MEDICATIONS USED IN GOATS

ANTIBIOTICS	Brand Name	Approval	Dosage	Route	Frequency	Withdrawal Time Meat	Milk
Procain Pen G	Crysticillin	extra label	10,000-20,000 IU/lb	SQ	QD	14-20 days	5 days
Benzathine Pen G	Pen BP-48	extra label	20,000 IU/lb	SQ	q 48 hours	30 days	?
Amoxicillin	Amoxi-inject	extra label	5 mg/lb	SQ	QD	25 days	96 hours
Ampicillin	Polyflex	extra label	5 mg/lb	SQ	QD	10 days	72 hours
Oxytetracycline	LA-200	extra label	9 mg/lb	SQ	q 48 hours	28 days	6 days
Sulfadimethoxine	Albon	extra label	25 mg/lb	PO	QD	7 days	?
Ceftiofur	Naxcel/Excenel	extra label	0.5-1 mg/lb	IM	QD	4 days	3 days
Erythromycen	Erythro-200	extra label	1 mg/lb	SQ	QD	3 days	72 hours
Tylosin	Tylan-200	extra label	10 mg/lb	IM	QD	30 days	95 hours
Neomycin	Biosol	approved	5 mg/lb	PO	BID	30 days	?
Florfenicol	Nuflor	extra label	9 mg/lb	IM	q 48 hours	28 days	?
Gentamicin	Gentocin	do not use					
Tilmicosin	Micotil	do not use	toxic to goats				
Enrofloxacin	Baytril 100	do not use	no extra label use				
ANTI-INFLAMATORY DRUGS							
Flunixin meglumine	Banamine	extra label	1.1-2.2 mg/kg	IV/IM	QD	14 days	4 days
Phenylbutazone	Bute	extra label	10-20 mg/kg	PO	QD	14 days	5 days
Aspirin	Aspirin	extra label	100 mg/kg	PO	QD	1 day	24 hours
ANESTHETICS AND TRANQUILIZERS							
Xylazin	Rompun	extra label	0.5-0.1 mg/kg	IM/IV		5 days	72 hours
Ketamin	Ketaset	extra label	5-10 mg/kg	IM/IV		3 days	72 hours
Thiamylal Na	Biotal	extra label	1-20 mg/kg	IV		1 day	1 day
Yohimbine	Yobin	extra label	0.25 mg/kg	IV		7 days	72 hours
Lidocaine	Lidocaine	extra label	variable for locale	anesthesia use 1%			
COCDIOSTATS							
Monensin	Rumensin	approved	15-20 gms/ton	anesthesia use 1%		0	?
Lasalocid	Bovatec	extra label	20-30 gms/ton	anesthesia use 1%		?	?
Decoquinate	Deccox	approved	0.5 lb/ton feed	anesthesia use 1%		0	?
Amprolium	Corid	extra label	25-30 mg/feed or water	anesthesia use 1%		?	?
ANTHELMINTICS							
1. Avermectins:							
Ivermectin	Ivomec Drench	extra label	0.3 mg/kg	PO		11 days	6 days
Ivermectin	Ivomec 1%	extra label	0.3 mg/kg	SC		56 days	36-40 days
Doramectin	Dectomax	extra label	0.3 mg/kg	SC		56 days	36-40 days
Eprinomectin	Eprinex	extra label	0.5 mg/kg	PO		0 days	0 days
Moxidectin	Quest, Cydectin	extra label	0.5 mg/kg	PO		0 days	?
2. Benzimidazoles:							
Albendazole	Valbazen	extra label	10 mg/kg	PO		27 days	5 days
Fendendazole	Panacur/Safeguard	approved	10 mg/kg	PO		14 days	4 days
Oxfendazole	Synanthic	extra label	0.5 mg/kg	PO		14 days	5 days

3. Cholinergic:
Agonists

Levamisole	Levasole	extra label	8 mg/kg	PO	10 days	4 days
Morantel Tartrate	Rumatel	approved	10 mg/kg	PO	30 days	0 days

This is a listing of different medications that are useful in treating problems with your goats. We are not experts or vets and you should only use this as general information and not expert advise. The majority of this information was taken from articles in goat magazines, specifically Goat Rancher. We are not recommending any specific brand names nor specific dosages but believe we should include what was stated in the articles.

