



# Controlling livestock parasites through proper management and optimal nutrition

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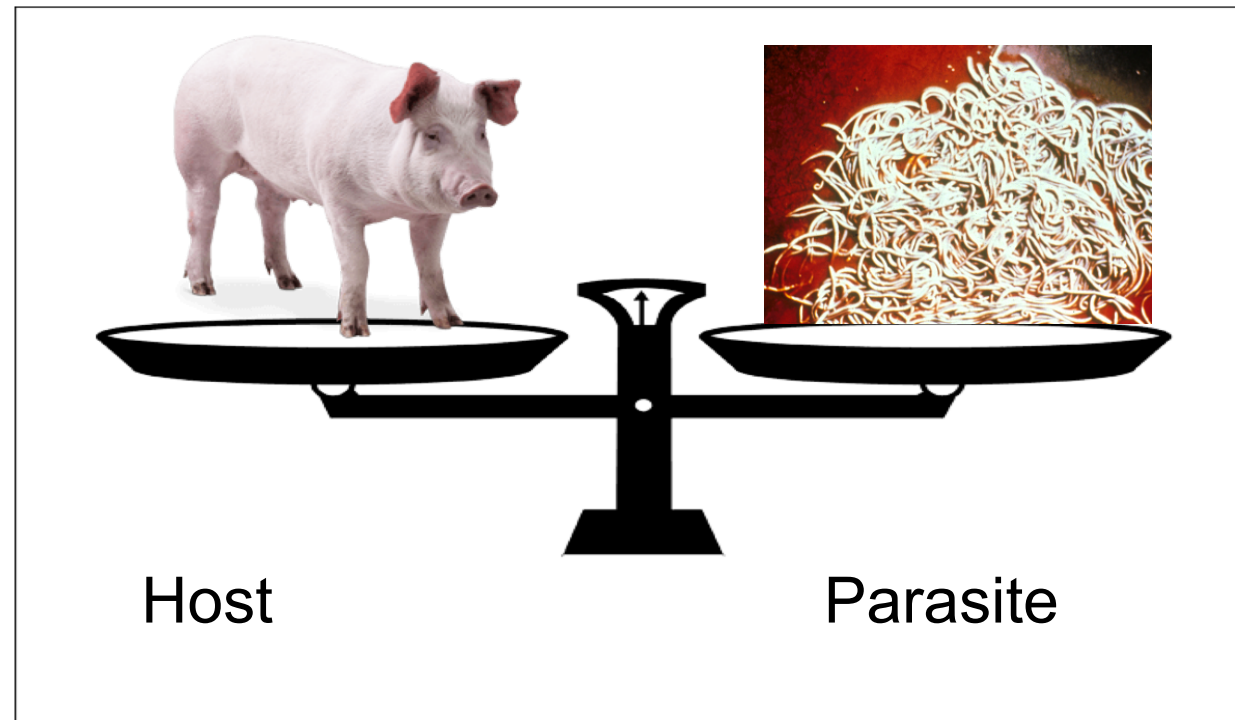
# Host/Parasite Relationships

- Which is parasitized?



