Major Parasitic Diseases of Livestock and their Control

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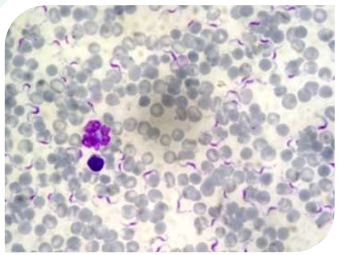
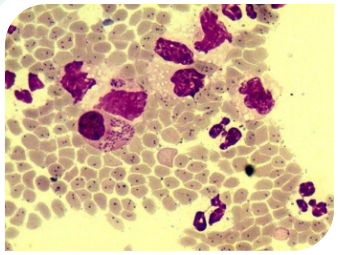
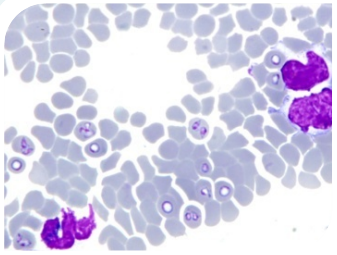




Economic impact

- Parasitic diseases are major constraints in economic livestock farming
- Trypanosomosis = ₹ **5025.0** crore

  Theileriosis = ₹ **8426.7** crore

  Babesiosis = ₹ **551.54** crore

  Anaplasmosis-??????

  Tick control = ₹ **4353.0** crore

  Haemonchosis = ₹ **2220.0** crore
- Total Loss = ₹ **18,356** crore ≈ 1/2 of the higher education budget

  ≈ 1/4 of the Health care facility budget

✓ Except an attenuated vaccine against tropical theileriosis, control of these diseases solely depends upon- early diagnosis, treatment and good management practices

Major Parasitic Diseases

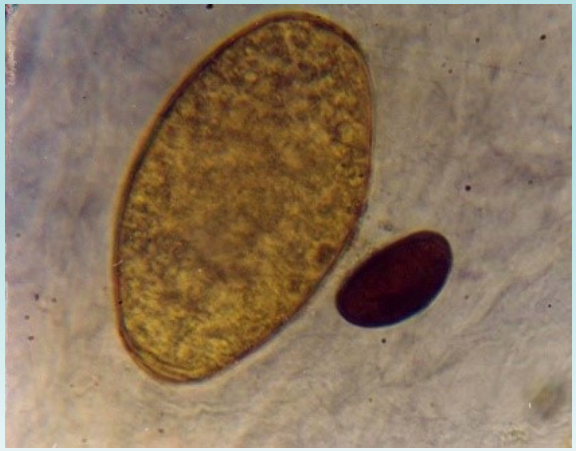
Large ruminants:

Fasciolosis, Paramphistomosis, Trypanosomosis, Theileriosis, Babesiosis, Mange & Tick infestation

Small ruminants:

GI Nematodosis, Paramphistomosis, Fasciolosis, Coccidiosis, Mange & Lousiness

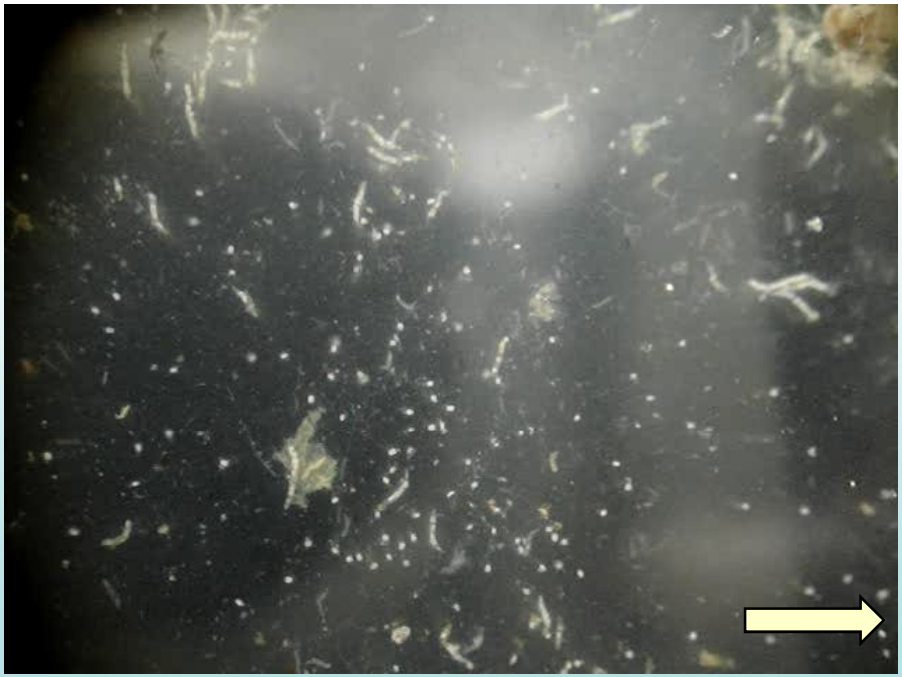
Fasciolosis



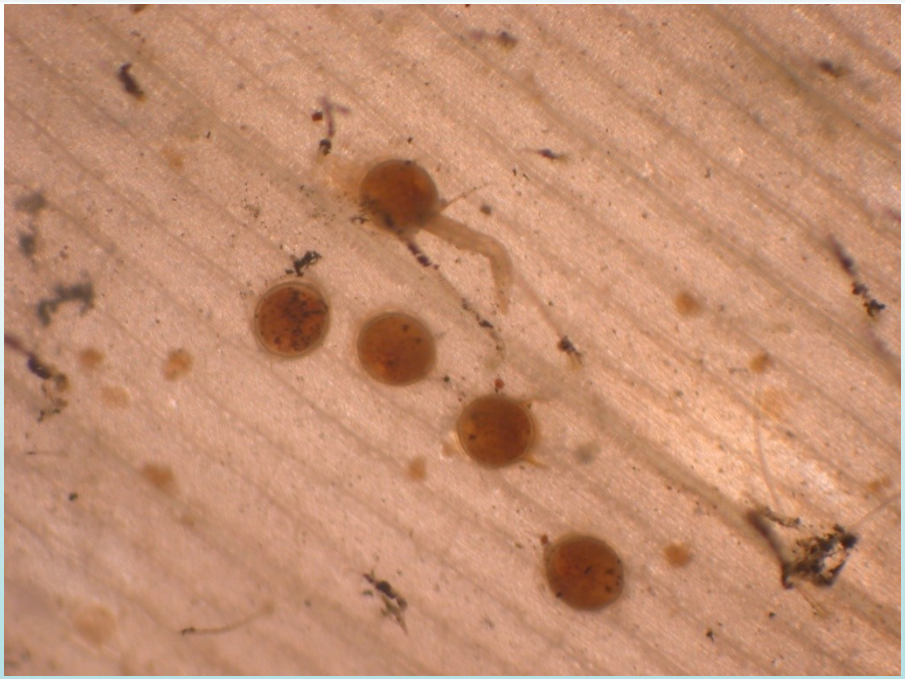
✓3.29 to 17.65% cattle and buffaloes in Maharashtra were found infected with *F. gigantica*

