

Background

- LGDs in 2001
 - \$40K pastured broiler contract
 - Pastured rabbits, weeder geese, show chickens, sheep, beef, horses
- Kansas working dogs
- Wisconsin return 2010
 - Donkeys
 - Llama
 - LGDs
 - Goats, sheep, cattle, chickens, pigs, horses
 - Mentoring
- Prairie brush management with goats – BAAP, USDA-DFRC, 2012-2014
- MS Research – Yellowstone Lake Wildlife Area oak savanna brush management with goats
- 7 adult LGDs currently



Outline

- Predator ecology
- Statistics
- Fencing
- Guardian species
- LGD
 - History and Job
 - Selection
 - Raising and training
 - Costs
 - Mistakes to avoid
- Resources



Predator Ecology

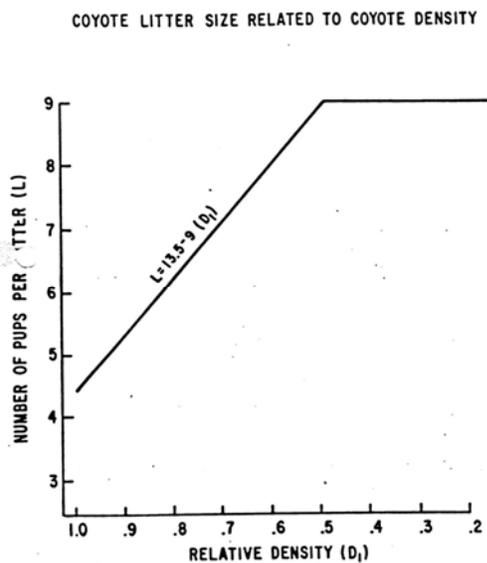
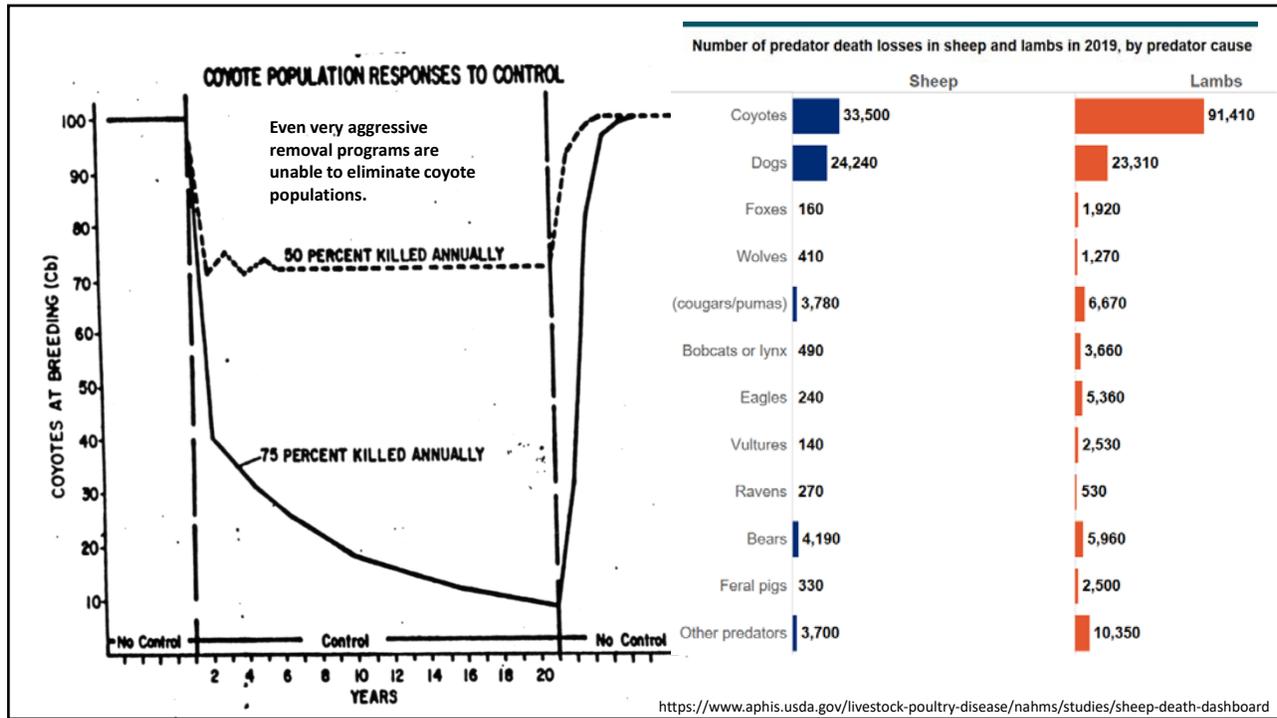
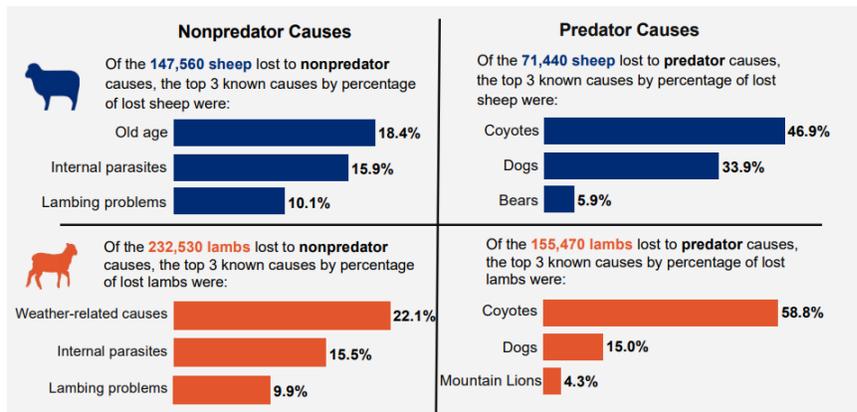


