Parasitic Gastro Enteritis (PGE)
-Etiology and Transmission of GI nematodes

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Update on Control of Gastro Intestinal Nematodosis in small ruminants

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1. Parasitic Gastro Enteritis (PGE)
   - Etiology and Transmission of GI nematodes
2. Epidemiology and pathogenesis of GI parasitism
3. Economic impact and Diagnosis of GI Nematode infections
4. Parasitic Gastro Enteritis – Therapy and control by Anthelmintics
5. Integrated approaches in control of GI nematodes in small ruminants

Parasitic Gastro Enteritis (PGE)
- Etiology and Transmission of GI nematodes

1. Gastro intestinal nematodes that causes PGE

2. Mode of Transmission

What is Parasitic Gastro Enteritis?

- PGE is a disease complex associated with a number of nematode species (mostly strongyles) either in single or in combination.

- Characterised by diarrhoea, weakness, anaemia, hypoalbuminaemia and reduced productive performance.

Present scenario on GIP..

- All grazing ruminants have GIN
- Major constraint in small ruminant production
- Hot and humid tropical climate is very conducive for development and survival of preparasitic stages
- Governed by weather conditions and adopted managemental practices
- Extensive grazing system - community grazing

Major kinds of Internal parasites that causes PGE

I. Helminths (worms)

Nematodes (Round worms)

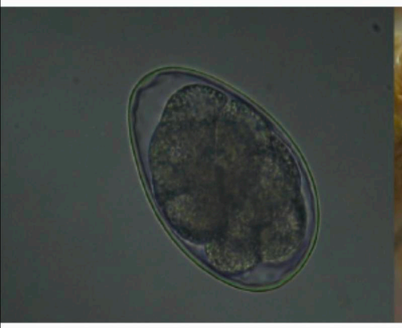
Cestodes (Tapeworms)

Trematodes (Flukes)

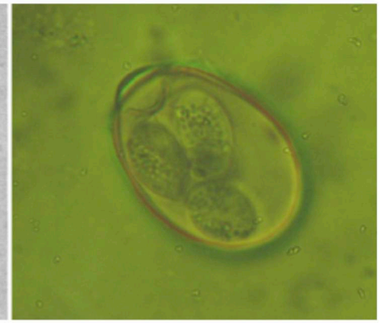
II. Protozoa

Coccidia *(Eimeria spp.)*

Cryptosporidium spp.







Parasite species differ in location and weather conditions

Common GIN that causes PGE includes

Strongyle nematodes – Bursate worms

Haemonchus contortus (Barber pole worm)	- abomasum
Trichostrongylus colubriformis (Black scour worm)	- small intestine
Teladorsagia circumcincta (Brown stomach worm)	- abomasum
Nematodirus battus (thread necked worm)	- small intestine
Bunostomum trignocephalum (hook worm)	- small intestine
Gaigeria pachyscelis (hook worm)	- small intestine
Oesophagostomum columbianum (Nodule worm)	- large intestine

Strongyloides spp.