General Information on Injections			
Intramuscular (IM)	Injected deep within a major muscle mass, such as that in the hind leg or on the shoulder. It should be given with an 18 gauge, 2.5 to 4 cm needle, pointed straight into the muscle. Before injecting the drug, always withdraw on the syringe plunger to make sure you haven't hit a blood vessel. If this happens, blood will flow into the syringe. To correct, simply replace the needle in the muscle.		
Subcutaneous (SQ)	Injected under the skin, usually in the neck or behind the shoulder. Usually a 1 to 2.5 cm needle is inserted at an angle through the skin. So that you do not stick yourself, pick up the skin with your fingers and insert the needle through the skin while it is pointed away from your fingers.		
Intravenous (IV)	Injected into a vein, usually the jugular or neck vein. This procedure takes some skill and practice. Become thoroughly familiar with the method before attempting to use it. Thevein must be blocked with one hand near the shoulder to enlarge it and make it visible. Usually a 4 cm. 18 gauge needle is used for IV injections. All IV injections should be given slowly. The heart should be closely monitored as heart block may occur. This may be done by use of a stethoscope, placing your ear against the chest, or by merely feeling the heart beat with your hand.		
Intramammary	Injected within the milk gland, the end of the teat through the natural opening. Always wash the teat end with soap and water and wipe it with alcohol before injection. Use only sterile, blunt, teat infusion needles or "throw-away" mastitis medicine applicators. Unclean material entering the teat will case mastitis. Our vet has indicated this type of treatment for goats is of little value.		
Important Conversions	1 ml = 1 Tsp = 1 Tbsp = 2 Tbsp = 1 pint =	15 drops = 1 gram = 1/2 oz. = 1 oz. = 16 oz. =	1 cc 5 cc's 15 cc's 30 cc's 480 cc's
Information on Dosage Conversions			

Warning - Warning - Warning - Warning - Warning
----- Micotil (tilmicosin) can cause fatal reactions in goats -----
Warning - Warning - Warning - Warning - Warning

Medication	Source	Description
Banamine	**Prescription**	Anti-inflammatory that is good for bringing down high fever,

(FluMeglumine)		stopping severe diarrhea in very young kids, calming the gut in digestive illnesses, and relieving pain and soreness associated with animal bites and other injuries. Cannot be used but once every 36 hours, because it builds up in vital organs and will cause permanent damage to the animal, including but not limited to ulcerations in the digestive system of the goats. Dosage is 1 cc per 100 lbs IM. Refrigerate
Bar-Guard-99	**Over-The-Counter**	Protests newborns against scours caused by K99 strains of E.coli. We use this to help prevent Floppy Kid Syndrome and it has worked well. We give 2cc drench right after kid has had some colostrum from the mother.
Baytril (Enrofloxacin 2.27%)	**Prescription**	A broad spectrum antibiotic to be used only after other antibiotic therapies have failed. Can cause tenderness and swelling in joints. Comes in injectable and tablet form. Injectable dose at 1 cc per 20 lbs. for five consecutive days. Good for gut-related illnesses.
Benzathine Penicillin (long-acting penicillin)	**Over-The-Counter**	Antibiotic that has been overused and not effective against many problems. Dosage is 5 cc per 100 lbs SQ. Refrigerate
Bo-Se and Mu-Se	**Prescription**	Injectable medication for selenium deficiency. Since selenium deficiency exists at different levels throughout the US, it is critical to follow your vet's direction on the usage of these products.
Bovi-Shield	**Prescription**	Vaccine against bovine respiratory syncytial virus. For cattle, but some vets and ranchers are giving to goat herds. Annual revaccination needed.
C&D Antitoxin	**Over-The-Counter**	Used for many problems. Fresh cuts, castration, dehorning. Severe diarrhea in very young kids, toxicity situations in which the goat is frothing at the mouth, one of the products administered to combat Floppy Kid Syndrome. Provides short-term protection (just a few hours) but works quickly towards solving the immediate problem. Young kids should receive a minimum of 3 cc SQ up to three times a day; adults should receive 10-15 cc, depending upon size of the animal. C & D negates any protection previously given by CD/T vaccine therefore, wait for at least five days and re-vaccinate and booster shot. Refrigerate
CD/T (Clostridium Prefringens Type C & D - Tetanus Toxoid)	**Over-The-Counter**	Provide long-term protection against overeating disease and tetanus. Newborn kids and newly purchased animals should be vaccinated with 2 cc (kids at one month of age) and then a second vaccination should be given 30 days later (kids at 2 months of age.) Two injections 30 days apart are required in order to provide long-term protection. Annually thereafter, one injection of 2 cc per animal will renew the protection. Can be given either IM or SQ. Do not be surprised if it makes a knot at the injection site. This is the body' reaction to the vaccination, and in most cases, it eventually goes away. Refrigerate
CHX Guard LA (.12% Chlorhexidine Glluconate)	**Prescription**	Aids in treatment of Sore Mouth. Contains an effective antibacterial agent in a long-acting gel. This adhesive-based gel adheres to the gums, thereby increasing the amount of time the antibacterial agent is in the animals mouth.