Photo from Dr. Thomas, UW-Madison, 2015

Coyotes respond with increased reproductive rates when their population density is reduced



Sheep Losses to Predation, 2019 USDA Data



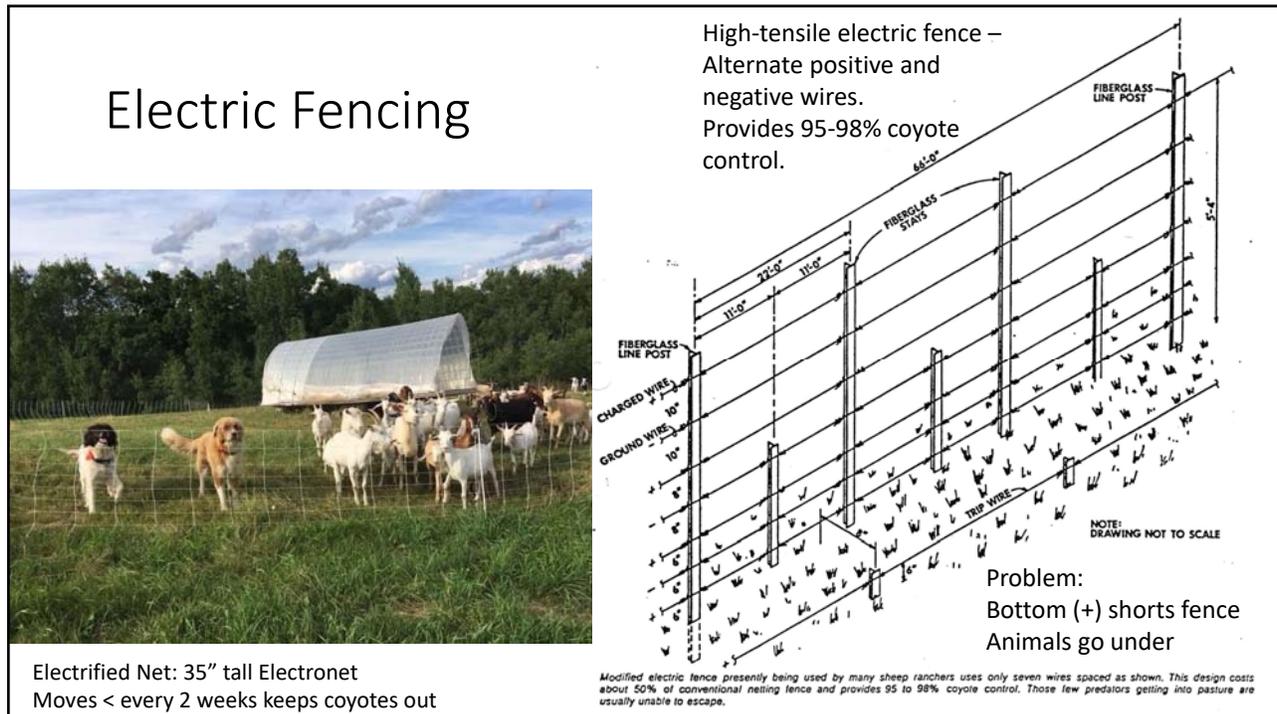
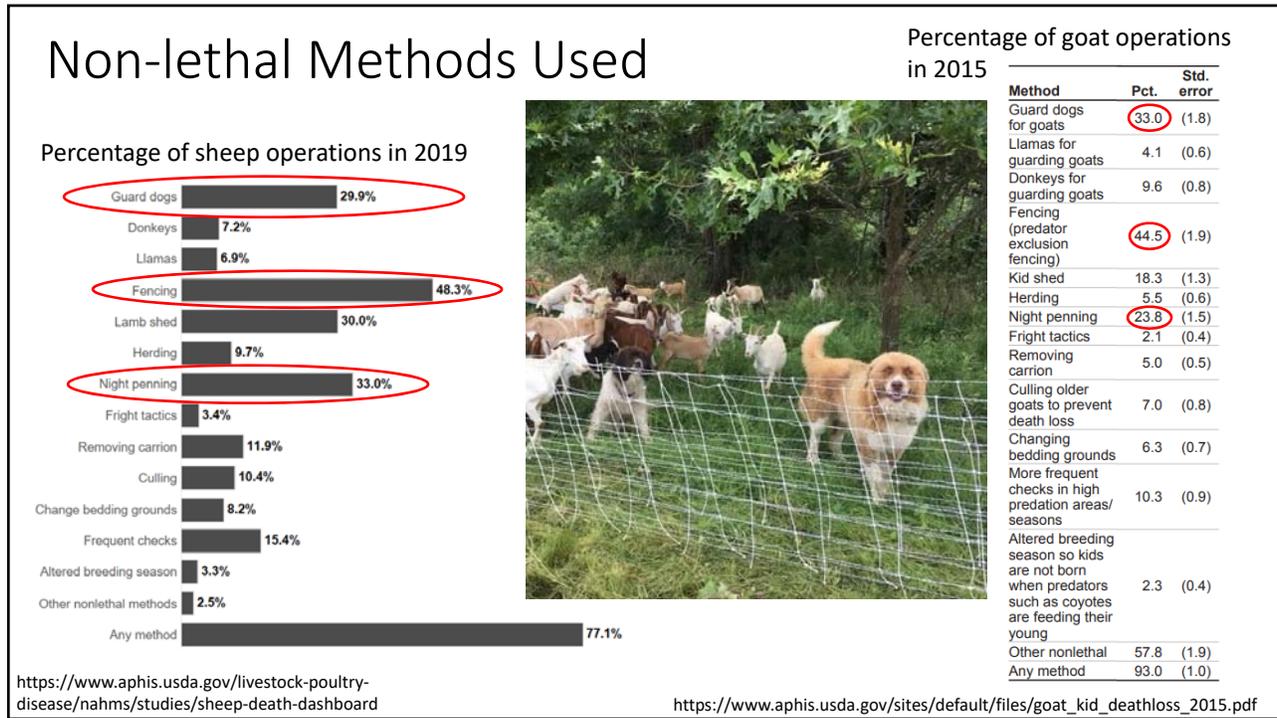
Predation accounted for 32.6% of sheep losses
40.1% of lamb losses