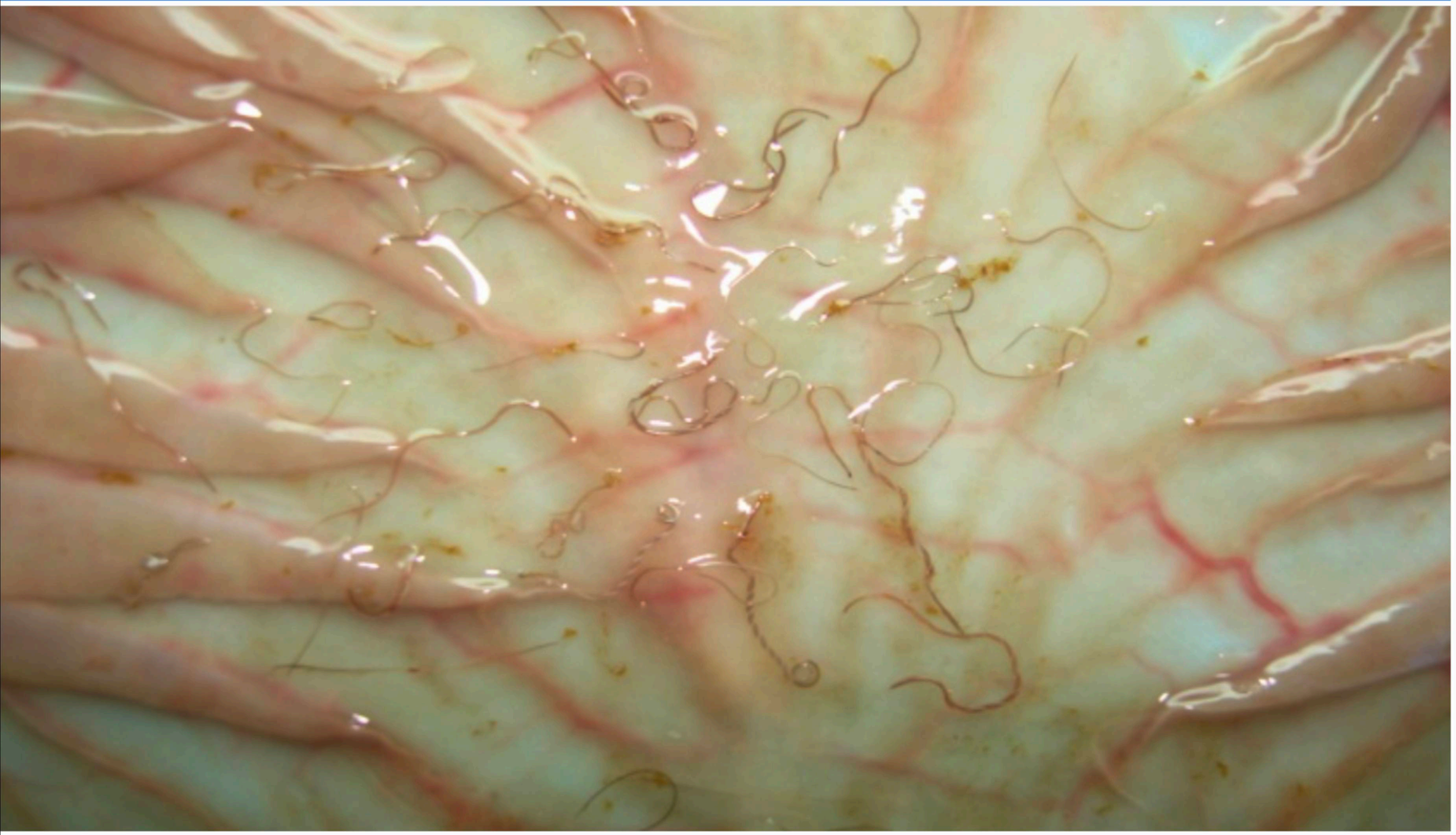
Strongyloides papillosus (Thread worm)	- small intestine
Other GIN	- lesser importance

Haemonchus contortus - Barber's pole worm

- Most pathogenic abomasal worm (15 -30 mm in size)
- Blood sucking nematode – (0.05 ml/worm/day)
- Bleeding on abomasal surface by bite of sharp teeth-Lancet
- Anaemia
- Most fecund nematode - 5000 - 8000 eggs/day/worm
- Short lived

The most pathogenic parasite of sheep

Haemonchus contortus in sheep abomasum



Haemonchus contortus - Identification

Gross- female worm

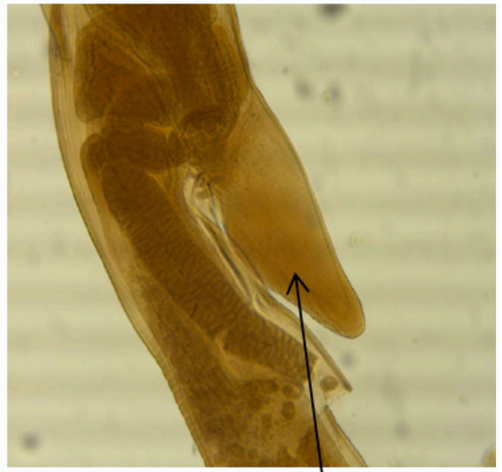
Worm uterus is visible as a white stripe around the red blood-filled intestine, giving it a barber's pole appearance