CMT (California Mastitis Test Kit)	**Over-The-Counter**	Is a screening test to quickly detect mastitis.
Colostrum Supplements and Replacers	**Over-The-Counter**	Do not confuse these two types of products. Newborns must have colostrum during the first hours after birth. If the dam is colostrum deficient, use the colostrum replacer. The best colostrum replacer is frozen colostrum taken from does on your property who have already kidded. This colostrum will have the immunities needed for your particular location. If you don't have a supply of frozen colostrum, then you must use a commercially-prepared goat colostrum replacer. In such instances, usage of colostrum supplements along with the replacer is often helpful. Do not use colostrum or colostrum replacer beyond the first 24 hours of life. Switch to goat's milk or goat's milk replacer.
CoRid	**Over-The-Counter**	Treatment for Coccidiosis. Give kids 30-40 cc of mixture twice daily; adults should receive 70-80 cc twice daily. Confine the entire exposed herd to a single source of water for five consecutive days. Using the treatment dosage on the CoRid package, mix CoRid into the only source of water. In some areas, vets are finding that new strains of coccidia are resistant to CoRid and should consider Albon or its generic equivalent, Sulfadimethoxine 12.5%.
Cydectin	**Over-The-Counter**	A cattle pour-on dewormer. Use a a drench on goats. Works against internal and external parasites. We drench with 1cc per 15-18 lbs.
Dexamethasone	**Prescription**	Can be used to induce labor if required in a doe after day 141 of pregnancy. Also used to improve appetite after kidding.
Doprem	**Prescription**	Eliminates respiratory distress in newborns caused by troubled births, including C-sections. Drop 2/10 cc under kid's tongue immediately upon birth to stimulate long activity. May also be used when kids are pulled out of their dams. Refrigerate.
Epinephrine	**Over-The-Counter**	Never be without it. Used to counteract shock in animals from other medication. Always carry it with you when giving injections. Dosage is 1 cc SQ per 100 lbs.
Ivomec 1% cattle injectable	**Over-The-Counter**	For eliminating stomach worms. A clear, oily liquid works best if used orally at a rate of 1 cc per 75 lbs. Do not under dose. Achieves a quicker "kill" via oral dosing.
Kopertox	**Over-The-Counter**	Product for hoof rot and hoof scald. For topical application as a "liquid bandage".
LA-200 (oxytetracycline)	**Over-The-Counter**	Broad-spectrum antibiotic use. Thick liquid is painful to the goats. Never use on pregnant does or kids under six but preferably under 12 months old. Interferes with bone & teeth formation both in utero and while kids are growing. Can cause abortion in pregnant does. Dosage 1cc per 25 lbs. IM every third day for a maximum usage of three doses. The non-sting version of oxytetracycline is called Bio-Mycin. Can be used for pinkeye. Refrigerate.
Lutalyse	**Prescription**	Used to bring a doe into heat or cause an abort of a early pregnancy not desired. If a doe has an unwanted breeding, wait 11 days and then give her a shot of lutalyse. We use 2cc in the muscle. Although Lutalyse will bring a doe into heat, it does not