Nonpredator losses were 67.4% of sheep losses
59.9% of lamb losses

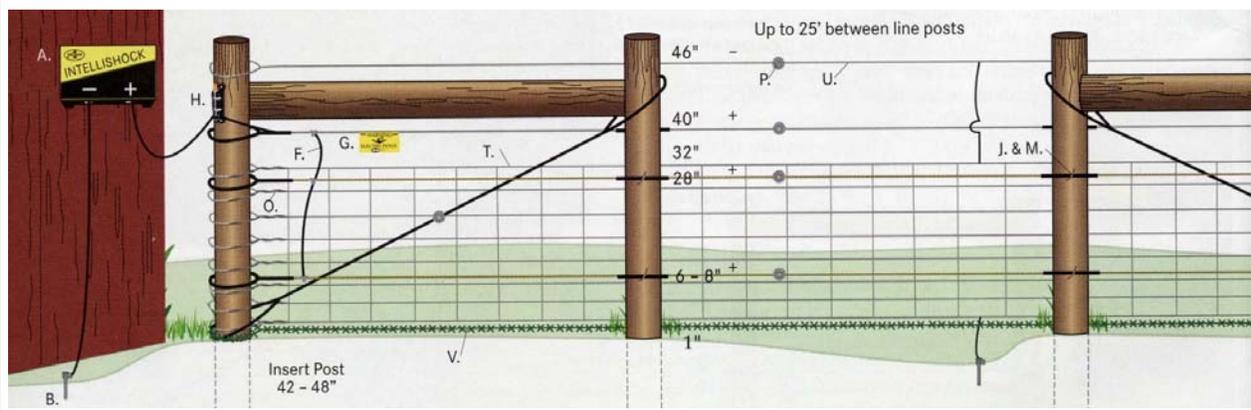
Percentages remained similar each study year since 1994

Predator losses showed marginal increases from 2014-2019

<https://www.aphis.usda.gov/sites/default/files/sheep-death-loss-trends-us-2020.pdf>



Woven Wire Fencing, Hot High Tensile



From: Premier1 Supplies. 2007. Fences that work – from folks who use them every day.

Narrow paddocks, without a guardian, allow predator harassment of stock



Coyotes spooked the goats eating brush in these prairie strips
 Spooked goats run and scatter
 Goats with guardians get out and hang out nearby

Photo by Cherrie Nolden, Badger Army Ammunition Plant, USDA Dairy Forage Research Center

Guardian Species?

- Llamas
- Donkeys
- Mules
- Horses
- Cattle
- Pigs
- Geese, Guineaas
- General farm dogs
- Herding dogs
- LGDs



Donkeys and Llamas¹

- No extra food needs to be provided, live longer than dogs
- Llamas and donkeys effective against canines, afraid of bears and mountain lions²
- “Bad habits which donkeys may display include pulling wool, picking up lambs, biting off ears, dominating a feeder, separating calves from their mothers, and even killing lambs.”
- Intact male llamas will mount and kill sheep and goats
- Female llamas can be aggressive toward stock
- Can’t use more than 1 donkey; will stick together and ignore stock. Same with llamas
- Can use 1 donkey, 1 llama and 1-∞ guardian dogs. Get along if properly raised/introduced
- Llamas susceptible to meningeal worm, Johnne’s disease
- Courtesy of Steve Kenyon, Greener Pastures Ranching in AB, Canada:
 - Guard Pigs work too!
 - Tie cheap bacon every 100’ onto electric fence to train all surrounding predators to stay away



¹Gese et al., 2005; ²Andelt, 1995

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Badger Army Ammunition Plant, photo by Ken Brunson

Guardian Dog History

- Fenceless pastoral societies¹
 - Centuries of selection
 - Asia, Middle East, Mediterranean Basin
 - Full-time shepherds
 - Older dogs help discipline puppies
 - Multiple flocks merge on mountain pastures
 - Shepherds spot and correct undesirable puppy behavior
 - Large tracts of land
 - Rarely bored
 - Protect against aerial predators and ground predators
 - Coyotes, dogs, black bears, mountain lions, wolves³
- Serious use started in 1970s in USA^{1, 2}



¹Fytche, 1998; ²Gese et al., 2005; ³Andelt, 1995

The Job¹

- Use inherited traits to protect livestock from harm
- Protect species known from birth - bonded
- Move calmly and slowly among stock
- Avoid direct eye contact with stock
- Exclude predators – bark, posture, pursue, fight and kill if needed
- Keep order
- Make decisions without human direction
- Set up a territory/pack
- Presence²



¹Dawydiak and Sims, 2004, ²Andelt, 1995

<https://www.farm2fork.co.uk/wp-content/uploads/2022/10/turkey234-scaled-e1666790171705.jpg>

Stay with Loose Stock



Alert me to Problems



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Not Pets, Herders, Property Guards

- Low prey drive – opposite of herding dog breeds¹
- Protects first by bluffing – opposite of property/person attack breeds¹
- Can't guard when its in your house, or on your porch
- Bonds to people faster than to livestock
 - More positive interactions
 - More interesting things going on
- Gets herded with the flock by the herding dogs
 - Won't herd unless stock in danger
 - Gets along with herding dog if introduced properly
 - Rides in the trailer with the stock
- Severe separation anxiety if removed from stock
 - Likely to dig out of your house if you leave for work
 - Good if someone is home all the time
 - Elderly, dairy farmers, autistic child companion
 - Low energy dogs don't require hours of exercise daily
- Commands viewed as suggestions
- Can be general farm dogs
- Do not try a dog that is crossed with a high prey drive or attack breed¹
 - Many of these in rescue situations; bad mix



¹Dohner, 2014

Janet McNally, Tamarack Sheep

~40 LGD Breeds

- “More differences between pups in a litter than between the breeds themselves”¹
- Some traits different between breeds
- Turkey – Akbash, Akkush, Kangal, Karabash, Anatolian Shepherd, Caucasian Ovcharka
- France/Spain – Great Pyrenees, Spanish Mastiff
- Hungary – Komondor, Kuvasz
- Italy – Maremma
- Poland – Tatra
- Slovakia – Cuvac
- Tibet – Tibetan Mastiff
- Bulgaria – Bulgarian Karakachan



Types of Livestock Guardian Dog Breeds



¹Dawydiak and Sims, 2004

Number of LGDs Needed

A general rule of thumb is that 1 LGD is needed per 100 ewes or does in the operation.