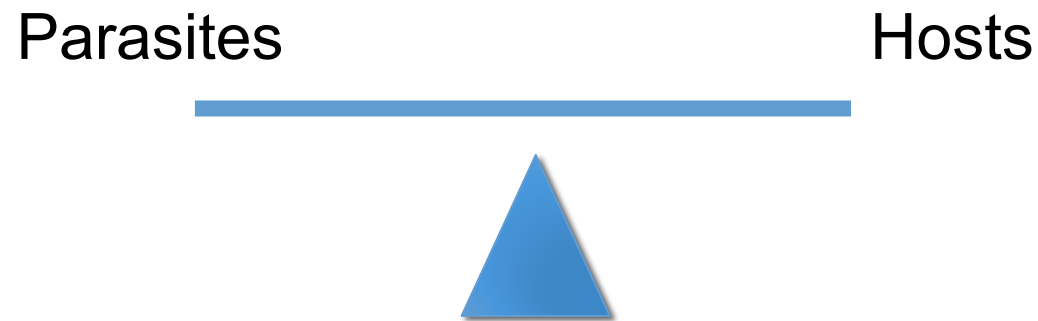
# Host/Parasite Relationships

- Infection does not equal disease



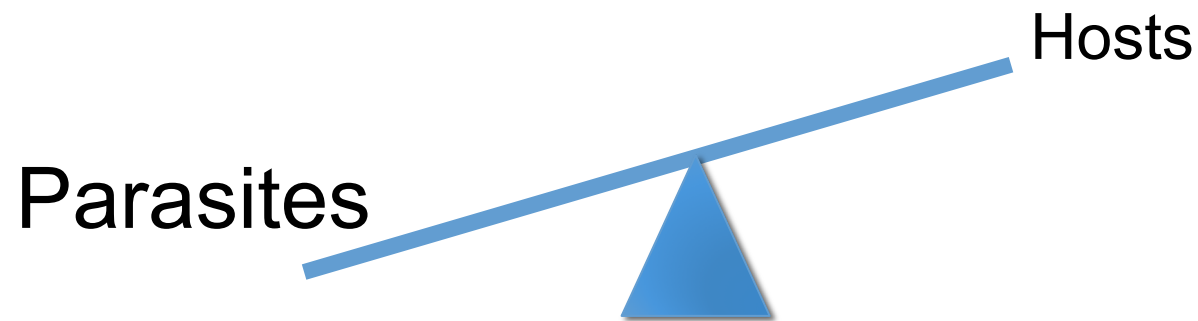
# General Principles of Parasites

- We all know parasite infection can be a problem in animals
- Because they live outside we can't expect to eliminate the parasites
- When do parasites become a problem in livestock?



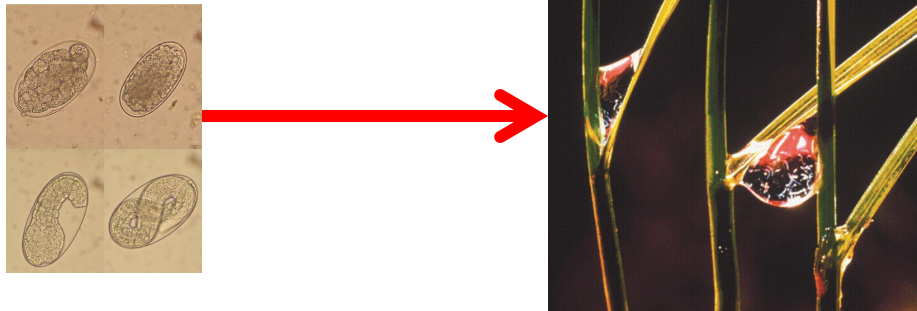
# General Principles of Parasites

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# Balance Shifters—Parasite Factors

- Favorable weather
  - Most common/important parasites spend time in environment developing to infective stage (infective = able to infect the host)
  - Warm temperatures, high moisture best for development
  - Once developed—cool, moist conditions best for survival
- Helps explain disease patterns, control methods



# Balance Shifters - Parasite Factors

- Management extremely important in determining parasite numbers
  - Parasite problems are very often the result of management and can be fixed by management changes



not equal to



# Balance Shifters—Host Factors

- Some animals especially vulnerable
  - **YOUNG ANIMALS**
    - Immune response to parasite is complex takes time to develop
    - Often don't have reserves to withstand parasite effects





## Balance Shifters—Host Factors

- Some animals especially vulnerable
  - **ANY ANIMAL THAT HAS ANOTHER DISEASE OR STRESS IN ITS LIFE**
    - Infectious diseases
    - Old age
    - Other diseases
    - Early lactation



## Balance Shifters—Host Factors

- Some animals especially vulnerable
  - **ANY ANIMAL ON A NUTRITIONALLY DEFICIENT DIET**
    - If you have a parasite problem in animals of all ages check the diet



# Balance Shifters—Host Factors

- Some animals especially vulnerable
  - **Animals with increased genetic susceptibility**
    - In populations of animals, some have genetic increased susceptibility to a parasite, usually about 20-30%
    - 20:80 Rule



# Parasites

- There are primary parasite problems and secondary parasite problems
  - Always look for those other factors when you have what appears to be a parasite problem
  - Immediate cause of death on report from diagnostic lab may identify parasites as the cause of death, but high parasite load may be the result of another problem—management, infectious, dietary, etc.

