

PYGMY GOAT POST

NPGAA OFFICIAL NEWSLETTER
AUTUMN 2020 | EDITION 2



THE NATIONAL PYGMY GOAT
ASSOCIATION OF AUSTRALIA INC.



FROM THE PRESIDENT ...

We are already into the second half of our first fiscal year. The bottom line is very encouraging, simply a method of visualising the success of our infant organisation. Thank you to older established breeders that needed a refreshing alternative and thank you for the newbies who have entrusted us with their future as breeders and exhibitors.

Our close collaboration with our USA big sister has seen influential NPGA members add constructive comments and add great articles on our social media page. As an active member of the page I cannot recall a single negative comment or post. I congratulate everyone who has added to the stream and expect the happy, mature discussion to continue without negative interruption.



NPGA USA had to consider registering pygmy kids born from embryo transfer technology. Their system had never been asked to do such a thing, to consider breeding dates and kids born 14 months apart, as well as litters easily exceeding four kids born over 5 days, instead of one day. Challengers to their system that Australian breeders have come to accept as normal, a number of years ago.

But not all has been clear sailing since the last newsletter. For those that do not know already Christine Falconer injured a leg in a fall and has spent some weeks in recovery. Combining Christine's layup with attempting to get literally hundreds of pedigree families up on Premium Breed recording system, has been and continues to be an enormous task. Please be patient while our Registrars complete the pedigrees back to 2013. We also have a unique requirement of the registration format and how the information is displayed on the Animal Pedigree Certificates. Something most non-IT people would think to be a no brainer.

As part of our Charter members are getting their cuties out into the public, into retirement villages and hospitals. Keep up the good work.

NPGAA is also very proud to have had the first Show in Australia based on performance rather than type. A competition to compare type was thought to not to be fully inclusive at this time in our evolution. To get around this situation and still have a day that was both competitive and entertaining we have devised a competition based primarily around a balance beam used in gymnastics.

The other point was again to be inclusive of the public and encourage further acceptance of the breed to the general public and potential new owners. To assist in the spectacle the local athletes from the YMCA were more than willing to help out and show the pygmies what us humans can do.

It was a very successful day with everyone having fun and wanting to better their animals' performance in the next show, coming up on the schedule. There always is one stand out performer and a cute one at that. (See the Berwick Show photos on page 5)

It is February and the day length is shortening, the signal to does to get themselves ready to conceive. It is only the doe that determines how many kids she will have. The buck has nothing to do with the number of kids per pregnancy. A doe in good condition will allow her hormones to flourish and have multiple kids. A doe not at its optimal age or in poor body condition will also look after her survival and litter size will be reduced. It makes good sense to present your best quality, age, and conditioned does to AI or the buck. Again my pet hate is trash does being used to breed more kids the industry does not need. Be careful not to clog the supply channel.

Our AGM will be in June-July period and we are looking for members to think about nominating to assist us on the board. Everyone has unique talents and can add colour and flair to the future of NPGAA.

Keep your animals close to you and enjoy them as you can. Have a good breeding season full of expectation.

Paul Hamilton

PRESIDENT, NPGAA

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The NPGAA is affiliated with the NPGA.



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Front cover: Narion Farm | Photo credit: NPGA | President Paul Hamilton

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FROM THE COMMITTEE

Welcome to the second edition of the Pygmy Goat Post. We would like to wish everyone a happy and safe Easter. With Coronavirus (COVID-19) starting to affect many of our shows and activities we can only hope that restrictions are short lived and we can get back to normal as soon as possible. The article on Uraolithiasis in Pygmy Goats may be old but we felt the information was still relevant.

SUPPORT FOR MEMBERS

We welcome members to contact us for advice and assistance. We are here to help and are both very experienced in our role as Registrars. We will strive to ensure registry records are completed and updated in the NPGAA data base within fourteen days.

The NPGAA database is the new version of Premium Breed. We are the only Association in Australia to be using this version.

With memberships increasing, we are now asking members to forward their stud registry records of their animals to be processed and updated in the NPGAA Premium Breed data base. Registry forms are on our website www.npgaa.com.au

If you have any questions or need help please do contact us and we look forward to hearing from you



Chris and Karen

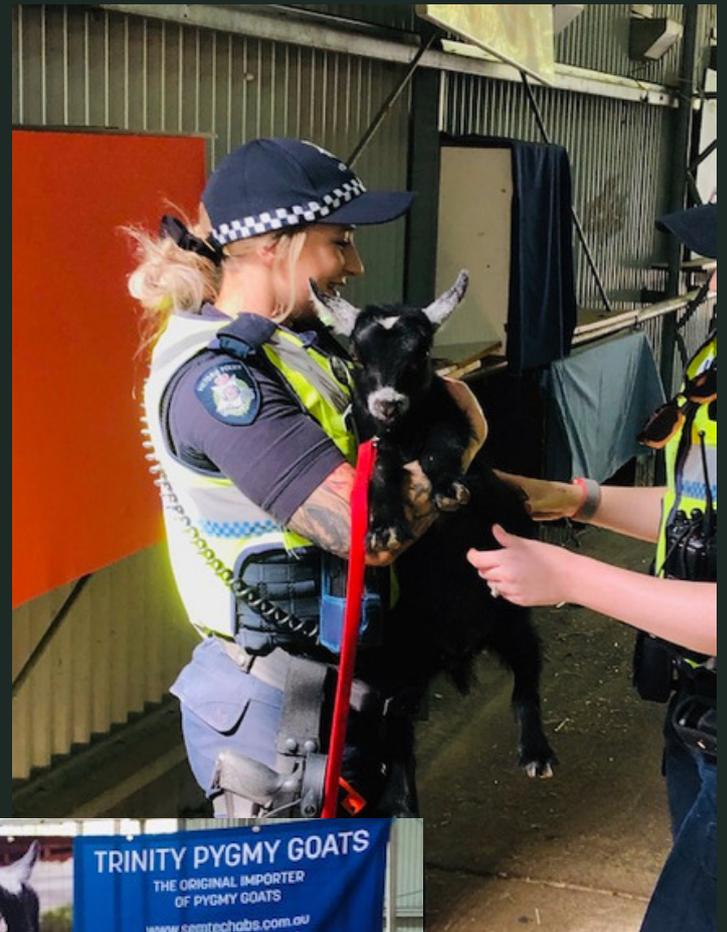
Member Photos

Trevor and Lynne recently visited Peregrin Kindy on the Sunshine Coast. They took along several of their kids to meet the children and share with them information about looking after animals.