However, the ideal stocking rate for LGDs will depend on several factors:

- number of stock to be guarded
- predation pressure and species
- maximum acceptable predation rate (no predation or minimum kills)
- terrain, amount of cover and the location of the pasture (for example, flat versus hilly, level of tree cover)
- number of ewe or doe groups in the operation and the distance between them
- dog confinement versus ability to free roam between pastures
- use of other anti-predation strategies
- strength of flocking behavior of the sheep or goats
- effectiveness of individual dogs (age, training)
- personalities of individual dogs and dog-to-dog conflicts



<https://www.ontario.ca/document/livestock-guardian-dogs/purpose-benefits-and-considerations>

Characteristics for WI Farms

- Close-guarding (non-wandering)
 - Tatra, Maremma, Karakachan, Spanish Mastiff, Komondor
- Short-Med hair coats
 - Akbash, Karakachan, Spanish Mastiff, Anatolian, Kangal, Tatra, Cuvac
- Calm
 - Pyrenees, Karakachan, Spanish Mastiff, Ovcharka, Tibetan Mastiff
- Quiet (not excessively barky)
 - Tatra, Karakachan, Spanish Mastiff, Komondor
- Working parents
- Parents free of inherited diseases (Embark tests over 200 diseases)
- Born and raised with livestock





Komondor x Akbash



Bulgarian Karakachan

These two adults are owned by Dr. Phil Sponenberg, Blacksburg, VA and are the parents of Kutro, the red/white male that I own

Cherrie Nolden



Cherrie Nolden

Maremma x Anatolian



St. Bernard x Newfoundland

Not recommended, not true LGD; Doesn't tolerate heat as well as a LGD breed, eats stock when hungry

Komondor x Akbash x Pyrenees

Cherrie Nolden



Puppy Selection

- Middle of the litter
 - Shy/calm: one-person dogs, won't be stolen
 - Exuberant: high energy, active, easily bored
 - Loud: barky adult
 - First one to be petted: assertive, aggressive
 - Struggles upside down, hung: dominant personality
- Good structure = long useful life
- Opposite sex of current dog¹
 - Males mature slower, more dominant
 - F-F fight, M-M better, neutering/spaying helps
- Opposite dominance of current dog¹



¹Dawydiak and Sims, 2004



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Disciplinarian mentor dog is rare, but excellent for raising pups right

LIVESTOCK GUARDIAN DOGS — FIRST YEAR DEVELOPMENT						
Attentive Behaviour					Trustworthy Behaviour	Protective Behaviour
STAGE 1	STAGE 2	STAGE 3	STAGE 4	STAGE 5		
Neonatal 0-2 weeks	Transitional 2-3 weeks	Primary Socialisation 3-8 weeks (ends at weaning)	Early Juvenile 8-16 weeks	Late Juvenile 4-6 months (ends at puberty)	Sub-adult (6+ - 12+ months)	Adult 12+ months
<p>Pup is insulated from the environment outside the litter. Reflex care-soliciting behaviour: cries, sucks, roots toward warmth. Crawls.</p>	<p>Eyes open, teeth appear, walks. Non-reflexive learning behaviours appear. Mother stops responding to pups' cries.</p>	<p>Ears and eyes begin to work. Notices other animals at a distance. Begins to form primary social relationships that determine later attachments. Can eat solid food.</p> <p>Food pan dominance begins, and wrestling with littermates.</p>	<p>Secondary socialisation begins; attachments made to other animals and even species. Non-reflexive care-soliciting behaviour such as dominance-submission and food-begging appear. These become the basis for the complex social behaviours of the adult. The target of these behaviours is determined to some degree by primary socialisation.</p> <p>In guardian dogs this is the period for bonding pups with livestock. By 16 weeks the "critical period" or window during which social attachments are made is closed.</p>	<p>Emerging social behaviours of Stage 2 must be reinforced. Pup must be kept with livestock all the time and not be allowed to play or interact extensively with other dogs or people. Exception would be if pup is put in a pasture with another guardian dog, presumably older, which is acting as a "teacher" dog. Any wandering or other inattentive behaviour should be addressed immediately.</p>	<p>Onset of predatory behaviour patterns and of "play", which includes the predatory movements of chase, grab-bite, wool pull, ear chew. If this behaviour is allowed to be expressed, which to the pup is a reinforcement of the behaviour, it will become common and be almost impossible to correct. If the behaviours are not reinforced then they will disappear from the pup's repertoire of behaviours.</p> <p>If not desexed, heat cycles begin in females, sometimes resulting in unexpected behaviours such as wandering or chewing on livestock. Males may stray if attracted by a female in heat.</p>	<p>Care-giving and mature sexual behaviours emerge. A dog that has been properly bonded with livestock and not allowed to disrupt them should be an effective guardian at this point.</p> <p>First experiences with serious predators must not be overwhelming; the dog needs to gain confidence in its ability as it matures.</p>
<p>Onsets and offsets do not occur at exact ages. They vary around a norm. The norms, or demarcations, shown here are made for illustrative purposes. They indicate approximate ages and events in a guarding dog's first year that can be used as guideposts by owners who need to be aware of timing and a dog's abilities, in order to train it effectively.</p>						

Table reproduced with permission of Ray and Lorna Coppinger.

