Article

Distribution of lameness lesions in beef cattle: A retrospective analysis of 745 cases

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Abstract — The objective of this retrospective study was to characterize the relative prevalence of diagnoses and location of lameness lesions in beef cattle. Medical records from 2005 to 2012 were reviewed and 745 cases of beef cattle that had presented for lameness were identified. Information regarding signalment, lesion location, and cause of lameness was analyzed. The cause of lameness was localized to the foot in approximately 85% of cases; a hind limb was affected over 70% of the time. The lateral claw was most commonly affected in cases of both fore- and hind-limb lameness. The most common diagnoses of noninfectious etiology were screw claw, vertical fissure, and interdigital fibroma. Infectious foot disease accounted for only 20% of foot lameness. Routine foot trimming may be warranted in some herds to improve weight-bearing balance and alleviate lameness.

Résumé — Répartition des lésions de boiterie chez les bovins de boucherie : analyse rétrospective de 745 cas. L'objectif de cette étude rétrospective était de déterminer la prévalence relative des différentes lésions à l'origine d'une boiterie chez des bovins de boucherie admis dans un hôpital universitaire vétérinaire. Les dossiers médicaux datant de 2005 à 2012 ont été examinés et 745 cas de boiterie ont été identifiés. Les renseignements concernant le signalement, la localisation de la lésion et l'origine de la boiterie ont été analysés. La boiterie a été attribuée à une pathologie du pied dans approximativement 85 % des cas. Dans de tels cas, un membre postérieur était affecté dans 70 % des cas. L'onglon latéral était le plus souvent affecté qu'il s'agisse d'une boiterie d'un membre antérieur ou postérieur. Les lésions d'origine non infectieuse les plus souvent identifiées étaient une concavité de la muraille (pied enroulé ou pied chinois), une fissure verticale et une hyperplasie interdigitale. Les lésions d'origine infectieuse représentaient seulement 20 % des cas de boiterie liés à une lésion du pied. Un parage fonctionnel régulier est probablement nécessaire dans certains troupeaux de bovins de boucherie afin d'améliorer la répartition des charges entre les onglons et l'incidence des boiteries.

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Introduction

The estimated prevalence of lameness in cattle ranges from 1.1% to 54.8% (1–4). The wide range of reported prevalence reflects differences in a number of factors including housing, nutrition, seasonality, environment, method of determining lameness, and the purpose of the cattle (beef *versus* dairy). Lameness events are frequently under-recorded or underestimated by producers (5). The study of lameness in cattle has often focused on dairy animals as they are more frequently at risk of lameness events due to differences in management factors such as being housed on concrete more frequently and consuming a diet higher in fermentable carbohydrates. However, in 1 study, lameness accounted for 1 of the top 3 expenditures for veterinary services related to episodes of disease in 57 California beef herds (6). The prevalence of lameness in beef animals at packing plants was 26.6% in cows and 36.3% in bulls (7).

Diseases of the foot are the cause of approximately 90% of all lameness cases in dairy cattle and 70% of cases in feedlots (8). Diseases of the foot are often classified as infectious or noninfectious based on their etiology. Interdigital phlegmon (foot rot) is the most important infectious lesion of the foot; papillomatous digital dermatitis (hairy heel warts) and heel erosion are also examples of infectious foot disease. Noninfectious claw disease occurs most commonly subsequent to laminitis. Examples of noninfectious claw disease include screw claw (corkscrew claw), sole hemorrhage, abscesses, ulcers, vertical fissures, and false (double) sole. Interdigital hyperplasia is a firm, fibrous mass that develops sporadically in the interdigital space of the feet of cattle and may also cause lameness, particularly when ulcerated or infected. Traumatic injuries resulting in lameness are not uncommon and include pedal bone fractures and foreign body penetration; such injuries often predispose the patient to the development of septic arthritis or septic tenosynovitis.

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As a source of important economic loss and a primary cause of reduced animal welfare in both beef and dairy herds, lameness is of crucial concern to bovine herd health. Reproductive efficiency is significantly reduced by lameness events in both cows and bulls in cow-calf operations due to decreased breeding activity. Lame cows have decreased ovulation rates, conception rates, overall pregnancy rates; less intense estrus; and a higher incidence of cystic ovarian disease (9,10). Severe lesions may be the source of extreme pain and discomfort while walking and lame cattle have a decreased lifespan due to premature culling. Despite the importance of bovine lameness, there is a paucity of published data characterizing the distribution and relative prevalence of various lesions causing lameness in beef cattle outside of the feedlot. Thus, our aim was to describe the relative prevalence of lesions and affected sites in lame beef cattle from cow-calf operations presenting to a veterinary teaching hospital.