Member Photos

The Berwick Show was a big hit with all who attended and the pygmy goats were absolute stars. Below are some photos from the day.





Member Profile

Sharon Parkyn
Windy Ridge Pygmy Goats
Gympie, Qld



I wasn't sure which way to go with this article about how I started out with goats, I could have written so much more about the pet goats I've owned in the past and the mistakes I made with them when I was an uneducated goat owner, but I've decided to just start my story with when I actually started breeding them.

In 2014 I was at a loose end, we had moved onto 25 acres 2 years previously and I had my chickens and vegie garden but there was something missing. I had owned goats before as pets so decided I would look into miniature goats. I contacted a local breeder who gave me a lot of info on the Australian Miniature Goat breed and after going out and meeting these little goats I bought a couple of little does and my love affair with miniature goats began.

After a while the chickens were sold because I lost interest (nothing ever kept my interest for long) and the vegie garden decreased in size and became overgrown, but my goat herd increased.

I swore after reading about bucks that I would never own one I would just send my girls to someone who owned one to be put in kid, but after about a year I caved in and bought my first mini buck.

Continued over page

Member Profile

Sharon Parkyn
Gympie, Qld

I was quite frustrated to find that although he was a stunning buck, he grew quite large as did his offspring and I heard at the time that this can be a common thing with the minis. You never knew what you were going to get and they were still throwing some large sizes more often than I was comfortable with. A foundation breeder said that she and others had always talked about how wonderful it would be if pygmy goats were in Australia and they could cross their minis with them.

I knew about pygmy goats but had only recently learnt that their genetics were in Australia so I started looking around for a buck with some pygmy genetics. I bought a nice 25% pygmy buck and noticed the improvement in the offspring straight away, that first pygmy boy was treated like royalty from the minute he arrived here...I couldn't believe I actually had some pygmy goat genetics for my stud!

After a while I thought, well if a 25% can improve my herd like that what can a higher percentage buck do? So I bought a nice chunky little 62.5% boy, next I upgraded to 2 x 81.25% boys but after an issue with my mental health last year I sold those beautiful boys and most of my best does. I thought I couldn't continue to breed because I like many others suffer from anxiety and depression and it all gets too much for me sometimes. I get quite overwhelmed around kidding time and because my husband works FIFO I don't have any support so I thought it was the best thing to do.

Little did I know how much I would miss breeding, I had kept a few does just to keep as pets but it just wasn't the same and I missed my little bucks terribly. What I thought was going to be best for me and my mental health turned out to be a bad decision, so I spoke to my very understanding husband about getting a couple more bucks and he agreed because he could see I needed something to do and knew how passionate I was about the pygmies.

I contacted Paul and asked him if he possibly had another little buck like the one I sold who stole my heart "Clancy Of The Overflow" and he said that he did indeed have one there but understandably he wanted to make sure I was positive this time, so while he went overseas he gave me time to think. On his return I purchased a little caramel buck Ben Hall and also William McCarty.

The boys came up by road just before Christmas but due to the transport truck breaking down I wasn't able to get them until Boxing Day, so knowing they were stuck in the trailer over Christmas I had a very stressful time but when we picked the boys up we brought them home and made sure they were nice and comfortable with a nice clean shed, fresh water and plenty of fresh hay. They settled in very quickly and they are now both much loved additions to my goatie family.

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Member Profile

Sharon Parkyn
Gympie, Qld

After my setback of selling most of Clancy Of the Overflow's progeny I'm eagerly looking forward to my first offspring from William and Ben which are due in early June. All we can ever hope for as breeders is to keep continuing to improve our herd and with every buck I have purchased my offspring have kept improving.

I haven't bought any high percentage does, I am breeding up by joining my boys with the lower percentage does I have bred. I wanted to keep a bit of the Windy Ridge identity in my goats even though I know things will be a bit hit and miss at times with what I get, I know what the breed standard is and that is what I am striving for. It's taking me longer and sometimes there's disappointment when a doe throws more mini than pygmy but I know the satisfaction I will have when all of my hard work and patience have paid off.

My 9 grandchildren enjoy coming out to see the goats and they often bring their friends, it warms my heart to see the interactions between the goats and children. My 89 year old mother is my biggest fan and she laughs and cries with me over my goats, I have often thought I am way too sensitive to breed these beautiful animals because I stress over them constantly. They are more like my children than just goats. But I'm just trying to take one day at a time and remembering to take the good with the bad, at the end of the day we can only do our best. Yes they can be lots of hard work and at times we have to deal with failure and heartache but in the end it's all worth it to share our homes and our lives with these very special little animals.



