Coyote & Wolf Biology 101: helping understand depredation on livestock

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Outline

1. Description & Distribution - What are they, where did they come from, where are they now?
2. Life History & Ecology - social organization, density, dispersal, reproduction, mortality, food habits
3. Management - what are we doing to them?
4. Research - what does science say about livestock depredation?
Gray wolves common in Northern Ontario. Eastern wolves (3 pics on left) are most common in deer range.
What Species and Where?

Adapted from: White et al. 2001
“Status of the eastern wolf (Canis lycaon)”
“Although debate persists, recent molecular studies suggest that the eastern wolf is not a gray wolf subspecies, nor the result of gray wolf/coyote hybridization. Eastern wolves were more likely a distinct species, C. lycaon, prior to the eastward spread of coyotes in the late 1800s.”
Here the “Ontario Type” refers to gray wolves, “Algonquin type” refers to eastern wolves, and the Tweed type refers to Eastern coyotes (hybrids between eastern wolves and typical western coyotes).
Eastern wolf-coyote hybrids common in Eastern Ontario
More hybridization among females, manifest in greater decrease (and higher var) in body weights relative to males in hybrid zones.
Our Timmins study area contained mostly Eastern-wolf X Gray wolf hybrids that were generally larger than Eastern wolves in the Algonquin area.
Figure 4. Results of clustering analysis and group assignment in STRUCTURE. Rows represent individuals, grouped by sampling location, and bars indicate the proportion of ancestry for each that is attributed to the two groups (clusters).

**Cluster 1** – *eastern wolf*

**Cluster 2** – *eastern coyote*
Relative sizes and descriptions

Size & weight often over-estimated – thick coat & bushy tail

Western coyote

 Eastern Wolf

Eastern Coyote

Gray Wolf
Coyote-dog hybrids?

- Little genetic evidence of domestic dogs in eastern coyote populations.
- Only one confirmed case of introgression of dog genes into a wild coyote population.
  ... domestic? + coyote?
- Fertility of hybrids is generally low.
- Hybrid? come into season about 2 months early? pups born in Feb? low survival.
- Male hybrids show no parental instinct.
Ontario Wolf Status/Distribution

• estimate of 8,800 wolves
• in Ontario little change in distribution after European settlement
  – occupy 85% historical range (~ 800,000 km\(^2\))
  – largely absent from agricultural/developed areas
• considered stable; some evidence of disease
Ontario Wolf Status

- 2 species/subspecies present in Ontario:
  - Gray Wolf (*Canis lupus*)
    - designated *Not at Risk* nationally & provincially
  - Eastern Canadian Wolf (*Canis lycaon*)
    - designated *Special Concern* nationally (2001) & proposed for provincial designation
Outline

1. Description
2. Life History & Ecology
   - Social habits
   - Density
   - Reproduction
   - Mortality
   - Dispersal
3. Management
4. Research
Coyote Social Organization

- Basic social unit – mated pair
- Larger groups may form...
  ... delayed dispersal of pups
- Coyote aggregations – large groups of transients that display no pecking order & stay together for short periods of time
• **Basic social unit of wolf population is the pack**
  – generally consists of mated pair and its offspring from previous years
Territories of collared Wolves in Algonquin Park, winter 2004
• Territory size is inversely related to prey density
• Fewer prey species or less of them means coyotes and wolves have to defend a larger territory in order to sustain themselves and successfully rear young

more prey = smaller home range size = more predators per farm
Coyote/ wolf Territory Sizes

- Southern U.S.
- NE North America
- Ontario
- Wolf (Minimum)

Gestation

Nursing

High prey diversity and abundance

Km²

0
20
40
60
80
100
120
140
160

2
4
6
8
10
12
14
16
18
20
22

Coyote & wolf density

1. Generally – lower in the N and E of North America than in the South

Wolves here or lower!
Reproduction

- Females – 1 estrus cycle / year
  Males reproductive only during this time
- Breeding usually occurs Feb
- Gestation ~ 60-63 days – pups born Apr-May
- Both parents share in pup rearing duties
- 3-4 wks – pups leave den
- 8-12 wks – pups taught to hunt
- Coyote young usually disperse in first fall, wolves during 2nd year
Litter Size