Materials and methods

The records of all bovine cases presenting to the Auburn University Large Animal Teaching Hospital (AULATH) from August 1, 2005 to July 31, 2012 were examined for beef cattle associated with a complaint of lameness, or a request for a foot trim at the time of admission, or had a final diagnosis of lameness. The beef cattle caseload seen at the AULATH consists primarily of cattle from commercial cow-calf operations. Stocker cattle, seedstock cattle, and show cattle are also seen, albeit less frequently. The average cow-calf operation in the area consists of approximately 30 brood cows. Most herds are primarily based on *Bos taurus* bloodlines, frequently Angus, Simmental, Hereford, or Charolais, although *Bos indicus* influence is not uncommon. Seasonal calving occurs primarily in the fall, with weaning following in the summer or early fall, although spring calving herds are present as well. Perennial and cool-season forages form the basis of most nutritional plans with supplemental feeding practiced most commonly in the winter. Mineral supplements are commonly provided free choice. The bovine clinic at the AULATH functions most often as a primary care facility, although secondary care is also provided. Hoof trimming is not routinely practiced by most producers. Most cases of lameness are managed through consultation with a veterinarian or culling, depending on severity of the lameness and value of the animal. However, uncomplicated cases of foot rot may be treated on-farm.

In order to ensure identification of all relevant cases, the complete list of final lameness diagnoses, as listed in the records software, included in the search comprised: lameness non-specific, foot lameness, abscess-sole, abscess toe, ulcer-sole, false sole, sole bruise, laminitis, fibroma interdigital, white line disease, heel erosion, pedal osteitis, arthritis, septic coffin joint, septic arthritis, screw claw, dermatitis-digital, papillomatous digital dermatitis, foot rot, luxation, hip luxation, luxation coxofemoral, stifle injury, cranial cruciate injury-stifle, tenosynovitis, tenosynovitis-septic, vertical fissure of hoof, sequestrum-bone, osteochondrosis, OCD, trauma, fracture, fracture MC3, fracture MT3, fracture-phalanx-first, fracture-phalanx-second, fracture-phalanx third, fracture-radius, fracture-tibia, fracture-humerus, fracture-femur, nerve injury-radial, nerve injury-sciatic, nerve injury-peroneal, nerve paralysis, nerve injury-obturator, nerve damage, spastic paresis, spastic syndrome, and Elso heel. Data obtained from the medical records included signalment (breed, age, and gender), presenting complaint and final diagnosis. When available, the affected limb (forelimb or hind limb), site of the lesion (e.g., foot, tarsus, stifle), and if applicable, the claw affected (medial or lateral) were also recorded. For statistical comparisons, a Student's *t*-test was used to compare means between groups and a Chi-square test was used to compare distributions between groups; *P*-values < 0.05 were considered significant for all tests.

Table 1. Sites and relative distribution of lesions causing lameness in 606 cattle presented to a university teaching hospital over a 7-year period for which a site of lameness was identified. The sum of the individual sites exceeds the total as lesions were located in multiple sites in 5 animals

Site of lesion	Number of cases	Percent	Average age (y)	Most common diagnoses
Foot	513	84.7	5.0	Screw claw, Vertical fissure, Interdigital fibroma, Sole disease
Stifle	20	3.3	5.2	Cranial cruciate ligament rupture
Tarsus	17	2.8	3.6	Osteochondrosis/ Physitis
Pastern	12	2.0	4.5	Septic arthritis/ Tenosynovitis
Shoulder	10	1.7	2.5	Trauma
Metatarsus/ Metacarpus	9	1.5	2.9	Fracture
Carpus	9	1.5	3.2	Osteochondrosis/ Fracture
Upper limb	8	1.3	1.8	Fracture
Hip	7	1.2	2.5	Coxofemoral luxation
Fetlock	3	0.5	2.7	Physitis
Spine	3	0.5	6.5	Trauma
Total	606	100.0	4.8	

