Uncommon; Africa and Mediterranean; tick vectors; <i>Theileria parva</i> (“East Coast fever”) may be associated with papules and nodules over neck and trunk; fever, lymphadenopathy, oculonasal discharge, dyspnea, and wasting; <i>T. annulata</i> (“Mediterranean Coast fever”) may be associated with wheals or papules that begin on face, neck, and shoulders, and then generalize; pruritus may be intense; fever, lymphadenopathy, and wasting; <i>T. lawrencei</i> associated with edema of eyelids, face, and throat; fever, lymphadenopathy, and oculonasal discharge; histopathology of lymph nodes (schizonts), and serology
Trypanosomiasis	Uncommon; Africa; <i>Trypanosoma congolense</i> ; papules on neck, chest, and flanks; fever, apathy, anemia, lymphadenopathy, and wasting; blood smears (trypanosomes) and serology
<i>Vaccinia</i>	Reported in Brazil; origin of the virus is still debated (both native and small pox vaccine-derived origins are proposed); painful reddish or whitish vesicles and papules, and crusts on the teats and udders of dairy cows; pox lesions on the fingers, hands, and arms of in-contact humans; viral isolation and viral antigen detection



Figure 1.4-43 Bluetongue. Erythema and necrosis of muzzle.
Source: Courtesy of J. Gourreau.



Figure 1.4-46 Bluetongue. Erythema, necrosis, ulceration, and crusting of teats.



Figure 1.4-44 Bluetongue. Necrosis and sloughing of muzzle skin.
Source: Courtesy of A. Weaver, coll. J. Gourreau, AFSSA.



Figure 1.4-47 Pseudolumpy skin disease. Tufted crusts (arrow) in perineal area.



Figure 1.4-45 Bluetongue. Coronitis.



Figure 1.4-48 Pseudolumpy skin disease. Multiple areas of superficial necrosis (arrow) and sloughing on neck and shoulder.



Figure 1.4-49 Pseudolumpy skin disease. Large area of necrosis, slough, and ulceration on leg.



Figure 1.4-51 Pseudorabies. Linear area of erythema and excoriation produced by frenzied licking. *Source:* Courtesy of M. Sloet.



Figure 1.4-50 Pseudorabies. Frenzied, focal, unilateral licking. *Source:* Courtesy of M. Sloet.



Figure 1.4-52 Rinderpest. Necrosis and ulceration of oral mucosa. *Source:* Courtesy of J. Gourreau.



Figure 1.4-53 Rinderpest. Erythema and crusting of perineum and ventral tail. Source: Courtesy of J. Gourreau.



Figure 1.4-54 Sarcocystosis. Loss of tail switch ("rat tail").

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