Caseous Lymphadenitis of Sheep and Goats

By Kevin Washburn , DVM, Texas A&M University

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Caseous lymphadenitis (CL) is a chronic, contagious bacterial disease that manifests clinically as abscesses of peripheral and/or internal lymph nodes and organs. The characteristic purulent material is very thick and nonodorous. Whereas the peripheral form presents as abscesses of single or multiple peripheral palpable lymph nodes, internal CL typically manifests as chronic weight loss and ill thrift. Culture of active lesions for *Corynebacterium pseudotuberculosis* is diagnostically definitive. When eliminating animals from the herd/flock is undesirable, treatment consists of consistent, sustained antimicrobial therapy to reduce the numbers of active draining lesions and isolation from other herd mates until lesions are dry and/or resolved.

Caseous lymphadenitis (CL) is a chronic, contagious disease caused by the bacterium *Corynebacterium pseudotuberculosis*. Although prevalence of CL varies by region and country, it is found worldwide and is of major concern for small ruminant producers in North America. The disease is characterized by abscess formation in or near major peripheral lymph nodes (external form) or within internal organs and lymph nodes (internal form). Although both the external and internal forms of CL occur in sheep and goats, the external form is more common in goats, and the internal form is more common in sheep.

Economic losses from CL include death, condemnation and trim of infected carcasses, hide and wool loss, loss of sales for breeding animals, and premature culling of affected animals from the herd or flock. Once established on a farm or region (endemic), it is primarily maintained by contamination of the environment with active draining lesions, animals with the internal form of the disease that contaminate the environment through nasal discharge or coughing, the ability of the bacteria to survive harsh environmental conditions, and lack of strict biosecurity necessary to reduce the number and prevent introduction of new cases. Although CL is typically considered a disease of sheep and goats, it also occurs more sporadically in horses, cattle,

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Caseous Lymphadenitis of Sheep and Goats cont...

camelids, swine, wild ruminants, fowl, and people. Because of its zoonotic potential, care should be taken when handling infected animals or purulent exudate from active, draining lesions.

Etiology and Pathogenesis of Caseous Lymphadenitis of Sheep and Goats

C. pseudotuberculosis is a gram-positive, facultative, intracellular coccobacillus. Two biotypes have been identified based on the ability of the bacteria to reduce nitrate: a nitrate-negative group that infects sheep and goats, and a nitrate-positive group that infects horses. Isolates from cattle are a heterogeneous group. All strains produce an exotoxin called phospholipase D that enhances dissemination of the bacteria by damaging endothelial cells and increasing vascular permeability. The bacterium has a second virulence factor, which is an external lipid coat that provides protection from hydrolytic enzymes in host phagocytes. Replication of bacteria occurs in the phagocytes, which then rupture and release bacteria. The ongoing process of bacterial replication, followed by attraction and subsequent death of inflammatory cells, forms the characteristic abscesses associated with CL.

To establish infection, *C. pseudotuberculosis* must penetrate skin or mucous membranes. The most common site of entry is the skin after an injury that may result from shearing, tagging, tail docking, castration, or other environmental hazards resulting in skin trauma. Contact with purulent material draining from open, active lesions most commonly serves as the source of bacteria through these breaches in the skin. Although less common, entry across mucous membranes from inhalation or ingestion of the bacteria also serves as a means of infection. Once the bacteria have entered the body, they move to the lymph nodes via the regional draining lymphatic system.

Internally, the bacteria establish infection not only in the lymph nodes but also in the viscera. The incubation period varies from 1 to 3 months, culminating in development of encapsulated abscesses. *C. pseudotuberculosis* is hardy in the environment and can survive on fomites such as bedding and wood for 2 months and in soil for 8 months. The presence of organic material, shade, and moisture favor and enhance survival.

Clinical Findings of Caseous Lymphadenitis of Sheep and Goats

The hallmark clinical finding in cases of external caseous lymphadenitis is the development of abscesses in the region of peripheral lymph nodes. Common sites of development include the submandibular, parotid, prescapular, and prefemoral nodes. Less commonly, abscessation of supramammary or inguinal lymph nodes occurs, in addition to an occasional ectopic location along the lymphatic chain. If left untreated, these lesions eventually mature into open draining abscesses. The purulent material from these lesions has no odor and varies in consistency from soft and pasty (more common in goats) to thick and caseous (more common in sheep). Once natural draining occurs, the skin lesion heals with scarring.

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Caseous Lymphadenitis of Sheep and Goats cont...

Recurrence is common, which can be months later. CL should be highly suspected in a sheep or goat with abscessation in these regions. Although other bacteria may cause abscessation in these locations (and in other animals), because of the ramifications of the presence of this disease within a herd or flock, these cases should be handled as CL until proved otherwise.

The internal form of CL most commonly presents as chronic weight loss and failure to thrive. The presence of other clinical signs depends on the organs of involvement, which may include any of the major organ systems. Lung abscessation is a common site of visceral involvement in internal CL; therefore, signs of chronic ill thrift with cough, purulent nasal discharge, fever, and tachypnea with increased lung sounds may be noted. The internal form is more common in sheep and has been termed the “thin ewe syndrome.” The incidence of abscesses and development of clinical disease with either the external or internal form increases with age.

Lesions

In sheep, abscesses often have the classically described laminated “onion-ring” appearance in cross section, with concentric fibrous layers separated by inspissated caseous exudate. In goats, the abscesses are less organized, and the exudate may be soft and paste-like.

Diagnosis of Caseous Lymphadenitis of Sheep and Goats

- Physical examination of lesions associated with lymph nodes
- Bacterial culture of suspected lesions
- Serologic testing

The presence of an external abscess on a small ruminant is highly suggestive of caseous lymphadenitis, especially in locations of peripheral lymph nodes. However, definitive diagnosis is only by bacteriologic culture of purulent material from an intact abscess. Although other pyogenic organisms such as *Trueperella pyogenes* (formerly *Arcanobacterium pyogenes*), *Staphylococcus aureus*, *Pasteurella multocida*, and anaerobes such as *Fusobacterium necrophorum* can cause abscessation, affected animals should be kept isolated pending culture results.

