

Livestock Production: ticks and tick-borne diseases

Training Summary:

I attended a 6 week-long training at Washington State University (WSU) guided by the Animal Disease Biotechnology Facility. The training involved a combination of theory sessions and laboratory work from various lab units in the department of Microbiology. Some of the activities that were carried out at the WSU were based on the followings topics; Tick dissection, Transfection, Cell culture (propagation of tickborne parasites in red blood cells), Gene cloning and learning about automation of lab processes, among others.



The work focused on processes that are linked to vaccine production, diagnosis and research of ticks and tick-borne diseases. The activities included the dissection of *Dermacentor andersoni* tick species, commonly known as, the Rocky Mountain wood tick. Some transfection experiments involved the use of enough voltage to insert specific genes in haemoparasites which were sustained in a red blood cell culture. We also conducted Polymerase Chain Reaction (PCR) for *Babesia bovis* genes. Gene cloning experiments were also done using plasmid vectors and chemically competent bacterial cells.

We visited a tick facility in Moscow, Idaho which had tick cultures of many different varieties of tick species. Tick borne parasites Genomic DNA extraction was carried out followed by nested PCR experiments with artificial tick feeding system. This system involves using artificial membranes which can be an alternative feeding for the ticks on rabbits to feed ticks on their blood. Experiments were also done to wash frozen stabilities to prepare them for tissue culture. This is an aid in the analysis of molecules expressed by the parasites.

What's Next:

Some of the future research collaborations I would like to take part in are on the tick distribution changes in relation to climate change. Also, on clinical trials on tick borne disease transmission blocking vaccines, challenges with the virulent strains to test the efficacy of the vaccine and establishment of artificial membrane feeding systems for ticks.