Diseases of goats

Paralleling the upsurge of interest in goat farming is an increasing quest for information on their diseases. The object of this article is to list the diseases recognised by the Animal Health Laboratories (Table 1), to discuss in more detail some of the important ones, and to include exotic diseases that should be kept in mind.

Table 1: A breakdown of the 624 positive diagnoses recorded by the Animal Health Laboratories 1974-1980.

Disease	*Percent*
Gastrointestinal Nematodes	45
Mastitis	7
Nutrition deficiencies	7
Coccidiosis	6
Skin disease	5
Nervous disease	4
Clostridial disease	3
Lungworm	3
Neoplasia	3
Abortion	3
Perinatal death	2
Pasteurella pneumonia	2
Foot disease	1
Fascioliasis	1
Salmonellosis	1
Tuberculosis	1
Facial eczema	1
Miscellaneous	5

Common kid diseases

Dystocia is normally seen only in overfat, under-exercised does.

The starvation-exposure complex however, is an important cause of loss in free range Angora flocks. Their habit of grazing some distance away from the kids results in mismothering and abandonment. To lessen the problem does should kid in small, well sheltered paddocks.

Congenital goitre does appear to be more prevalent in goats than in sheep and consequently can be an important cause of perinatal loss. As a routine, pregnant does grazing *Brassica sp.* should be given supplementary iodine.

Outbreaks of diarrhoea are common in artificially reared kids. Predisposing causes such as draughty housing, fluctuating intake and unsanitary conditions are similar to those affecting calves and lambs. In the young kid enterotoxigenic colibacillosis is the most common infectious disease although rota and corona viruses have been recovered recently from such cases.

Continued overleaf

From 2 weeks of age coccidiosis should be included in the differential diagnosis. Affected kids develop diarrhoea often with blood, have a harsh coat and become illthrifty. From 2 months, depending on management practices, gastrointestinal nematodes must also be considered.

Gastrointestinal nematodes

Gastrointestinal nematode infection is way ahead of all other goat diseases in importance. Three points worth emphasizing are:

- Endoparasites of goats and sheep are interchangeable.
- Many adults are susceptible to infection because goats are slow to develop resistance.
- *Haemonchus contortus* is a significant pathogen especially in the northern half of the North Island.

It is generally accepted, but based on limited data, that the epidemiology of goat parasite infections is comparable to sheep and that anthelmintics behave similarly. More work needs to be done in these areas. In the interim goat farmers should be encouraged to adopt the preventive and integrated control techniques as developed for sheep.

Preventive control is advisable where there is little provision for saving safe pasture. Animals are dosed four times at no more than 28 day intervals from the first of December. The subsequent build-up of larvae on pasture during autumn is minimised. Adults should be included in this programme.

When safe pastures are available, the integrated control approach is preferred. Goats are drenched in early December and moved to safe pasture. This is repeated in early March. A second drench 28 days after each of the above treatments is necessary if weather conditions favour larval survival.

Safe pasture is any pasture grazed only by cattle or non-lactating adult sheep in the previous 3 months.

Anthelmintics used should be effective against lungworm because *Muellerius* can produce severe respiratory disease in goats, contrary to its effect on sheep. Clinically there is progressive weight loss and respiratory distress. When the thorax is opened, the lungs fail to collapse and are palpably firm. Antemortem diagnosis is based on typical clinical symptoms and the presence of *Muellerius* larvae in the faeces.

Clostridial diseases

Enterotoxaemia caused by *Clostridium perfringens* type D epsilon toxin is a common and important disease of goats. Both acute and chronic forms have been described. It is commonly associated with feeding green, lush pasture or animals breaking into feed sheds and engorging themselves with high carbohydrate concentrates.

The acute form affects goats of all ages. Many are found dead while others have a short period of diarrhoea, initially yellow-green changing to mucohaemorrhagic before death. The chronic form is only recognised in adult goats and is hard to diagnose. There are intermittent bouts of diarrhoea with depression and fluctuating appetite. Response to antitoxin administration is diagnostic.

Control is by vaccination but protection is not total. Four ml of toxoid is given to does 2 weeks before kidding followed by treatment of kids at 4 and 8 weeks and then annually.

Although the other clostridial infections are less common, annual protection by pre-kidding vaccination is advisable.

Nervous disease

Encephalitic listeriosis primarily affects adult goats during winter. Contributing factors are undernutrition and silage feeding. Symptoms consist of unilateral facial nerve paralysis, constant circling, torticollis and recumbency.

