- Name of the Regional Centre/Division/Section : Division of Animal Health (Veterinary Parasitology) ICAR Research Complex for NEH Region, Umiam, Meghalaya
- Area of work (with achievements) not more than one page (Last Five years summation)
- 1. Detection of Haemoprotozoan infections in animals of this region
- Standardized molecular diagnosis of haemoprotozoan diseases like Babesiosis, Theileriosis and Trypanosomosis in cattle. Detected *Babesia bigemina* infection in cattle in this region using examination of Giemsa stained blood smears and molecular diagnosis using PCR. Standardized *Babesia* spp. infections in dogs using PCR. Estimated a total loss of 51.6 litre milk production due to *Babesia bigemina* infection in a clinical case of cross bred cattle.

2. Epidemiological studies on gastrointestinal (GI) parasitism in pigs, Goats and Cattle of Meghalaya

- GI parasitic infections in goats, cattle and pigs of this region have been found to occur through out the year. Examination of faecal samples of goats, cattle and pigs revealed over all 46.46%, 28.25% and 34.00% GI parasitic infections, respectively. 68.21% of gastrointestinal (GI) tracts of goats were found positive for gastrointestinal parasites either single or mixed infections. Amongst the positive, *Oesophagostum* spp. (both Oe. *columbianum and Oe. venulosum*) (69.89%), *Haemonchus contortus* (67.38%), *Trichuris ovis* (29.74%), *Moniezia* spp. (8.24%), Amphistomes (3.58%), *Bunostomum trogonocephalum* (2.15%) and *Gongylonema pulchrum* (0.35%) were recovered from these GI tracts. *Nematodirus helvetianus* in cattle and *Gongylonema pulchrum* in goats recorded first time from this area. Prepared bioclimatograph for *Haemonchus contortus* infection.
- Identified six different species of *Eimeria* i.e. *E. magna*, *E. exigua*, *E. piriformis*, *E. coecicola*, *E. intestinalis and E. media* and thus only intestinal coccidiosis were found responsible for mortality in rabbit in this region.

3. Detection of mange infestation in pigs of Meghalaya

Microscopic examination of skin scrapings of suspected pigs revealed 11.11% pigs were infested with *Sarcoptes scabiei* var. *suis infestation*. The infested pigs were treated successfully with Ivermectin @ 300µg/kg b.wt subcutaneously.

• Technologies/interventions available for farmers/others-Bulleted forms with a brief note

a) Computer Programme for Protozoan Parasitic Diseases :

This is a window based multimedia software containing the detail description about morphology, lifecycle, pathogenesis, diagnosis and treatment of different protozoan parasites affecting domestic animals. Different immunological techniques have also been incorporated in detail with animation effect. Although the main aim of the programme is to give detail information on protozoan parasites, this programme is also having different types of databases for cestodes, trematodes, nematodes and protozoa. This database is useful for easy retrieving of different parasites based on host, organ, location etc. This programme is helpful for the workers, academician and also for students engaged in the field of Parasitology. This is also helpful for the technician engaged in the Parasitology laboratory.





b) DOT-ELISA based diagnostic kit for identification of specific gastro intestinal parasitic infection (*Oesophagostomum* spp and *Bunostomum* spp.) from serum samples of goat and cattle

For epidemiological survey, the Division of Parasitology, ICAR Research Complex for NEH Region, Umiam, continuously monitoring the gastrointestinal (GI) parasitic infection in animals for several years using standard faecal sample examination through microscope. Though it is till now the only recommended standard method for monitoring of GI parasitic load in animals but the method has some limitation regarding the sensitivity and specificity. Due to close morphological resemblance between the eggs of different GI parasites, experience and expertise is required for accurate identification. Since floatation and centrifugation of faecal sample using concentrated salt solution is required for isolation of parasitic egg, it is very difficult to isolate the eggs in low level of

GI parasitic infection in animals. To overcome this limitation, division has evolved serological based alternate method for accurate identification of different GI parasitic egg in farmers' field. This method is based on identification of specific antibody in the sera of infected animal using specific antigen purified in the laboratory. The antigen purified for this purpose is specific for each GI parasite. The purified antigen is able to identify in low level of specific infection in animals. The antigen used for this purpose purified using different immunological and biochemical techniques. Using this purified antigen a DOT ELISA based diagnostic kit has been developed for monitoring the antibody level of GI parasites (*Oesophagostomum* spp and *Bunostomum* spp.) in naturally infected animals.



c) PCR based diagnosis of *Babesia* spp. infection in animals

Haemoprotozoan parasites are serious constraints for the improvement of livestock production. Trypanosomosis, Theileriosis, Babesiosis and Anaplasmosis are the major haemoprotozoan diseases of livestock in our country which causes severe economic losses to the livestock owner. Losses due to these haemoprotozoan diseases include high mortality, reduction in milk yield, loss of body weight, abortion, immunosuppression, infertility and the cost of treatment of infected animals. Molecular diagnosis of haemoprotozoan diseases using PCR has been found more sensitive than diagnosis by examination of stained blood smears. So, the Division has standardized the PCR based diagnosis of *Babesia* spp. infection in cattle and dogs.

d) Diagnosis of parasitic diseases of livestock and poultry

To control parasitic diseases of livestock and poultry, proper diagnosis of such infections is very much essential. The facilities for routine diagnosis of gastrointestinal parasitic infections by microscopical examination of faecal samples, diagnosis of haemoprotozoan infections by examination of stained blood smears and microscopical examination of skin scraping for diagnosis of mange infestation in pigs are available in the Division for utilization in the farmers field.