		mean that she produced an egg.
Milk of Magnesia	**Over-The-Counter**	Useful for constipation and toxicity reactions, including Floppy Kid Syndrome. Use as oral drench at rate of 15 cc per 60 lbs.
Naxcel (ceftiofur sodium)	**Prescription**	Excellent broad-spectrum antibiotic for respiratory illnesses (pneumonia). Comes in two bottles...one bottle contains a powder which must be kept refrigerated and another bottle of sterile water. When the two are mixed, they keep for only seven days. So draw up syringes in dosages of 1/2 cc 1 cc 2 cc and 3 cc, put needle caps o them, place the filled syringes in a ziplock bag, label and date it, and put it in the freezer. Syringes thaw quickly, but hold the needle cap up, because some times the medication will settle into the needle cap. Dosages on the bottle are insufficient for goats. If newborn kids have respiratory distress or e.Coli infections, they must receive a minimum dosage IM of 1/2 cc daily for 5 consecutive days. A 100 pound goat needs at least 5-6 cc's of Naxcel IM over the 5-day course of treatment.
Nuflor (Florfenicol)	**Prescription**	Same as Naxcel. Administer IM every other day for a minimum of three injections. Dosage is 1 cc per 25 lbs. Refrigerate.
Oral Ruminate Gel	**Over-The-Counter**	Should always be used after the completion of antibiotic therapy and treatment for diarrhea/scours. Also works well when shipping goats. Refrigerate.
Ovine Ecthyma Vaccine (live virus)	**Prescription**	For the vaccination of sheep and goats against sore mouth infection. Humans have been infected with this virus. Protect against such accidents.
Oxytocin	**Prescription**	Use when a doe kids and does not pass her afterbirth. Must be used before the cervix closes (within approximately five hours after kidding). Causes contractions that expel the afterbirth. This is not a comfortable experience for the doe, so use it sparingly. Dosage is 1.5 cc per 100 lbs. Vet has recommend we use .5 cc to doe.
Pepto-Bismol	**Over-The-Counter**	Controls diarrhea in kids under one month old. Use up to 2 cc every four to six hours for newborns; 5 cc over the same timeframe for kids approaching one month old. Follow up with oral ruminant get Probios to repopulate the gut with vital live bacteria used for digestion. Do not use Immodium AD to control diarrhea in goats, because it stops the peristaltic action of the gut and death is a likely result of its use.
Presponse HM	**Over-The-Counter**	Vaccinate against pneumonia at one month and two months of age and then annually thereafter. Pregnant does should be boostered with both pneumonia and CD/T vaccines at least six weeks before parturition (kidding). Goats receive two cc SQ, with a follow-up booster in 30 days. If the goat has been vaccinated against pneumonia within 12 months, I booster with 2 cc SQ (under the skin). Refrigerate.
Primor	**Prescription**	Oral antibiotic that comes in tablet form, by weight of animal, for gut-related infections. Primor 120 is for 5-15 lb goats, Primor 240, 10-30 lb goats; Primor 600, 25-50 lb goats; and Primor 1200, 50-100 lb goats. Give two times the appropriate weight's dosage the first day, than then match the goat's weight for the next 9 consecutive days.

Probios	**Over-The-Counter**	Used to get the rumen back working. Contains a source of live naturally occurring microorganisms. We use this prior to trips with goats and after shots to keep the rumen microorganisms in balance and working.
Procaine Penicillin G (Regular)	**Over-The-Counter**	Good for treating Clostridial myositis, Enterotoxemia, or Strep. mastitis. Generally used twice a day. Give in the muscle if you want the blood level to come up faster. SQ injections are less damaging and usually less painful than IM injections. Penicillin injections that hit a blood vein can kill an animal almost immediately. Dosage recommended between 3-5 cc per 100 lbs.
Propylene Glycol	**Over-The-Counter**	For ketosis in does. Comes in one-gallon containers. Use 50-60 cc twice a day for an average-sized doe until she gets back on feed. Administer orally. If this product is not available, use molasses or Karo syrup.
Red Cell	**Over-The-Counter**	Red Cell can be used to combat anemia in goats. Packages in quart bottles, use it in conjunction with Vitamin B12 injections or as a stand-alone treatment. Should be administered daily via mouth for at least one week in no less than three cc amounts for an average-sized goat.
Re-Sorb oral electrolytes	**Over-The-Counter**	For rehydrating sick animals, regardless of age. Can be used as an oral drench, put into baby bottles for kids to suck, or mixed into pans of drinking water. Each packet should be mixed with 1/2 gallon warm water.
Selenium with Vitamin E	**Over-The-Counter**	Complements potential deficiencies. Deficiencies can result in mastitis, retained placentas, and white muscle disease.
Spectam Scour Halt	**Over-The-Counter**	Controls diarrhea in adults and kids over one month of age. This is a pig scour medication which works well on goats. Follow label directions when pumping this liquid into the goat's mouth. Follow up with oral ruminant gel (Probios) to repopulate the gut with live bacteria necessary for food digestion.
Synergized De-Lice	**Over-The-Counter**	Applied along the backbone from base of neck to base of tail. Follow the directions carefully, and do not use on kids under one month old. Maximum application is 3 oz. per animal, regardless of weight.
Tagament	**Over-The-Counter**	Use in conjunction with Primor for gut-related pain resulting from illness like coccidia. Dosage is one half of a HR200 Tagamet (200 mg) for 3 - 5 days.
Tetanus Antitoxin	**Over-The-Counter**	Protection against tetanus and tetanus-like infections. Comes in single-dose vials; use the entire vial IM for adults; cut it back proportionately for kids. No sooner than five days after this medication is last used, will have to re-vaccinate with CD/T and booster.
Thiamine (Vitamin B12)	**Prescription**	Used in conjunction with large dosages of antibiotics to treat listeria and goat polio, diseases which demand vet assistance. Moldy feed and hay may cause these illnesses. Refrigerate.
Tincture Iodine 7%	**Over-The-Counter**	Topical antiseptic for use to reduce the risk of infection of superficial cuts and abrasions. Use on navel cords at birth of kids