Fasciolosis

Acute	Chronic
Due to migration of immature flukes	Due to adult flukes in bile ducts
Sudden death, common in sheep	Very common in large ruminants
Traumatic hepatitis	Hyperplastic cholangitis
Difficult to diagnose	Easy to diagnose



Cercariae in water



Metacercariae

Amphistomosis

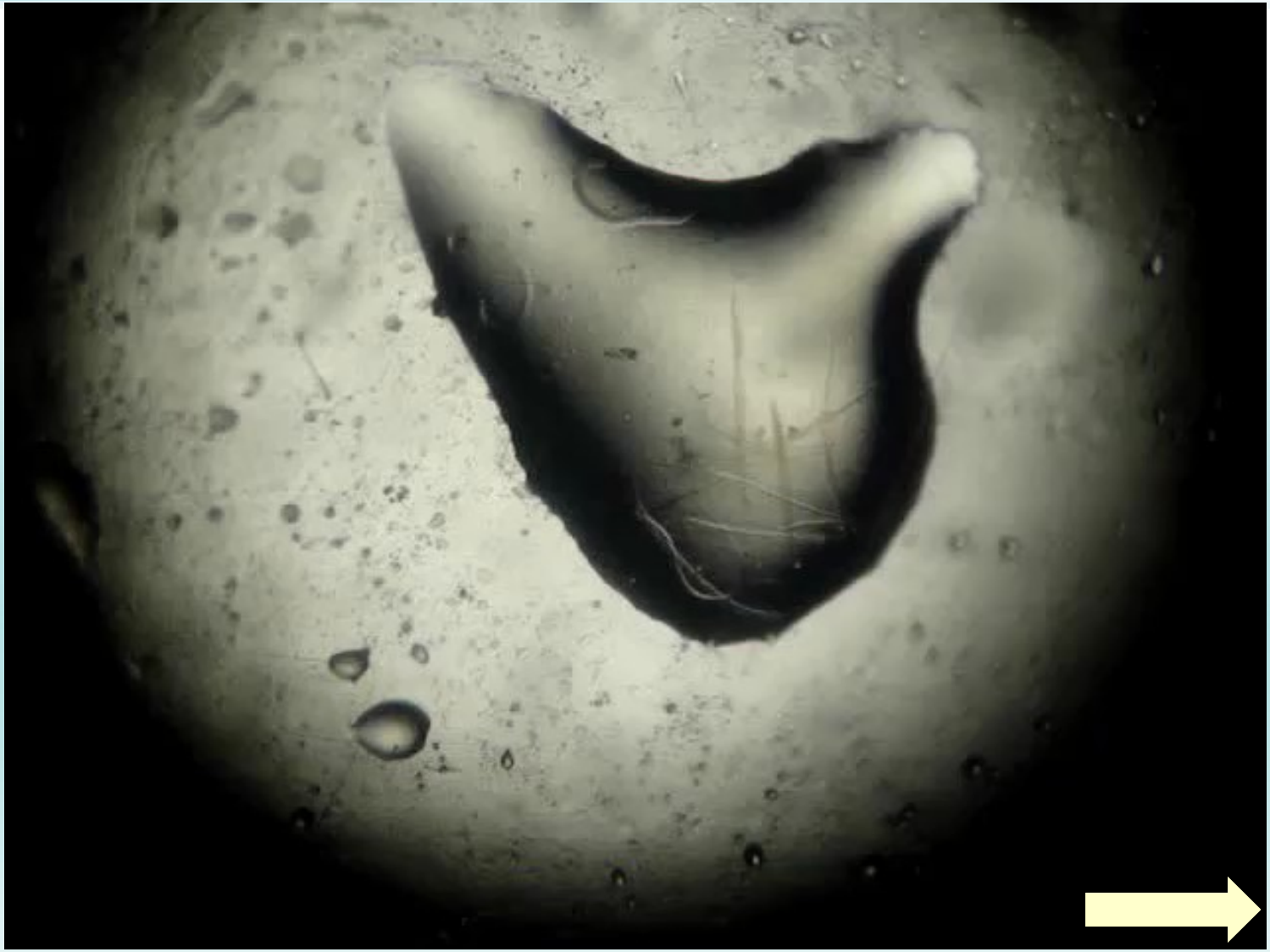
Immature amphistomosis

- Immature amphistomes attach to duodenal and ileal mucosa and cause severe enteritis
- Aanorexia, polydipsia, unthriftiness, and severe projectile diarrhoea
- Extensive mortality may occur, especially in sheep, goat and calves
- Examination of the faeces may reveal immature flukes

Haemonchosis

- Most important helminth for Sheep and goats
- Almost all small domestic ruminants are infected in tropical countries.
- Barbervax, Worm Vax are commercialized for use in Auatralia

Infective larvae



Anthelmintic Resistance

Why?

- ➢Heavy reliance on anthelmintics (frequent deworming)
- ➢Inaccurate dose calculation
- ➢Indiscriminate use
- ➢Long term use of a single class of anthelmintic
- ➢Grazing on same pasture

What to do?

- ✓Avoid frequent and repeated use of anthelmintics (same class)
- ✓Avoid under dosing
- ✓Assess the treatment efficacy (FECRT)
- ✓Avoid mass drenching (Targeted treatment)

- ✓Nutritional supplements enhances the resilience (Helminth-Gut microbiota-Nutrition interaction)

Haemoprotozoan Diseases

- TRYPANOSOMOSIS (Surra)
- BOVINE TROPICAL THEILERIOSIS
- BABESIOSIS

(ANAPLASMOSIS)

Trypanosomosis (Surra)

- Wide range of hosts are affected

- Domestic animals: Equids, Dogs, Camels, Cattle, Buffaloes, Sheep & Goats, Pigs

- Wild animals: Felids, Canids, Bovidae, Cervids, Elephants, Rhinos rodents etc.

