

# CASHMIRROR



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The monthly magazine devoted to cashmere goats and their fiber



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# CASHMIRROR

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## Tedious (Yet Important) Technical Information

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The *CashMirror* welcomes contributions of articles and photographs. Submissions may be made by mail, fax or e-mail.

No responsibility will be taken for material while in transit or in this office, although we will certainly be real careful.

**Cover photo: Goats staying cool at the pond  
Yvonne Taylor, Black Locust Farm, Washington, Maine**

## The Reinstalling Windows Song

(This is to be sung to the tune of

“When I’m Cleaning Windows” by George Formby)

I bought a new computer, it cost two thousand pound;  
But every time I switch it on it keeps on falling down.

I used to think it was my friend, now it drives me round the bend;  
You’d be surprised the time I spend—Reinstalling Windows.

I switch it on but what is this? There’s something wrong with  
CONFIG.SYS? This isn’t my idea of bliss—Reinstalling Windows.

Reboot again and what is that? I’ve gone and lost my SYSTEM.  
DAT? Would you ever credit that? Reinstalling Windows.

I want to share my printers and I want to share my files, I want  
to share my anger ‘cos it drives me bloomin’ wild.

Load disk four, oh what fun! It says it helps you get things done;  
Every day now everyone’s Reinstalling Windows.

Load disk ten and it will say, all you do is plug and play, so why  
do I spend every day—Reinstalling Windows?

It can’t locate my printer and it can’t locate my mouse; The other  
day it told me they were in Bill Gates’s house.

Still unplugged, still unplayed, I’ve E-mailed God in search of  
aid. He’s far too busy he’s afraid—Reinstalling Windows.

Up at dawn for one more try; Does it work? Can pigs fly? How  
do I expect to die? Reinstalling Windows.

It doesn’t like my modem and detests all CD-ROMs; let’s see if  
Setup Wizard recognizes bombs.

I used to like a drink or three; No time now, don’t call for me; I’m  
going to spend eternity—Reinstalling Windows.

- Author unknown



### We're Late! We're Late!

**We were doing so well, catching up on those back issues after we'd fallen behind this summer. As the astute reader on the previous page noticed—“it seems like we get a new magazine each week recently!” It wasn't quite that often, but we were catching up at a furious pace.**

**And now we're behind again. Never fear, you will get all your issues—eventually. Some day, we may even catch up permanently. However, until then, life gets in the way of our Publishing Empire from time to time and you'll need to be patient.**

**P.S. We won't bore you with our litany of excuses! However, one of them has to do with upgrading to Windows 2000... sigh...**



# Refractions

By GK001W (Mini-Pearl)

We in the barn just can't understand our humans. First they keep dumping straw in our pen all winter. We like to eat the straw, before it gets dirty, so we don't complain much about that. Now they are spending all their time cleaning it out. Go figure! Maybe they enjoy it. Digging it up with pitchforks into wheelbarrows and hauling out heavy loads to dump. To us, the damp, slimy stuff looks like the hair of the Orcs in Lord of the Rings. As long as they fill it back up with nice, clean, edible straw, I suppose we can live with it. I guess their boss, the little gray cat referred to as "The Mick", or "Mickey", has his reasons.

Speaking of the house cat, his latest is to ride the straw and hay bales up to the hay loft, and later demand to be lowered down the same way. Guess that's why they got the block and tackle rig. Elevator for cats.

The cat's people seem to obey his every command. For one so small, especially the head and tiny brain, he appears to be on top of everything, except when he hisses and spits at the Maremma dogs. But then, they just look at him strangely and walk off. Maybe he knows karate or something.

In any event, looks like we now have a good store of food for the winter. The hay looks good, but I wish they had more grain with molasses put away. We have had a lot of visitors this summer. Glad it's over. It seems that every time someone visits, more of us disappear. We hope they went to happy homes, but one hears rumors...

Unfortunately, it's the time of year they throw some of us ladies in with those smelly, gross bucks. Yuk! Every once in a while, one of the girls gets a dreamy look in her eye, and flirts with the buck. Then, in a few hours, or days, she wakes up to find his smelly scent all over her, and (luckily) can't remember what happened. Glad it's just once a year! They say we can't have those cute babies without them, but there should be a better way, don't you think?

Oh, NO!! They have closed off the "wild side" for the winter already! The best cherries and apples were over there. Now the deer will get them all! And I'm sure there were some blackberries left, too.

Life is hard, at Goat Knoll. Ah, well, back to the clean barn with new straw and a full loft of hay. Will have to remember to thank the cat.

## At Last—What We All Weren't Waiting For— A Cloned Cat!



Just what we need, more cats!

Goats, pigs, sheep and cattle have been successfully cloned. Now, Texas A&M has cloned a cat. The kitten, named "cc", is apparently doing well.

"With each new species cloned, we learn more about how this technology might be applied to improving the health of animals and humans," said Dr. Mark Westhusin, lead investigator on the project.

At least two companies are offering services to save DNA from your pets and/or livestock. Genetic Savings and Clone, is one and Lazaron Biotechnologies is another. You can even get gift certificates from G.S.&C. To our knowledge, no one is actually cloning pets commercially yet.

Do cloned cats need cloned mice to chase? And how about cloned fleas?

"So many cats, so few recipes."—anonymous



## Why is it Difficult to Find a Goat Vet?

Of the 45,000 veterinarians in private practice in the U.S. today, only 6,000 specialize in large animals, and nearly one-third of those are equine specialists. Another 3,400 have mixed practices.

Progressive Farmer, September, 2002  
<http://www.progressivefarmer.com>



## When Readers Talk...

CASHMIRROR:

ALWAYS AN INFORMATIVE MAGAZINE. ON THE DEHAIRING SURVEY. I DID ANSWER THE SURVEY. I AM NOT SURE THAT THE QUESTIONS GAVE A CLEAR VIEW OF THE SITUATION. IN MY SITUATION, I HAVE ONLY 10 GOATS. I USE THE HAIR FOR FLY TYING AND WE EAT THE EXTRA MALES. WE COULD RAISE MORE GOATS IF THERE WAS A PROFITABLE DEMAND FOR HAIR. I WAS NOT INTERESTED IN THE MACHINE BECAUSE OF LOW PROFIT / DEMAND FOR THE FIBER. I CAN USE THE COMBED HAIR FOR FLY TYING WITHOUT DEHAIRING. I DO UNDERSTAND THAT A LARGER AMOUNT OF FIBER AVAILABLE WOULD HELP IN MARKETING.

AS LONG AS THE MACHINE WAS NOT LARGER THAN A SNOWMOBILE, ATV, TRACTOR, LAWNMOWER, APPLE PRESS, OR GOAT I THINK MOST PEOPLE COULD FIND A SPACE. I WOULD THINK THAT DUST IS INVOLVED, SO IN THE HOME, USE WOULD NOT BE DESIRED.

AFFORDABLE? MOST HOMES HAVE COMPUTERS (\$1000 +). THE SURVEY DID NOT HAVE THE \$500-\$1000 OPTION. THE THIRD WORLD MARKET IS HANDLING A LOT OF PRODUCT BUILDING. (\$1000 US CAN BE WORTH UP TO \$10,000 FOREIGN ).

SOME PEOPLE DO NOT LIKE THE BUILD YOUR OWN, BUT I BELIEVE IF THEY WERE ASKED IF THEY KNEW SOMEONE WHO COULD HELP THEM, THEY WOULD SAY YES. MOST LARGE PRODUCTS SHIPPED TODAY REQUIRE SOME BUILDING. THE SAME APPLIES FOR REPAIRING IF PARTS ARE AVAILABLE.

IF THERE WERE A LARGE NUMBER OF GOATS AND A BIG DEMAND FOR FIBER, I BELIEVE SOMEONE WOULD HAVE ALREADY PUT OUT AN AFFORDABLE DEHAIRER. WHOEVER PUTS ONE OUT FIRST WILL MOST LIKELY CORNER THE MARKET.

WHAT I SAW IN THE RESULTS OF THE SURVEY WAS THAT A BUSINESS THAT HAD A DEHAIRER WOULD SELL AND WRITE BOOKS ON DEHAIRING, RAISING, MARKETING, USING FIBER, ETC. THERE IS A MARKET FOR CLASSES. THERE IS A DEMAND FOR

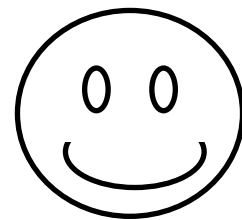
DEHAIRING MACHINES. THERE IS A MARKET FOR REPAIR PARTS. HAVING THE ONLY DEHAIRER AVAILABLE ON THE MARKET WOULD MAKE FOR A KEY ITEM IN A CATALOG WHICH WOULD INCLUDE GOAT SUPPLIES. I SEE A VERY NICE PROFITABLE BUSINESS ADDITION FOR A CASHMERE GOAT RAISER. ONLY SOMEONE WHO UNDERSTANDS A DEHAIRER COULD DO THIS SUCCESSFULLY.

ALVIN THERIAULT  
PATTEN, MAINE  
AUGUST 12, 2002

Hi Linda. I am so impressed—it seems like we get a new magazine each week recently! Either your kids are being very good and quiet or you have been sitting on some great articles for awhile. Truly, you and Paul and cat do a terrific job and we all appreciate your efforts and talents...

If I can remember to use up my roll of film, there may be a couple of cute pictures coming soon. Hope all is well. Thanks again for everything you do.

Marilee Williamson  
Foggy Bottom Farm  
Buchanan, Virginia  
June 28, 2002



### Big Buck Awards for Cashmere Goat Winners OFFF Cashmere Goat Show



**CashMirror Magazine is sponsoring a \$50 cash award to the best cashmere herd (Well, actually the \$50 will go to the owner/s of the winning goat herd; if it were given to the goats, they would probably just eat it.) selected at the cashmere goat show to be held in conjunction with the Oregon Flock and Fiber Festival, Canby, Oregon, September 21 - 22, 2002.**

**Northwest Cashmere Association is sponsoring a \$50 cash award to the Grand Champion cashmere doe selected at the cashmere goat show at OFFF.**



## Improving Livestock Diet and Nutrition

From USDA, ARS Newsletter *Healthy Animals*, 9/02

According to the old song, mares eat oats, and does eat oats, and little lambs eat ivy. But what do cows and goats eat? Would they rather eat something else? And how would it affect their health and production?

The availability of forage throughout the year, from crops grazed on rangelands and pastures or harvested as hay and silage, ensures livestock nutritional requirements are met. A well-fed, well-nourished animal is a healthy and productive animal.

The U.S. livestock industry contributes more than \$60 billion in farm sales every year to the economy. Forage-based livestock production ensures that forage is available and of ample quality to meet the nutritional requirements of farm animals. Producers need dependable resources and management practices that benefit livestock health.

An ARS national program, Rangeland, Pastures and Forages, is concerned with the sustained and productive use of our nation's natural resources. The program focuses on plant resources, forage management, grazing management and how it affects livestock production and the environment, as well as management of weeds and other pests. Resulting technologies and management strategies help maintain our rangelands and pastures.

A related national program, Food Animal Production, wants to improve growth and reproduction in livestock and poultry, while also maximizing production efficiency. Part of its mission is to examine how animals absorb and use nutrients. In order to improve animal nutrition, the program directs research in the chemical composition and availability of nutrients in feedstuffs. Researchers are exploring ways to achieve more efficient use of nutrients while also minimizing non-productive nutrient losses. They are determining the nutritional requirements of grazing and non-grazing animals, with special attention on functions such as reproduction, growth and lactation.

Across the country, ARS laboratories under the direction of these national programs are finding solutions to problems affecting the health and performance of livestock.

For example, researchers at the U.S. Dairy Forage Research Center in Madison, Wisconsin, want to improve digestibility and nutrition in forage crops such as alfalfa and corn silage by modifying their cell walls so animals can extract more nutrients from the crops. Studies there found red clover might be better silage than alfalfa in the Midwest. Cows eat less red clover silage but produce the same amount of milk, and less nitrogen is excreted as waste.