		after mother has cleaned them.
To-Day (cephapirin sodium)	**Over-The-Counter**	For mastitis treatment. Milk out the bad milk/pus/blood and infuse one tube of To-Day into each infected udder for a minimum of two consuctive days.
Triangle 9	**Over-The-Counter**	Vaccine for pneumonia type of illness. For cattle but some vets are using on goat herds. Given annually.
Tylan 200 (tylosin)	**Over-The-Counter**	For respiratory problems. Dosage 1 cc per 25 lbs for 5 consecutive days IM. Refrigerate.
Valbazen	**Over-The-Counter**	De-wormer of the "white" wormer family. Can cause abortion in pregnant does at certain points in the the pregnancy.
Vitamin B12	**Prescription**	Wonderful for use on goats who are anemic from worms or stressed from just about any illness. Dosage 1 cc per 100 lbs. Refrigerate.
Please visit JACKMAULDIN.COM for more excellent goat information!		

Subject: Worming: A simple approach for success (updated 10/06)

WORMING:

A Simple Approach for Success
By Sue Reith.

Resistance to wormers is a 'catch all' term that's very popular these days. What's really happening is a failure to understand the proper approach to worming.

The directions on any wormer package invariably say it wipes out ONLY the ADULT worms. (Well, some claim to wipe out ‘4th stage larvae as well, but they’re only a day away from adulthood by then so the wormer will still be in the system to get them the next day.)

The time it takes for the average worm egg to pass thru the larval stage, and mature to lay its own eggs, is only about 14 days. If your goats have a pretty serious worm problem and you worm them once, and then check a fecal sample a month later, you're still going to find a bunch of worm eggs on the slide. And it'll be quickly determined that your goat is 'resistant' to the wormer. But the catch is that the eggs on the slide this time aren't from those original worms, which most definitely are long dead. Instead, they're being produced by new adult worms that were just eggs and larvae when the previous worming was done, so were not affected by it. Now they're adults themselves, producing their own eggs!

To avoid that confusion (and to be sure you've actually reached your goal of wiping out a serious worm load as well) proper worming must be done 3X in a row, allowing about 10 days between each dose, to destroy as many newly

matured adults as possible before they start producing eggs of their own to start yet another worm cycle.

After doing all that you should be able to do another fecal check and find that lo and behold, these worms assumed to be 'resistant' have all but disappeared entirely! (BTW: It's important to recognize that the body needs to maintain a very low level of worms, not even enough to show up on the slide in most cases, so the immune system will have something against which to continue developing antibodies.)

There's one big exception to that, and it's the existence of the Liver fluke. This is a highly lethal, difficult to eradicate worm that can only be done-in sufficiently by using that 3X worming regimen. The Liver fluke eggs closely resemble those of the Haemonchus contortus (barberpole worm). But unfortunately for goat owners, while Haemonchus contortus responds well to general wormers, the Liver fluke does not. It will, however, respond readily to a relatively new product, Ivomec PLUS. The PLUS part is clorsulon, specific to Liver fluke eradication.

This is where (albeit unintentionally) the problem falls squarely on the shoulders of the veterinary community, in the form of misidentification of worm eggs. However, that was not always the case. Early on there was excellent photo reference material available for microscopic ID of eggs /oocysts in a book entitled Veterinary Clinical Parasitology, by Sloss and Kemp. But following the release of the 5th Edition in 1982 the publishers, Iowa State Univ Press, changed the format entirely, ruining it for parasite egg /oocyst ID. Unfortunately for us all, to date they haven't seen the need to re-issue the 5th Ed., and while a few others have tried unsuccessfully to replicate the quality of that book for use in microscopic ID of parasites, no one has yet succeeded. Idealized artists' renditions have been made available in the hope they'll 'fill the gap', but they simply aren't useful for making those crucial, accurate ID's out here in the real-world. So unless / until someone else successfully takes on this important challenge, the fact is that Veterinary offices don't have access to good photos for accurate ID of the eggs / oocysts seen on slides that would enable them to make that vital distinction between the egg of a Liver fluke and that of a Haemonchus contortus.