✓ The prevalence in Mumbai region was found to be alarmingly high (29.64%). Only 10 out of 75 positive animals were showing clinical signs. (Migri *et al. 2016*)

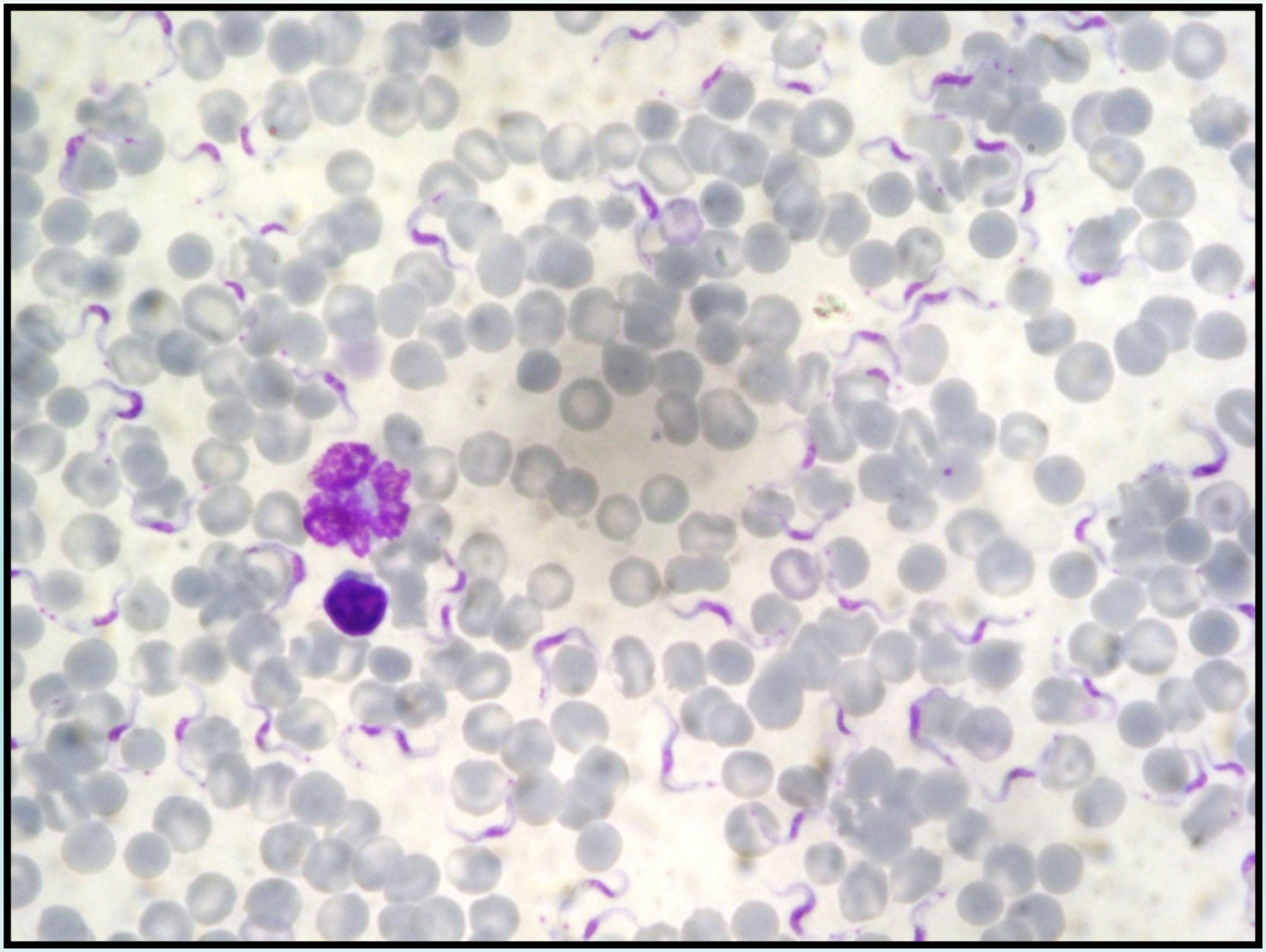
Surra infected Black buck

Diagnosis

- Thin and thick blood smear examination
- Microhaematocrit centrifugation
- Animal inoculation
- Serological(CATT, ELISA)
- Molecular techniques- Nucleic acid based assay

Buffycoat examination

Trypanosoma evansi



Chemotherapy

- Inj. Berenil- @ 5 mg/kg i.m.
- Quinapyramine prosalt- 3-5 mg/kg s.c. (Horses and dogs may suffer from local or systemic reaction)
- Isometamidium chloride- 0.5-2 mg/kg i.m. (prophylaxis for 3-6 months)
- Melarsomine dihydrochloride- 0.25-0.75mg/kg

Cattle & buffaloes

Varied response

- Anaemia
- Intermittent fever
- Loss in weight, milk and meat production
- Loss in draught power

In buffaloes two syndromes have been described

- Chronic wasting sickness lasting weeks or months
- Acute disease leading to death within hours