Results

A total of 745 cases (327 adult females, 266 adult males, 46 yearlings, 8 calves, 98 of unrecorded signalment) fit the inclusion criteria. Of the 745 cases, 287 (38.5%) presented for a hoof trim and 458 (61.5%) presented for a complaint of non-specific lameness. Patient signalment was available in 647 cases; 270/287 hoof trims (94.1%) and 377/458 (82.3%) lameness cases. The ages of patients included in the study ranged from 1 wk to 15 y with a mean age of 4.74 y. The age range was similar for the patients presenting for a hoof trim (9 mo to 15 y) and those animals presenting for a complaint of lameness (1 wk to 14 y). The mean ages of animals in the hoof trim and lameness groups were significantly different ($P = 0.02$) at 5.04 y and 4.54 y, respectively. The gender distribution between groups was also significantly different ($P < 0.001$) with 84/270 (31.1%) hoof trims being males and 212/377 (56.2%) lameness cases being males. Breed distribution was similar between groups

Table 2. Etiologies and distribution of lesions in 513 cases of foot lameness in beef cattle presented to a university teaching hospital over a 7-year period. Sums of the individual categories exceed the totals as multiple lesions were present in some animals; percentage values reflect the proportion of cases affected by a given etiology. Lesion location was not available for all cases; percentage values reflect the proportion of cases for which lesion location was known

Etiology	Cases		Limb affected			Claw affected					
						Forelimb			Hind limb		
Lesion	Number	Percent	Forelimb (%)	Hind limb (%)	Both (%)	Medial	Lateral	Both	Medial	Lateral	Both
Non-infectious											
Screw claw	133	25.6	12 (9.8)	105 (86.1)	5 (4.1)	10	2	0	1	104	0
Vertical fissure	109	21.2	56 (52.8)	47 (44.3)	3 (2.8)	17	32	5	2	32	7
Interdigital fibroma	81	15.8	8 (11.9)	49 (73.1)	10 (14.9)		INTERDIGITAL SPACE			INTERDIGITAL SPACE	
Sole ulcer	73	14.2	7 (11.9)	51 (86.4)	1 (1.7)	3	4	0	2	49	0
Abscess	57	11.1	23 (52.3)	20 (45.5)	1 (2.3)	8	15	0	2	18	0
False sole	35	6.8	9 (27.3)	24 (72.7)	0 (0.0)	3	6	0	2	19	2
White line disease	19	3.7	5 (31.3)	9 (56.3)	2 (12.5)	2	3	0	0	8	1
Laminitis	19	3.7	2 (22.2)	5 (55.6)	2 (22.2)	1	0	1	0	4	0
Trauma	6	1.2	2 (40.0)	3 (60.0)	0 (0.0)		N/A			N/A	
Fracture of P3	3	0.6	1 (50.0)	1 (50.0)	0 (0.0)	0	1	0	0	1	0
Non-specific	31	6.0	2 (20.0)	7 (70.0)	1 (10.0)		N/A			N/A	
Infectious											
Digital dermatitis	31	6.0	1 (5.0)	18 (90.0)	1 (1.0)		HEEL			HEEL	
Heel erosion	30	5.8	3 (11.5)	21 (80.8)	2 (7.7)	1	1	0	0	15	4
Sepsis of deep structures	22	4.3	4 (20.0)	16 (80.0)	0 (0.0)	2	1	0	2	14	0
Foot rot	22	4.3	5 (29.4)	12 (70.6)	0 (0.0)		INTERDIGITAL SPACE			INTERDIGITAL SPACE	
Total	513	100	114 (27.1)	290 (68.9)	17 (4.0)	31	56	9	9	145	12

N/A — Not available.

and reflective of the overall bovine population presenting to the hospital during the study period. Angus (41.8%) and Brangus (20.6%) were the most commonly represented breeds; other breeds represented in the study included Simmental (6.8%), Hereford (6.0%), Charolais (5.4%), Brahman (2.3%), and Beefmaster (1.5%) and crossbred commercial cattle (14.4%). Eleven breeds comprised the remaining 1.2% of cases for which breed information was available.