And many years of ongoing mistakes in ID have now fostered a shocking veterinary protocol wherein it's assumed that all eggs 'looking like' Haemonchus contortus ARE Haemonchus contortus, thus failure to wipe them out makes them automatically resistant to worming, period. The conclusion, then, is that the only practical method of control is to destroy the animals harboring these worms as a means to prevent further spread.

The reality, however, is that the eggs that are not responding to treatment for Haemonchus contortus are actually those of the Liver fluke instead, a worm that doesn't respond to any of the goat wormers they're using, but can be eradicated if just treated with the proper wormer! A pathetic situation, I must say...

Having said that, in my view the easiest way to overcome this whole problem of egg misidentification and get the job done right once and for all is to use only Ivomec Plus (at a regular dose of 1cc / 100lbs, SQ), and to repeat the wormings 3X in a row with 10 days' lapse between each one, for ALL general worming. The result will be an excellent broad-spectrum worming, and the only worms you won't be able to wipe out by that method are lungworm (easily recognized by a dry cough, and treated effectively with Levamisole), tapeworm (easily recognized by little flat white segments in the feces, and treated effectively with Praziquantal), and pinworms (easily recognized by tiny, hairlike, wiggly white worms in the anal opening, and treated effectively by repeated daily doses of any of the benzamidazoles.)

I raise Toggenburgs... After having been continuously on the 'show circuit' for about 25 years, I've now retired. My goats, housed in their lovely 'Goatie Condo', are no longer being exposed to worms from outside goats... Every now and then (If I'm lucky enough to be in the right place at the right time) I scoop up a few 'nanny berries' from specific animals and run a fecal check on them right here in my office... And I have to tell you, I have not seen a worm egg in any of my goats for 4 years now!

I don't necessarily recommend that you close your herd, but I do want you to know that if, when you do worm, you worm appropriately, you really can keep your animals worm-free.

Relative to the use of BoSe proactively as well as reactively:

My routine approach these days when treating a sick animal is the following:

BoSe inj (at the rate of 1cc/40 lbs SQ) is given once daily for 3 days...
Then it is given once every 2nd day for 3 doses... Then once a week for a month...

However, in an animal that is older, so that his/her own immune system functions less efficiently than it did in earlier years, and in particular when there is some disease involved for which, in this older animal, there is no known cure, I have found, much to my astonishment, that continuing BoSe monthly on a permanent basis after having introduced the initial regimen outlined above results in markedly increased health and greater expectation of longevity in that animal.

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HYPOCALCEMIA IN LATE-GESTATION (and lactating) DOES:

Feeding to Prevent it
By Sue Reith (1/5/07 update)

Hypocalcemia is a life-threatening condition that shows up when a doe is either pregnant or lactating, but getting fed an unbalanced diet that doesn't provide her with enough calcium for both herself and her growing fetuses or for milk production. It can appear at any time during the last 2 months of pregnancy, right up to the doe's due date, as well as at any time while she's lactating.

Symptoms: The first thing she'll do is refuse to eat her grain. Soon after that she won't want her hay either. Without quick intervention she'll become weak and wobbly, lethargic and depressed. If still untreated by then, she'll lie down and not want to get up. If you take her temperature when you first see these changes, it'll be normal (102.3), but soon after that it'll drop to sub-normal (below 102). Unless corrective measures are begun right away you'll lose both the doe and her fetuses.

Treatment: If, because you're unsure as to why the doe is behaving this way, you call a veterinarian in for advice, he or she will probably (and unfortunately) tell you that her problem is "pregnancy toxemia", or "pregnancy disease", or perhaps the most likely diagnosis will be "ketosis" a secondary condition that happens when the doe stops eating (in this case because she's too weak to do so) thus has to start living on her own body's reserves*. While ketosis was not the initial cause of the doe's difficulty, after a couple of days of being too weak to eat any food it will certainly become a major part of her problem! So it, too, must be dealt with fast! A veterinarian, recognizing the ketosis but not the hypocalcemia that caused it, will want to treat with glucose, etc. But it's absolutely essential that the doe be treated with calcium supplements** at the same time, without which she will either end up dead, babies and all, or with a c-section, with babies too young to survive, and a hefty vet bill as well. So it behooves the owner to take charge of this whole process right away, to treat the doe with calcium supplements for the hypocalcemia, and, if more than a day or two has passed before treatment was begun, with glucose for ketosis as well.