Animals with visceral abscesses pose a greater diagnostic challenge. Radiography and ultrasonography can be useful to detect internal lesions. Culture of a transtracheal aspirate obtained from an animal with pneumonia can help determine whether CL is the cause. Excluding other causes of chronic weight loss and ill thrift in the face of proper nutrition and good appetite such as Johne’s disease, parasitism, and poor dentition further raise suspicion.

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Caseous Lymphadenitis of Sheep and Goats cont...

In the absence of accessible abscesses for bacterial culture, definitive diagnosis of active cases of caseous lymphadenitis is challenging. Although many diagnostic tools are available, results of these tests must be interpreted with caution and with consideration of herd or flock history, the presence or absence of active infection within the herd or flock, and vaccination status. A synergistic hemolysin inhibition (SHI) test that detects antibodies to the phospholipase Dexotoxin is available at many diagnostic laboratories. Positive titers indicate past resolved infections, recent exposure, recent vaccination, or active lesions or their development. Titers of 1:256 or higher have been correlated in past studies with the presence of active, developing abscesses; however, in a more recent study, a high titer was poorly correlated with presence or development of abscesses over an 18-month period.

When the status of an animal with a positive titer is in doubt, the titer should be repeated in 2–4 weeks. If the titer is rising and clinical signs of abscesses are noted, then CL can be assumed to be the cause. False-negative results can occur if testing is done in the first 2 weeks after exposure before the animal has seroconverted. Also, animals with chronic, walled-off abscesses can have a false-negative result. Colostrum titers usually disappear by 3–6 months of age, so serologic testing of lambs or kids <6 months old should be interpreted with caution.

Treatment and Control of Caseous Lymphadenitis of Sheep and Goats

Treatment

- Antimicrobial treatment (intralesional and/or systemic)
- Supportive care

Control

- Strict biosecurity measures
- Elimination of diseased animals from the herd/flock
- Vaccination
- Disinfection of shearing equipment and other instruments used for production procedures (castration, ear tagging, etc) between animals
- Removal of hazards in the environment that could potentially injure the skin
- Prepurchase examination for lesions, serologic screening and a period of quarantine before introduction of new animals



Image: Kevin Washburn

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Caseous Lymphadenitis of Sheep and Goats cont...

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Once a diagnosis of caseous lymphadenitis has been established, owner education stressing the persistent, recurrent nature of the disease is necessary. The most practical approach for commercial animals infected with CL is to cull them from the herd or flock. However, animals with draining abscesses should not be sent through sale barns until draining has ceased and the wound has healed. Treatment of individual animals should be undertaken with the understanding that CL is not considered a "curable" disease. Animals with genetic or emotional value are treated mainly for aesthetic reasons and to limit their infectivity to the rest of the herd or flock. Treatment options have included lancing and draining, surgical excision, formalin injection of lesions, systemic antibiotics, and intralesional antibiotics.

If external abscesses are lanced and drained, the cavity should be lavaged with dilute iodine solution and the animal isolated in an area that can be disinfected until the lesion stops draining and heals. Drained purulent material should be carefully collected and disposed of. Dilute bleach and chlorhexidine solutions are effective disinfectants of hard surfaces and fomites, but the presence of organic material on these surfaces inactivates them and drastically reduces or prohibits effectiveness. Intact accessible abscesses can be surgically removed; however, this option is more expensive, and undetected abscesses are often present and continue to develop. Recurrence rates with either lancing or surgical removal are high.

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Caseous Lymphadenitis of Sheep and Goats cont...

The practice of injecting abscesses with formalin should be strongly discouraged, because the FDA has zero tolerance for extra-label use of a potent carcinogen in food-producing animals. The efficacy of systemic antimicrobial therapy and, more recently, intralesional antimicrobial therapy has been investigated. It must be noted here that the use of any antimicrobial for treatment of CL is extra-label; therefore, strict adherence to published guidelines on withdrawal times and an established veterinarian-client-patient relationship are mandatory. Longterm administration of procaine penicillin G and rifampin has been successful in some cases. Penicillin alone, although effective in vitro, is unlikely to penetrate the capsule of developed abscesses, as are many, if not most, of the water-soluble or moderately lipid-soluble antimicrobials.

Recent studies have shown that administration of one dose of tulathromycin at 2.5 mg/kg, either SC directly into the abscess cavity, or two doses at 2.5 mg/kg, administered at the same time, one SC and one intralesionally, can resolve the lesions without lancing the abscess. Further, effective concentrations of tulathromycin can be achieved within walled-off abscesses caused by *C pseudotuberculosis* after a single dose at 2.5 mg/kg, SC. The highly lipid-soluble property of tulathromycin may be particularly helpful in cases of internal CL, when abscesses are not accessible for other forms of treatment. Despite the efficacy of intralesional and parenteral administration of tulathromycin in many cases, recurrence remains a problem. Therefore, use of these drugs cannot be considered curative but rather an acceptable alternative to manage cases of CL when culling from the herd or flock is not an acceptable option for the owner.

Because of the nature of the causative organism, common means of exposure, chronicity of the disease, and difficulty in completely eliminating the organism from individual animals, control of CL focuses on strict biosecurity measures. The overriding goals of any control program are to eliminate the disease from the herd or flock and to reduce the number of new cases either from the spread of disease or introduction to the farm.

Ideally, animals identified as infected should immediately be culled. If immediate removal is not possible, infected animals should be isolated from the rest of the herd or flock. Diligence in this practice will eventually result in decreased prevalence as animals that develop active cases are identified and removed and given there are no new animals incubating the disease introduced to the premises.

When elimination through culling is not a viable option for the owner, control of CL is challenging at best. Dividing the herds or flocks into "clean" and "infected" groups and eliminating older and less genetically valuable animals over time is one control strategy.