# Parasites

- There are primary parasite problems and secondary parasite problems
- Diarrhea in a calf from GI worms
  - *Too many worms in an animal with incomplete immune response*
- Diarrhea in an adult cow with worms
  - *Unexpected, likely due to suppression of immunity from some other cause*
- Treatment with anti-parasitic drug not sufficient to control the problem in either animal
- Always consider what balance shifter(s) might be present---
  - Ask yourself:
    - Are parasite numbers increased/increasing?
    - Did something make this animal more susceptible?

# How are animals infected with parasites?

- Common/important parasites of livestock are eaten by the host in 2 forms
  - **Eggs, oocysts (coccidia)**
    - Egg shell makes them hard to kill
    - Disinfectants usually ineffective
    - Can last a long time in the environment
  - **Worms (larvae) that have hatched out of the egg**
    - Not as well protected as eggs, easier to kill
    - More likely to be killed by adverse environment
- Most common/important parasites go from one livestock host to another
  - A few pass through another type of animal on the way (tapeworms)

# Controlling Parasites

- **Reduce number of parasites in the host**
  - Drugs - dewormers
  - Alternative anti-parasitics
  - Selection for host parasite resistance
  - Ensure optimal nutrition
- **Reduce parasites in the environment**
  - Pasture management—rotation, cropping, mixed species
  - Sanitation
  - Reduce animal density
  - Remove animals from contaminated area

# Reduce number of parasites in host

## Drugs - dewormers

- Major Drug Groups (some others, more restricted in use)
- Widely used in ruminants, horses, pigs

Group	Members (in U.S.) Generic names	Trade names (examples)
Benzimidazoles	fenbendazole, albendazole, oxibendazole	Safeguard, Panacur, Valbazen, Anthelcide All given orally
Nicotinics (tetrahydropyrimidines and imidazothiazoles)	pyrantel, morantel, levamisole	Prohibit, Strongid, Rumatel, Banminth Mostly given orally
Macrocyclic lactones	ivermectin, doramectin, eprinomectin, moxidectin	Eqvalan, Ivomec, Noromectin, Eprinex, Dectomax, Cydectin, Quest, Longrange Oral, pour-on, injectible



# Reduce number of parasites in host

## Deworming Drugs

- Drugs we have for many common/important parasites are terrific
- **BUT**
  - For some animals (poultry) not many products approved
    - Read the label, the label is the law!
  - If you buy a drug (FDA approved) at the feed store and use it differently than described on the label, that is **off-label use**, **must be done under the supervision of a veterinarian and may require long withholding times for meat and milk**
- **RESISTANCE TO DEWORMERS INCREASING!**
  - Only 3 major groups

# Reduce number of parasites in host

## Alternative Anti-Parasitics

### Herbal products



### Herbal Wormer

SKU: 20F-5

The original, all natural, herbal wormer is compounded especially for goats. This wormer contains no artificial chemicals and is non-toxic and non-sickening. Safe for kids & pregnant does. No milk dumping or withdrawal time for slaughter. 200 doses in every pound of wormer. Dosage for mature goats is 1-1/2 tsp. (per 100lbs) weekly. We recommend an initial dosing of twice a day for three days in a row. Safe for most farm animals (including sheep!) except for cats. Dosage for chickens is 1 tsp. per 5 chickens mixed in feed weekly. Ingredients: Worm Wood, Gentian, Fennel, Psyllium, Quassia

### Silver Lining Herbs 13 Herbal Wormer 1 4 lb | AA Callister [Back](#)

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Item Number: 55163

The herbs used in this herbal combination are for the maintenance of a healthy and naturally worm- and parasite-free system. This combination works by simply maintaining an environment which is not welcoming to parasites and worms; they are opportunistic and need an unclean environment to thrive. Active Ingredients: A proprietary blend of (Garlic, Cascara, Clove, Kelp, Sage, Slippery Elm, Black Walnut, Chaparral and Juniper) 7560 mg per tbsp. Scoop included. Inactive Ingredients: None. Recommended use: 1 level scoop per day for 10 days, for 1000-1200 lb horse. There are approximately 60 scoops per 1 lb bag, and 15 scoops per 1/4 lb bag. 1/4 lbs wormer comes in tub with lid.