<https://pestsmart.org.au/wp-content/uploads/sites/3/2020/06/Guardian-Dogs-web.pdf> 137 page eBook, Australia

Puppy Development

Puppy Training

- Straight to the barn for bonding
- Establish trust, dominance
- Handle all body parts
- Take for truck rides, vet prep
- Pen when you aren't there
- Release when you can supervise, protect, reprimand
 - Argh!, Lift by scruff, Pin by scruff, growl and stare, wait till submits, let loose quickly and forget it
- Old unafraid but tolerant wethers/ewes
 - Intolerant of rough play
 - Reprimand without injury
 - 2 wks; till not showing play tendencies

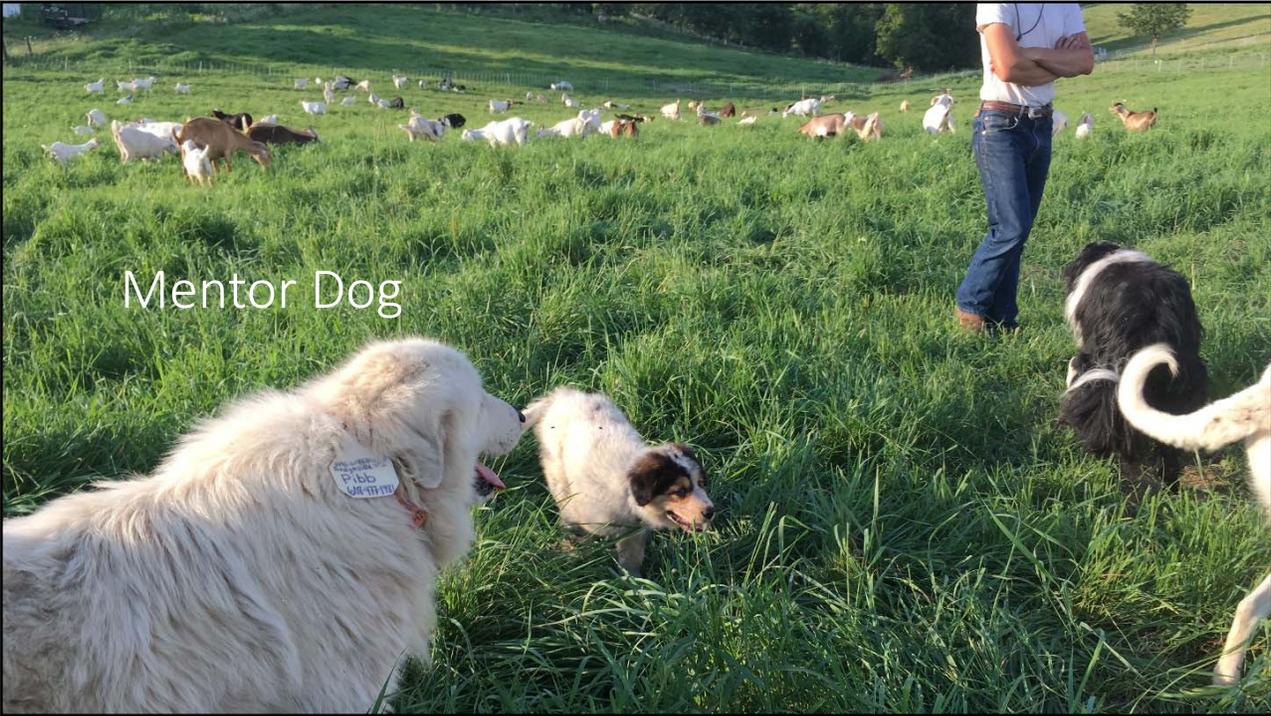


This pup was born and raised with goats, and I drove to Virginia to buy him, so I also bought a goat to be his companion on the long drive home. This made the ride low stress.

Cherrie Nolden



Puppy Introduction to New Goats





Puppy Training

- **Biggest Problem: owners trust dog before it is ready**
- **Second: owners aren't consistent; pups get away with bad behavior, goes unnoticed until an animal gets injured**
- Small puppy stage – stock can correct pup
- Large puppy stage – play behavior begins again
 - Watching intently, cocked head, ears up, tail up, tail wagging, play bow, head down, biting, pawing, chasing, licking assertively
 - Hide, shock collar, timing, consistency, patience
- Play with pup in barn, not in house
- Perimeter walking – boundaries
- Prevent escapes: physical, electric
- Introduce to other dogs – house, herd
- 2 pups at once – challenges
- Adult LGD – possibly helpful for training





Puppy Training

- 2-5 mo old
- Praise for good behavior
- Reprimand for bad behavior
 - Timing, consistency, patience, forgive
 - >2 sec = too late to correct
- Chewing
 - Wool pulling, ears, hocks, tails – reprimand in the act or just before
 - Shoe laces, hems, arms, hands – reprimand
 - Lemon juice squirt, pin tongue
- Jumping
 - Make sit before petting
 - Knee to chest
 - Use front paws to flip on back
- Early Maturing=6 mo, Slow=24 mo
- Leash, sit, come, stop, lay
 - Expect slow response
- Some neuter at 7 weeks¹



¹Dawydiak and Sims, 2004



Improper play behavior



Proper lack of interest



Good bonding

Cherrie Nolden



Poultry¹, Rabbits²

- Smallest species guarded
- Most enticing for pups to chase
 - Birds flap, squawk, run, fly
 - Rabbits bolt, quiver
- Some dogs treat them like varmints
 - Won't eat, just kill and leave for you to find
- Monitor dog behavior *at all times* till reliable
- Praise for leaving them alone/ignoring
- Reprimand for *any* play behavior directed at stock
 - Strength of reprimand based on dog temperament
 - Hide, electric collar; timing key
- Don't assume dog is trained too early = dead chickens a
- Raise pups with chickens/rabbits in safe/protective pen
- LiCl laced eggs teach dogs to not eat eggs^{3,4}
 - standard endangered species conservation practice
- Geese and turkeys can be aggressive to the dog
 - Don't expect dog to guard animals that attack the dog