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Caseous Lymphadenitis of Sheep and Goats cont...

Lambs and kids from infected dams can be raised on pasteurized colostrum and milk away from infected animals. However, the internal form of CL and animals incubating the disease can maintain infection within the "asymptomatic clean" group and limit the success of this approach.

Commercial CL vaccines are currently licensed for use in sheep and goats. These vaccines should only be used in the species they are labeled for, because adverse reactions have been reported in goats given vaccine labeled for sheep. Rigidly adhering to vaccination schedules according to the manufacturer's labeling can help reduce the prevalence and incidence of CL within herds or flocks. However, it is important to emphasize that efficacy of these vaccines is not 100%, and vaccination will not clear infected animals. Vaccination of young replacement stock should be considered, and older infected animals should be gradually culled as economics allow. Once the disease is at a low prevalence rate, vaccination should be stopped and all seropositive unvaccinated animals culled. In "clean" herds or flocks that have no history of CL, vaccination is not recommended.

The risks of disease transmission among animals should be recognized when shearing or dipping, and management practices should be adjusted accordingly. Animals with noted lesions should be shorn last, and clipper blades disinfected between animals. Shearers should recognize the hazards associated with contact with purulent material and the possibility of acting as mechanical vectors, either on clothing or via equipment, for spread of the bacteria to new animals. Further, dipping tank solutions should be kept as fresh as possible, because *C pseudotuberculosis* can survive within them and serve as a source of infection of freshly shorn sheep that have skin abrasions.

Owners should remove hazardous items (barbed wire, exposed nails, rough feeders) from the environment to decrease injury and potential CL transmission from the presence of bacteria on these fomites.

One of the most common ways CL can be introduced into a previously "clean" herd or flock, or reintroduced to one in which CL has been reduced or eliminated, is through the addition of replacement stock. Often, animals from other farms that are asymptomatic on arrival are incubating the disease and then manifest infection weeks to months later. Purchasing animals from sources with unknown histories is hazardous to maintaining a "clean" herd or flock. Newly arrived animals should be examined thoroughly for signs of CL, such as abscesses or scars near peripheral lymph nodes. They should remain isolated from the rest of the herd or flock until their serologic status is determined, and only animals that are seronegative with no evidence of present or past CL lesions should be allowed to enter the herd or flock.

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Caseous Lymphadenitis of Sheep and Goats cont...

Key Points

Caseous lymphadenitis is a chronic disease that is challenging, if not impossible, to eliminate within an individual animal. Sustained antimicrobial therapy may lead to apparent resolution of lesions, but recurrence is common. The internal form of CL is characterized clinically as chronic weight loss, is difficult to definitively diagnose antemortem, and serves as a means to unknowingly maintain potentially infective animals within the herd/flock..

Despite reported success with various antimicrobial regimens coupled with strict biosecurity measures, eliminating affected animals from the herd or flock remains the best way to eliminate caseous lymphadenitis. Vaccination protocols can aid in reducing the numbers of new cases within a herd or flock, but adhering rigidly to the manufacturer's label directions is paramount to efficacy.

In situations where elimination of affected animals is not desirable, dividing "clean" and "infected" animals into separate herds/flocks, prompt antimicrobial treatment, isolation of animals with active lesions, and culling of aged infected animals may eventually lead to decreased prevalence of CL.

Owners/managers of clean herds/flocks should carefully evaluate potential additions of animals by close examination for potential CL lesions, serologic testing, and mandating periods of quarantine before introduction to the herd/flock.



Images: Kevin Washburn

UROLITHIASIS IN PYGMY GOATS

By Nancy Walters, DVM

(reprinted by permission from Pygmy Goat WORLD magazine, November, 1995 and Maxine Kinne 2020)

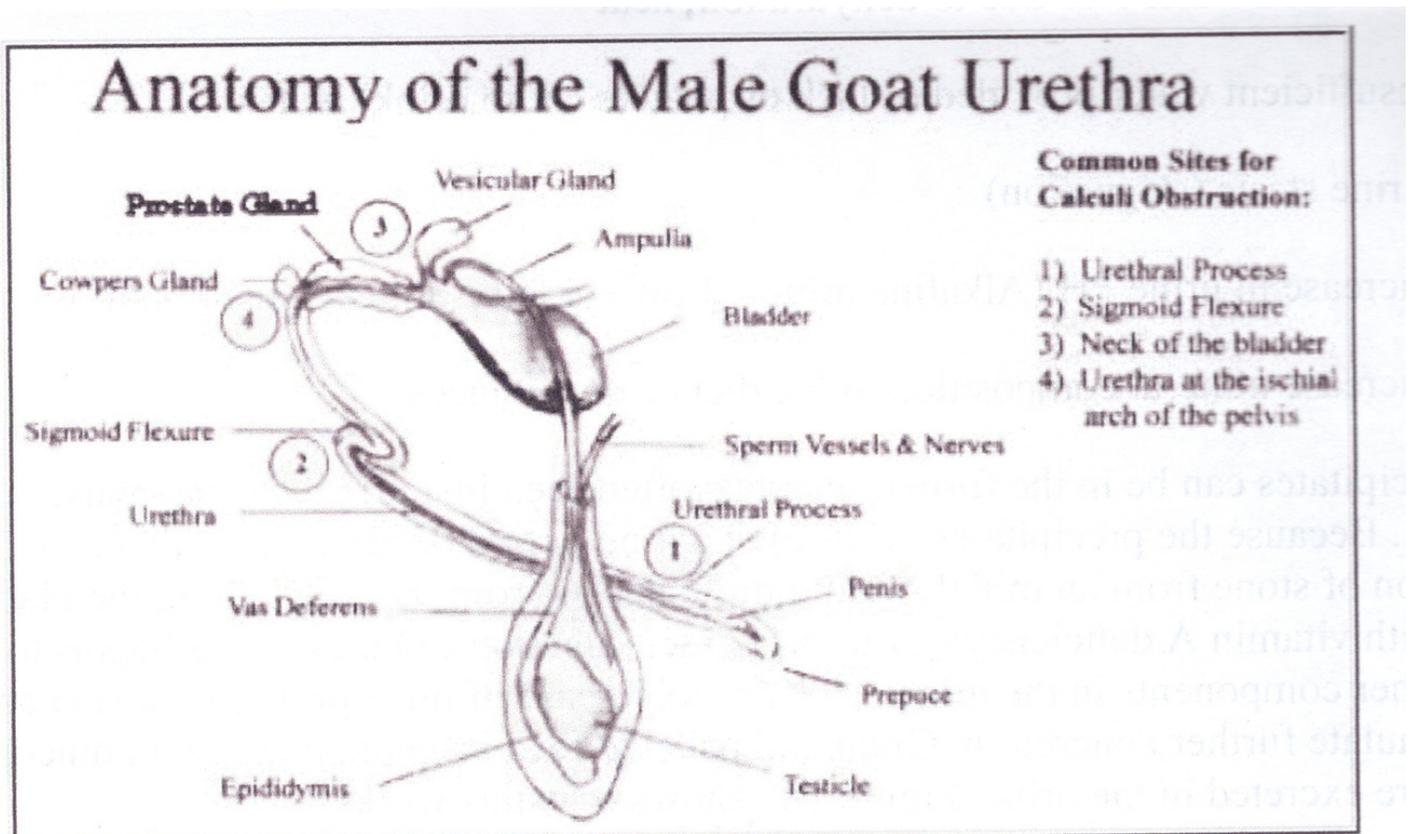
Many goat owners live in fear that their wethered goats or bucks will, sometime in their lives, develop obstruction because of urinary calculi. Many of us feel helpless because of the potential problem.