- Ranges 3-9 but averages ~ 6
- Increases with maternal age
- May increase when food abundant
- Alberta study:
  - low rodent #s 4.8 – 5.1 pups
  - high rodent #s 5.8 – 6.2 pups
Age at first reproduction (coyote & wolf)

- 3-5% juveniles breed in their 1\textsuperscript{st} year
  - In Ontario – little breeding among female pups
- More young of year breed in exploited populations or in areas with lots of food
- In areas of low food abundance (e.g. NB study) female coyotes may not breed until they are much older (= 5 yrs)
Coyote & Wolf Mortality

• Only 20-50% survive their 1st year
  In Ontario – 45-75% of coyotes taken by hunting and trapping in the fall were juveniles

• Annual survival of adult coyotes = 50-70%

• Wolves = 65-80%

• Humans accounts for most deaths…
  … guns, traps, snares, cars, trucks

• Compensatory mortality
Outline

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   Food
3. Management
4. Research
Food Habits

- **Coyotes** are opportunists and take natural prey in proportion to availability.

**Winter:**
- Rabbits
- Hare
- Adult deer when conditions are favourable

… deer generally in poor condition or when snow impairs movement.
Spring-Summer-Fall:
Mainly small mammals
Also... wild berries
birds
amphibians
grasshoppers
deer fawns

... unfortunately livestock, especially sheep, lambs and calves, can also be prey to coyotes
• Food drives many aspects of coyote biology...

• As local food resources change? may be changes in coyote foraging behaviour, spatial requirements, density and group sizes

• Food abundance regulates coyote numbers by influencing:
  – Reproduction
  – Survival
  – Dispersal
  – Space-use patterns
Ontario study in the 1970’s:

- Stomach contents of 250 coyotes
- 30% mice
- 5% sheep remains
- Most livestock was consumed as carrion
- Coyotes have learned to scavenge the carcasses of livestock, much the same way as carrion left by wolves

? disposal of dead stock is an important issue
Ungulates are the primary prey of wolves
Why prey on livestock?

... Energetics

- Domestic prey (especially lambs) have a high energy value because:
  - handling costs
  - search time
  - energy delivery
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Coyote Management

• For the most part, coyotes in Ontario are not managed…

• Currently no bounties or closed seasons on coyotes in Ontario, except:
  – wolf hunting seasons apply also to coyotes in wolf range
  – Municipal Financial Incentives for Control of Coyote Predation
  – Coyotes protected in townships around Algonquin Park as part of the wolf protection program

• Some records kept for annual fur harvests

• Trapper harvests rarely manipulated through quotas…

• Anyone can kill coyotes in defence of property
Wolf Management

- Effective 2005 - closed season from April 1 to September 14, covers most central and northern Ontario
- Hunters must purchase, in addition to a small game license, a special seal (residents – $10 fee; non-residents – $250 fee).
  - a limit of two seals per hunter per calendar year
  - mandatory reporting by hunters about hunting and harvest
- mandatory reporting of wolves/coyotes killed in protection of property
- No quotas for trappers
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Depredation on livestock....

• Coyotes account for considerably more depredation losses in Ontario than wolves.
• Livestock depredation is a complex problem – e.g. coyote or wolf abundance alone is a poor predictor of kill rates of livestock.
• Breeding pairs of coyotes are the primary predators of sheep because of increased energetic demands of raising pups.
Controlling coyote populations

• Several studies report an increase in coyote numbers where there have been intensive control efforts or increased harvests because of higher pelt prices

• Possible exception where there are no areas off limits to harvest
What do we know about coyote/wolf predation on livestock?