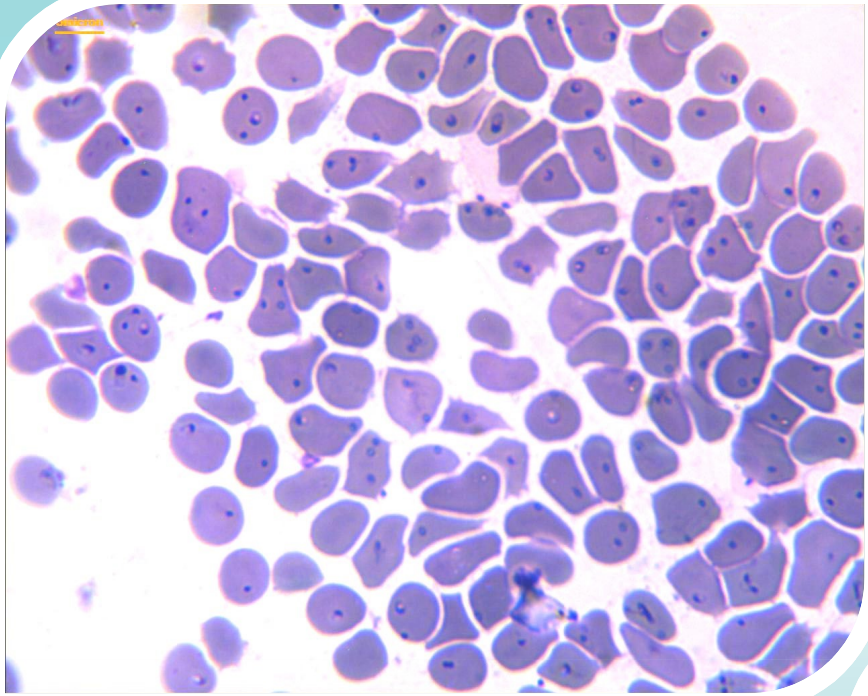
Bovine tropical theileriosis

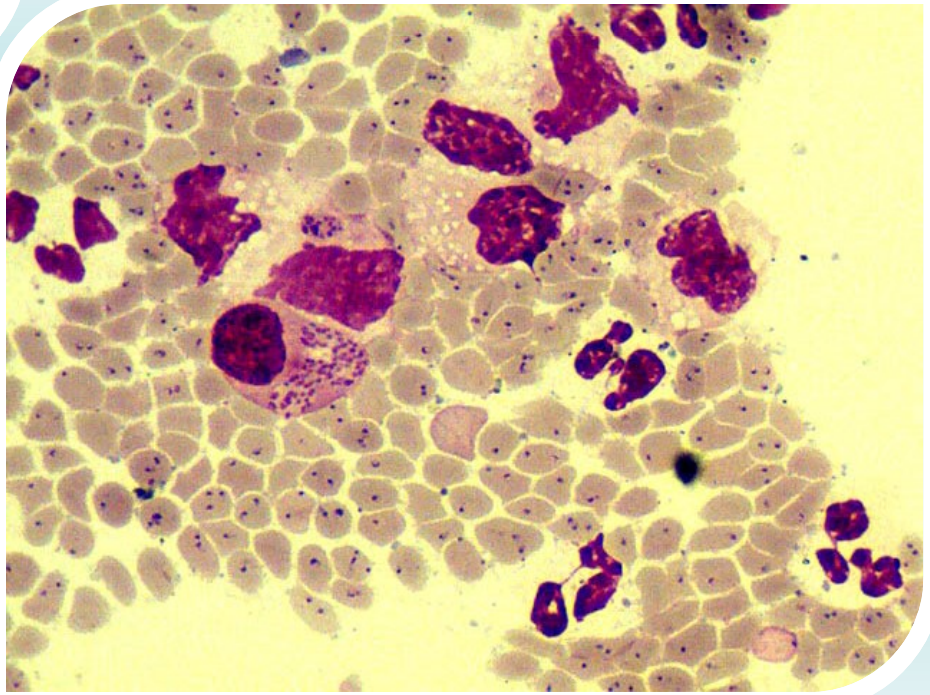
- Blood protozoan disease of cattle transmitted by *Hyalomma anatolicum anatolicum*
- Clinical Signs:
  - High fever (105° – 107 °F)
  - Swelling of superficial lymph nodes and face
  - Coughing
  - Nasal discharge and lacrimation
  - Laboured breathing, coughing
  - Haemoglobinuria (Rare)

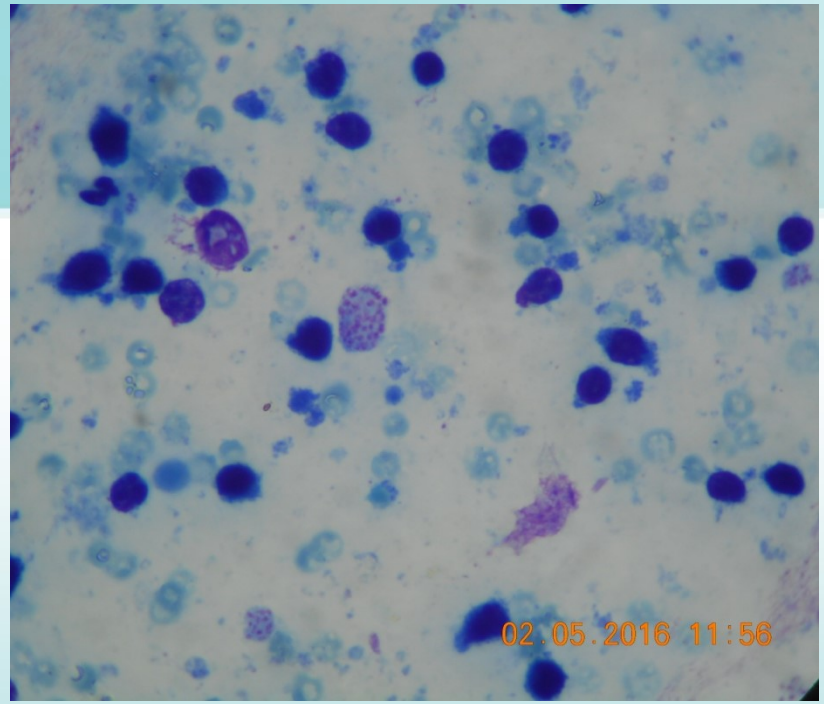
✓ 6.5% to 29.5% in different agroclimatic zones of Maharashtra. (Kolte *et al.* 2017).

Diagnosis

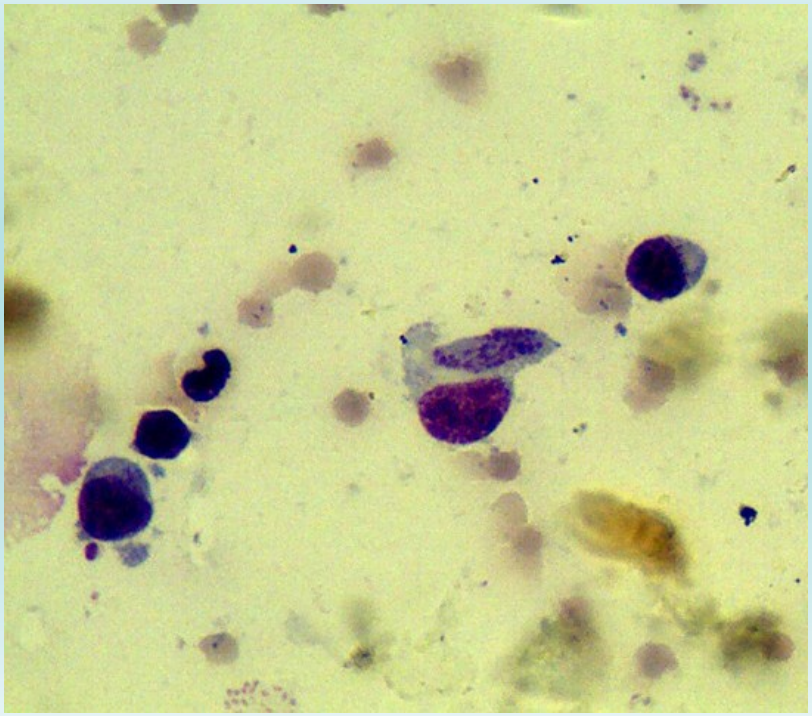
- Parasitological techniques- Blood smear, Lymph node aspirate (early diagnosis is the key to successful treatment)
- Serological tests
- Molecular techniques