You can help avoid urinary calculi by applying some basic principles of husbandry and becoming aware of some important behaviour in goats that predispose them to stones. Most importantly, educating the prospective new owner about these principles of care can be their first line of defence in preventing problems.

Although we don't have all the answers, I hope the following articles will provide some new insights and understanding as to why the problem occurs, what options and approaches are available when a goat becomes obstructed and what measures we might employ to help avoid the problem.

Anatomical Considerations

Two fundamental principles are involved: how urinary calculi form, and the life threatening condition that occurs when stones lodge in and obstruct the urinary system.



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Urolithiasis in Pygmy Goats cont...

The urethra is a tube that empties urine from the bladder. Illustration 1 shows why male goats are more prone to obstruction; the male's urethra is much longer and narrower than the doe's. Even though does may certainly develop stones; we don't tend to see this as a clinical problem as they generally pass through.

Stones are mainly formed in the bladder. We usually don't have a problem until a stone becomes lodged in the urethra. This causes acute discomfort and inability to urinate. A common misunderstanding is that if the troublesome stone is removed, the goat will be free of any further problems. Unfortunately, the odds are that many more stones are present (usually at the neck of the bladder) or, quite commonly, lodged in urethra just as it narrows over the pelvic arch below the rectum. I've removed as many as 32 stones from this area.

The S-shaped sigmoid flexure just behind the testicles is another area that is quite prone to calculi obstruction. An even more common location is at the end of the penis where the small diameter urethral process extends beyond the penis. The extension is often poorly developed in young castrated goats and may even be fused to the end of the penis making it very difficult for the veterinarian to recognise the urethral opening or to pass a catheter.

Another anatomical "quirk" in the male is the urethral recess found in all ruminants (sheep, goats, cattle). As the urethra exits the pelvis just below the anus, there is a small blind pocket arising from the urethra. This can make it virtually impossible for the veterinarian to pass a urinary catheter into the bladder in an attempt to flush lodged stones or establish urine blow. Inevitably, the catheter gets caught in this blind pocket.

Factors Influencing Stone Formation

The formation of urinary calculi results from the interaction of numerous physiological, nutritional and management related factors. The tendency of the stone to become lodged, as we have seen, is determined by the anatomy of the urinary tract and age at castration.

Urine is a highly saturated solution of dissolved minerals. Normally these solutes stay in solution and won't precipitate out to form calculi. Factors which influence precipitation (separation of a solid substance from the solution) of minerals are:

- Decreased water intake and consequently very concentrated urine
- Increased water loss due to dehydration, heat
- Insufficient water provided or lack of potable (fit to drink) water
- Urine stasis (stagnation)
- Increase in urine PH (alkaline urines allow certain solutes to precipitate)
- Increased mineral composition in the diet or imbalances

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Urolithiasis in Pygmy Goats cont...

The precipitates can be in the form of crystals often seen in a urinalysis or sandy, gritty material. Because the precipitates occur over a long period of time, the tendency is in the formation of stone from an initial small nidus, such as from free cells along the bladder wall (seen with vitamin A deficiency), or urinary tract infections. Once a stone begins to grow, often other components in the urine, such as an increase of mucoproteins, can act as a matrix and stimulate further concretion. Grain and pelleted feed promote increase in mucoproteins that are excreted in the urine.

Calculus formation frequently reflects diet and this is a very important factor individual owners should look at when attempting to prevent problems. When you have a goat with a calculi problem, getting a sample stone and having it analysed for its mineral composition can provide you with insight as to the possible source of the dietary imbalance. (Quantitative analysis is preferable).