Cause: It's all about the food! Most cases are seen in does that are getting a hefty grain ration along with their hay, especially when they're getting grass hay instead of alfalfa. During the last 2 months of the doe's pregnancy, this type of grain/grass hay diet does not provide enough Calcium for both the fast-growing fetuses' bone development and for her own muscle tone as well, so depending on how many fetuses are draining calcium from her to build their little skeletons, at some point the babies will drain ALL of her calcium from her for their own needs, leaving her nothing to keep her heart going (the heart is a muscle) or to go into labor (the uterus is ALSO a muscle). And the more fetuses she's carrying, the sooner this will happen! With just 1 or 2 fetuses she may make it until she goes into labor, but then be too weak from lack of muscle tone to expel the babies in a timely manner***. Or if she does succeed in birthing the kids (often requiring the owner's assistance), starting lactation in a calcium-deficient state can lead to a sudden (and very surprising!) loss of milk production at some unexpected point during lactation.

Prevention: You CAN prevent this, just by feeding your pregnant does a proper diet during pregnancy! Pregnant does need a great deal of calcium in their diets, particularly in the last two months of gestation. That's when the fetuses, now having fully developed all their little parts, focus all their energy on growing rapidly, and in so doing drain large amounts of calcium from the mother's body. Calcium is only available in the diet if the doe is ingesting at least 2 parts (and no more than 5 parts) of calcium-providing food to every 1 part of phosphorus-providing food. “The calcium-to-phosphorus ratio of a food or supplement determines how much of the calcium is absorbed.” (http://www.askdrsears.com/html/4/T040600.asp, bottom of the article, #8 under “12 ways to boost your calcium”.)

The only really good Calcium-providing feeds are alfalfa and clover, because grass hay contains barely any at all. OTOH, ALL forms of grain contain a great deal of phosphorus (and almost no calcium whatsoever). So if you feed grain without the calcium available from alfalfa or clover, OR if you feed alfalfa or clover without the phosphorus available from grain, there will be NO calcium available in the diet you feed for the developing babies....

During the doe's pregnancy, there are only two basic feeding approaches that will prevent hypocalcemia.

(1) Provide her daily with a small amount of grain (for a mature dairy-sized doe that would be no more than one cup per feeding) along with a regular ration of alfalfa, or,

(2) If feeding a grass hay or pasture instead of alfalfa, give her NO grain at all. That's because while grass hay does in itself contain a proper ratio of calcium to phosphorus, the total amount of each is exceedingly low. But adding a heavy-phosphorus grain ration to it would turn the balance of calcium to phosphorus upside down to something like 1 Ca to 4 (or more) P, making NO calcium available to the doe, and setting her up for hypocalcemia in late gestation. To increase the availability of Calcium in this instance, provide a good free-choice loose supplemental trace mineral mixture that contains at least 16% protein (grass hay has only ~5%), along with a ratio of no lower than 2 parts of Calcium to each 1 part of Phosphorus (the amount of which could be nicely increased with the addition of powdered Di-Calcium Phosphate, available through feed suppliers as well as online.)

However, there's an ideal third option available for those who prefer to feed both grain and hay in late gestation, but because they don't have ready access to free choice alfalfa must instead either pasture their goats or feed them grass hay. If alfalfa pellets can be bought locally at a reasonable price, a perfect late gestation diet for prevention of Hypocalcemia would be a ration of 1 cup (by measure) of grain, added to (using the same cup) 3 cups of alfalfa pellets, fed 2X daily, along with all the free choice pasture or grass hay the does want to eat between meals, and free choice access to a good, loose, trace mineral supplement, and baking soda.

In an effort to help owners figure out just how much of what feed to give their late gestation does to provide that minimum 2:1 ratio, I recently wrote a technical nutritional analysis of how the 2 CA to 1 P balance works out in real-time farm-feeding measurements. (I'll be happy to forward a copy of that analysis to readers who'd like to read it.)

And then to translate the technical information in the article into useful terms, I calculated the actual weight of the (minimum) 2Ca:1P ratio diet I feed to my own Togg does. In so doing I found that at mealtime they each get 1 lb of alfalfa (a combination of 12 oz alfalfa pellets, ALL of which is devoured eagerly, and roughly 24 oz loose alfalfa free choice, some of which is generally wasted) along with 1 cup (1/4 lb by weight) of grain. That's roughly a per-meal ratio of 1 lb of calcium-containing food to each 1/4 lb of phosphorus containing food, translating to a daily ration of 4:1 (4 Ca to every 1 P), well-within the parameters of the acceptable calcium to phosphorus ratios of 2Ca:1P to 5Ca:1P that are needed to make calcium available in the diet.