Of the 287 animals presenting for a hoof trim, 100 had no abnormalities noted at diagnosis; for cattle presenting lame, a diagnosis of non-specific lameness was made in 21 cases; an unspecified fracture, traumatic event, bone sequestrum or arthritis was diagnosed in 8, 7, 2 and 1 cases, respectively. Thus, the site of lameness was identified in 606/645 cases. In 5 cases, lesions were found at multiple sites: 4 cases of osteochondrosis involved both the tarsus and carpus and 1 case had lesions affecting the foot in addition to osteochondrosis of the tarsus. Lesions of the foot were responsible for lameness in 84.7% (513/606) of cases. Lesions of the stifle (3.3%), tarsus (3.0%), pastern (2.0%) and shoulder (1.7%) were the most common sited for lesions causing lameness outside of the foot (Table 1).

Foot lameness due to hind-limb lesions (68.9%) was more than twice as common as lameness due to lesions of the forelimbs (27.0%); in 4.0% of lame animals, lesions were found in both the fore- and hind limbs. For cases in which the affected claw was identified in the hind limb, 157/166 (94.6%) cases occurred in the weight-bearing (lateral) claw; the weight-bearing (medial) claw was affected in only 40/96 (41.7%) cases of forelimb lameness. Cases of foot lameness were most commonly due to noninfectious causes. Of 513 cases, 408 (79.5%) were classified as having a noninfectious etiology, 71 (13.8%) an infectious etiology and 34 (6.6%) as having both an infectious and a noninfectious etiology.

Screw claw was the most common cause of foot lameness and occurred most frequently in the lateral claw of the hindlimb (Table 2). Cases of screw claw were often complicated by vertical fissure (23/133), sole ulcer (23/133), and interdigital fibroma (11/133). Vertical fissures were also a common cause of lameness, occurring with similar frequency in the fore- and hind limbs. For cases in which the affected claw was identified, only 17/54 (31.5%) cases in the forelimb occurred in the primary weight-bearing claw as opposed to 32/41 (78.0%) cases in the hind limb. Vertical fissures of the axial claw surface comprised 84.8% of cases; fissures were diagnosed on the abaxial surface (6.5%) or the dorsal wall (6.5%) less commonly. In 1 case, vertical fissures were diagnosed on both the axial and abaxial surfaces. Interdigital fibromas were the third most common diagnosis in cases of foot lameness, occurring in the hind limb alone in 73.1% of cases, the forelimb alone in 11.9% of cases and in both the fore- and hind limbs in 14.9% of cases. Sole ulcers were diagnosed in 14.2% of cases of foot lameness. Nearly a third (31.5%) of these cases were associated with a diagnosis of screw claw. Of the 57 cases diagnosed with an abscess, the lesion was localized to the sole in 67.3% of cases and the toe in 26.5% of cases; the white line (4.1%) and heel (2.0%) were less common sites of abscessation. In addition to the 2 cases of white line abscessation, white line disease was observed in 17 cases of foot lameness. In only 2 cases was white line disease the sole diagnosis; it was more commonly associated with a diagnosis of screw claw, abscessation, and vertical fissure of the hoof. Laminitis was diagnosed in 19/513 (3.7%) cases of foot lameness. Lameness as a result of trauma was not observed commonly

and most commonly resulted from lacerations, penetration of foreign bodies, and/or fracture of the third phalanx.

The most common infectious cause of lameness localized to the foot in this study was papillomatous digital dermatitis (PDD), diagnosed in 6.0% of cases (n = 31). Lesions of PDD were located in the hind feet in 90% of cases that identified the affected limb, 5% in the front feet, and in both the front and hind feet in 5% of cases. Heel erosion was seen in 16.1% (5/31) of cases of PDD and was the second most commonly diagnosed cause of lameness of infectious etiology. Cases of heel erosion were seen most often in conjunction with other lesions, most commonly sole ulceration, false sole, and PDD. Sepsis of the deep structures of the foot, chiefly the coffin joint, was the cause of lameness in 22/513 (4.3%) cases and represented 21.0% of the cases of lameness due to an infectious etiology. Sepsis of deep structures of the hind foot accounted for 80.0% of the diagnoses of septic foot infections. Foot rot was also diagnosed with greater frequency (70.6%) in the hind feet compared to the front feet and accounted for 22/513 cases of foot lameness.