Researchers in Madison are developing an expert system using equations that describe how variables affect the nutritional value of forage, including the crop's growing environment, maturity at harvest time, how it's preserved and how it's processed. The Feed Information Technology (FIT) expert system combines data about the chemical composition of forage with information from the user to help better understand just how nutritious the forage is.

ARS researchers also are addressing specific animal health problems that producers often encounter.



**The Whiting thinks his future nutritional needs are being met just fine. Photograph by Diana and Steve Hachenberger, Castle Crags Ranch, Hamilton, Montana.**

Researchers at the Fort Keogh Livestock and Range Research Laboratory in Miles City, Montana, have found that if heifers are fed to maximize their growth from weaning to breeding, their skeletons and pelvises will be large enough to deliver their first calves more easily. Earlier, the Miles City researchers found that proper dietary levels of fat may help calves withstand cold temperatures.

Henry F. Mayland of the Northwest Irrigation and Soils Research Laboratory in Kimberly, Idaho, and colleagues bred a hardy, new tall fescue grass, "HiMag," to help protect cattle, sheep and goats from an affliction known as grass tetany. HiMag is unusually high in magnesium, so it should protect against a deficiency of this mineral in grazing animals' blood. Taste tests showed that the animals found the grass to be very palatable.

Mayland and other researchers also analyzed tall fescue grasses to see what chemical and physical properties grazing animals preferred. In another study, Mayland and colleagues found that cattle, sheep and goats favored hays harvested in the afternoon. Shifting the mowing of alfalfa hay from morning to late afternoon increased the animals' preference for the plant. The same results held up in grazing studies. Increased sugars in afternoon forage could explain the increased number of bites counted in afternoon grazing versus morning grazing.

These are just a few of the projects in these national programs addressing livestock diets and nutrition.

## Alternative Medicine—Defini-

You probably already know what all the following terms mean, but humor me while I write them down. I have a tendency to think that homeopathy means merely “natural” or “herbal” remedies, acupuncture has something to do with poking needles and am a bit vague or uninformed about the rest of the list. Mick hasn’t a clue about any of it, or if he does, he’s not inclined to tell.

**Acupuncture:** Stimulation of specific body points with pressure, heat, cold or insertion of needles, electrical stimulation or injection with assorted drugs. According to theory, acupuncture points on the body surface are related to internal organs and stimulation of the points aids in healing.

**Auricular Therapy:** A specialized branch of acupuncture where certain points on the ear are thought to relate to body organs. Stimulation of these ear points is thought to aid healing in corresponding organs.

**Acupressure:** Massage applied to acupuncture points.

**Tellington Touch:** A method of anxiety and stress relief developed by Linda Tellington-Jones, a horse trainer, used primarily for handling and training animals, called the T.E.A.M. approach (Tellington-Jones Equine Awareness Method). These procedures involve touching the animal in specific areas, in specific way.

**Chiropractic:** Based on the theory that health and disease are related to nervous system function. Using holistic approach, mechanical, chemical, or psychic factors which may have caused the disease, are identified and removed. Procedures frequently involve manipulation of the vertebral column to correct faulty bone alignment.

**Herbal Remedies:** Use of plants for treatment of ailments. Medicinal lore was passed down verbally through generations and eventually compiled into various books.

**Homeopathy:** System of therapy based on the work of Samuel Hahnemann, a German physician, (1755-1843).

Treatments involve use of compounds that have properties similar to signs exhibited by the patient in an attempt to amplify signs of a disease, as opposed to “traditional medicine which generally strives to suppress disease symptoms. Homeopathy also holds that substances become more potent with greater dilution.

**Kinesiology:** Technique of identifying a malfunctioning organ by testing strength of patient’s muscles.



**Goats! Gotta love ‘em—or so my people say.**

## Alternative Medicine for

Smith and Sherman, authors of our friend, the helpful and often complex [Goat Medicine](#), devote an appendix in their book to Alternative Medicine. They state that they offer the information primarily for veterinarians who are trying to understand and work with their patients’ owners who are experimenting with various forms of holistic medicine. They write brief summaries which cover various alternative methods of treatment to facilitate a general understanding and recommend that further references be consulted for more information. They also note that in some parts of the world, these alternative techniques are all that is available for treating and preventing illnesses in goats.

Acupuncture, as a treatment for pain and disease, is becoming increasingly accepted in the Western world. Veterinarians with experience in acupuncture in other species may be inclined to treat goats as well. Acupuncture is complex and takes much knowledge, training and experience to gain competency. [Goat Medicine](#) contains a chart (page 594) of the acupuncture points for goats. Acupressure for goats has not been well described or evaluated.

T.E.A.M. News International is a newsletter focusing on the Tellington Touch techniques for handling and training primarily horses. However, case reports for goats have occasionally been

**Continued on next page**

## Alternative Medicine

Continued from previous page

featured in the newsletter. This method, if effective, might help calm owners and goats after traumatic experiences such as dog or predator attacks. Other traumatic experiences including hospitalization or other training for the goat might be made easier and less stressful for the goat and the owner using these techniques.

Goat owners who find relief for themselves through chiropractic methods may be eager to seek similar treatment for their animals. A chiropractor, using a veterinary anatomy book, may be able to apply similar techniques to goats. However, Smith and Sherman note that results of these trials are normally unreported due to fear of prosecution for unlicensed practice of veterinary medicine by the chiropractor. A veterinarian could certainly ask a chiropractor to consult on animal cases to make use of these techniques.

Herbal remedies are old, no doubt passed down through the generations before Amazon.com was even started. Chemicals contained in plants are often the same as the active ingredients in drugs administered for animal ailments in contemporary medical treatment. However, many herbal remedies claimed are without scientific basis for their claims. This does not mean that they are not effective—it just means that they have not been proved effective in the traditional scientific method of study. Smith and Sherman note that among the testimonials there are claims of yucca relieving swelling of CAE arthritis, comfrey controlling hemorrhage, healing fractures and treating arthritis and foxglove curing heart disease.

In treating ailments with herbs, unlike commercial drugs, there is an uncertainty in the dosage. Compounds contained in plants are variable, depending on the stage of growth of the plant, time of collection and other factors. However, some believe that modern drugs which have been developed to be very potent, may cause multiple, serious side effects, not caused by using a natural mixture of compounds found in a natural plant.

Treatment of any serious disease with unfamiliar herbs, without consulting a veterinarian, can be very dangerous. It is easy for a non-veterinarian to mis-diagnose a goat's disease and even if properly diagnosed, choose the wrong chemical for treatment or choose the incorrect dosage. A caring goat owner may administer an ineffective treatment—or even a poison—rather than a cure to a cherished pet.

Sometimes a herbal remedy may be a helpful treatment for an ailment. Sometimes, too, the herbal remedy may not be the best treatment for the disease. An example is using herbs for parasite treatment. Both garlic and tobacco have some effect on internal parasites (worms), but may not be as effective as a commercially-produced drug. After any treatment, herbal or

other, the owner should follow up to make sure the treatment has achieved the desired results.

In England and the United States, human and animal illnesses have been treated using flower essences, called Bach Flower Remedies. Edward Bach, an English physician developed 38 remedies prepared from flowers and trees to be used to treat “negative states of mind” including fear, uncertainty, loneliness, oversensitivity, despondency, shock, terror and other undesirable mental states. For goats owners, treatment could be helpful in relieving the stress of injuries, surgery, kidding or move to a new home. These remedies can often be purchased at health food stores or mail order. It is noted that, again there is little scientific evidence regarding success of these treatments.

Homeopathy is popular in some countries, for both human and animal patients. It is normally used in conjunction with antibiotics and other allopathic medications. You can find recommendations for goats (if you read French) in the book or whatever it is:

*L'homéopathie/l'aromathérapie. Les Dossiers Techniques de l'Institut Technique de l'Élevage Ovin et Caprin. Paris. Undated. Anonymous.*

Another book (fortunately in English—the real English, not American English) also contains recommendations for goats:

Macleod, George, MRCVS, DVSM, *Goats: Homoeopathic Remedies*, Published by C.W. Daniel Company Limited, Essex, England, 1991.

Dr. Macleod, a veterinary surgeon, has also written books on homeopathy for horses, cattle, dogs and cats.

There have been no published scientific studies about the effectiveness of homeopathic treatments for goats.

When using Kinesiology in veterinary medicine, a surrogate—like a willing veterinary technician—is used to help locate the organ in the animal's body where normal energy has been disrupted by disease or injury. Once the problem area has been identified, treatment of the specific area can begin.



## Treating Livestock with Medicinal Plants: Beneficial or Toxic?

By James A. Duke, Ethnobotanist, ARS/USDA

Ethnoveterinary medicine is a growing area of research. More and more scientists, veterinary practitioners, field workers in developing countries, and livestock owners are becoming interested in medicinal plants. A simplistic definition for ethnoveterinary medicine is: local or indigenous knowledge and methods for caring for, healing, and managing livestock. This includes social practices and ways in which livestock are incorporated into farming systems.

### Introduction to Medicinal Plants for Livestock

The idea of using medicinal plants to treat livestock is not new. Many of the active ingredients in chemically manufactured drugs were originally derived from plant compounds (e.g., the pyrethroids). Also, in many developing countries, medicinal plants are still being used on a regular basis. (The use of plants and traditional methods for treating animals is called ethnoveterinary medicine.) There is a renewed interest, especially in developed countries, in using plants to treat livestock, pets, and humans.

### Why?

Many people believe that plants are less toxic and safer than manufactured drugs.

Many people believe that plants are more natural than manufactured drugs.

Medicinal plants can be made at home and are less expensive than manufactured drugs.

In developing countries, medicinal plants often are more accessible than manufactured drugs.

The big questions are:

Are medicinal plants effective for livestock?

Are they really safe?

Of the hundreds of plants used in ethnopharmacology, very few have been researched for their efficacy and toxicity. In the U.S., medicinal plants for humans are registered with the Food and Drug Administration. Medicinal plants for livestock currently are not sold on a wide scale in the U.S. Based on the U.S. Department of Agriculture regulations, medicinal plants for livestock must meet the same stringent requirements as other animal drugs if they are to be registered and approved for use in food producing animals.

Just because medicinal plants for livestock have not been registered, does not mean they are not accessible.

When reading about various plants please remember that:

There is incomplete toxicity information on most of these plants;



There is incomplete efficacy information on most of these plants; and

The toxic dose and potentially effective dose could be very close.

## Review of Dr. Duke's

### Phytochemical and Ethnobotanical Databases

By Paul Johnson

Dr. Duke, the author of the article at left, has compiled a expansive database of plants. This database can be found on the internet at: <http://www.art-grin.gov/duke/>

This database is searchable using specific queries. You can click on a plant in the list to learn about what is known and not known about a specific plant used in ethnoveterinary medicine.