Lymph node biopsy



Ulcers in the abomasum

Treatment

- Buparvaquone- @ 2.5 mg/kg i.m.
  (Butalex, Zubion, Bupaven, Butawock,Thelzan)
- Inj. Chlortetracycline - @ 5 mg/kg i.m.
- Inj. Rolitetracycline - @4 mg/kg i.m.

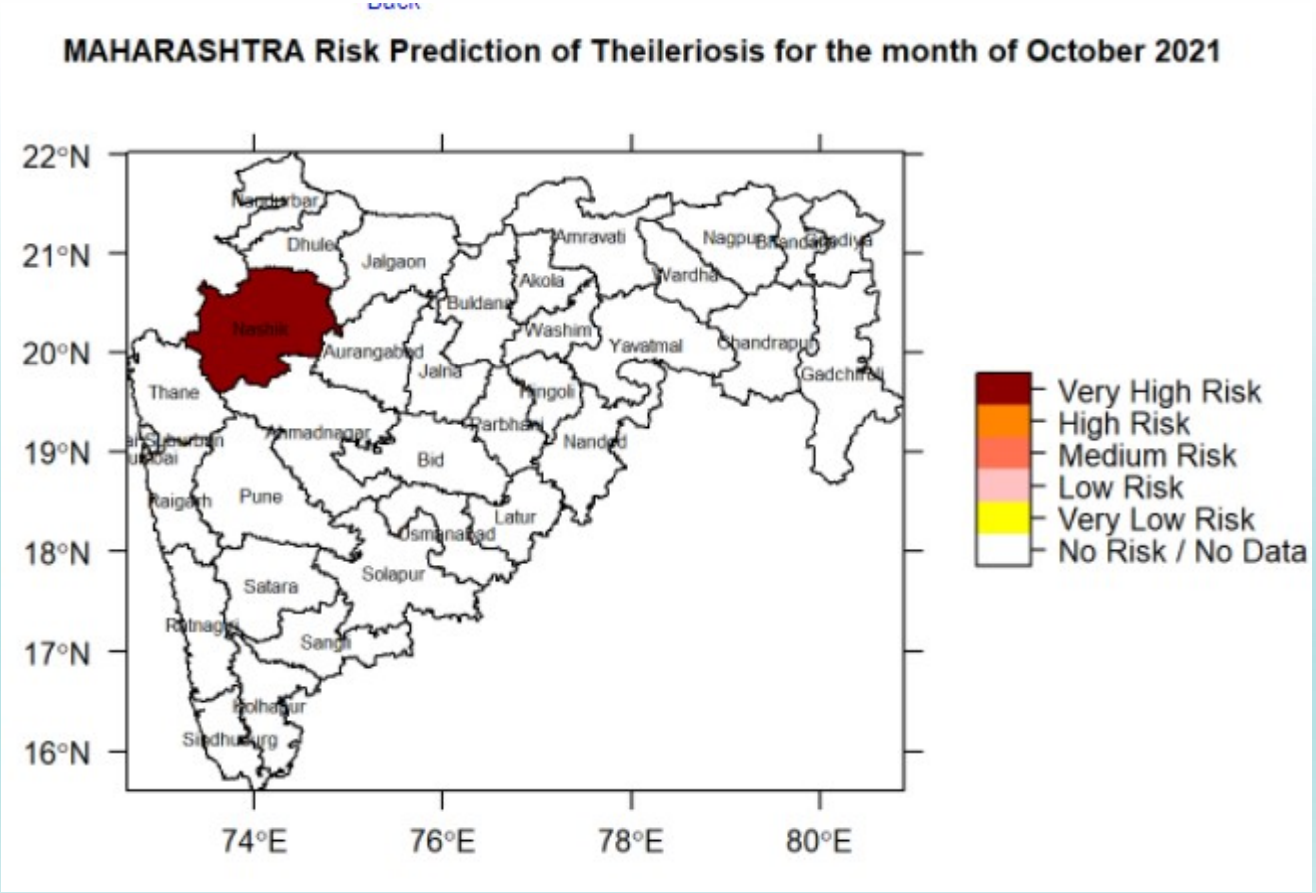
Resistance against Buparvaquone

- Treatment failure was first reported from Tunisia in 1996. Since then many reports poured in from Sudan, Turkey and Iran.
- Molecular studies confirmed five point mutations in the mitochondial cytochrome b gene & mutation in the Peptidyl Prolyl Isomerase Pin1 (*TaPIN1*) gene.

✓ Not yet reported from India

Live attenuated schizontal vaccine

Forecast of Theileriosis in Maharashtra (NIVEDI)