Polioencephalomalacia is another common nervous disease and is often associated with grain feeding. Affected animals range in age from 2 months to 2½ years and clinical signs begin with excitement and head elevation followed by blindness, opisthotonus, extensor rigidity and nystagmus. Response to thiamine injections is dramatic during the early stages. The differential diagnosis should include lead poisoning.

Sources of lead include paint, sump oil, batteries and linoleum. In addition to nervous signs there is a gradual weight loss, often with diarrhoea.

Enzootic ataxia, caused by copper deficiency has been recorded in goats world wide, including New Zealand. The symptoms of hind limb ataxia are first noted from 1 to 4 months and progress to complete paralysis. Histological confirmation by spinal cord examination is necessary as this disease is difficult to differentiate from viral leucoencephalomyelitis.

Viral leucoencephalomyelitis is a nervous disease of 1 to 6-month-old kids caused by a retrovirus. It has been diagnosed recently in New Zealand along with Australia and the U.S.A. Clinically it is characterised by an afebrile, ascending paralysis. The same virus causes an arthritic syndrome in mature goats characterised by progressive lameness with swelling of one or more joints and general wasting. It is refractory to antibiotic therapy. Preliminary studies suggest milk and colostrum are the major modes of transmission.

Mycoplasmosis

The role of *Mycoplasma sp.* in goat diseases is complex but undoubtedly they are an important group of pathogens. Some like *M. arginini* are commensals on mucous surfaces. Others produce local infections not preceded by a systemic phase e.g. keratoconjunctivitis caused by *M. conjunctivae.* Generalised infections however, account for most of the *Mycoplasma* disease syndromes recognised. *M. mycoides* subsp *mycoides* has been recovered in New Zealand and Australia from young goats suffering an acute febrile disease characterised by respiratory distress and lameness. The gross lesions consist of pneumonia, serositis and a productive polyarthritis. The goat strain appears apathogenic for cattle. Other *Mycoplasma sp.* as yet unrecognised in New Zealand but capable of producing similar disease syndromes are: *M. mycoides* subsp *capri, M. agalactiae* and *M. capricolum.* Consequently *Mycoplasma sp.* should be considered when examining a young goat suffering from respiratory distress and/or polyarthritis.

Infectious vulvovaginitis

Recently in the Waikato a herpes virus similar to but distinct from infectious bovine rhinotracheitis was isolated from the vaginas of Saanen does affected with vulvovaginitis.

The outbreak occurred during the mating period and was characterised by an acute necrotising vulvovaginitis with straining. The disease spread rapidly through the herd but resolution was rapid.

Causes of abortion

Non infectious causes are the most important. Losses in some Angora flocks within South Africa and Texas have been substantial. There are two clinical entities:

- The expulsion of a fresh foetus by an undersized Angora doe between day 90-110 is a common sequel to nutritional and environmental stress. Such stress induces a period of maternal hypoglycaemia which is believed to activate the foetal hypothalamo-pituitary-adrenal axis resulting in abortion.
- In contrast, well grown Angoras may expel a grossly oedematous and autolysed foetus habitually. It is believed such does have a genetically determined chronically hyperactive adrenal cortex that produces an environment unfit for foetal growth. These goats should be culled.

Infectious causes of abortion are numerous but outbreaks are uncommon. *Toxoplasma gondii* and *Campylobacter foetus* have only rarely been associated with abortions overseas. Important, exotic abortifacients include *Chlamydia* (the cause of enzootic ewe abortion), *Coxiella burnetti* (Q fever) and *Brucella melitensis* (contagious abortion).

Metabolic disease

Ketosis is a prepartum disease of Angoras but will affect dairy does both sides of parturition. It commonly follows nutritional stress in late pregnancy. Clinical signs, diagnosis and treatment are as for other ruminants.

Hypocalcaemia is a mild and relatively uncommon disease of goats. It occurs around parturition and the only symptoms usually noted are a wobbly gait and constipation. Does should receive a low calcium intake during the last 3 weeks of pregnancy i.e. avoid lucerne hay and any calcium supplemented meal. Treatment with calcium borogluconate is effective.

Hypomagnesaemia has seldom been reported.