I searched the database for plants containing selenium, a mineral often in short supply in our goats' daily diet. Part of a lengthy list returned of plants containing this mineral, ordered by amount of selenium, is contained on the next page:

**Continued on next page**

**Dr. Dukes's Database**

Continued from previous page

**Plants Containing Selenium (Partial List from Dr. Duke's Database)**

Species	Part	Quantity
Bertholletia excelsa BONPL. — Brazilnut, Brazilnut-Tree, Creamnut, Paranut	Seed	497 ppm
Nepeta cataria L. — Catnip	Plant	123 ppm
Silybum marianum (L.) GAERTN. — Lady's Thistle, Milk Thistle	Plant	171 ppm
Hibiscus sabdariffa L. — Acedera de Guinea (Sp.), Indian Sorrel, Jamaica Sorrel, Kharkadi, Malventee (Ger.), Red Sorrel, Rosa de Jamaica (Sp.), Rosella (Ger.), Roselle, Sereni (Sp.), Sorrel	Flower	143 ppm
Elytrigia repens (L.) DESV. EX NEVSKI — Couchgrass, Doggrass, Quackgrass, Twitchgrass, Wheatgrass	Plant	102 ppm
Polygonum multiflorum THUNB. — Chinese Cornbind, Chinese Knotweed, Fleeceflower, Fo Ti, He Shou Wu	Root	74 ppm
Agathosma betulina (P. J. BERGIUS) PILLANS — Buchu, Honey Buchu, Mountain Buchu	Leaf	70 ppm
Barosma betulina (P. J. BERGIUS) BARTL. & H. L. WENDL. — Buchu	Leaf	70 ppm
Cymbopogon citratus (DC. ex NEES) STAPF — Lemongrass, West Indian Lemongrass	Plant	62 ppm
Mentha pulegium L. — European Pennyroyal	Plant	25 ppm
Cypripedium pubescens WILLD. — Ladyslipper	Root	49 ppm
Valeriana officinalis L. — Common Valerian, Garden-Heliotrope, Valerian	Root	44 ppm
Caulophyllum thalictroides (L.) MICHX. — Blue Cohosh	Root	35 ppm
Berberis vulgaris L. — Barberry	Root	34 ppm
Cnicus benedictus L. — Blessed Thistle	Plant	34 ppm
Myrica cerifera L. — Bayberry, Candle-Berry, Southern Bayberry, Wax Myrtle	Bark	34 ppm
Althaea officinalis L. — Marshmallow, White Mallow	Root	33 ppm
Rhodymenia palmata — Dulse	Plant	33 ppm
Cimicifuga racemosa (L.) NUTT. — Black Cohosh, Black Snakeroot	Root	32 ppm
Cucurbita pepo L. — Pumpkin	Seed	32 ppm
Thymus vulgaris L. — Common Thyme, Garden Thyme, Thyme	Leaf	16 ppm
Trigonella foenum-graecum L. — Alholva (Sp.), Bockshornklee (Ger.), Fenugreek, Greek Clover, Greek Hay	Seed	16 ppm

This list of plants continues on—for pages. Do remember before you run out and try to get your goats to eat the most selenium-rich plants on the list that selenium can be toxic as well as deficient.

You can search the database for a specific plant to find out what chemicals it contains. A search for blackberry, a common nuisance plant around here, yielded the following information:

Chemicals contained in

Rubus fruticosus (Rosaceae) — Blackberry

2-HYDROXYURSOLIC-ACID Plant

ARBUTIN Leaf

ASCORBIC-ACID Leaf

BETA-AMYRIN Leaf

BORON Fruit 0.1 - 21 ppm

CHLOROGENIC-ACID Fruit

FERULIC-ACID Fruit

HYDROQUINONE Leaf

INOSITOL Leaf

LACTIC-ACID Leaf

MALIC-ACID Leaf

NEO-CHLOROGENIC-ACID Fruit

OXALIC-ACID Leaf

RUBINIC-ACID Plant

RUBITIC-ACID Plant

SITOSTEROL Plant

STIGMASTEROL Plant

SUCCINIC-ACID Leaf

TANNIN Leaf

URSOLIC-ACID Plant

I also checked out the chemical content of Scotch Broom:

**Continued on next page**

**Dr. Duke's Database**  
**Continued from previous page**

Chemicals contained in *Cytisus scoparius* (L.) LINK. (Fabaceae)—Scotch Broom  
 8-GLYCOSYL-5,7,4'-TRIHYDROXY-3'METHOXYFLAVONE Plant  
 ASH Seed 38,000 ppm  
 BETA-SITOSTEROL Seed  
 CHRYSANTHEMEXANTHIN Plant  
 CYTISINE Seed  
 DOPAMINE Plant  
 EPININE Plant  
 ESCULETIN Flower  
 FAT Seed 60,000 ppm  
 FLAVOXANTHIN Flower  
 FURFUROL Plant  
 GENISTEIN Flower  
 GENISTEIN-7,4'-DI-O-APIOSYLGLUCOSIDE Seed  
 GENISTEIN-7-O-GLUCOSIDE Flower  
 GENISTEINE Fruit  
 GIBBERELLIN-A-35 Plant  
 HYDOXYLUPANINE Seed  
 HYDOXYTYRAMINE Flower  
 HYPEROSIDE Flower  
 ISOSPARTEINE Flower  
 L(+)-TYROSINE Plant  
 L-DOPA Seed  
 LINOLEIC-ACID Seed 30,960 ppm  
 LUPANINE Seed  
 LUTEOLIN Plant  
 LUTEOLIN-4'-GLYCOSIDE Plant  
 METHYLOXYTYRAMINE Plant  
 ORIENTIN Plant  
 OXYTYRAMINE Plant  
 PROTEIN Seed 325,000 ppm  
 QUERCETIN Plant  
 QUERCETIN-GLYCOSIDE Plant  
 SAROTHAMNINE Fruit  
 SCOPARIN Plant  
 SPARTEINE Plant 2,500 - 15,000 ppm TANNIN Flower TARAXANTHIN Plant  
 TYRAMINE Plant  
 VITEXIN Flower  
 XANTHOPHYLL Flower  
 XANTHOPHYLL-EPOXIDE Flower

When I searched for Biological Activities of Scotch Broom, I found the following activities related to this plant:

Analgesic  
 Anorexic Dosage: 50 mg/kg scu rat  
 Antidote (Manganese)  
 Antiencephalopathic  
 Antifeedant  
 Antimorphinic Dosage: 100 scu mus  
 Antineuroleptic

Antiparkinsonian Dosage: 250-8,000 mg/man/day  
 Antireserpine Dosage: ED50=400 orl mus  
 Antitremor  
 Aphrodisiac  
 Arrhythmigenic  
 CNS-Active Dosage: 50 ivn rat  
 Cardiovascular Dosage: 12 ivn rat  
 Depressant  
 Diuretic Dosage: 1-2 g/man/day  
 Dopaminergic Dosage: 225 orl mus Dosage: 50 ipr rat  
 Emetic  
 Hallucinogen  
 Hypertensive  
 Hypotensive  
 Insectifuge  
 Miotic  
 Natriuretic

Spurge, dandelion and poison ivy contain an interesting list of chemicals as well. The database unfortunately did not contain a listing for my personal favorite, poison oak.

You can search for plants using either their common or scientific plant name. Dr. Duke has even made allowances for those of us who can't always come up with the correct spelling. If you're not sure of the spelling, leave the plant name blank and go to a grouping of plants by their first letter. You can then scroll through the list until you find the correct plant spelling.

You can search for a plant by concentration level of a particular chemical or you can also search for plants containing high concentrations based on a series of standard deviations.

You can also search for plants by ailment. You can find plants with properties which may be applicable for treating a particular medical problem. You can enter searches like "Pain" or "Wound" or "Fever" and you will find a list of plants that may be useful.

If you have an interest in using plants for medicinal purposes, you will want to poke around in the database. The database is not species-specific and while searching, don't forget to also review the lengthy warning printed along with it:

**WARNING:** Do not consult these databases unless you agree not to hold the compilers or the USDA liable for any errors or omissions. Data were gathered rather randomly from the literature on economic plants, none of which will ever be completely known phytochemically. These data were compiled by human beings, mostly Jim Duke and Stephen Beckstrom-Sternberg, from published, or rarely, personally communicated sources by human beings. To err is human! For any serious studies, values, especially deviant values, need to be rechecked with original sources.

Neither the compilers nor the USDA recommend self diagnosis

**Continued on next page**

**Dr. Duke's Database**  
Continued from previous page

or self medication; the compilers do urge serious studies of herbal alternatives, believing that in many cases, the herbal alternative may contain several synergistic compounds that will, in fact, do what empirical trials have suggested, as recorded in the folklore. Where these biologically active compounds occur in the edible portions of long established food species, we could be dealing with promising "food pharmacy" alternatives. Synergies often double the rates of biological activities, but sometimes increase them an order of magnitude or two or more. Plants usually contain synergistic suites of phytoprotective chemicals which are often responsible for their medicinal uses as well. Evolution would favor synergies and disfavor antagonisms in such suites of compounds. If we have learned anything in the preparation of this database, it is that the levels of biologically active compounds vary widely, often one or two, sometimes more orders of magnitude. An increase in one compound from a suite of compounds is usually compensated for by a decrease in another compound(s). All plants, like all animals, contain toxins and carcinogens. Even commonly ingested food plants, like peanuts, can be fatally allergic to sensitive people.



**"You want us to eat what???"**

**From the "Green Pharmacy"**

The following plants are listed as herbal remedies for the ailments listed. These are selected items listed from the book The Green Pharmacy, Rodale Press.

- Aging - Ginkgo, Evening primrose, Milk Thistle
  - Allergy - Garlic, Stinging nettle, Ginkgo
  - Alzheimer's Disease - Horseblam, Rosemary, Sage
  - Arthritis - Ginger, Red pepper, Pineapple, Stinging
  - Asthma - Coffee, Tea, Stinging Nettle, Ephedra, Licorice
  - Backache - Red pepper, Peppermint, Willow
  - Bad breath - Cardamon, Parsley, Eucalyptus
  - Baldness - Saw palmetto, Rosemary, Safflower
  - Bladder Infections - Blueberry, Yogurt, Parsley
  - Body Odor - Coriander, Vinegar, Baking soda
  - Bruises - Arnica, Parsley, Comfrey, Potato
  - Burns - Aloe, Garlic
  - Bursitis and Tendinitis - Willow, Ginger
  - Canker Sores - Myrrh, Tea
  - Cataracts - Bilberry, Rosemary, Catnip
  - Colds and Flue - Echinacea, Ginger, Garlic, Elderberry
  - Constipation - Flax, Psyllium
  - Cuts, Scrapes, Abscesses - Teatree
  - Dandruff - Soybean
  - Depression - Licorice, St. John's Wort, Ginger
  - Diabetes - Fenugreek, Onion
  - Dizziness (Vertigo) - Ginger
  - Dry Mouth - Jaborandi
  - Fever - Willow, Elder, Peppermint
  - Glaucoma - Jaborandi, Oregano, Kaffir Potato, Pansy
  - Gout - Celery, Chiso, Turmeric
  - Headache - Bay, Willow, Feverfew, Ginger
  - Heartburn - Camomile, Peppermint, Licorice, Dill
  - Hives - Jewelweed, Stinging Nettle, Parsley
  - Indigestion - Camomile, Ginger, Peppermint
  - Insect Bites - Mountain Mint, Citronella, Garlic, Basil
  - Insomnia - Lemon Balm, Valerianm Lavendar
  - Intestinal Parasites - Cinchona, Ipecac, Goldenseal
  - Laryngitis - Cardamon, Horehound, Ginger
  - Morning Sickness, Nausea - Ginger, Peppermint
  - Obesity - Plantain, Red pepper, Pineapple, Walnut
  - Pain - Clove, Willow, Red Pepper
  - Smoking - Licorice, Red Clover
  - Sore Throat - Eucalyptus, Licorice, Honeysuckle
  - Sunburn - Tea, Aloe, Eggplant, Calendula, Plantain
  - Toothache - Clove, Red pepper, Willow, Ginger
  - Ulcers - Ginger, Yellowroot, Licorice
  - Warts - Birch, Castor, Pineapple, Celandine, Banana
  - Worms - Ginger, Wormseed, Pumpkin, Papaya
  - Wrinkles - Horse chestnut, Cocoa, Sage, Carrot
- Of course, you won't use any of these on yourself or your animals without first checking with your doctor or veterinarian!**

## Ethnoveterinary medicine in the tropics—key issues and the way forward?

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### Introduction

Public funds and donor aid can maintain inappropriate and unsustainable systems and institutions for as long as the funds and aid continue to flow. But, once the financial support begins to fail, economic reality inevitably takes over and in the absence of other distorting factors more appropriate and sustainable systems tend to evolve. This scenario has been the recent history of many veterinary services in the tropics. For some time now these services, fashioned for the most part on a colonial model, have had to wrestle with sharply rising costs and the consequent unavailability of expensive synthetic drugs. As a result livestock keepers in many tropical countries are returning to, or staying with, the use of ethnoveterinary medicine (evm) to treat the health problems of their animals. This development is prompting a reappraisal of the potential and limitations of both ethno and modern veterinary medicine. The objective of this paper is to highlight the main issues in this reappraisal and to point to possible ways forward for ethnoveterinary medicine.