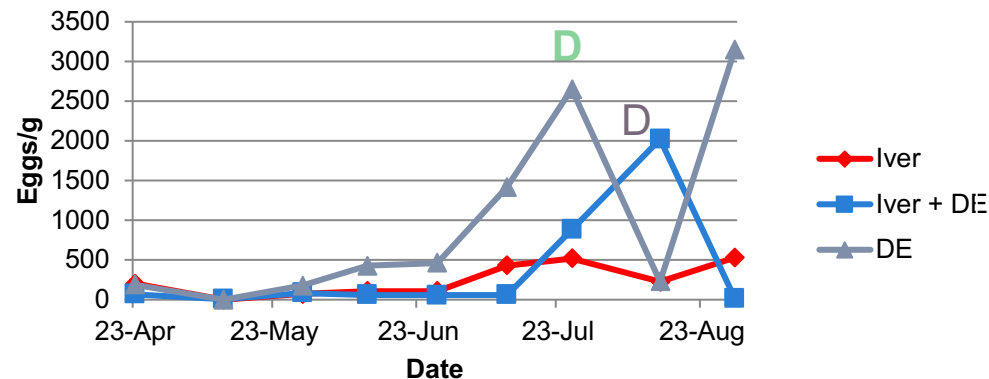
# Reduce number of parasites in host

## ALTERNATIVE ANTI-PARASITICS

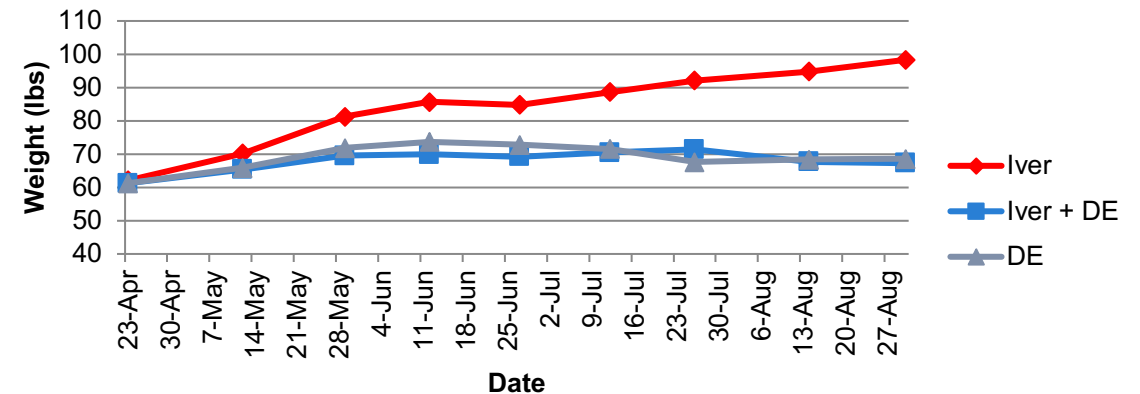
### Diatomaceous Earth

- Fossil diatoms, crystalline
- Used in the environment for insects, etc
  - Acts as desiccant
  - Sharp edges cut insect exoskeleton
- Also used for internal parasites, no good data to support

#### Fecal Egg Counts



#### Body Weights



# Reduce number of parasites in host

## **ALTERNATIVE ANTI-PARASITICS**

- Plant secondary metabolites (PSM) being investigated at a furious rate
- Condensed tannin containing forages and other crops grown in the U.S. that have a negative effect on parasites
  - Birdsfoot trefoil--north
  - Sainfoin--west
  - Sericea lespedeza—south
  - Cranberry vine



# Reduce number of parasites in host

## **SELECTION FOR HOST PARASITE RESISTANCE**

- Selecting animals that are more parasite resistant
  - Currently being done with small ruminants
  - Could be done in any any animal species