Cherrie Nolden

¹Dohner, 2014; ²Nolden, personal experience; ³Nicolaus, 1987; ⁴Gustavson et al., 1974; ⁵Dohner, 2007

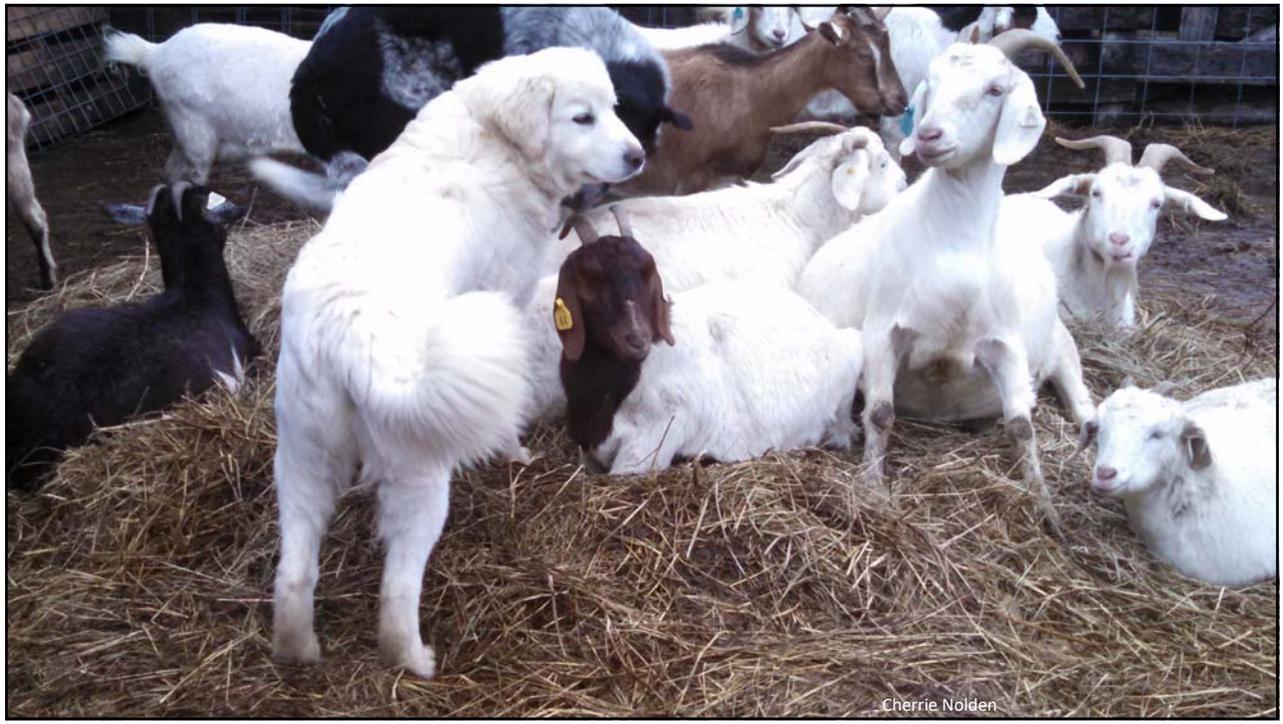




Adolescent Dog

- 4-5 mo old, small pen too restrictive
- Leave dog with stock for variable lengths of time
 - Feed pan in sheep/goat excluder
 - Drag or dangler; not AWA approved
 - Chaser – trip the rear legs, or hit chest/front legs
 - Escaper – longer to catch on fence, not hang
 - Supervise hidden, shock if needed
 - Basket muzzle for wool-pullers/biters
 - Doesn't stop chasing
 - May need big pen when not able to supervise
- Socialize to strangers, children
- Post signs, tell neighbors
- Contact info on collar, microchip, tattoo
 - Vehicle hit is primary cause of death





Cherrie Nolden

Factors to Consider-Survival

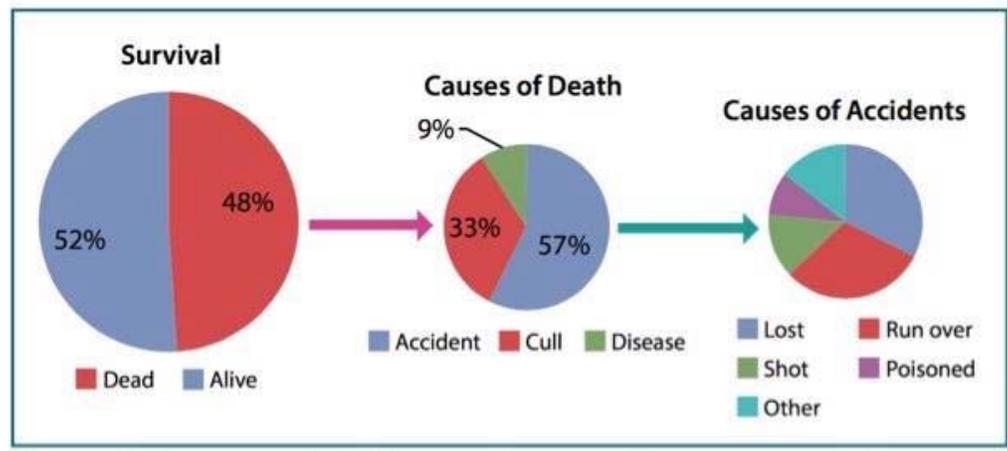


FIGURE 4. Six year survival of LGDs and causes of losses. Most accidents would not have occurred if the LGD had not left the grower’s property (Lorenz et al. 1986).