Definition and examples of ethnoveterinary medicine Mathius-Mundy and McCorkle (1989) have defined ethnoveterinary medicine as dealing with “the folk beliefs, knowledge, skills, methods and practices pertaining to the health care of animals”. For the purposes of this paper ethnoveterinary medicine is defined simply as the medicines that livestock keepers are using now, other than modern synthetic drugs.

In many mediterranean countries honey is used on wounds to promote healing (R A Prentis—Personal communication). The mode of action is believed to be partly achieved through an osmotic effect which draws fluid into the wound. This fluid serves to “flush out” dirt and other contaminants and thus promotes healing (Porth, 1994).

Old engine oil, i.e. containing sulphur, is widely used in Africa as a treatment for various skin conditions (Mathius-Mundy and McCorkle, 1989).

Wood-ash rubbed into animals' coats is commonly used by pastoralists to repel insects potentially carrying disease organisms (Mathius-Mundy and McCorkle, 1989).

In Ethiopia goatkeepers boil the leaves of the castor-oil plant (*Ricinus communis*) to provide a viscous liquid which they use to control mange in their goats. The active agent, ricin, is very poisonous and provides an example of an evm agent that must be handled with care, (Peacock, 1996).

There are many plants which have some anthelmintic effect and justify continued investigation: *Artemisia maritima*, *Caesalpinia crista*, *Melia azedarach*, *Mallotus philippensis*, *Chrysanthemum* spp., *Matteuccia orientalis*, *Carica papaya*, *Heracleum* spp., *Hedysarum coronarium*, *Aloe barteri*, *Terminalia avicennioides* and *Diospyros mollis*. (Hammond et al, 1997).

### Limitations of synthetic drugs

Modern antibiotics and anthelmintics can be dramatically effective when correctly used. But, the cost of these drugs and its consequences is a major disadvantage. If the cost of a treatment is a significant proportion of the value of the animal that is being treated then one or more things may happen:

- the animal is left untreated or a low cost evm method is used,
- the seller of the drug dilutes it to make it cheaper and so that it will “go further”. Monteiro et al (1998) in Kenya found that of seven anthelmintics marketed as containing lavamisole, an effective anthelmintic agent, two contained none, whilst two others had levels of lavimisole of 11.8% and 78.7 % of the amount stated on the label,
- livestock owners who buy costly drugs may also try to make them “go further” by diluting them, by underdosing or by not completing the full recommended treatment, as is often the case with antibiotics.

There is a further problem. Even when properly administered the long-term regular use of drugs and chemicals such as anthelmintics and acaricides leads to the loss of an animal's natural resistance. If for whatever reason the anthelmintics/acaricides are suddenly unavailable the animal is totally exposed to the worst effects of the parasites and organisms which these drugs are keeping under control. For this reason the routine use of acaricides, for example, has been questioned for some time (Norval, 1983).

### Advantages and disadvantages of evm

The advantages of evm are as follows:

- livestock keepers are already familiar with it, it is what they use now, a significant part of it appears to “work”. For example, in a preliminary experiment Bennet-Jenkins and Bryant (1996) tested the anthelmintic effect of *Eucalyptus grandis* leaves with feral goats. On autopsy these authors found 91% fewer *Haemonchus contortus* in the treated group as compared to the control ( $P < 0.05$ ).
- it is freely available or at a cost in proportion to the value of the animal,
- it is easily administered, usually topically or orally.

But evm is not without disadvantages and limitations:

- particular methods are often very localised and the scope for their further dissemination is limited,
- cures are variable in their effectiveness according to season,

**Continued on next page**

## Ethnoveterinary Medicine Continued from previous page

method of preparation etc., and few have been validated in the same way in which synthetic drugs must be validated,

- from a technical standpoint some are totally ineffective,
- evm has little or nothing to offer against the acute viral diseases of animals,
- evm is not always practical on a large scale. A particular evm method may require considerable amounts of leaves, seeds or even roots.

The major arguments for giving greater attention to evm include:

- it is what livestock keepers use now and by definition therefore, is the starting point for any animal health intervention,
- it would be unwise to rely on only one strategy for disease control i.e. modern drugs, when the strategy has so many limitations, some of which have been highlighted above,
- in the long-term the recognition of evm empowers those who practice it with potential benefits for increased participation in other areas of development.

The way forward - what now?

Evm is not universally recognised as a valid method of disease control. This is especially so in the more developed countries and especially in many veterinary schools in these countries. Even in the tropics many veterinarians and decision makers have not examined the potential of evm and/or have been trained to ignore or ridicule it. There is still therefore a need for the recognition, documentation and acknowledgement of evm in many countries.

Once it is acknowledged current evm practices may have potential for improvement. For example, in India, traditional healers reported that the decreasing supply of medicinal plants was a major limiting factor and they requested assistance with the drying and preservation of these plants in the rainy season for use when they were not readily available (Traditional healers, Personal communication).

A widespread view is that medicinal plants should be validated in western scientific terms. Even when funding for such work is available the researcher is faced with a level of variability that virtually defies control as required in traditional scientific experiments, e.g. species, time of year, growing conditions, method of collection, storage, preparation and administration.

If it is assumed that validation can be financed and carried out there are two possible outcomes. One outcome is that the plant has no statistically significant effect on the targetted organisms. For example, Hammond et al (1997), on the basis of a literature review suggested that *Mallotus philippensis*, widely used in Asia, could be effective as a broad spectrum anthelmintic. Following an actual evaluation of the dried powdered fruit of this plant, termed kamala, Jost et al, (1996) concluded that a particular sample of the dried fruit was ineffective against

particular gastrointestinal nematodes in particular goats indigenous to Balochistan, Pakistan. If a medicinal plant is found to be ineffective in an experiment there will be no campaign to stop farmers using it because nobody will be interested or prepared to fund it, and in any case farmers may not believe the negative result, and there may be some effect albeit in different circumstances and at different moments in time at a scientifically insignificant level.

If the validation proves positive as appears to be the case in several validations with pawpaw, (*Carica papaya*) (Satrija et al, 1995), what are the options? One sensible option is to encourage greater use of pawpaw as an anthelmintic through existing extension services and publications. But there are limits to the greater use of pawpaw in this way because of the work involved in preparing enough pawpaw for large numbers of animals and the limited number of pawpaws available. What will not be possible, because of lack of funds will be special campaigns to promote the use of pawpaw in this way or to extract and purify the active agent. Thus whether or not validation is carried out and whether or not it is positive seems unlikely to have much effect on the use of ethnoveterinary medicine by particular livestock owners who will continue to do what they can to protect the health of their animals.

## Conclusions

The key issues highlighted above are as follows:

- evm methods are appropriate for the circumstances of many if not the majority of livestock owners in the tropics,
- to be effective in the long-term modern drugs must be used in particular ways which most livestock owners do not appreciate,
- there is thus a place for both evm and modern methods according to circumstances,
- whilst the concept of local knowledge is global in its importance its practical application is very much at the local level where further investments should be concentrated in improving, if possible, a range of practices that are appropriate and sustainable.

## References

- Bennet-Jenkins E and Bryant C. 1996. Novel anthelmintics. *International Journal of Parasitology* 26:937-947.
- Hammond J A, Fielding D and Bishop S C. 1997. Prospects for plant anthelmintics in tropical veterinary medicine. *Veterinary Research Communications*, 21:213-228.
- Jost C C, Shermam D M, Thomson E. F and Hesselton R M. 1996. Kamala (*Mallotus philippensis*) fruit is ineffective as an anthelmintic against gastro-intestinal nematodes in goats indigenous to Balochistan, Pakistan. *Small Ruminant Research*, 20:147-153.
- Mathius-Mundy E and McCorkle C M. 1989. Ethnoveterinary

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## COCCIDIA INFECTION IN RUMINANTS

By CARMEL, D.K., S.M. BARAO, AND E.K. CASSEL  
From the National Dairy Goat Database (1992)

Parasites, living on or within an animal, always gain their livelihood at the expense of the host animal. Coccidia are one of many types of parasites of ruminant animals (cattle, sheep, goats). Nearly all ruminants are exposed to coccidia during their lifetime and subsequently carry the infection. Most animals infected with coccidia, however, do not show obvious signs of disease. This condition is known as subclinical coccidiosis. Regardless of whether or not an animal shows obvious signs of disease, coccidiosis has a significant impact on the economics of livestock production. Subclinical coccidiosis causes reductions in weight gain and feed efficiency, and increased susceptibility to other diseases. Clinical coccidiosis results in even higher financial losses for livestock producers than does subclinical coccidiosis, because of drug treatment costs, death losses and a more severe effect on growth performance.

### What Are Coccidia?

Coccidia are single-celled parasites that belong to a family of organisms known as Protozoa. The species of coccidia that are most detrimental to ruminants belong to the genus *Eimeria*. *Eimeria* species have a complex life cycle which involves development both within the infected animal and in the outside environment (Figure 1).

### Life Cycle of Coccidia

The life cycle begins when a ruminant animal ingests coccidia eggs, known as sporulated oocysts, from the environment. Inside the gastrointestinal tract, sporozoites within the oocyst are released, enter the epithelial cells lining the intestine or cecum, and form structures known as meronts. Meronts divide by an asexual multiplication process, and produce merozoites. Each meront can release hundreds of merozoites into the lumen of the gut. Merozoites penetrate other epithelial cells lining the gut, and continue their development in one of two ways. Merozoites can form second and third generation meronts which release additional merozoites, or they can divide into one of two sexual stages. The sexual stages are known as microgametes and macrogametes. The union of microgametes with macrogametes result in the production of oocysts. Oocysts break out of the epithelial lining of the gut and pass out in the feces of the infected animal. Each stage of development of coccidia within the animal causes physical damage. The damage to the lining of the intestines, and the animal's response to this injury are what are responsible for causing disease.

The whole process, from ingestion of the sporulated oocyst to the passage of oocysts, requires 21 days. The potential for producing large numbers of oocysts from the ingestion of a single sporulated oocyst is enormous. However, oocysts deposited in the environment must undergo additional development before they are infective. When the environment has adequate moisture, oxygen and temperature, the development of the infective stage (the sporulated oocyst) can occur in 24 to 48 hours. The sporulated oocyst can remain infective in the environment for prolonged periods of time, usually 2 to 3 months. Under certain conditions, they can remain viable for a year or more.

### What Animals Are Susceptible to Coccidiosis?

The three most common factors associated with the onset of coccidiosis in ruminants are: a severely contaminated environment (for example, a severe challenge exposure to coccidia oocysts) stress-related depression of the immune response of an animal to infection, and the pathogenicity (the ability of an organism to produce disease) of the coccidia species involved.

Coccidial oocysts survive best in moist, shaded areas. They survive very well at freezing temperatures, and are fairly resistant to common detergents. Coccidiosis is particularly a problem in confined animals. Concentration of confined animals creates heat and moisture which stimulates sporulation of oocysts. Further, transmission of oocysts is enhanced when soiled animals lick each other and when feed bunks and water troughs become contaminated with feces. Young goats, for example, may acquire massive infection when climbing in feed bunks where they and others defecate and then eat. Outbreaks of coccidiosis also can occur in animals on range or pasture, especially in dry years when animals concentrate around watering points

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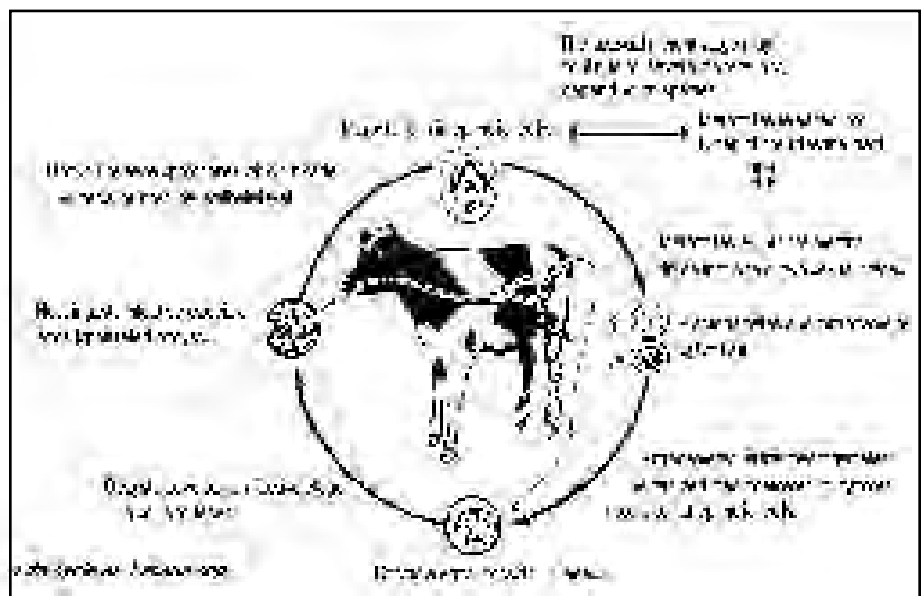


Figure 1. - Life Cycle of *Eimeria* spp.