head end

Male-tail

Asymmetrical dorsal lobe and y shaped dorsal rays

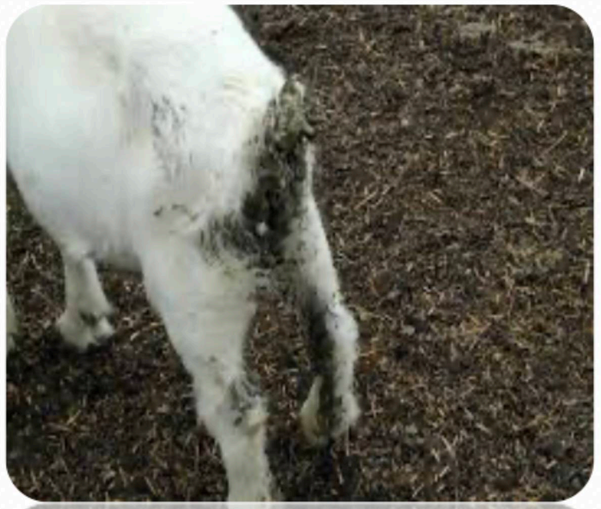
female



vulva flap

Trichostrongylus spp.

- **Black scour worms** – Lambs & weaners (5 - 7 mm in size)
- Abomasal and small intestinal nematode
- Mixed infection with other nematodes
- Less prolific egg layers
- Damage to intestinal mucosa – Diarrhoea
- Hypoproteinaemia- Reduced production performance



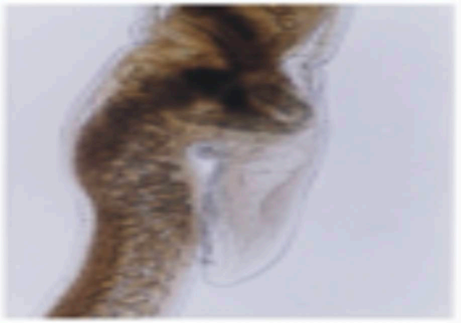
Oesophagostomum spp. (Nodule worm)

- Pathogenic worm in tropics
- Size : 15-30 mm
- Large intestinal nematode
- Dark green diarrhoea
- Nodule formation, emaciation

Adult gastrointestinal nematodes of sheep and goats

2.1 *Haemonchus contortus* - Head end

2.2 *Haemonchus contortus* - Male Tail end



2.3 *Haemonchus contortus* - Female Tail end with vulval flap

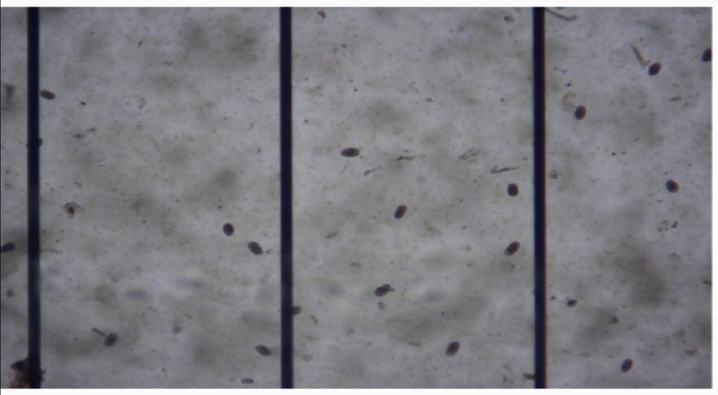
2.4 *Trichostrongylus colubriformis* - Head end

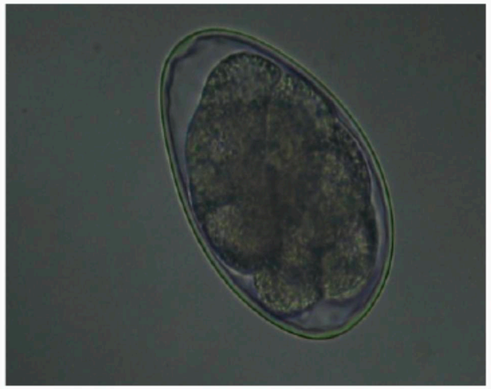
2.5 *Trichostrongylus colubriformis* - Male Tail end

2.6 *Oesophagostomum asperswm* - Head end

Photo courtesy:
Dr. Eswaran

Under field conditions…





- **Mixed infections is more common**
- **Difficult to differentiate strongyle ova**
- **Species confirmation by larval identification**
- **Infective stage- L_3**

How our farm animals acquired infection?