Training tools – Adolescent Stage

- Read the Recommended Books & Blog
- Electronet fence
- Triangle collar, wire wrap
- T drag
- Chain drag
- Hunting e-collar
- GPS collar
- Anti-bark collar
- Muzzle
- Tether
- Kennel



Mature Dog

- 18-30 mo old – useful, dependable guardian
 - Head down, quiet movement through flock
 - Stock bed down around dog
 - Stock run behind dog when startled
 - No predator issues
 - Independent, aloof, stubborn, distant
- Maintain health
 - Vet visit outside the pasture
- Pee on boundaries



Stillborn Kid,
He carried it off and buried it,
~2 hours after birth

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LGD Costs

- Purchase:
 - Puppy \$500–\$1,600
 - Adult \$1,500 - \$3,000
- First Year Costs:
 - Vaccines \$30
 - Dewormer \$20
 - Heartworm \$20
 - Spay/neuter \$250-\$350
 - Training tools \$400
 - 27% protein kibble, 3 c/day, 27% protein 50 lb bag \$33.00: \$365.00 per pup/yr
 - Total first year costs: \$1,735.00
- Annual Care:
 - Mature animals \$500–\$700 for mid-priced kibble
 - (5 c/day, 2.5 lbs) 21% protein 50 lb bag \$30.00: \$547.50 per dog/yr
 - Routine veterinary care \$200–\$300
 - Emergency veterinary care variable (ours is nearly zero)
 - Total annual costs: \$750.00
- Labor:
 - Farmers spend an average of 7.5–10 hours per month (ranging from 0–30 hours) training, feeding and working with each LGD [8].
 - Younger dogs typically require more time for training and care than mature dogs. Estimate of 0.25-1.0 hours per day.
 - Farmers reported that each working LGD saved them an average of 17.6 hours per month [8].



<https://www.ontario.ca/document/livestock-guardian-dogs/purpose-benefits-and-considerations>

Feeding Stations



LGD Mistakes to Avoid

- Not understanding the difference btwn a working LGD vs a farm pet dog
 - Following advice from pet-type LGD breeders/owners
 - Keeping pup in the house
 - Expecting obedience
 - Letting outside dogs in with livestock (friends, family)
- Buying from non-working parents
- Buying a high prey-drive LGD
- Buying a LGD mix with non-LGD breeds
- Trusting the pup before it is ready
- Not committed to being observant, consistent, persistent, patient
- Failing to contain your LGD
 - Allowing escapes
 - Not fencing with livestock
 - Teaching to get over/under/through fences/pens
- Unwilling to use training tools, as needed, properly
- Not learning to identify bad behavior and correct it in a timely manner
- Allowing the pup to do behaviors that will be a future problem
- Not willing to fence LGDs in with livestock
- Neighbors being nice to wandering LGDs



Rachel Ritland



LGD

Herder

LGD

sanangelo.tamu.edu/research/lgd/?fbclid=IwY2zjawiajytIeHruA2FibQbMAABHwjHhckb6t6f

Resources

- **Book: Livestock Protection Dogs**, by Orysia Dawdyiak and David Sims
- **Social Media Groups**
 - Farmers Only LGDs
 - Working LGD Livestock Guardian Dogs
 - Midwest Livestock Guardian Dogs
 - Livestock Guardian Dogs - Job Finder
 - Canadian Livestock Guardian Dogs
 - Tamarack Lamb and Wool
 - Strictly Working Livestock Guardian Dogs
 - Texas A&M AgriLife Livestock Guardian Dog Program
 - Sources: LGD Finder, LGD Livestock Guardians, Herding and LGD Dogs in WI, Midwest Livestock Guardian Puppies
 - Breeders of Working Health Tested LGDs
- **Blogs**
 - Louise Liebenberg <https://predator-friendly-ranching.blogspot.com/search/label/LGD>

Factsheets:

- [How to Make Dangle Sticks & Drags](#)
- [Livestock Guardian Dog Feeding Stations](#)
- [How to Make a Livestock Guardian Dog Yoke](#)
- [How to Select a Livestock Guardian Dog Puppy](#)
- [Livestock Guardian Dogs: An Overview](#)
- [GPS Technology to Aid in LGD Management Factsheet](#)
- [Coping with Coyotes](#)
- [Managing Conflict with Black Bears in Texas](#)
- [Living with Black Bears in Texas](#)
- [Managing Coyotes with Snares](#)
- [Managing Rural Vultures in Proximity to Agriculture](#)
- [Managing Suburban Coyotes](#)
- [Trapping Coyotes](#)
- [Predator Factsheet EWF-101](#)
- [LGD Bonding & Training](#)
- [Proper Grooming of Livestock Guardian Dogs](#)
- [How to Safely Approach Livestock Guardian Dogs](#)
- [Management of Livestock Guardian Dogs on Hunting Leases](#)

Other LGD Information:

- [A Neighbor's Guide to LGDs](#)
- [First Aid Kit for LGDs](#)
- [Examples of LGD Feeding Stations](#)
- [Evaluating Your Dog's Body Condition - YouTube](#)

sanangelo.tamu.edu/research/lgd/lgd-literature-archives/

LGD Literature Archives

This page provides access to a collection of dozens of scholarly articles and studies on livestock guardian dogs from the 1960's to today. The articles are broken down into broad categories that we believe will be helpful in your research regarding LGDs. If you have any further questions, please feel free to contact Bill Costanzo by email at bill.costanzo@ag.tamu.edu, or by phone at 325-653-4576.