**Coccidiosis****Continued from previous page**

which increases contamination of water and soil.

Coccidiosis is mainly a problem in young livestock, indicating that immunity may play a role in the protection of older animals. Long-term exposure to a given species of coccidia stimulates development of an immune response only against that particular species; thus coccidial immunity is species-specific. The magnitude of the immune response an animal mounts against various coccidia species differs, and breakdowns in immune protection, associated with either severe challenge or stress-related relaxation of resistance, do occur. Important stress factors that may lead to outbreaks of clinical coccidiosis include weaning, long-distance transportation, changes in diets, major weather changes, and parturition.

Differences in pathogenicity of species of coccidia occurs. In cattle, the species considered to have high pathogenicity are *Eimeria bovis* and *E. zeurnii*; in goats, *E. arloingi* and *E. ninakohlyakmova*; in sheep, *E. ashata* and *E. ovinoidalis*.

**What Are the Signs of Coccidiosis?**

Coccidiosis is actually two diseases: subclinical and clinical. Ruminants with subclinical disease do not show obvious signs of disease. These animals appear normal outwardly, but suffer from reduced feed consumption, feed conversion and growth performance. Subclinical coccidiosis characterizes 95 percent of the cases seen in ruminant livestock. The other 5 percent are clinical cases.

Clinical signs of disease include diarrhea, dehydration, weakness, depression, anemia, weight loss, rough hair coats, and death. The nature of the diarrhea (scours) associated with coccidial infection is variable. The diarrhea may or may not contain blood. Stools may vary from being soft to watery in consistency. Clinical coccidiosis can occur as a chronic, low-grade diarrheal problem, or as an acute, severe diarrheal disease.

On occasion, nervous signs of disease are associated with outbreaks of clinical coccidiosis. Nervous coccidiosis is characterized by muscle tremors, staggering, convulsions and occasional blindness. The majority of cases of nervous coccidiosis occur between January and March, when animals are often exposed to cold temperatures and marginal nutrition. The reasons why animals develop nervous coccidiosis are not clearly understood.

**How Can You Tell if an Animal Has Coccidiosis?**

The diagnosis of coccidiosis is based on the history of the animals affected (age, management, housing), observation of clinical signs (dehydration, unthriftiness and diarrhea, especially if the stool contains blood), and confirmation by finding oocysts in the feces. Oocysts are not present in the feces during the asexual development stages of the coccidia life cycle, so verification of disease due to coccidia cannot always be substantiated. Postmortem gross pathology and histopathology of the epithe-

lial lining of the intestines and cecum can be used to confirm the diagnosis of coccidiosis. A listing of other major causes of diarrhea in ruminants, depending on species and age, includes: *E. coli*, *Salmonella* spp., Rota virus, Corona virus, Bovine Viral Diarrhea virus, winter dysentery, *Cryptosporidia* spp., *Giardia* spp., intestinal helminthiasis, *Johnes* and clostridial enteritis. An accurate diagnosis by a veterinarian of the cause of diarrhea in a particular group of ruminants is essential. Otherwise, livestock producers may end up treating the wrong disease, and, in the process, wasting valuable time and money.

**How Should You Treat Coccidiosis?**

Successful treatment of clinical coccidiosis is limited for several reasons. First, drug treatment in a contaminated environment provides only temporary relief. Second, significant damage to the lining of the gut occurs before a veterinarian can confirm the diagnosis of coccidia and begin treatment. Third, limited success also is related to the fact that most drugs are coccidiostats (drugs that inhibit the growth of coccidia), and have only a limited coccidioidal effect (ability to kill coccidia). Finally, unless an animal is treated on an individual basis, addition of drug treatments to feed or water is less effective because the feed intake of affected animals is significantly reduced

Currently, clinical coccidiosis is treated with various sulfonamide compounds, or amprolium (Table 1). Clinical cases must be treated promptly or animals may die. It is extremely important not only to treat the sick animals, but also all herdmates. Once the clinical disease is treated, it is important to begin a prevention program.

**How Can You Prevent Coccidiosis?**

The most useful practice to reduce production losses due to coccidiosis is to prevent the disease by limiting exposure of susceptible animals to infective coccidia oocysts. This reduction is achieved mainly by feeding animals at feed bunks raised above the ground and by providing as clean an environment as possible through routine waste removal. Exposure of pens and stalls to sunlight (at least 4 to 8 hours per day) and dryness (humidity less than 25 percent) are bargain methods that reduce exposure of animals to infective oocysts.

Preventative drug treatments during expected stress periods may reduce the number of animals affected (Table 1). Livestock should be given preventative drug treatments at weaning, prior to parturition or long-distance transport, during major changes in feed diets, and throughout intensive grazing of pastures. In farm situations that are favorable to the development, survival and transmission of coccidia, feeding preventative drugs on a continual basis may be warranted, although long-term use of amprolium is not recommended. Drugs used in the prevention of coccidiosis should not be fed to lactating animals. It is essential that producers follow the manufacturer's labeled instructions for mixing and feeding these drugs. Toxic reactions may occur in animals that receive excessive amounts of any of the

**Continued on next page**



## Coccidiosis

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coccidiostats. Do not feed premixes or supplements containing coccidiostatic drugs to horses or other equines, because ingestion may be fatal.

Rumensin (Elanco) is licensed as a growth promotant but is not labeled for use in preventing coccidiosis. However, studies have shown that Rumensin does have sufficient effects against the developing stages of *Eimeria* spp. to prevent outbreaks of coccidiosis. Both Deccox (Rhone-Poulenc) and Bovatec (Roche) are licensed as growth promotants and coccidiostats. The low-dose administration of any one of these three growth promotants apparently does not interfere significantly with an animal's ability to develop partial immunity against coccidia.

The implementation of a coccidiosis prevention program should be a standard procedure in an effective disease management program, because of the almost universal occurrence of coccidiosis in ruminant animals. The most cost-effective means of reducing subclinical production losses associated with coccidiosis is through prevention-not treatment of coccidial infection.

**TABLE 1. Compounds used in the treatment or control of coccidiosis in ruminants**

Drug For Treatment	Animal	Recommended Dosage	Formulation/ Application
Sulfaquinoxaline	cattle, sheep, goats	8-70 mg/kg BW (a) for 5 days	soluble powder or feed additive
Amprolium(b)	cattle	10 mg/kg BW for 15 days	1.25% crumble, 9.6% solution, or 20% soluble powder
Amprolium(c)	sheep, goats	25-50 mg/kg BW for 5 to 10 days	as above
For Prevention Amprolium	cattle	5 mg/kg BW for 21 days	as above
Decoquinate(d)	cattle, goats	0.5 mg/kg BW for 28 days	feed additive
Lasalocid(e)	cattle, sheep	1 mg/kg BW for 6 weeks	feed additive
Monensin(f)	cattle	1 mg/kg BW	feed additive

(a) mg/kg BW = milligrams per kilogram of body weight.

(b) Corid (MSD Agvet).

(c) Not licensed for use in the United States.

(d) Deccox (Rhone-Poulenc).

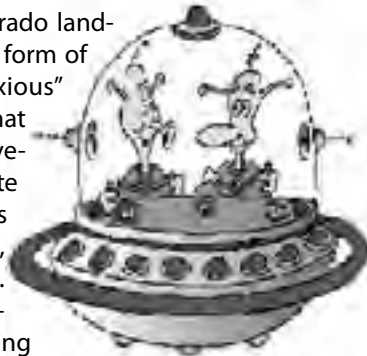
(e) Bovatec (Rhoche Animal Health and Nutrition).

(f) Rumensin (Elanco). Not licensed as a coccidiostat.

## Colorado Noxious Weeds

From the Colorado State Extension Service  
<http://www.ext.colostate.edu/ptalk/2103/html>

Aliens have invaded the Colorado landscape! These aliens are in the form of non-native weeds called "noxious" in Colorado. They've gotten that name because of their invasiveness, aggressiveness and the rate in which they spread. Noxious weeds are difficult to control, and most are very adaptable. They also can withstand a variety of harsh conditions, including climate extremes, drought and poor



soils.

There are approximately 1 million acres of noxious weeds in Colorado. The weeds cost Colorado residents more than \$10 million annually in lost productivity. Noxious weeds often displace native plants. Many native species have been forced out of their natural habitat.

There are several noxious weeds in Colorado. Among the worst are leafy spurge, spotted knapweed, diffuse knapweed, Russian knapweed, Canada thistle, musk thistle, Dalmatian toadflax, yellow toadflax, field bindweed and purple loosestrife.

Weed management includes cultural practices such as avoiding overgrazing, re-vegetating disturbed soils and maintaining the vigor of desirable grasses or other plants that compete with weeds. The easiest time to control noxious weeds is when only a few plants are present. Mowing weeds before their seeds are mature will help prevent the seeds from spreading and will reduce weed vigor.

Biological control can involve using livestock such as sheep and goats to graze on weeds, which reduces their vigor. It also may involve introducing a specific disease or insect to affect weeds. Biological control has proven to be effective to varying degrees on some weeds.

Herbicides may be used on noxious weeds as part of an integrated control strategy, often in combination with cultural and biological controls.

For more information, see the following Colorado State Cooperative Extension fact sheets.  
Weed Management for Small Rural Acreages  
Musk Thistle Range and Pasture Weed Management Leafy Spurge  
Diffuse and Spotted Knapweed  
Russian Knapweed

## Dread Diseases

We apologize! It seems every time we run an article on some dread disease, such as anthrax, foot and mouth, West Nile Virus, it appears in the "major" media a few weeks after we publish. It is really not our fault! Based on our track record, we have decided that we will no longer run articles on dread diseases, at least until after the mainstream media has reported on it. The Ace Reporter, whose investigative skills are beyond compare (or so he claims—Ed.), will be assigned other duties, such as writing warm, fuzzy anthropomorphic stories about a certain cat, or some such drivel.

PS: my next "Dread Disease" was to be Q fever. The half-finished story hit the cutting room floor. You'll have to blame the cute but authoritative Editor.

## Abscesses, Cysts and Lumps, Oh My!

Most of us have found lumps on a goat on occasion. This is common for goats. Our first "lump" gave us a fright, with visions of CL (Caseous Lymphadenitis), Lymphosarcoma, or some such dread problem. Neither of these proved to be the case. Our region of the country is inundated with blackberries, and their thorns are a hazard to goats as well as us humans who love the berries. Vaccination injection sites can also become infected with a piece of dirt or hair when the hollow needle punctures the skin. Other causes can be bites from other animals, a sharp piece of wire or metal or a sharp stick. We select our injection sites away from lymph glands, near the middle of the lower neck close to the shoulder, which helps your piece of mind when you find that lump. Most disappear in a few days or weeks. If not, you can contact a vet, or if adventurous, drain the abscess, once you are sure it is ripe. Care must be taken not to cause more problems. Use diluted iodine or another disinfectant. Use a small incision on the lump, not through it, and drain the pus before applying the disinfectant. Antibiotics can be used if the site is large or slow in healing. FYI, CL abscess fluid is thick, caseated, and has no odor. If the lump ruptures on it's own, isolate the goat and have the fluid checked. As in all things, check with your veterinarian to be sure.