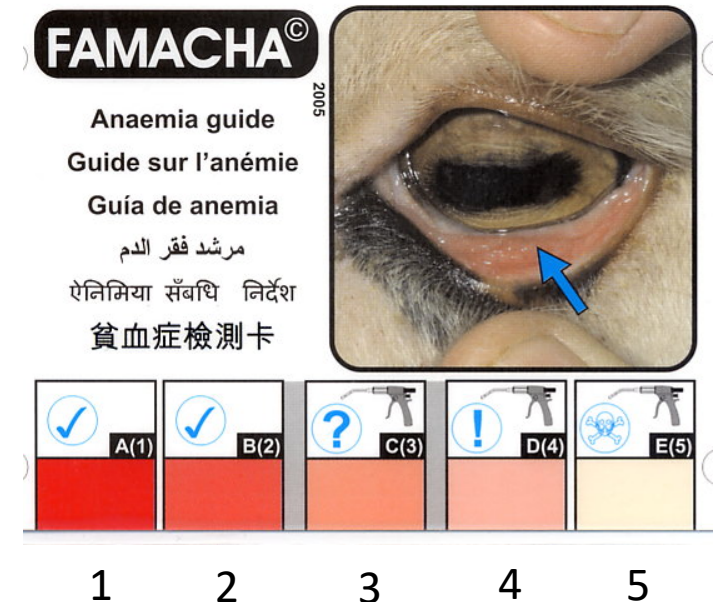


Reduce number of parasites in host

## SELECTION FOR HOST PARASITE RESISTANCE

### FAMACHA<sup>©</sup>

- Eye color chart with five color categories
- Compare chart with color of mucous membranes of **sheep or goat**
- Classification into one of five color categories:
  - 1 not anemic
  - 5 severely anemic

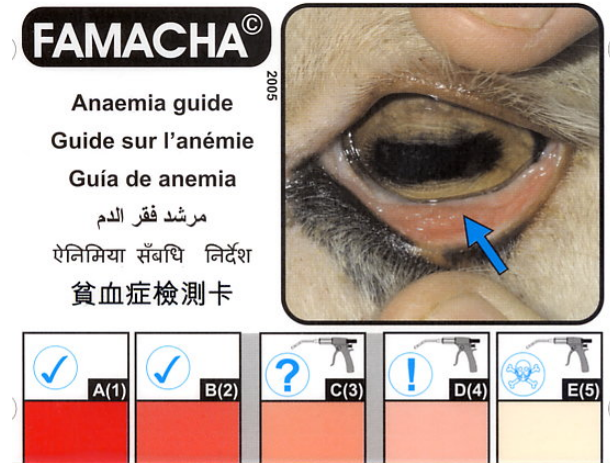


Reduce number of parasites in host

## SELECTION FOR HOST PARASITE RESISTANCE

### FAMACHA<sup>©</sup>

## Relationship of Eye Score to Anemia

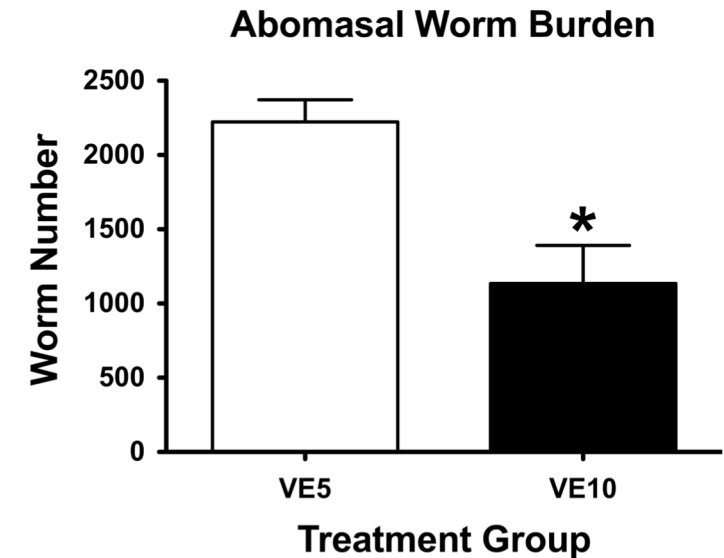


FAMACHA score	Color class	Hematocrit (% Red Blood Cells)
1	Red	≥ 28
2	Red-pink	23-27
3	Pink	18-22
4	Pink-white	13-17
5	White	≤ 12

# Reduce number of parasites in host

## **ENSURE OPTIMAL NUTRITION**

- Good nutrition **CRITICAL** to effective immunity
- Consider increasing protein levels in young or lactating animals
  - Immune response develops faster
  - No hard and fast rules (18% mentioned)
  - Benefit depends on circumstances
- Also need adequate minerals, vitamins
  - Vitamin E at current NRC recommendations (sheep)
- Heavily parasitized animals – pull off pasture and supplement with high quality feed