Because when measuring them pound for pound we can see there's a difference in the volume of grain and alfalfa pellets, after calculating the above feeding ratio by weight I went back again and re-calculated it by volume. When I filled up my 1-cup grain-measuring container with alfalfa pellets instead, I discovered that it took exactly 3 of them to fill up my larger, alfalfa-measuring container. So, when measuring out a feeding of grain and alfalfa pellets for one animal, to provide the essential minimum of 2 Ca to 1 P ratio in that meal all you need to do is put 3 of the small scoops (or a larger scoop that holds the equivalent) of alfalfa pellets into the dish, and top it off with 1 small scoop of grain****!

Addendum: For readers that while feeding to prevent Hypocalcemia are concerned about other nutrients, such as protein, being available to their does as well, according to Ensminger and Olentine's Livestock Feeds and Nutrition Complete the average digestible protein content in grain is 11.2%, whereas in alfalfa it's 15.9%, in clover 10.5%, in beet pulp it's 14.1% and in grass hay 5.1%. The average digestible energy level in grain is 1.38%, in alfalfa it's 1.13%, in clover it's 0.93%, in beet pulp it's 1.32%, and in grass hay it's 1.8%. And, last but not least, the average crude fiber content in grain is 6%, in alfalfa it's 27.2%, in clover it's 25.7%, in beet pulp it's 15.17%, and in grass hay it's 28.2%.

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*When the goat doesn't get food from outside, it tries to stay alive by using its own reserves. Its own fatty tissue is used to provide energy, and in so doing it releases 'ketones' into the system. The ketones soon shut down the liver, hence the name 'ketosis'.

**The most effective calcium supplementation is done with CMPK, because it's made up of not just Calcium, but also Magnesium, Phosphorus, and Potassium, formulated to work

together as a team to make Calcium more quickly available to the body, and at the same time prevent an overdose of the Calcium (which when given alone can result in cardiac arrest) during restoration. BTW: I have a 'homemade recipe' for CMPK that I'll be happy to give to anyone that wants it.

***This delayed labor brought about by a lack of sufficient calcium to provide the uterus with proper muscle tone is also the cause of Floppy Kid Syndrome! The babies remain in the birth canal for too long before gaining access to oxygen, a process which sets up an acidosis in the brain tissue. This is why Sodium Bicarbonate is the treatment of choice to save the 'Floppy Kid", which it does by neutralizing the acidosis in the kid's brain.

****If the pregnant doe is lactating and still being milked, you can serve that grain/pellets combo to her while in the stanchion.

(While I urge you to share this information with other individual small ruminant owners, please do not reproduce the article for publication without my specific permission. Thank you. Sue Reith.)

CMPK - "Kitchen Recipe"

(For Use in Repairing Hypocalcemia)

by Sue Reith (1/07 update)

Here's the CMPK 'kitchen recipe'...

If a doe is already down this should be given to her every 2 hours for the first day, or longer if it takes more than a day to get her up and eating normally again... And then it should be given 2X a day for a week or so, and finally 1X a day until you feel she's totally stabilized again. The repair process will be quicker if she's already freshened (and especially if she's nearing the end of the lactation period anyway) when you figure out what's going on with her... I've had people ask for this recipe at any stage, from the last 2 months of gestation until practically the day they're ready to dry the doe off... All have had excellent response, as I anticipate you will, too...

To re-create the equivalent of a 30 cc CMPK dose (650 mg calcium; 500mg potassium; 150 mg phosphorus; and 96 mg magnesium) right in your kitchen, go to the Supplements department of any large chain-type drugstore and buy a bottle of Posture-D tablets (containing 600mg calcium, 266mg phosphorus, and 50mg magnesium), and bottles of Potassium tablets (500 or 550mg) and Magnesium tablets (150 or 250mg). Calculate the amount of each pill needed to come up with an equivalent to one 30cc dose of CMPK as spelled out above, and, using a pill cutter of some kind, create that amount, crush it up to a powder and serve it orally in a little yogurt. Or add some water to the mixture and dose it in a drenching syringe.

(I used to get pretty frustrated when goat owners would contact me late Friday night or on the weekend, totally unprepared, with an already-down hypocalcemic doe. Of course the people had no access to CMPK on a weekend, so that's really how the 'kitchen recipe' came into being. We combined my input on the actual chemical and nutritional makeup of the CMPK with the creativity of a couple of owners that were caught in just such a bind, and Voila! The Kitchen Recipe! The oral CMPK available for livestock tastes awful anyway, and burns the bejeebers out of the throat membranes besides, whereas the Kitchen Recipe, made up of pills intended for human consumption, tastes pretty OK!)

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