Stones are made up of many different kinds of materials. The most common ones are:

- Silicates from grass and cereal hays, particularly in arid regions
- Phosphate salts, struvites (magnesium, ammonium, phosphate), and apatite (calcium phosphate) usually from excess grain diets.
- Calcium ammonium magnesium carbonate, found commonly in pastures where plants concentrate calcium, oxalates and clover rich pastures

From my own subjective point of view, I find mostly calcium carbonate stones in Pygmy goats in my area of Northern California. It seems to be associated with diets restricted to only alfalfa or pelleted alfalfa.

Measures Important in Avoiding the Problem

Diet

No rigid dietary formula can be followed that can prevent stone formation. Individual situations must be evaluated from the standpoint of diet and management. I think it's important to emphasise balance and variety in the diet. Goats are browsers. They don't eat the same food every day, all their lives.

We know that oat hay, grasses and grains are very rich in phosphorous and that alfalfa is very rich in calcium. Fed as the sole ration, either one of these can predispose the goat to calculi. We like to see a calcium to phosphorous ratio of 2:1. Rations high in grass hay and concentrates (grains) will most likely produce excess phosphorous and, consequently, phosphate stones. When possible, a ration of high quality, free choice, mixed alfalfa/grass/oat hay with salt and trace minerals is best. Freedom to browse is an added plus.

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Urolithiasis in Pygmy Goats cont...

Concentrates have their place in the overall balance and should not be fed at more than 1% of the body weight, depending on energy needs – breeding, pregnancy and lactation – and size of the animal. As a general rule, I give adult Pygmy goats no more than ½-¾ cup grain per day. If they eat more alfalfa and not so much of the oat hay I give them more.

I don't recommend pelleted feeds for several reasons. You are often unaware of weeds and other constituents in the pellet. A high roughage diet is crucial in maintaining a healthy, functional rumen (digestive system). In addition, low roughage diets (such as pelleted feeds) foster increased mucoproteins in the urine that act as a cementing factor in stone formation.

Water Intake

Have fresh water available at all times. Goats are very finicky about their water. Water intake is essential for a good, dilute urine flow and to avoid solute precipitation. In the winter or rainy months make water easily accessible. They won't go out in the rain to drink! Offer warm water at these times, as they don't like cold water. Urinary obstruction is often seen in late autumn and winter.

When goats are stressed and stay under shelter, water consumption decreases because of stale water or a cold, inaccessible source. If you have highly mineralised well water, change their water source or filter it if possible. If you have problems getting them to drink or a history of stones in your herd, increase concentration of salt in their diet up to 4% of the ration.

Urine Acidifiers

If calculus analysis consists of phosphate minerals, prophylactic use of urinary acidifiers can be helpful. Normal urine pH in herbivores is alkaline (greater than 7) and in this environment phosphate calculi are more likely to precipitate. Administration of ammonium chloride salt at a level of 2% in the concentrated ration is recommended. For example, if you are feeding ½ cup of grain/day – that equals 120mL and 2% of that equals 2.4mL or ½ teaspoon of ammonium chloride a day. I usually have owners divide that into ¼ teaspoon salt in ¼ cup grain morning and night. By testing their urine with litmus paper (available at chemists) owners can assess urine acidity. One must be very careful in the amount of ammonium chloride given. There is a fine line between therapeutic benefits and toxicity.

Delaying Castration

Deferring castration until 3-5 months of age may reduce the incidence of obstructive calculi. This allows the influence of testosterone on the development of the urethral lumen size. It also helps the urethral process separate completely from its attachment to the end of the penis. This involves more management by the owner because the young males are so precocious and capable of impregnating as early as 3 months. In addition, because the older male requires sedation and more involved castration, the expenses are greater.

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Urolithiasis in Pygmy Goats cont...

Approach to the Clinical Problem of Urethral Stones

When you are faced with a goat who is potentially obstructed, what do you look for? How much time do you have before it becomes a life threatening situation? What needs to be done?

Clinical Signs

In the first phase of obstruction, a male goat will show restlessness and anxiety. Often he will stand with his back legs stretched back and all his weight leaning forward on the front legs. You may see a pumping action and twitching of the tail. He'll do this frequently and sometimes vocalise. You might notice drops of bloody urine from the penis, no urine stream at all or, with a partial obstruction, an intermittent stream and discomfort. I'm often amazed by the tolerance these goats have to the obstruction. As the condition progresses, some goats will just lie down and stop eating and drinking. This is the phase that commonly alerts owners that something is wrong. If not treated, the goats will become progressively weaker and depressed to a moribund (about to die) state due to the build up of toxins in the blood. There is also potential for bladder rupture, but usually the goat has been sick and depressed for several days before this occurs.

Diagnostic and Medical Management

A definitive diagnosis of urinary calculi must be made by your veterinarian. Your description of your goats' clinical behaviour at home is very important information. Examination and history are critical because there can be other medical reasons why a goat is down and not eating. Indigestion, gastrointestinal obstruction, infection, and liver and kidney problems can often present the same symptoms.

Usually on presentation to the veterinarian, the goat is standing and alert and has a very painful, full, hard bladder that can be palpated high into the caudal abdomen in front of the pelvis. Often the goat will resist dramatically and cry out. Palpation of the urethra just below the anus will demonstrate a firm pulsating urethra.

Checking the BUN (blood urea nitrogen) is an excellent way to assess the severity of the condition. This measures the level of toxins building up in the body. These toxins are normally excreted in the urine. As more toxins build up in the blood, the more depressed the animal becomes.