# Reduce Parasites in the Environment

## SANITATION

- Remove or manage manure
- Removing manure best parasite control ever!
- Not enough just to remove it, parasites survive
- Spreading manure—just spreading parasites around for animals, wait until pasture empty and then allow time to pass



# Reducing Parasites in the Environment

## PASTURE MANAGEMENT

- Move through paddocks in a rotation
  - Parasites die over time in resting pastures
- BUT, length of rest is critical
  - Some parasites may die in a months, others take years
  - Parasite infections transmitted by larvae will die sooner than those transmitted by eggs
- Don't graze pasture down to the ground
  - Longer forage—many parasite larvae don't migrate up grass or only migrate a few inches



# Reducing Parasites in the Environment

## PASTURE MANAGEMENT

- Mixed grazing
  - Sheep/goats/camelids  $\neq$  cattle  $\neq$  horses  $\neq$  pigs for most parasites
  - Each host is a vacuum cleaner for the parasite larvae of other hosts
    - Few exceptions
      - barber pole worm can infect calves
      - Pig roundworms can infect other animals
- Can mix species or graze one species followed by another



# Reducing Parasites in the Environment

## REDUCE STOCKING DENSITY

- Generally helpful, but can still get foci of intense transmission when animals congregate— “Barnyard effect”



not equal to



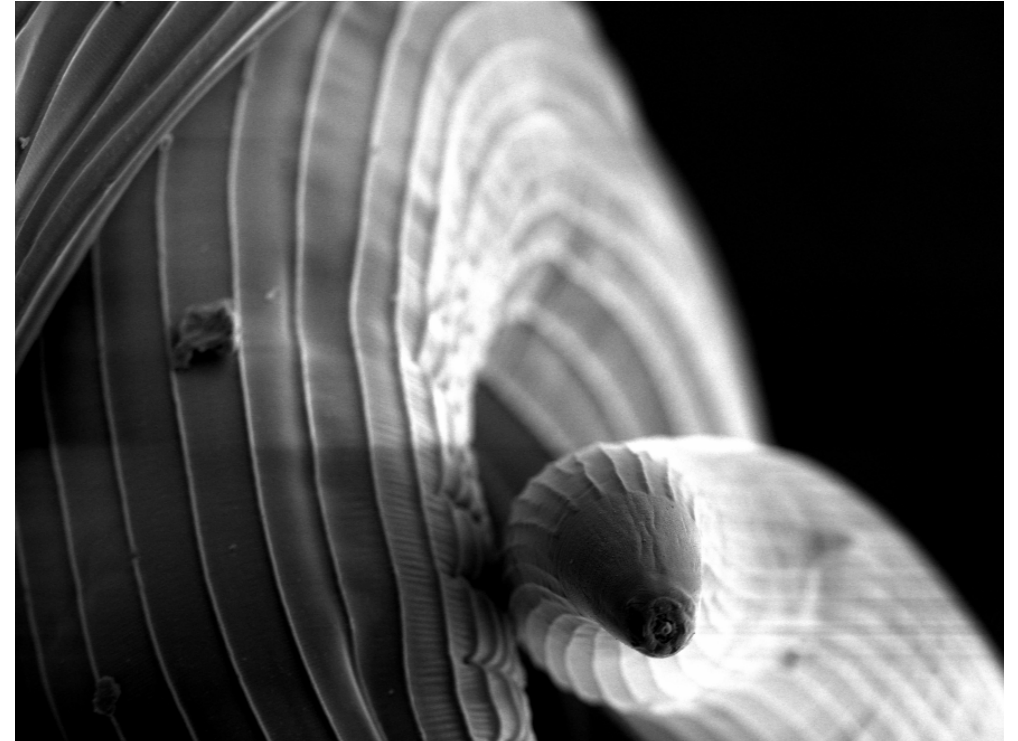
# Reducing Parasites in the Environment

- “Babies Get the Best”
  - The most vulnerable animals should always go where parasites are fewest
  - Least vulnerable animals can help remove larvae
    - Example: Wean onto pasture with few larvae, leave non-lactating, immune animals on contaminated pasture



# Recap – Parasite Control

- No silver bullet
- Good management critical
- Optimal nutrition essential
- General principles apply across species
- Understanding these principles is key to control





Questions?