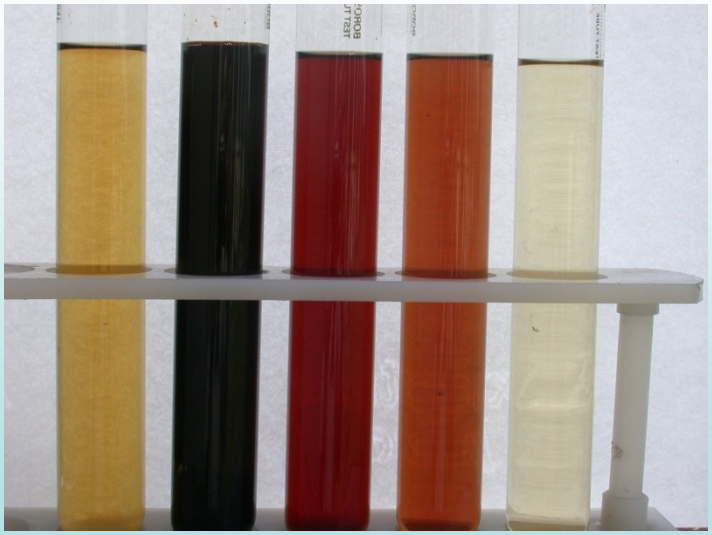


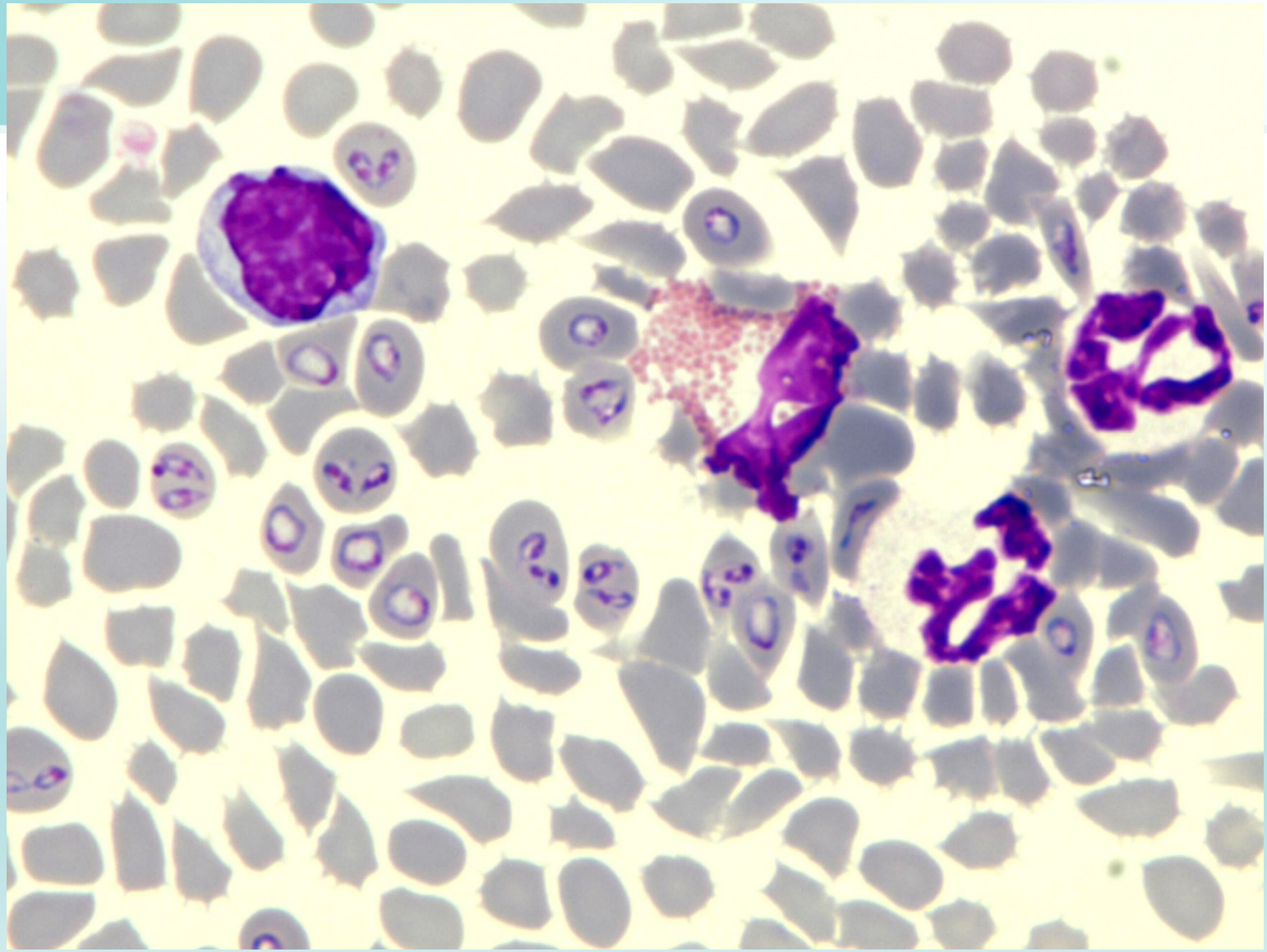
BABESIOSIS

- Acute blood protozoan disease of mainly crossbred cows transmitted by *Rhipicephalus (Boophilus) microplus*