Coyotes and LGDs

- [Comparison of Bobcat and Coyote Predation on Lambs](#)
- [Coyotes Can Protect Your Livestock From Predators](#)
- [Coyotes Guard Dogs and Electric Fences](#)
- [Coyotes in the Southwest - A Compendium of Our Knowledge](#)
- [Effect of Coyote Removal on Sheep Depredation in Northern California](#)
- [How Komondor Dogs Reduce Sheep Losses to Coyotes](#)
- [LGDs Protect Domestic Sheep From Coyote Predation in Kansas](#)
- [Relative Vulnerability of Coyotes to Removal Methods](#)
- [The Effectiveness of Selective Removal of Breeding Coyotes in Reducing Sheep Predation](#)

The Economics of LGDs

- [Causes and Economic Effects of Mortality in Livestock Guarding Dogs](#)
- [Cost Effectiveness of LGDs for Predator Control](#)
- [Do LGD Lose Effectiveness Over Time](#)
- [Investigating the Hidden Costs of LGDs](#)
- [LGDs Do Benefits Outweigh Costs?](#)
- [Are These Big White Dogs Worth the Expense?](#)

The Effectiveness of LGDs

- [Are the Livestock Guarding Dogs Where They are Supposed to be?](#)
- [Attentiveness of Guarding Dogs for Reducing Predation on Domestic Sheep](#)
- [Effectiveness of LGDs for Reducing Predation on Domestic Sheep](#)
- [Influence of Livestock Guardian Dogs on Mesocarnivore Activity in Central Texas](#)
- [LGDs Reduce Predation on Domestic Sheep in Colorado](#)
- [Reducing Livestock-Carnivore Conflict on Rural Farms Using Local LGDs](#)
- [Relative Effectiveness of Guarding Dog Breeds to Deter Predation on Domestic Sheep in Colorado](#)
- [The Use of LGDs in Associate with Large Carnivores in the Rocky Mountains](#)
- [Top Dogs and Under Dogs: Competition Between Dogs and Synaptic Carnivores](#)
- [Utility of LPDs for deterring wildlife](#)

The History of and How to Use LGDs

- [A Decade Of Use Of LGDs](#)
- [Development of Interspecies Social Attachments](#)
- [Guardian Dogs: Best Management Practices](#)
- [How Does Work?](#)
- [How LGDs Protect Livestock](#)
- [Introducing LGDs to Sheep and Goat Producers](#)
- [LGD by Any Other Name](#)
- [LGD Developmental Environments](#)
- [LGD Guard Sheep by Guarding not Establishing Territories and Excluding Livestock Protection Dogs - The Paper Arrives](#)
- [LPDs in the 21st Century](#)
- [Olfactory Communication - Dingo Response to LGD Urine Marks](#)
- [Raising and Training a LGD](#)
- [USDA Factsheet - Livestock Protection Dogs](#)
- [USDA LGDs: Protecting Sheep from Predators](#)
- [Use of Livestock Guarding Animals to Reduce Predation on Livestock](#)
- [Using Guardian Dogs for Livestock Protection](#)
- [LGDs as Surrogate Top Predators](#)
- [LGDs Today: Possible Solutions to Perceived Limitations](#)
- [Management Problems Encountered with LGDs](#)
- [Studying Internal & External Factors Affecting LGDs](#)
- [LGDs Aggression To People](#)
- [Lethal vs Non-Lethal Predator Control](#)
- [Are Viable Non-Lethal Management Tools Available for Reducing Wolf](#)
- [Comparing Costs and Benefits of Lethal and Non-Lethal Human-Wolf Mitigation on Livestock Farms](#)
- [Dead or Alive - Costs of Lethal & Non-Lethal Control of Predators](#)
- [Predator Control Should Not be a Shot in the Dark](#)
- [Review of Methods to Reduce Livestock Depredation](#)
- [The Complex Interactions Between Wolves and Dogs in a Conservative](#)
- [What's New for Conserving Carnivores](#)
- [Wolf Livestock, Nonlethal Conflict Avoidance: A Review of the Literature](#)
- [Livestock Protection Tools](#)
- [Positive attitude towards livestock guarding dogs do not mitigate pastoral wolves or prairie bears](#)

The Movement of LGDs

- [A Comparison of Movement Speeds for Domestic Sheep in the Presence of LGDs](#)
- [Factors Influencing the Movement of LGDs in the Edwards Plateau of Texas](#)
- [GPS to Monitor Spatial Movement - Sheep Goat LGD](#)
- [Implementation of Electric Fencing for Establishing Effective LGDs](#)
- [Spatial Associations of LGD and Sheep](#)
- [Spatial Relationships Between Livestock Guardian Dogs and Mesocarnivores in Central Texas](#)
- [Where Do LGDs Go- Movement Patterns of Free-Ranging Maremma Sheepdogs](#)

Other Articles on LGDs

- [Conceptualizing the Ethical Questions in the Use of LPDs](#)
- [Coe Dogs: Use of LPDs for Reducing Predation and Transmission of Pathogens from Wildlife to Cattle](#)
- [Ecological Effects of LGDs on Target and Non-Target Wildlife](#)
- [LGDs Aggression To People](#)
- [The Influence of Livestock Protection Dogs on Mesocarnivore Activity in the Edwards Plateau of Texas](#)
- [LGD Studies Based in Other Countries](#)
- [Guard Animals for Livestock Protection in Australia](#)
- [Interactions of LGDs & Wolves in French Alps](#)
- [LGD Current World Wide Use \(2001\)](#)
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- [Mitigating Carnivore Livestock Conflict in Europe](#)
- [Using LGDs In Balkans](#)
- [Livestock Damage by Carnivores and Use of Livestock Guardian Dogs for its Prevention in Europe](#)

The Movement of LGDs

- [A Comparison of Movement Speeds for Domestic Sheep in the Presence of LGDs](#)
- [Factors Influencing the Movement of LGDs in the Edwards Plateau of Texas](#)
- [GPS to Monitor Spatial Movement - Sheep Goat LGD](#)
- [Implementation of Electric Fencing for Establishing Effective LGDs](#)

LGD Genetics and Breeds

- [Evaluation of the Work Potential of Great Pyrenees Puppies for the Protection of Herds](#)
- [Genetic Characterization of Yugoslavian Shepherd](#)
- [Genomic Characterization of the Three Balkan LGDs](#)
- [Investigating the Population Structure and Genetic Differentiation of Livestock Guard Dog Breeds](#)
- [Navajo Use of Mixed-breed Dogs for Management of Predators](#)

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