Goat Medicine, Mary C. Smith, David M. Sherman Goatkeeping 101, Caprine Supply  
Veterinary Guide for Farmers, GW Stamm  
CashMirror, April, 2000

# APHIS Weed Policy

Prepared by APHIS, Plant Protection and Quarantine

## Introduction

The mission of the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) is to protect America's animal and plant resources by:

- Safeguarding resources from exotic invasive pests and diseases,
- Monitoring and managing agricultural pests and diseases existing in the United States,
- Resolving and managing trade issues related to animal and plant health, and
- Ensuring the humane care and treatment of animals.

The APHIS mission is an integral part of the USDA efforts to provide the Nation with safe and affordable food. To achieve this mission, APHIS conducts programs that are designed to prevent the introduction and spread of certain nonindigenous (foreign-origin) pests into and within the United States. Pests of concern to APHIS include certain insects, plant diseases, animal diseases, mollusks, nematodes, and weeds.

## The APHIS Weed Program Mission Statement

APHIS will use modern technologies to prevent the introduction of parasitic-plant pests and noxious weeds (federally listed or candidates) into the United States. APHIS will exclude, detect and eradicate newly introduced weeds that pose the highest risk to US agriculture or the environment. APHIS may cooperate with other agencies to achieve environmentally sound and desirable forms of integrated management against introduced invasive plants. Some have termed nonindigenous weed species "biological pollutants" because their presence upsets the balance among native species within natural and agricultural ecosystems. Unlike chemical pollutants that degrade over time, biological pollutants have the potential to persist, multiply, and spread. Free from competition from co-evolved biological and native environmental restraints, introduced species often displace native plant life in natural areas over a period of time. In agricultural systems, they may complicate existing weed management practices and reduce crop production. The value of annual crop losses from weeds is estimated at about \$20 billion (in 1991 dollars). ("The Costs of Invading Pests to U.S. Agriculture," APHIS PPD, March 1993.) A major portion of the losses due to weeds are attributable to nonindigenous (foreign-origin) species.

Because APHIS is vitally interested in furthering an effective, science based, up-to-date integrated pest management approach to the control and management of weeds, APHIS is committed to developing a sound policy towards weeds which could be used to guide the development and eventual implementation of an integrated, comprehensive APHIS weeds program.

The weed policy is organized into sections that encompass the primary issues identified and discussed by APHIS and

non-APHIS interviewees and/or by the weed policy project's steering committee during the course of the project (1991-93), and revised in 2000 following passage of the Plant Protection Act. The Act replaces the Federal Noxious Weed Act and many other APHIS Plant Protection Authorities. The Policy was revised to reflect the recently revised APHIS Strategic Plan (2000-2005).

## APHIS Weed Policy (revised fall 2000)

Faster, more frequent, and wider-ranging transport of both people and products in recent decades has greatly expanded opportunities for introductions of foreign species into the United States. Foreign species, brought unintentionally or intentionally by vessel, air, and overland from places formerly isolated, may become established in this country with little or no competition from native species, and eventually displace some of those native species.

Goal 1: Effectively exclude noxious weeds of quarantine pest significance not yet present in the United States.

Goal 2: Detect incipient populations early, and implement appropriate responses to new introduction or spread of noxious weeds of limited distribution.

Goal 3: Cooperate with other agencies to manage invasive plants with integrated pest management tools, minimizing the risk to agricultural production, natural resources, and human health.

Goal 4: Serve the public effectively by promoting public awareness regarding noxious weeds and noxious weed programs.

## Goals, Strategies and Action Items for 2000-2002

Goal 1: Effectively exclude new weeds

Proposed Strategies to Achieve the Goal:

Risk assessment: Use risk assessment processes that follow international standards to support identification of weed species to be regulated, provide classification of undesirable plant species, and determine appropriate regulatory action.

Permits: Evaluate permit requests for importation and interstate movement permits for regulated Federal noxious weeds (FNWs). The conditions of the permit will require appropriate safeguards.

Weediness Screening: Explore revision of the nursery stock quarantine to require risk assessment before a commodity is approved for entry.

Enforcement activities: Provide support to APHIS enforcement personnel to reduce introduction and spread of FNW.

Environmental protection: Include potential environmental

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## **APHIS Weed Policy**

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impacts in risk assessments to determine if a weed species should be listed as a FNW.

### **Action Priorities for 2001-2002:**

Complete risk assessments for at least 10 weeds not known to occur in the U.S. by 2002. Publish a proposed rule by 2002 to list new species identified by risk assessment, and add sections on the petition process and mandatory treatment for niger seed, a weed pathway. Continue to work with the professional societies and external partners to identify weeds not known to occur in the US nor currently recognized as noxious weeds. Participate in public meeting to begin discussions on weediness screening of propagative plant material (January 2001). Develop, refine and recommend treatments for weed devitalization.

### **Goal 2: Detect, implement responses**

#### **Proposed Strategies to Achieve the Goal:**

Identify pests of concern: Through use of the New Pest Advisory Group system, provide a forum for discussion and decision-making support for regulatory decisions regarding taxa newly introduced or of limited distribution.

Early detection: Encourage reporting to APHIS of newly introduced or newly detected populations of plants of concern through use of State, Federal and other plant professionals by supporting a National Early Warning System. Development of Integrated management plans: Coordinate development and implementation of program options for eradication, biocontrol or other appropriate control or management measures for targeted taxa. Cooperate with State, local, and other Federal agencies to eradicate designated invasive plants. Survey: Provide support for State and Federal survey efforts to characterize populations of plants of regulatory concern.

Delisting: Provide support for decision-making regarding removal from regulated status of FNW determined to be beyond the scope of APHIS's regulatory authority.

Environmental compliance and monitoring: Support compliance with environmental statutes (NEPA, ESA, FIFRA) in the planning process. These processes will require liaison with appropriate APHIS staff (e.g. Environmental Documentation and Environmental Assessment and Monitoring) and staffs of other agencies, such as U.S. Fish and Wildlife Service.

### **Action Priorities for 2001-2002:**

Canvass the States for incipient populations of newly introduced species known only at the local level. Complete timely risk assessments (using NPAG) for newly introduced species. (Ongoing) Coordinate through APHIS Plant Health Directors detection and delimiting surveys for Federal noxious weeds and new introductions through the CAPS program. Report new finds into the NAPIS database. With State Departments of Agriculture, develop official control programs for priority Federal noxious

weeds of limited distribution. Provide coordination for APHIS FNW eradication activities among regional, field, and national headquarters program staffs. Assist in the development of early response systems for weeds.

### **Goal 3: Cooperate with other agencies**

#### **Proposed Strategies to Achieve the Goal:**

Risk assessment input from partners. Expedite the risk assessment process by encouraging interested partners to submit data or draft risk assessments regarding the weediness of candidate species. Encourage review and consultation with appropriate APHIS and external scientists during development of risk assessments Survey. Provide support for State and Federal survey efforts to characterize populations of plants of regulatory concern. Encourage development and utilization of new technologies for remote sensing of weed populations. Interagency liaison. Support Federal initiatives to minimize introduction and spread of invasive plants through participation in interagency initiatives such as FICMNEW and the Invasive Species Council. Data management. Work with cooperators to coordinate an appropriate information management system for invasive weeds. Provide specific input on FNW.

### **Action Priorities for 2001-2002:**

Target A2 weeds, or candidates for FNW list, for CAPS survey. (Inula britannica, for one) Work with stakeholders to identify and rank Category C weeds. Develop cooperative action plans and MOUs with external partners for targeted weeds. Through the APHIS-NRCS partnership, develop the PLANTS Internet site to provide increased data management capability.

### **Goal 4: Serve the public effectively**

#### **Proposed Strategies to Achieve the Goal:**

Communication strategic plan. Develop and implement an effective communication strategy regarding the providing of public information on weeds and weed risk. Encourage awareness. Market and increase awareness of PPQ program activities relating to noxious weeds. Cooperate. Establish formal linkages and cooperative communication strategies with other Federal, State, and local weed programs. Participate in the activities of appropriate professional societies. Audience education. Reduce the interstate movement of FNW through audience education. Provide seminars, presentations, training workshops; on-site consultations to cooperators, stakeholders, and other public groups; write and publish articles and books on invasive plants of regulatory concern.

### **Action Priorities for 2001-2002:**

Develop a poster for the aquarium/aquatic plant dealers & their customers, identifying aquatic Federal noxious weeds by end of 2000. Develop a poster on Federal noxious weeds for the traveling public by end of 2001. Develop fact sheets for high-risk Federal noxious weeds or candidates. (Ongoing).

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## APHIS Weed Policy

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#### Definitions

Key to development of an APHIS weed policy is how the term “weed” is defined. The broader the definition, the larger the (potential) scope of APHIS weed programs. This policy defines “weed” broadly, not limited to species identified in current legislation. Weed: Any plant that poses a major threat to agriculture and/or natural ecosystems within the United States.

Current Federal laws/regulations contain several related definitions as follows: Noxious Weed: “any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry or other interests of agriculture, irrigation, navigation, the natural resources of the United States, the public health, or the environment.” (Plant Protection Act).

APHIS regulations in 7 CFR 360 currently list approximately 94 taxa that are defined as noxious weeds.

Undesirable Plant Species: “Plant species that are classified as undesirable, noxious, harmful, exotic, injurious, or poisonous, pursuant to State or Federal law. “Species listed as endangered by the Endangered Species Act of 1973 shall not be designated as undesirable plants under this section and shall not include plants indigenous to an area where control measures are to be taken under this section.” §2814 of 7 U.S.C. 360; the Federal Noxious Weed Act (FNWA), the only part of FNWA remaining in effect. This section is now incorporated into the Plant Protection Act>

Plant pest: “The term “plant pest” means any living stage of any of the following that can directly or indirectly injure, cause damage to, or cause disease in any plant or plant product:

- A protozoan.
- A nonhuman animal.
- A parasitic plant.
- A bacterium.
- A fungus.
- A virus or viroid.
- An infectious agent or other pathogen.

Any article similar to or allied with any of the articles specified in the preceding subparagraphs.” (Plant Protection Act).

Noxious Weed Seeds: Two different definitions in the Federal Seed Act:

Defined as the seeds of 11 specified species. (*Lepidium draba* L., *Lepidium repens* (Schrenk) Boiss; *Hymenophyllum pubescens* C. A. Mey, whitetop; *Cirsium arvense* (L.) pers., Johnsongrass; *Convolvulus arvensis* L., bindweed; *Centaurea picris* Pall., Russian knapweed; *Sonchus arvensis* L., perennial sow-thistle; and *Euphorbia esula* L., leafy spurge.) Any other kinds of seeds or

bulblets that the Secretary finds should be included may also be classified as noxious. (Foreign Commerce provisions of the Federal Seed Act) Defined as the “seeds or bulblets of plants recognized as noxious— by the law or rules and regulations of the State into which the seed is offered for transportation, or transported; by the law or rules and regulations of Puerto Rico, Guam, or the District of Columbia in which sold; or by the rules and regulations of the Secretary of Agriculture under this Act, when after investigation he shall determine that a weed is noxious in the United States or in any specifically designated area thereof. (Interstate Commerce provisions of the Federal Seed Act)

Integrated Management System: “A system for the planning and implementation of a program, using an interdisciplinary approach, to select a method for containing or controlling an undesirable plant species or group of species using all available methods, including:

- (A) education;
- (B) preventive measures;
- (C) physical or mechanical methods;
- (D) biological agents;
- (E) herbicide methods;
- (F) cultural methods; and
- (G) general land management practices such as manipulation of livestock or wildlife grazing strategies or improving wildlife or livestock habitat.”

Interdisciplinary Approach: “An approach to making decisions regarding the containment or control of an undesirable plant species or group of species, which— (A) includes participation by personnel of Federal or State agencies with experience in areas including weed science, range science, wildlife biology, land management, and forestry; and (B) includes consideration of— (i) the most efficient and effective method of containing or controlling the undesirable plant species; (ii) scientific evidence and current technology; (iii) physiology and habit of a plant species; and (iv) economic, social, ecological consequences of implementing the program.