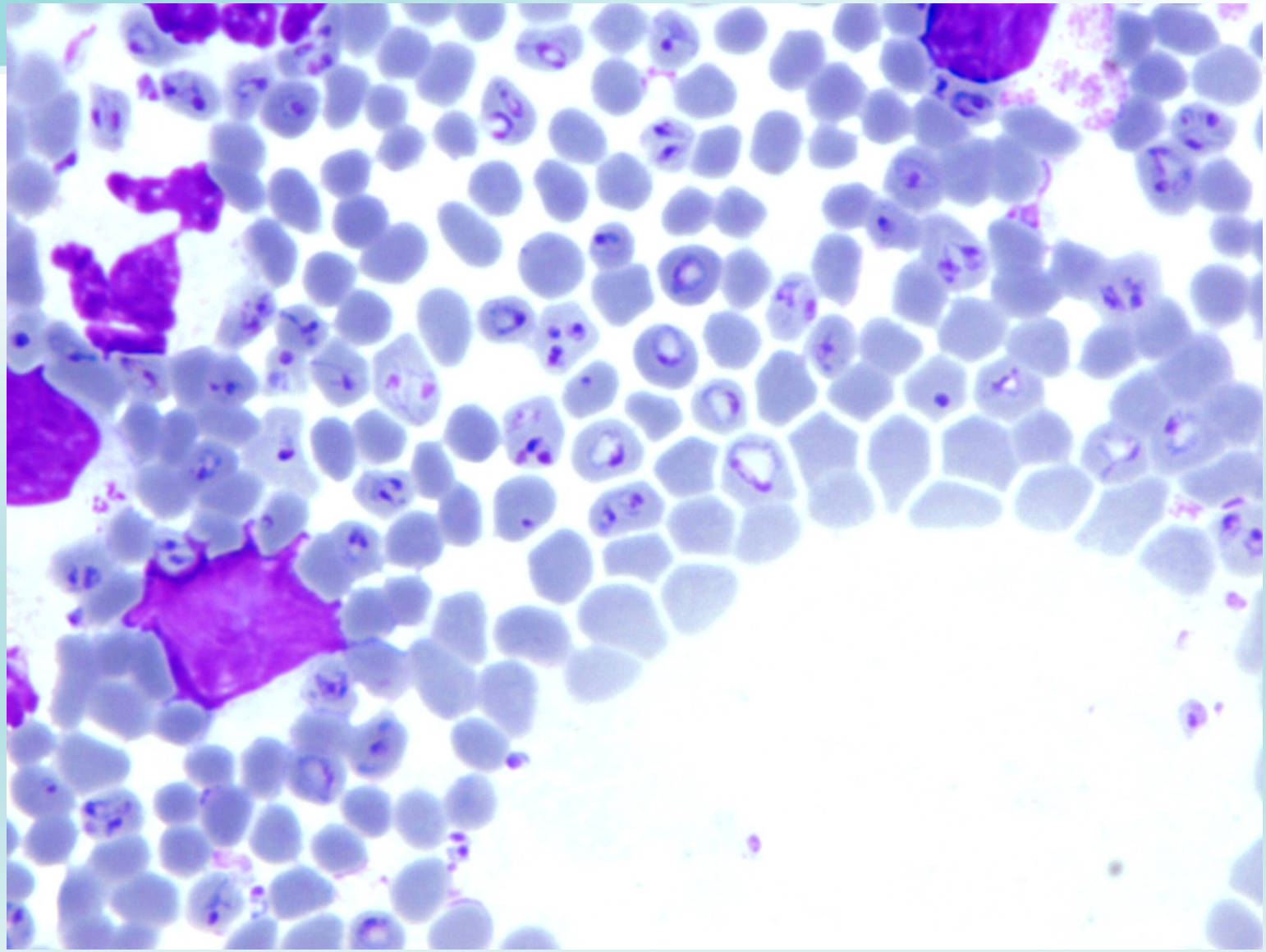
- Clinical signs
  - High fever (105°-107° F)
  - Anaemia
  - Dramatic reduction in milk production
  - Haemoglobinuria
  - Lacrimation
  - Blood in faeces and milk (Rare)
  - Nervous signs (circling, head pressing etc.)
  - ✓ 1.3% to 3.0% animals were found positive for either *B. bigemina* or *B. bovis*


Bernie





Pleomorphic piroplasm



The vectors

Chemotherapy

- Inj. Berenil - @ 3-5 mg/kg i.m. twice at 24 hr. interval
- Imidocarb dipropionate (imizole) as subcutaneous or intramuscular injection@ 1-3 mg/kg.
- Supportive therapy (Antipyretic, Haematinics and Blood transfusion in severely anaemic cases)

Search for new anti-*Babesia* Drugs

- Triclosan
- Nerolidol
- Artesunate
- Epoxomicin
- Gossypol
- Atovaquone

Promising in *in vitro* studies

ANAPLASMOSIS

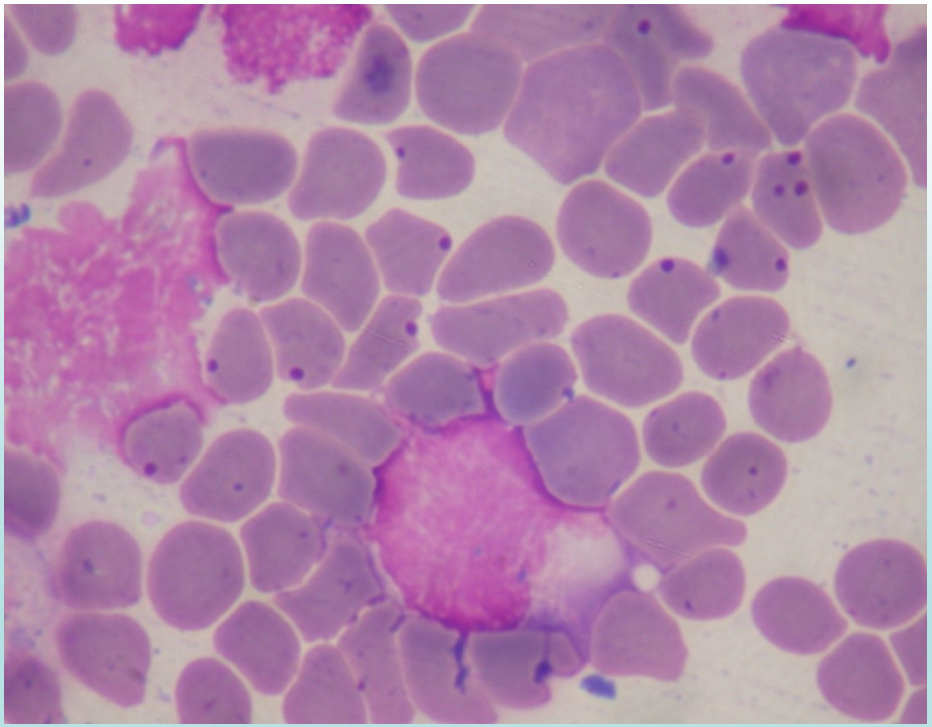
- Rickettsial disease transmitted by one host cattle tick *Rhipicephalus (Boophilus) microplus* (Also blood sucking flies e.g. Tabanid flies and *Stomoxys*)

Clinical Signs

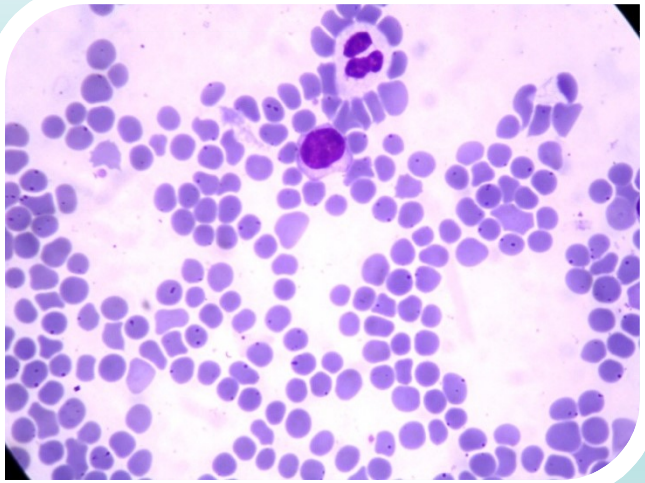
- Fever (Early stage, subnormal temp. at later stage)
- Severe anaemia
- Frank jaundice
- Reduced milk yield
- Emaciation
- Panting, exhaustion
- Jugular pulse
- ✓ **53.3% cattle were found positive (Kolte *et al.* 2017)**