- Kill livestock in proportion to livestock abundance in territory

If pairs/packs have access to high abundance of livestock? may become specialists

Pairs with access to low abundance of sheep? may simply prey opportunistically on sheep

- Use of deer by coyotes inversely related to abundance of sheep
Predation on livestock continued…

- Adult males involved in most depredations
- Removal or either or both members of the breeding pair reduced depredation within that territory during the subsequent 3 month period

- If only known depredating animals are removed then territorial non livestock-killing animals might help reduce predation by excluding livestock killing animals from their territories.
What about wolves?

- 66% of 71 wolf packs monitored in Wisconsin were never suspected of predation, but 4 packs were involved in >4 events each.
- **Belarus** - The rate of wolf predation on domestic animals and their appearances in villages increased exponentially with declining biomass of wild ungulates and ceased again when wild ungulates began to recover.
What makes wolves kill livestock?

- Mech et al 2000 - Attempted to detect factors that might predispose farms in Minnesota to wolf depredations.
- Compared results of interviews with 41 farmers suffering losses with 41 non-loss farmers.
- Habitat types were similar between the 2 sets.
- Farms with chronic losses were larger, had more cattle, and had herds farther from human dwellings.
Can we predict where coyotes or wolves will kill livestock?

- Dense vegetative cover appears to favor livestock predation by wolves and other large carnivores.

- Likewise, placing pastures around vegetated waterways may promote coyote depredation.
What about Bounties?

- Bounty on predators in Ontario through 1973
- Can eradicate wolves, never shown effective on coyotes
- “The overwhelming disadvantage of coyote bounties is the misdirection of funds meant to, but not effectively and economically able to, reduce coyote damage to livestock.”
  

- Nova Scotia – First coyote arrived in 1977, bounty introduced in 1982
- Coyotes increased every year, bounty cancelled in favour of compensation program in 1986
“Although several state and provincial case histories, including Utah, are available (Bennitt 1948, Latham 1951, Michigan Department of Conservation 1960, Nielsen 1973, Theberge 1973), there is no documented evidence indicating that bounty programs temporarily or permanently reduce coyote abundance or subsequently reduce livestock depredation.”
“Fur managers and biologist from across Canada and the eastern U.S. met to discuss coyotes in Newfoundland, and the synopsis was that bounties did not work. Despite aerial slaughters, poisons, and bounties, the resilient coyote proved to be a survivor, and the lesson was that on a large scale at least, coyotes could not be eradicated. In fact, their versatility and reproductive capacity actually allowed them to expand their range despite very intense control initiatives.”
Coyote bounties are bunk
If lawmakers pass a new bounty bill, Minnesota will have the distinction of enacting, not once, but twice the most worthless wildlife-management tool

By Ron Schara
Host of ESPN2's "The Outdoor Beat"
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Email
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In 1865, Minnesota counties began paying bounties for dead coyotes. County commissioners eagerly gave taxpayer money for coyote scalps until 1957. When the bounty system ended, Minnesota had more coyotes in more counties than it did in 1865.

At the moment, the Legislature is again considering a bill to give counties the option of restoring a bounty on coyotes. If this bill passes, Minnesota will have the distinction of enacting, not once, but twice the most worthless wildlife management tool in America's history.
Grey County Municipal Incentive

Payment for 53-120 coyotes/ year.

1. Grey County (4,426 km²) probably has 500 – 1,700 coyotes

2. Even if we only use deer range (2548 km²) there would be 275-1000 coyotes.

3. If Grey county were an Island, removing >50% of the coyotes every year might eventually get rid of them, but….
Knowing this, what can we do?

- “Blanket” removal methods focus on the least important segment of the predator populations with respect to livestock depredation.
- Shooting is more selective within breeding territories and shooting over calls can be particularly effective at taking breeding males.
- Promote trapping of problem wolves and coyotes only by highly trained trappers because “educated” dogs become very difficult to capture.
- Timing is important, removal of breeding coyotes during the non-lambing season does little to reduce losses during the following lambing season.
So what do we do...

Since coyotes and wolves are probably here to stay...

? in our best interest to learn all we can about these adaptable animals, manage them where possible, and control them when necessary.
Questions?