Mastitis

Dairy goat mastitis has the same range of predisposing causes, aetiologies and clinical signs as the disease in dairy cows. *Staphylococcus aureus* is the most common pathogen followed by *Streptococcal sp.* and *Escherichia coli.* The five point plan of mastitis control as practised in the dairy cow industry is also applicable to the dairy goat industry. Remember though that normal goat milk has a 60 percent higher cell count than cows milk which influences the interpretation of the rapid mastitis test. Also remember that goats appreciate a regular milking routine and anything that upsets this can result in poor milk let down and udder injuries from fighting.

Foot diseases

Goats do not tolerate sore feet at all well and hence the productivity of affected animals is

noticeably decreased. This is mainly a problem where goats are run intensively on wet land. Hooves become overgrown from lack of wear while persistent dampness predisposes to foot infections. The conditions seen in decreasing order of prevalence are interdigital dermatitis (scald), foot rot and foot abscess. They can be controlled satisfactorily if hooves are trimmed regularly, the goats are walked through a formalin or copper sulphate foot bath weekly and wet areas such as gateways and tracks are filled in or drained.

Caseous lymphadenitis

This is the scourge of the U.S.A. goat industry but has not become a problem in New Zealand. Swollen, abscessed lymph nodes should always be cultured. Commonly the parotid, prescapular, subinguinal and popliteal nodes are affected but visceral nodes may also abscess – a common cause of emaciation. Affected animals must be isolated and the dairy shed, shearing shed etc rigorously cleaned and disinfected.

Johne's disease

Despite widespread infection in sheep and cattle the disease has only recently been diagnosed in a New Zealand goat. It is an important cause of chronic wasting in many overseas herds. Diarrhoea is only present during the terminal phase. Post-mortem lesions may be minimal and must be specifically looked for. They include thickened intestinal wall, corded and knotted serosal lymphatics and enlarged mesenteric lymph nodes. In the affected living animal helpful diagnostic aids include the gel diffusion precipitation test on serum and the Ziehl-Neelsen stain on faeces. It is unclear if *Mycobacterium johnei* can be transmitted naturally from other ruminants to goats although goats readily become diseased when experimentally challenged by infected cattle material.

Brucellosis

Brucella melitensis, the cause of contagious abortion in goats and Malta fever in man is an exotic disease. *B. abortus* and *B. ovis* are insignificant infections. Goats will seronconvert to *B. abortus* if kept in close contact with infected cattle but abortion is rare. At Wallaceville, titres to *B. abortus* have been detected in only 0.3 percent of sera tested. Experimental infection with *B. ovis* produces a mild, transient epididymitis. The natural disease is rare.

Tuberculosis

Despite the known susceptibility of goats to *Mycobacterium bovis* infection, confirmed cases have been reported infrequently. Over the past 5 years there have been three cases of *M. bovis* and one case of *M. avium* infection in New Zealand. From overseas experience the most useful tuberculin test is a cervical intradermal injection of 0.1 mg-ml bovine P.P.D. read at 72 hours.

Leptospirosis

Six percent of sera so far tested at Wallaceville have been positive to *Leptospira hardjo,* 0.7 percent to *Leptospira copenhageni* and 0.1 percent to *Leptospira pomona.* These results parallel those for sheep. *L. pomona* infection will cause an acute haemolytic crisis with red water in kids but the role of *L. copenhageni* and *L. hardjo* is unknown.

Skin diseases

Ectoparasites of importance include the mites *Demodex, Chorioptes, Sarcoptes* and *Psoroptes* and the lice *Damalinia caprae* and *Linognathus stenopsis.* They all respond well to antiparasitic treatments. Angoras should be dipped annually during the autumn to protect their mohair.

Mycotic dermatitis *(Dermatophilus congolensis)* can produce quite extensive skin lesions in kids kept in damp, muddy surroundings. Systemic antibiotics effectively control the disease.

Contagious ecthyma or scabby mouth infection behaves similarly to the condition in sheep. Yearly vaccination of the kid crop at weaning does control the disease but should only be advised on a known infected property.

By Roger Ellison
Ruakura Animal Health Laboratory

Baxendell, S.A.; Caprine limb and joint conditions. *Post-Graduate Committee in Veterinary Science Refresher Course No. 52 (1980) 369-71*
Guss, S.R. (1977): Management and Diseases of Dairy Goats. *Dairy Goat Journal Pub. Corp., Scottsdale, Arizona*
Lloyd, L.C.: Johne's Disease of Goats. *Post-Graduate Committee in Veterinary Science Refresher Course No. 52 (1980) 269-271*
Scott, A.C.; Luddington, J.; Lucas, M.: *Rota virus in Goats. Veterinary Record (1978) 145*