- Contaminated pasture - major SOURCE of infection
- Better understanding of lifecycle is important for worm management
- GIN infection has to be managed - NOT possible to eradicate

Haemonchus and other GIN have direct lifecycle

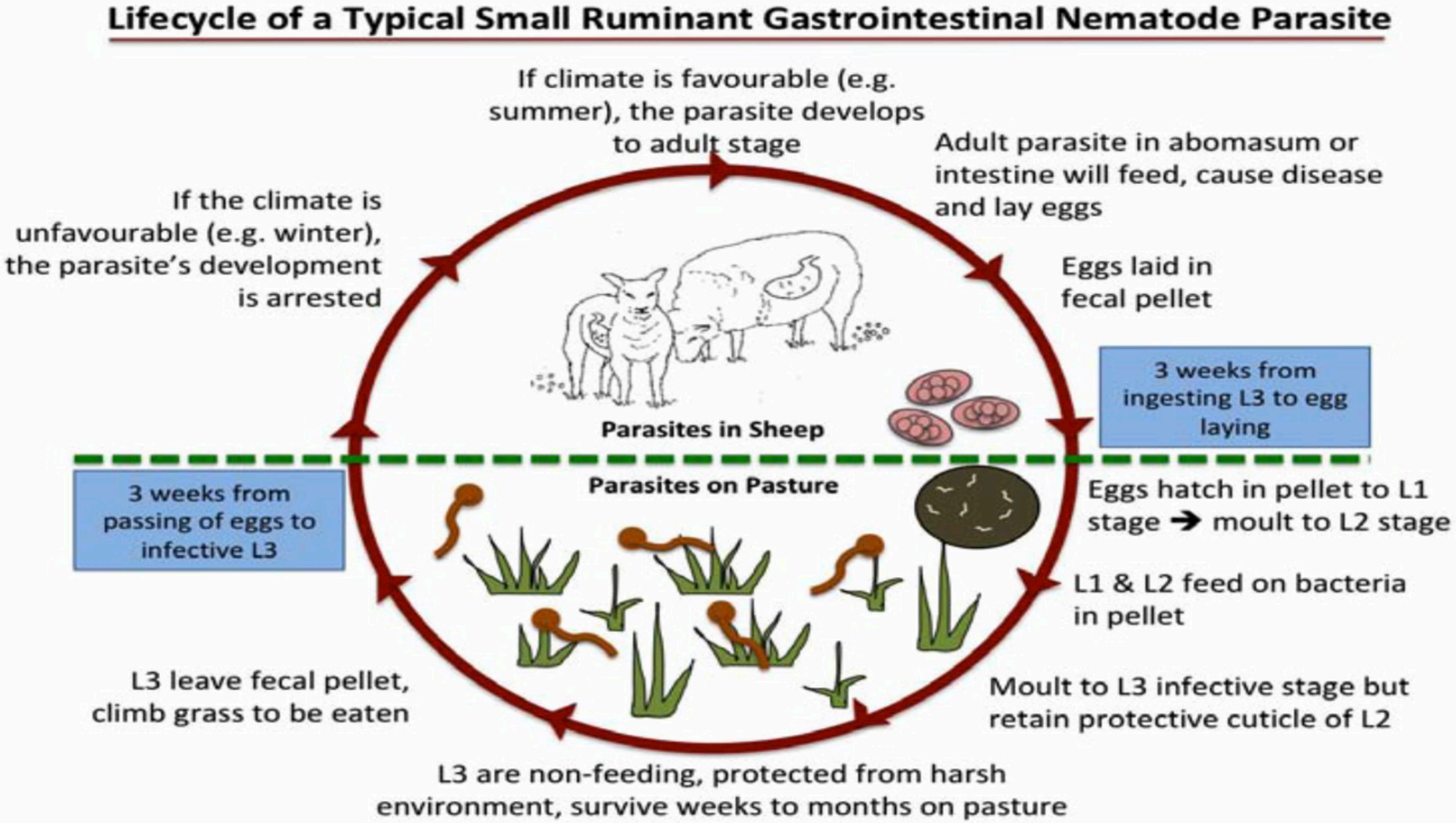
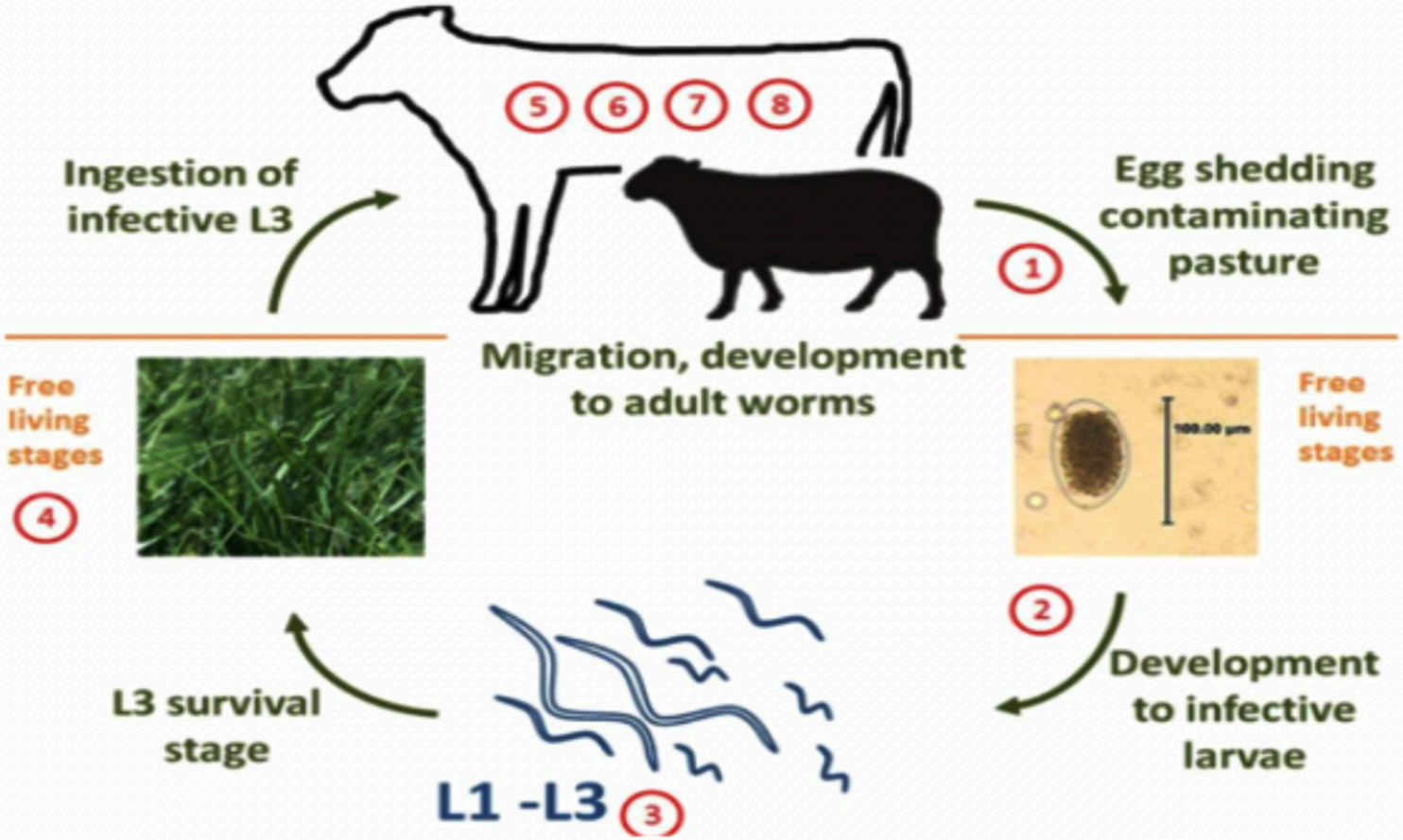