Fractures and traumatic injury were the greatest reason for lameness outside the foot. Trauma resulted in 33 cases of lameness, most commonly due to damage to the shoulder (n = 6), tarsus (n = 5), or carpus (n = 4). A simple diagnosis of trauma was also made for 6 cases of foot lameness. In 8 of the 26 cases in which a fracture was diagnosed the site of the fracture was not identified; 7 cases involved the long bones of the leg, most commonly the radius. For the 15 cases of fracture for which signalment information was available, the median age at presentation was 2 y. Unexpectedly, only 20% of those cases were found in calves $<$ 1 year of age; in all 3 cases, the fracture involved a long bone (humerus, radius, or femur). Only 3 fractures were identified in animals $>$ 3 years of age, 2 cases of phalangeal fracture and 1 case of chip fractures in the fetlock joint. Metacarpal and metatarsal fractures (n = 6) were nearly as common as long bone fractures; phalangeal fractures (n = 5) were most commonly diagnosed in the third phalanx (n = 3). Trauma was also the main cause of lameness associated with the stifle; cranial cruciate ligament rupture was diagnosed in 13/20 (65%) cases of stifle disease. Osteochondrosis was the primary non-traumatic cause for lameness not involving the foot. Osteochondrosis accounted for 10/18 (55.6%) cases of lameness involving the tarsus and 4/9 (44.4%) lameness cases involving the carpus.

Discussion

To our knowledge, this study is the first to characterize the different types and locations of lameness in beef cattle outside of feedlot studies. There are numerous reports that describe lameness lesions in dairy cattle; however, lameness in beef cattle, particularly outside of the feedlot, is poorly characterized. In this study, most cases were seen on a primary care basis and thus are typical of what may be seen by clinic owners and ambulatory practitioners. A previous research abstract from Auburn University indicated that the most common lesions resulting in lameness in beef and dairy cattle presenting to the Large Animal Clinic from 2000 to 2001 were, in decreasing order: hoof overgrowth, PDD, subsolar abscess, screw claw, sole ulcer, interdigital fibroma, and interdigital dermatitis (11). However, neither the relative number of cases nor the lesion distribution was described in the preliminary report although the lesions listed all occur in the foot. A more recent study assessed the prevalence of claw and limb disorders in Norwegian beef-cow herds (1). Although the overall prevalence of lameness in that study was low (1.1%), nearly 30% of animals had lesions of the claw and limb detected during routine foot trimming, with most lesions being localized to the foot. In this study, lesions of the foot were the cause of lameness in 84.7% of cases, which is similar to what is seen in dairy cattle (8).

Noninfectious causes of lameness predominated in this study, accounting for 82.2% of all diagnoses; an additional 5.6% of cases had lameness due to mixed infectious and noninfectious etiologies. Noninfectious disease was the cause of lameness in 79.5% of cases affecting the foot and in 96.0% of cases in which the lesion was located outside the foot. Screw claw, vertical fissures of the hoof, and interdigital fibromas were the most common noninfectious etiologies of foot lameness, followed by sole ulcers and abscesses, false sole, white line disease, and laminitis. A report of 274 lameness cases at Auburn University between August 1, 2000 and July 31, 2001 reported that hoof overgrowth and subsolar abscesses were the most common causes of lameness; screw claw, sole ulceration, interdigital fibroma, and interdigital phlegmon were reported less commonly (11). The reason for the differences in relative lesion prevalence is not clear. In contrast to the current study, the previous report included cases of lameness in both beef and dairy cattle, which may have been responsible for at least part of the differences seen. Alternatively, the changes in relative prevalence may reflect an increasing incidence or awareness of screw claw and interdigital fibromas.

The predominance of screw claw, vertical fissures of the hoof, and interdigital fibromas in this study also contrasts with published reports in dairy cattle where white line disease and sole disease are the most common causes of lameness (12–14). Sole injury and white line disease are often associated with subclinical laminitis, which is considered the most important claw disease of dairy cattle (15,16). Nutrition is one of the primary underlying causes of laminitis, particularly the consumption of high-concentrate diets, which are more common in lactating dairy herds than in beef cattle. In this study, laminitis was diagnosed in only 19 cases. Laminitis in cattle may be of the acute, subacute, or chronic form; as the records evaluated in this study were completed by various clinicians over the course of the study, the criteria for a diagnosis of laminitis was not clear. However, it is clear that subclinical laminitis is a significant cause of claw lesions in beef cattle as well as dairy cattle. Subclinical laminitis often results in white line disease and other changes to the hoof horn and may or may not result in lameness. In a study of beef herds in Europe, lesions associated with laminitis were the most common reason for abnormal hoof growth, although the lesions found in that study were generally mild and rarely resulted in clinical lameness (1). The reason that so few cattle were diagnosed with laminitis in this study may be due to the fact that the subacute form of the disease predominates in cattle and results in other definitive changes to the hoof. It is highly likely that many of the diagnoses of false sole, white

line disease, and sole ulceration occurred in cattle subsequent to previous episodes of subclinical laminitis.