Continued on next page

So far, HiMag has been tested not only in Idaho and Missouri, but also in Utah, Texas, Arkansas, Georgia, Virginia, and New York, as well as in Canada. Scientists recommend it for rain-fed pastures in eastern, southeastern, and Pacific Northwestern states and British Columbia.

The idea of breeding a high-magnesium forage grass to combat grass tetany isn't new. But the ARS and University of Missouri researchers are the first to accomplish that with tall fescue.

ARS grazing trials in Idaho with a dozen Angus and Angus-Hereford heifers indicated that the cattle find the plant palatable and will make profitable weight gains. When given a choice among HiMag and seven other tall fescues, HiMag garnered a respectable third-place.

Such a reality check with four-legged customers is crucial: Plant breeders elsewhere have learned the hard way that no matter how healthful a forage is, animals may turn up their noses at it if they don't like the taste or aroma.

The grazing test included only tall fescues that were free of a troublesome microbe known as an endophytic fungus. Cattle that graze on infected fescue may not gain as much weight as they should and may also have reproductive problems. Nevertheless, tall fescue is planted on more acres of American pastureland than any other type of forage grass.

Grass tetany is often fatal. Symptoms include nervousness, convulsions, and paralysis. Sometimes, potassium plays a role in the disease by outcompeting magnesium for what are known as absorption sites in an animal's gut. That can happen if hungry ruminants graze on pastures that have been overloaded with high-potassium commercial fertilizers or potassium-containing manure.

Preventive measures include adding magnesium to drinking water or salt licks or spreading it around the pasture with a fertilizer spreader. Each tactic has drawbacks. Spiking trough water with magnesium, for example, works only if animals will make the trip to the trough—which may be a mile or so away. They might choose instead to guzzle rainwater from a convenient puddle or ditch.

"A palatable, magnesium-rich forage," says researcher Shewmaker, "is a better guarantee that the animals will get the right amount of this essential nutrient."

This research is part of Soil Quality and Management, an ARS National Program.

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## What's New? HiMag Fescue

From the *Agricultural Research* magazine (4/99)

By Marcia Wood, ARS Information Staff

A hardy new grass called "HiMag" may help protect cattle, sheep, and goats from an affliction known as grass tetany.

When ruminants—animals with four stomachs—have too little magnesium in their blood, grass tetany can result. Also known as hypomagnesemia, grass tetany causes an estimated \$50 to \$150 million in livestock production losses each year in the United States.

Because it is unusually high in magnesium, the new tall fescue grass should help protect vulnerable animals from magnesium deficiencies. Plans call for HiMag seed to be made available to plant breeders this year.

Investigators Henry F. Mayland, who is with ARS at Kimberly, Idaho; Glenn E. Shewmaker, formerly with ARS and now at the University of Idaho; and David A. Sleper and colleagues at the University of Missouri developed HiMag in a cooperative effort that began in 1983.

As part of the HiMag collaboration, Shewmaker and Mayland scrutinized mineral levels of hundreds of candidate forage plants. They did the work at the ARS Northwest Irrigation and Soils Research Laboratory at Kimberly. HiMag had up to 20 percent more magnesium than some of the other plants they examined. And their greenhouse tests showed that levels of magnesium remained high in two successive generations. Page 22, August 2002

# What's in a Weed?

By Paul Johnson

Okay, we all know goats eat weeds. We all know what's in it for the weed—total annihilation of life as they know it. But, what is in it for the goats? I researched the subject, and share my findings below. There are some good web sites where you can check the contents of many plants (weeds).

A simple but limited database is the USDA Nutrient Database for Standard Reference at:

[http://www.nal.usda.gov/fnic/cgi-bin/nut\\_search.pl](http://www.nal.usda.gov/fnic/cgi-bin/nut_search.pl)

An example lists what can be found about our prolific "friend" the Dandelion—in the table at right.

The plant data base I favor is: USDA - Dr. Duke's Phytochemical and Ethnobotanical Databases at:

<http://www.ars-grin.gov/duke/>

You can search this data using many different criteria (see article this issue beginning on page 9). Other useful and interesting web sites relating to plants are:

<http://plants.usda.gov/>

For pictures go to: [http://plants.usda.gov/cgi\\_bin/topics.cgi?earl=fact\\_sheet.cgi](http://plants.usda.gov/cgi_bin/topics.cgi?earl=fact_sheet.cgi)

Washington State noxious weeds: [http://www.wa.gov/agr/weedboard/weed\\_info/contents.html](http://www.wa.gov/agr/weedboard/weed_info/contents.html)

Poisonous Plant database: <http://www.vet.purdue.edu/depts/addl/toxic/over1.htm>

Other good sites:

<http://www.ansci.cornell.edu/plants/medicinal/other.html>

<http://www.ansci.cornell.edu/plants/medicinal/comp.html>

<http://www.quackwatch.org/> <http://altvetmed.com/>

<http://www.pitt.edu/~cbw/altm.html>

USDA Noxious Weed search page

[http://plants.usda.gov/cgi\\_bin/topics.cgi?earl=noxious.cgi](http://plants.usda.gov/cgi_bin/topics.cgi?earl=noxious.cgi)

USDA Herb Hunters Guide American Medicinal Plants of Commercial Importance

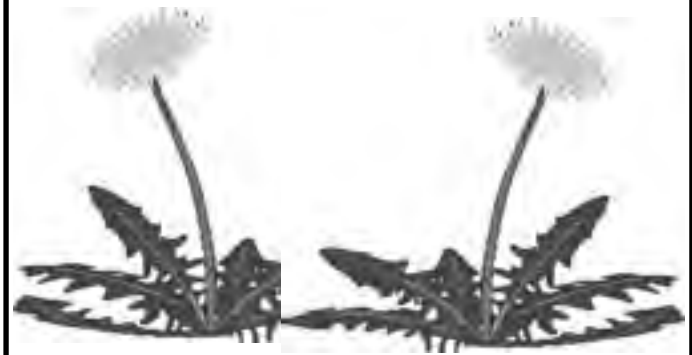
<http://www.hort.purdue.edu/newcrop/HerbHunters/hhunters.html>

Dandelion Greens, Raw

Scientific Name: *Taraxacum officinale*

NDB No: 11207

Nutrient	Units	Value per 100 grams of edible portion
Proximates		
Water	g	85.60
Energy	kcal	45
Energy	kJ	188
Protein	g	2.70
Total lipid (fat)	g	0.70
Ash	g	1.80
Carbohydrate	g	9.20
Fiber	g	3.5
Minerals		
Calcium, Ca	mg	187
Iron, Fe	mg	3.10
Magnesium, Mg	mg	36
Phosphorus, P	mg	66
Potassium, K	mg	397
Sodium, Na	mg	76
Zinc, ZN	mg	.41
Copper, Cu	mg	0.171
Manganese, Mn	mg	0.342
Selenium, Se	mcg	0.5
Vitamins		
Vitamin C	mg	35.0
Thiamin	mg	0.190
Riboflavin	mg	0.260
Niacin	mg	0.806
Pantothenic acid	mg	0.084
Vitamin B-6	mg	0.251
Folate, total	mcg	27
Folic acid	mcg	0
Folate, food	mcg	27
Folte, DFE	mcg_DFE	27
Vitamin B-12	mcg	0
Vitamin A, IU	IU	14000
Retinol	mcg	0
Vitamin A, RAE	mcg_RAE	700
Vitamin E	mg_ATE	2,500



**Ethnoveterinary Medicine**  
**Continued from page 14**

medicine: an annotated bibliography. *Bibliographies in Technology and Social Change*, No 6. Technology and Social Change Program, Iowa State University, Ames, Iowa 50011. USA. 199p. ISBN 0-945271-16-6.

Monteiro A M, Wanyangu S W, Kariuki D P, Bain R, Jackson F and McKellar Q A. 1998. Pharmaceutical quality of anthelmintics sold in Kenya. *Veterinary Record*, 142:396-398.

Norval R A I. 1983. Arguments against intensive dipping. *Zimbabwe Veterinary Journal*, 14:19-25.

Peacock C. 1996. *Improving Goat Production in the Tropics - A Manual for Development Workers*. Oxfam, 274 Banbury Road, Oxford OX2 7DZ.

Porth C M. 1994. *Pathophysiology - concepts of altered health states*. (4th Edition) J.B.Lippincott Company, Philadelphia, USA.

Satrija F, Nansen P, Murtini S, He S. 1995. Anthelmintic activity of papaya latex against patent *Heligmosomoides polygyrus* infections in mice. *Journal of Ethopharmacology* 48:161-164.

### **Would It Work for Cashmere Goats?**

Mathematics may hold the answer to how much of a dairy goat's observed traits are the result of genetics versus environment. Researchers devised a formula that describes the genetic and environmental components of conformation traits such as a goat's strength, stature, and udder shape. The equation even separates temporary environmental factors such as seasons from permanent ones such as injury. It considers the influence of all the animal's relatives—not just the sire, as in other models—and provides insights into heredity's role.

Least likely to be influenced by genetics are rear udder arch and rear legs. But stature, teat diameter and placement are highly heritable.

By accurately estimating the heritability of valued traits, breeders may be better able to calculate dairy goats' genetic merit. Researchers developed the formula using data from the American Dairy Goat Association. Records from 154 herds and six breeds were used, and pedigrees were included for animals born in 1978 or later.

Animal Improvement Programs Laboratory, Beltsville, MD Suzanne Hubbard/George Wiggans, (301)504-8334. <http://www.ars.usda.gov/is/qtr/q396/ap396.htm>

### **Applicable to Goats?**

Cattle breeders who screen young bulls for potential natural-mating fertility by measuring testicle size and semen quality may soon be adding another criterion—scrotal temperatures. Using an infrared camera-like device, scientists measured 73 bulls' scrotal surface temperatures in a pattern from top to bottom of each testis. Surface temperatures typically were 1.5 to three degrees warmer at the top of the scrotum than at the bottom. In a 45-day breeding test, a typical 14-month-old bull with a uniform progression of decreasing scrotal surface temperatures impregnated 15 of 18 heifers. In contrast, bulls that didn't have this uniform temperature pattern impregnated about 16 percent fewer.

U.S. Meat Animal Research Center, Clay Center, NE Donald D. Lunstra, (402) 762-4188



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## Calendar of Events

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## Association Contacts

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September 17 - 20, 2002

Third National Small Farm Conference, Albuquerque, New Mexico. Training for specialists, technicians, farm advocates/entities. Info: Denis Ebodaghe, USDA, email debodaghe@reusda.gov, phone: 202-401-4385.