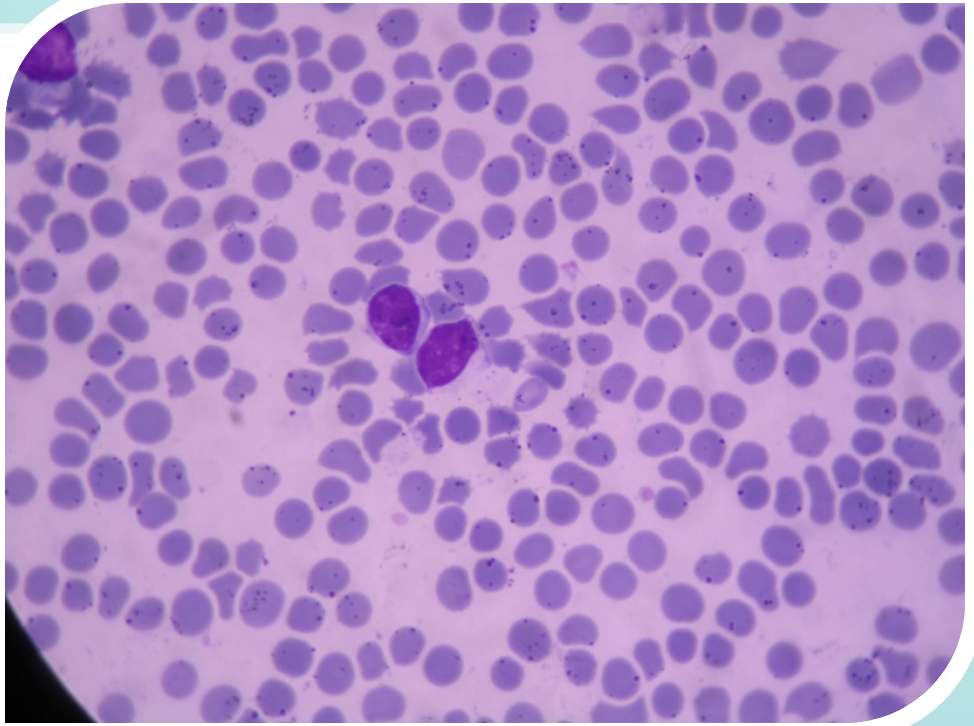
Clinical findings

- Haematology
  - Hb. as low as 2.5gm%
  - PCV 14%
  - Leucocytopaenia
  - Lymphocytosis
  - Eosinophilia



Anaplasma marginale





Chemotherapy

- Blood transfusion (2-4 lts)
- Inj. Oxytetracycline @ 20 mg/kg i.v. daily for 4-5 consecutive days
- Complete rest
- *Ad libitum* water with molasses and common salt
- Haematinics

Tick infestation & Mange

- Most successful creatures on the earth
- Tremendous capability of survival in adverse situation
- Acaricide resistance in ticks is widespread in all most all countries including India
- Multi-drug resistance has also been reported
- Points to ponder:

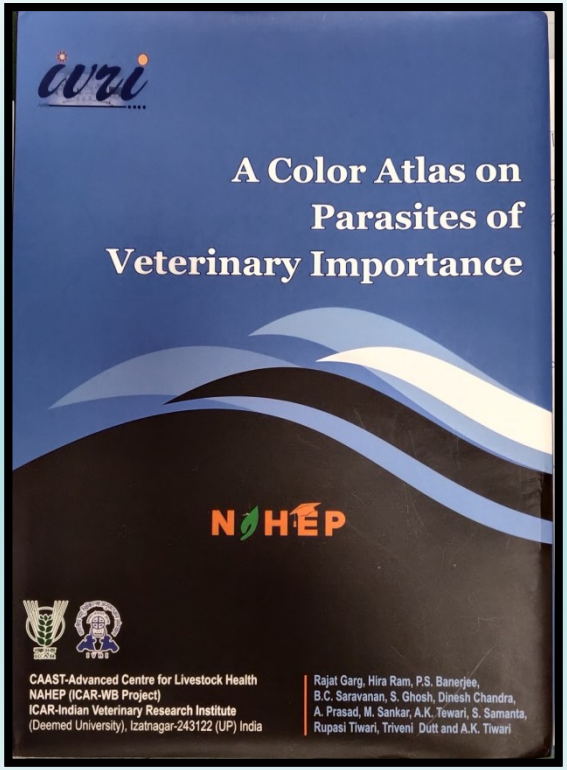
✓ Treatment of animals as well as animal shed

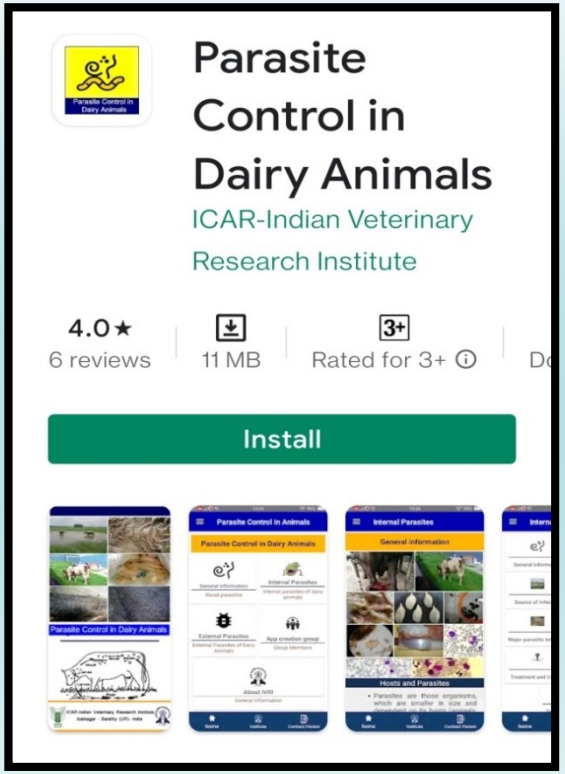
✓ Judicious use

✓ Integrated control measures (Chemicals, herbal drugs, Vaccine)

Mobile App & Colour Atlas for Veterinarians

- We developed a mobile app available in Google play store (both English and Hindi version)
- Atlas of important parasitic diseases in India






THANK YOU