Relatively few cases of infectious disease compared to noninfectious disease were diagnosed in this study; PDD was the most common infectious cause of lameness identified. Commonly treated without veterinary intervention, the low prevalence of PDD in this study is likely a reflection of the study population, namely hospital cases. Historically, PDD has been diagnosed primarily in dairy cattle. A study of 815 culled dairy and beef cattle conducted at an abattoir in the southeastern United States reported a prevalence of 29% in dairy cattle compared to only 4% in beef cattle (17). However, the prevalence in beef cattle is believed to be on the increase (18). In the abattoir study, detection of a PDD lesion was significantly associated with gender in beef cattle, with lesions found in bulls more commonly than cows (17). In this study, 31 cases of digital dermatitis were identified in beef cattle, 5 in bulls, 15 in cows, and 11 in cases for which the gender of the patient was not available. Foot rot, which is considered the most prevalent and costly cause of foot disease in cow-calf herds (6,19), was not commonly diagnosed. The relative prevalence of foot rot is likely underestimated in this study as over-the-counter antibiotics labeled for the treatment of foot rot are commercially available and widely used by producers. Consequently, many cases of foot rot are treated on the farm and not examined by a veterinarian unless resolution of the lameness is not seen after initial treatment.

Weight distribution between the medial and lateral claws of the hind feet is unequal, with the lateral claw bearing more weight. The proportion of force borne by the lateral claw may be as high as 80% in some cattle with only 20% of weight distributed to the medial claw (20). While this imbalance may be improved with proper foot trimming, most of the weight is still borne by the outer claw. Weight distribution between claws of the front feet tends to be more even, although the medial claw bears more weight, in general, than the lateral claw (16). This uneven weight distribution is reflected in this study in the relative prevalence of claw lesions resulting in hind-limb lameness. Most of the lesions (68.9%) were found in the hind feet; of these, when only 1 claw was affected, the lateral claw was the source of the lesion more than 16 times as often as the medial claw. Over half of the hind-limb lameness cases with lesions in the medial claw also had lesions in the lateral claw. The disparity in claw lesion distribution was most pronounced for cases of screw claw with greater than 99% of cases in the hind limbs affecting the lateral claw. For no disease process was the number of medial claws affected greater than the number of lateral claws. Interestingly, in cases of forelimb lameness, the described lesion was also most often located in the lateral claw. In 96 cases of forelimb foot lameness for which information was available, 58.3% were a result of lesions found only in the lateral claw; 32.3% were a result of lesions found only in the medial claw; and both claws were diseased in 9.4% of cases. Redistribution and balancing of weight-bearing, particularly of the hind limbs, is the basis of functional claw trimming (16). While this study does not allow for speculation as to the effect of routine trimming on the incidence of lameness, the distribution of lesions suggests that many cases of lameness may result from improper weight-bearing balance and would thus benefit from functional claw trimming. However, the economic benefit of the procedure in beef cattle has not been clearly defined and will likely vary among different management systems. Therefore, careful study is needed before such a system is implemented.

In summary, this report describes the relative prevalence and distribution of lesions causing lameness in 745 beef cattle presenting to a university teaching hospital over a 7-year period. Nearly 85% of lameness cases were due to foot lameness with the majority occurring in the hind limb, most often in the lateral claw. The stifle, tarsus, pastern, and shoulder were the most common sites of lameness-causing lesions proximal to the foot. Lameness was more likely to be the result of a noninfectious etiology than an infectious etiology. The most common diagnoses were screw claw, vertical fissure, interdigital fibroma, and sole ulceration and abscessation. Laminitis-associated lesions were seen less commonly in this population than has been previously reported in dairy cattle. Digital dermatitis was the most common infectious etiology diagnosed and may represent an increasing cause of concern for beef producers. Lameness in beef cattle is an important concern from both humane and economic standpoints and the data presented in this report will help the practitioner in the assessment and diagnosis of lameness in beef cattle. CVJ

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