Image from : Handbook for the Control of Internal Parasites of Sheep and Goats University of Guelph

L3 larvae retain the L2 cuticle and do not feed and relies on stored nutrients



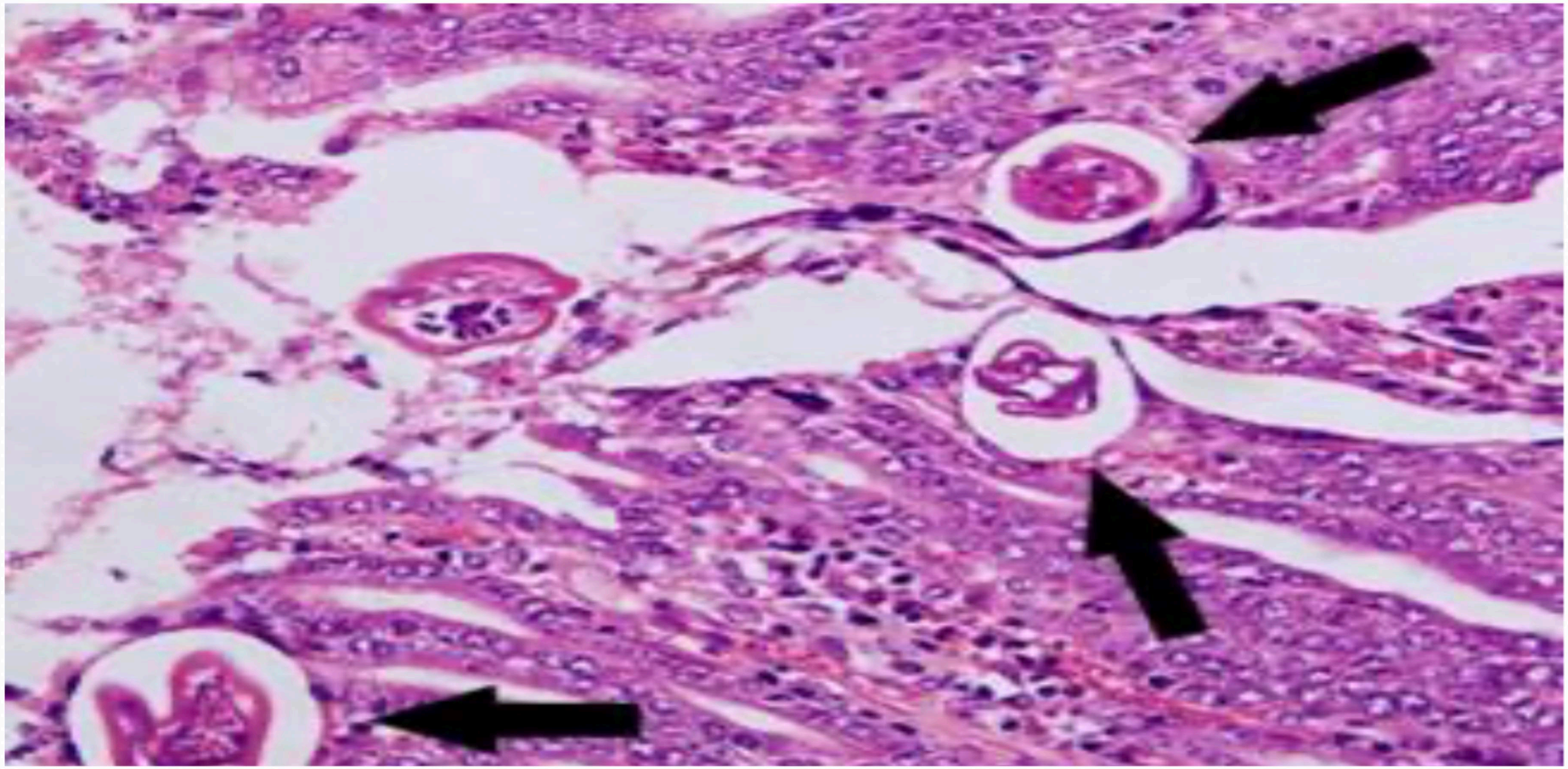
Source: farmhealthonline.com

Hypobiosis (Arrested larval development)

- One way to cope up with adverse environmental conditions
- Temporary cessation in development of its early parasitic development
- The trigger is thought to be unfavourable environmental conditions for egg hatching and development of the free-living larval stages

- For example, cooling weather of autumn in temperate climates or the dry season in the tropics
- When L_3 is ingested in winter/extreme dry conditions, parasite undergo hypobiosis
- Further development occurs when conducive climate returns or at time of lambing / kidding

Sheep abomasum containing encysted hypobiotic L4 of Trichostronglus sp.



Source:www.vet-parasitology.com/ strongyloida.php

Peripartorient egg rise in faecal egg counts

- Increase in numbers of nematode eggs around parturition
- Pronounced in 2-3 weeks before and up to 8 weeks after parturition
- Temporary relaxation of immunity due to circulating lactogenic hormone - prolactin
- Wake up of hypobiotic parasite - mature - egg shedding / increased rate of egg production from existing adult worms

What kind of animals are more susceptible?

- Young lambs/kids & weaners (<6 months)
- Weak/aged animals
- Pregnant animals (>4 births)
- Stress
- Poor nutrition
- Other diseases

Conclusion

- PGE is caused by mixed infections of GIN
- Strongyle nematodes are the major cause
- *Haemonchus contortus* – predominant sp with other GIN
- Short, direct lifecycle with L3 as infective stage
- Hypobiosis & PPR occurs in strongyle nematodes

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Thank you