• Knowledge input for farmers/others – Two important topics that could be uploaded. Subsequent uploads would be done periodically (once a month).

a) Gastrointestinal parasitic infections in cattle, goats, pigs and rabbits have been found to occur through out the year in this region. It is very much essential to diagnose such infections by examination of faecal samples. Treatment of infected animals with suitable anthelmintics and managemental practices could control those infections.

b) Coccidiosis has been found to cause the mortality in rabbits and only intestinal coccidiosis could able to cause the mortality in rabbits, without involvement of the hepatic coccidiosis. The rainy season particularly the month of August is very much susceptible for coccidian infection in subtropical hilly region. Individual treatment was found effective to control mortality rather than group treatments.

• 10 numbers of good quality photographs along with suitable captions



Photograph-1: Babesia bigemina in RBC of Giemsa stained blood smears of cattle



Photograph-2: Mortality in rabbit due to Coccidiosis







Eimeria magna







Eimeria intestinalis



Eimeria exigua

Photograph-3: Six different species of *Eimeria* identified from this area



Photograph-4: Egg of *Nematodirus helvetianus* (20X) Cattle – Identified first time from NEH Region



Photograph-5: *Gongylonema pulchrum* (Anterior end) – A parasite of goats, Identified first time from NEH Region



Photograph-6: Amphistomes in gastrointestinal tract of goats



Photograph-7: Amphistomes in gastrointestinal tract of cattle



Photograph-8: Trichuris spp - Gastrointestinal parasite of goats



Photograph-9: Dorsal view of *Sarcoptes scabies* var. *suis* under high power of microscope



Photograph-10: Losses of hair from the thickened skin of pig due to mite (*Sarcoptes scabies* var. *suis*) infestation

• 10 numbers of FAQs along with the appropriate answers (to be provided monthly)

a) What are the percentage of gastrointestinal (GI) parasitic infections in goats, cattle and pigs of this region?

Answer: GI parasitic infections in goats, cattle and pigs have been found to occur through out the year. Examination of faecal samples of goats, cattle and pigs revealed over all 46.46% goats, 28.25% cattle and 34.00% pigs were infected with GI parasitic infections, as observed after examination of faecal samples.

b) Is there any seasonal effect on GI parasitic infections?

Answer: Yes, there are effects of season on prevalence of GI parasitic infections in this region. Generally higher prevalence observed during rainy season (May to early October) followed by cool season (early October to November), summer season (March to April) and cold season (December to February). As per bioclimatograph, prediction of *Haemonchus contortus* infection in goats have been made from April to September in subtropical hill region.

c) How does GI parasitic infections spread from infected animals to healthy animals?

Answer: Different GI parasites have different life cycle. Generally, adult parasite liberate eggs which comes outside through faeces of infected animals. Thus contamination of pasture land takes place. In the pasture with the help of suitable temperature and moisture eggs hatched to form larve. These larve are the infective stage for healthy animals. Ingestion of larvae during grazing in contaminated pasture by healthy animals makes them infected (reinfection in infected animals). Some times there are role of intermediate hosts (snails etc.) for transmission of infection from infected animals to healthy animals, as it has been observed in case of Amphistome and *Fasciola* spp. infections.

d) How to control these GI parasitic infections?

Answer: Treatment of infected animals with suitable anthelmintics is the one way of control these infections. But, before treatment, it needs proper diagnosis of infections after examination of faecal samples. Besides treatment, it needs to follow managemental practices to control such infections.

e) What is the main parasitic disease of rabbits?

Answer: Coccidiosis is the main parasitic disease of rabbit.

f) What are the main gastrointestinal parasitic infections found in goats?

Answer: *Haemonchus contortus* and *Oesophagostomum* spp. are the main gastrointestinal parasitic infections found in goats.

Can you tell about the name of some gastrointestinal parasitic infections found in

g). Whether haemoprotozoan infections are prevalent in cattle of Meghalaya also like other parts of Country?

Answer: Haemo -protozoan infections are prevalent in **Meghalaya** also like other parts of Country, but till now within farm animals we have found *Babesia bigemina* infections in cattle.

h) How far the incidence of haemoprotozoan infections in Meghalaya varied from the haemoprotozoan infections of other parts of the country?

In other parts of the country, all four haemoprotozoa like *Babesia bigemina*, *B. bovis*, *Theileria annulata*, *Trypanosoma evansi and Anaplasma* spp. are prevalent in animals. But till now we have recorded the presence of *Babesia bigemina* infections in cattle of Meghalaya in farm animals.

i) Whether there is any role of climate change to occur haemoprotozoan infections in this region? Ticks *Boophilus microplus* have been found in the body of cow, which was diagnosed as infected with *Babesia bigemina*. Presence of ticks also reported by various Veterinary Officers of cattle farms located in this region. Ticks are the vector to transmit haemoprotozoan infections. Climate change of this region, may favour the conditions favourable for increase the breeding of arthropods like ticks, flies etc., which are the vectors for transmitting different haemoprotozoan infections.

j) What is the main external parasitic infestation in case of pig ?

Sarcoptic mange in pigs caused by the mite *Sarcoptes scabiei* var. *suis* is the main external parasitic infestation of pigs in this region, which pig producers generally ignored but which has economic importance.