September 21 - 22, 2002

Finger Lakes Fiber Arts Festival, Hemlock Fairgrounds, Hemlock, NY, internet: [www.gvhg.org/fest.html](http://www.gvhg.org/fest.html)

September 21 - 22, 2002

Oregon Flock and Fiber Festival, Clackamas County Fairgrounds, Canby, Oregon  
Goat and sheep shows, animals on exhibit, vendors, workshops, fiber art exhibits, fleece competition/show/sale, lamb and cabrio cookoff, food--they have it all! Cashmere goat show, Saturday, September 21, 2002, 9:00 AM. Info: OFFF, 30881 SW Bald Peak Road, Hillsboro, OR 97123-8817, 503-628-1205, email: [offf@gte.net](mailto:offf@gte.net)  
website: [www.flockandfiberfestival.com](http://www.flockandfiberfestival.com)

October 1 - 2, 2002

Cashmere goat events at the Virginia State Fair, Richmond, Virginia. October 1st - ECA 2002 fleece competition, October 2nd - Doe/Wether and buck goat shows. Questions/Info: Lisa Vailes 540-885-1261, email: [lvailles@inbio.com](mailto:lvailles@inbio.com)

October 5 - 6, 2002

Northwest Fiber Festival, Southwest Washington Fairgrounds, Lewis County, 255 N. National Ave., Chehalis, WA, Sponsored by Llama Owners of Washington (LOWs). Fleece show and sale, animal and vendor exhibits, banquet, auction. For information: Pat Skelton, Fiber Festival Chair, 24869 Brotherhood Rd., Mt. Vernon, WA 98274, 360-445-5362, [hbllamas@fidalgo.net](mailto:hbllamas@fidalgo.net)

October 18 - 20, 2002

New York State Sheep and Wool Festival, Rhinebeck, New York. October 18 & 19 (two classes), fiber classing workshop with Terry Sim. October 20 - cashmere goat show. Questions/Info: Wes Ackley 207-336-2948, email: [ackley@megalink.net](mailto:ackley@megalink.net)

November 3, 2002

Goat Gala at FarmFair International, 10 - 2 PM  
Northlands Park, Edmonton, Alberta, Canada  
Related events: Canadian Finals Rodeo  
[www.farmfairinternational.com](http://www.farmfairinternational.com)

Cashmere America Cooperative

Joe David Ross, Manager, 915-387-6052  
fax: 915-387-2642, Email: [goat@sonoratx.net](mailto:goat@sonoratx.net)  
Wes Ackley (Maine) 207-336-2948  
Marti Wall (Washington) 360-424-7935

Eastern Cashmere Association (ECA)

Ann Wood, President  
937-568-4994, [tamarack@iapdatacom.net](mailto:tamarack@iapdatacom.net)

North West Cashmere Association (NWCWA)

Website: <http://www.nwccashmere.org>  
Paul Johnson, President  
503-623-5194, [paul@cashmirror.com](mailto:paul@cashmirror.com)  
Diana Mullins, Membership Coordinator  
509-997-2204, [dmullins@methow.com](mailto:dmullins@methow.com)

Pygora Breeders Association (PBA)

Inga Gonzales, Secretary  
PO Box 565, Knightsen, CA 94548, 925-625-7869  
email: [Igonozo@goldstate.net](mailto:Igonozo@goldstate.net)

Texas Cashmere Association (TCA)

William (Bill) Nagel, President  
4625 Sandy Fork Rd., Harwood, TX 78632  
830-540-4707, email: [bnagel@bvtc.com](mailto:bnagel@bvtc.com)



**STC "G Steven". We don't know what the "G" stands for.  
Photograph by Wendy Pieh, Springtide Farm, Bremen, Maine.**

# Breeders

hermit@oorg.com

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email: prhoads@mindspring.com

### HENRY LOWMAN

PO Box 2556  
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650-225-1171  
email: hlowman@compuserve.com

## COLORADO

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Guffey, CO 80820  
719-689-9502

### K. BULLARD/CHALK

7225 E. County Rd. 18  
Loveland, CO 80537  
970-667-2999

### MARSHALL'S ORGANIC ACRES

9217 N. County Rd. 7  
Wellington, CO 80549-1521  
970-568-7941  
Borganic2@aol.com

## CONNECTICUT

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860-873-3403

## MAINE

### BESSEY PLACE CASHMERE

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ackley@megalink.net

### BLACK LOCUST FARM

Yvonne Taylor  
PO Box 378  
Washington, ME 04574  
207-845-2722  
yvonne@blacklocust.com

### SPRINGTIDE FARM

Peter Goth & Wendy Pieh  
PO Box 203  
Bremen, ME 04551  
207-529-5747  
fax: 207-529-5739  
wpieh@lincoln.midcoast.com

## MARYLAND

### MIDDLETOWN FARM

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**Internet listing of these breeders and a link to their email addresses and homepages, can be found on the internet at:**

**<http://www.cashmirror.com/breeders.htm>**

## Enhancing Goat Production

By Cassandra Vaughn, D.V.M.  
Alcorn State University, MS

Goat production has increased dramatically over the past ten years in the United States. One major problem many producers face is the inability to find reliable, complete information about goat production in their geographical zone. Thus, the quality of the animal produced is decreased. In this paper I will address factors which must be considered when entering or sustaining goat production.

### Getting Started

Equipment and supplies should be factored into the start of any livestock production entity. Without the necessary equipment and supplies, much time and money may be lost by having to rely on outside personnel. I recommend the equipment and supplies in the box at right for any goat enterprise.

### Basic Rules of Goat Production

There are some basic rules which should be observed when producing goats. They are as follows:

1. Buy only healthy appearing stock, free of lumps, cuts, limps and other physical defects.
2. Isolate newly purchased stock for 30 days from the remainder of the herd.
3. You can realistically raise 2 - 10 goats/acre. This depends on the amount of brush and grass available. If an abundant supply, closer to 10, if sparse, closer to 2.
4. You must invest in a woven wire fence i.e. cyclone fence, 6 X 6 woven wire, or reinforced chicken wire.
5. If you decide to use electric fencing, at least 3 strands of electric wire will be needed for the perimeter. The goats must be accustomed to woven wire fences prior to using electric fencing. It is highly likely that goats will run through an electric fence especially if they were previously free-ranging.
6. You need a three-sided shed which is large enough to accommodate the entire herd.
7. A clean water source, preferably not a pond, is needed.
8. An isolation pen or area is needed which is completely separated from the other herd areas. There should be no physical contact between the affected and normal animals, thus this area will need separate feed and water containers. There is a need to disinfect with a product such as Clorox between ill animals. Consider concreting this area to enable easier disinfection. All bedding should be burned or buried.

### Management Factors

### Recommended Equipment & Supplies

Healthy stock  
Mineral Oil  
Dehorning equipment-electric cauterly, pastes  
Electric Clippers  
Castration equipment- scalpel blade, sharp knife  
Milk replacer or frozen goat milk  
Hoof nippers, hoof pick hoof knife  
Pedalyte or other electrolyte solutions  
Coppertox  
Dewormers- Ivomec, Dectomax, Levamisole  
Antibiotic Spray  
Vaccinations- Tetanus, Clostridials, Caseous, Lymphadenitis Chlamydia  
Tetanus Antitoxin  
Hacksaw  
Pinkeye Puffer  
Baby Bottles  
Clorox  
Nose Bulb  
Povidone Iodine Solution  
Thermometer  
Bandage Material  
Karo Syrup  
Syringes - 3 cc, 10 cc, 20 cc  
Injectable antibiotics- LA 200, Penicillin  
Needles- 22g, 18g  
Obstetrical chains

### Predator Control

Use proper fencing, guard dogs, mules, llamas, etc. to deter predators.

### Supplemental Feeding

Goats are not cattle. Grazing alone will usually not produce a high quality animal. You should plan to provide feed. The amount of feed needed depends on the available of browse.

### Improved Pastures

Take the time to plant and fertilize grasses for your pasture. This will help offset the cost of the feed.

### Penning

By keeping your animals penned at night, you accomplish two things:

1. decrease exposure to predators; and
2. allows you to quickly determine any problems in the herd.

### Health Maintenance

### Nutrition

Continued on next page

## Enhancing Goat Production Continued from previous page

There is a great deal of controversy concerning the protein needs of goats. We do know that different levels of protein are required by the various stages of the goat (kid, doe, nursing doe, pregnant doe, buck). Protein levels of 12 - 16% are thought to be acceptable. In the pasture, grass seldom exceeds 15% crude protein and weeds/browse commonly contain >25% crude protein.

### Vaccinations

Why vaccinate? One, to prevent disease and two, if your animal is exposed or contracts the disease, there tends to be a shorter recovery period. There are four vaccines I recommend for goats: Clostridium, Chlamydia, Tetanus and Caseous Lymphadenitis. Tetanus oftentimes will be in combination with the Clostridium vaccine.

Costs for the vaccines in the Southern regions based on a 100 lb. goat are:

Clostridium- 50 doses	\$21.25
Chlamydia- 50 doses	33.00
Tetanus- 50 doses	5.35
Caseous Lymphadenitis	16.35
 Total for a Year	 \$75.95

You may think this sounds expensive, but the cost of a veterinary visit to treat one of these diseases will equal or exceed this amount.

### Parasite Control

Internal parasites are the number one health problem of goats. The costs associated with controlling parasites is second only to the cost of feed. Strategic deworming should be incorporated into your health maintenance plan. The cost of parasite control in the Southern regions based on a 100 lb. goat are:

Ivermectin	\$45.00
Levamisole	37.58
Safeguard	44.64
Dectomax	89.00

### Kidding Assistance

It is a good idea to be present whenever a first-time doe or a doe with previous kidding problems is due. Your assistance may be needed to pull or turn a kid. Make sure you have blankets available in the winter.

### Breeding Management

This process begins with the selection of breeding stock. The stock should be healthy and conformation should be correct. Selection of a buck to improve the herd is important. This means take the time to avoid mating your does with any undesirable bucks, offspring bucks, or bucks originating from a diseased herd. Castrate or sell all bucks not used for mating

purposes. Your main goal should be the production of a high quality animal.

### REMEMBER

IMPROVED NUTRITION AND MANAGEMENT =  
INCREASED PRODUCTIVITY =  
INCREASED PROFIT!



**Note to Steve Hachenberger: Burritos and frosted pastries were not what the author had in mind for proper goat nutrition! The Whiting, however, seems to approve. Photographs by Diana Hachenberger, Castle Crags Ranch, Hamilton, Montana.**



## Forage To Make Taste Buds Tingle

From the pages of *Agricultural Research Magazine* (9/99)

By Marcia Wood, ARS Information Staff and  
Jill Lee, formerly with ARS.



Just as chefs in a fine restaurant are intent on creating meals to delight your taste buds, ARS scientists are busy sleuthing the secrets of how to tempt palates of ruminants like cattle, sheep, and goats.

Knowing more about the cues that govern cattle's culinary choices can mean healthier animals that make better weight gains and bigger profits for ranchers. The research can also help plant breeders avoid the pitfall of developing a new forage that grows fast and has high yields—but doesn't appeal to animal diners.

ARS soil scientist Henry F. Mayland at Kimberly, Idaho, is coordinating a series of ARS and university studies designed to reveal "just what is it about certain forages that makes animals keep coming back for more."

In perhaps the best known of these tests, Mayland—along with ARS colleagues Dwight S. Fisher at Watkinsville, Georgia, and Joseph C. Burns at Raleigh, North Carolina—showed that cattle, sheep, and goats prefer hay harvested in the afternoon to that cut in the morning.

"The animals," says Mayland, "apparently discriminate on the basis of total non-structural carbohydrates—the easily digestible starches and sugars in the forage."

"Our feeding study," Mayland points out, "was likely the first to show up to a 50-percent difference in forage preferences based on time of day the forage was cut."

Follow-up experiments with alfalfa hay showed the same trend. "The bottom line," notes Dwight Fisher, "is that farmers may get better performance from their livestock if they feed them hay harvested in the afternoon. It's an easy, practical way to enhance profits at no extra cost."

Other research scrutinized different chemical and physical characteristics of forages. For one investigation, scientists analyzed some 50 different chemicals given off from freshly harvested samples of 8 different kinds of tall fescue grass and nearly 100 chemicals from tall fescue hay.

Robert A. Flath, formerly with ARS at Albany, California, did the work in collaboration with Mayland and Glenn E. Shewmaker, who is now at the University of Idaho. Cattle preferred fescues with high levels of a volatile—that is, easily vaporized—natural chemical known as 6-methyl-5-hepten-2-one. But they didn't like fescues with high amounts of two other volatiles, (Z)-3-hexenyl propionate and acetic acid. However, a study of two other classes of chemicals in these fescues—amino acids and nonvolatile organic acids—showed no link to forage choices.

Other experiments are probing the effects of other chemicals, including the minerals calcium, magnesium, and potassium, along with physical characteristics such as plant height or the amount of energy an animal has to invest to tear off a mouthful of grass.

This research is part of Soil Resource Management, an ARS National Program described on the World Wide Web at

<http://www.nps.ars.usda.gov/programs/nrsas.htm>.

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...Smith and Sherman, Goat Medicine

"I used to like a drink or three; No time now, don't call for me; I'm going to spend eternity – Reinstalling Windows."

...Author unknown

"Observation of an animal's behavior and how it reacts to any given situation (including disease), to other animals or people, noise, climatic conditions etc. will in some measure compensate for the lack of communication by speech."

...George Macleod, Goats: Homoeopathic Remedies

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