During this preliminary phase, if the goat is looking fairly comfortable, your veterinarian may choose to sedate him and give an anti-inflammatory agent such as Banamine™ to counteract spasm of the urethra. Hopefully, he will pass the stone that is causing the immediate obstruction and pain. This is also a good time to examine the urethral process for a stone. The urethral process can be easily excised in an attempt to restore urine flow. At the University of California, Davis, 40% of the cases in one study had obstruction at the urethral process and amputation of the process may temporarily restore urine flow. This surgery alone will not affect breeding ability in the buck. It is very important

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Urolithiasis in Pygmy Goats cont...

to remember however, multiple calculi are usually present. A thorough assessment of the state of mind of the animal, palpation of the remainder of the urethra and attempts to pass a catheter to find other stones are critical diagnostic methods in understanding the scope of the problem. X-rays are most useful for detecting calculi along the urethra, and they are most commonly seen at the neck of the bladder and the ischial arch. Occasionally the task may involve flushing sandy crystalline material from the distal urethra.

Depending on the goat's condition, the veterinarian may want to observe him in the hospital for 24 hours. More invasive procedures will need to be discussed and decided upon at that time.

Surgical Options

Once the extent of the stones has been determined, one or more surgical procedures may be required. Further treatment will depend on the stage of disease in the animal, the intended long term use of the animal and financial constraints.

Stones in the bladder definitely indicate a need for abdominal surgery, opening into the bladder (cystotomy) for stone removal as well as possibly making an incision into the urethra (urethrotomy) for complete removal of all stones. A urethrotomy alone has resulted in a stone recurrence rate of 45% within 8 months of surgery at the University of Davis. The importance of the removal and identification of all stones along the urethral tract and in the bladder cannot be overemphasised for the best long term results.

Even with the best surgical outcome there can be many frustrations and potential postoperative complications owners may be forced to address. Strictures (closing) at the urethral incision may occur and a permanent opening site may be required (urethrostomy). This will cause loss of breeding capability and potential management problems of urine scale on the hind legs and perineum. There can be a fair amount of pain and spasm involved which leads to a failure of eating and drinking and a need for extended hospitalisation and treatment. There is a potential for infection and haemorrhage, and always a risk of new stones and re-obstruction. In some cases, I have had to operate and establish patency three times to create a permanent opening into the urethra below the anus. In others I have only had to remove stones and the animal healed, urinating normally from the penis. Some have lived 8 or more years with a permanent urethrostomy site, and some have blocked again a year or two after surgery.

As you can see, there is much to consider. There needs to be a tremendous amount of communication, trust and understanding of the problem each step of the way in order for you to make the appropriate decisions. Cost is certainly a big factor. You may spend a great deal of money and still lose your favourite pet.

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Urolithiasis in Pygmy Goats cont...

Summary

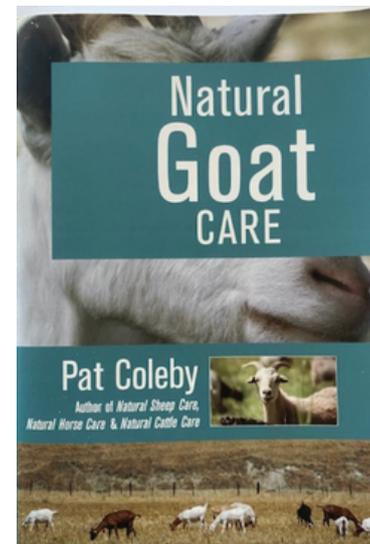
Urinary calculi formation has a complex etiology. Because we cannot control all the physiological factors that can cause the problem, we cannot follow a set protocol to prevent it. Understanding that there are certain management, nutritional and anatomical considerations which predispose the male goat to the condition is helpful. Certain mineral imbalances, dietary extremes, water consumption and behaviour must be carefully evaluated.

If the problem does arise in your herd, I feel it is critical to have individual stones analysed for their mineral content in order to help define the problem. Feeling comfortable and confident in your veterinarian is certainly a benefit when it comes to making some very important decisions. Each situation is unique, and the extent of the condition must be assessed before any prognosis can be given. Remember, frequently there are multiple stones, not just one isolated stone.

Book Review

Pat Coleby | **Natural Goat and Alpaca Care**

Review by Christine Falconer



I would like to share a book that I often refer to as my bible in goat keepings and to this day feel is one of the most valuable and my favourite books in raising and caring for my goats in the most natural way possible. This book contains excellent information and touches on every subject that relates to goats.

An informative book of three hundred and thirty pages on goat nutrition and husbandry, the approach to livestock and farming using natural rather than chemical methods and solving health problems both with natural herbs and medicines.

Pat Coleby was a dairy farmer with an approach to livestock and farming the natural way, she has become known as one of Australia's experts on natural health for animals. An author of a range of books on livestock and the natural approach to farming, she is highly respected in her approach on natural health for animals and has been a consultant and worked with farmers, vets, government departments and interested parties in Australia, New Zealand, USA and the United Kingdom.

There has been some controversy over a few of her recommendation's but her books provide an excellent resource for those who prefer a holistic approach to goat management.

The book includes topics on housing goats, farming methods, choosing livestock, diagnosing health problems, nutritional requirements and feeding practises, the needs of goats, vitamins and minerals and all aspects of pregnancy and breeding.

This book helps one to understand and how to keep the balance and importance of trace minerals in a goat's diet and covers topics of housing, farming methods, choosing the right stock, diagnosing health problems, vitamins and minerals and natural remedies, breeding, pregnancy and birthing and explains how easy to keep your goats in top condition without using expensive treatment.

Pat Coleby relates that the majority of health problems with goats is feed related and nutrient deficiencies, especially minerals and helps one understand the relationship between fertilisers and trace elements and how to keep the balance and to understand soil requirements for raising healthy livestock.

My copy of thirty-four years old is well read from page to page. This book has been taken on holidays , notes scribbled and words and topics underlined, and rightly so the book and content personally highly recommended as a valuable resource for the beginner or most experienced goat breeder or enthusiast.

NPGAA MERCHANDISE



Karen Bowron with Chris Falconer and Karen's nieces at the Gidgegannup Show

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