Ticks: Major Economic Impediment

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The total livestock population of India as per 20th Livestock Census Report-2019 is 535.78 million. The data revealed the cattle population in the country has grown by 1.05% from 190.49 million in 2012 to 192.49 million in 2019, mainly driven by an increase in cross-bred cattle and higher among female indigenous cattle population. The parasitic infections cause a tremendous burden of disease on animals in both tropics and sub-tropics as well as in temperate climates. Parasites are extremely diverse and frequently responsible for significant morbidity and mortality in their hosts. Among ectoparasites, ticks are the most important vectors of diseases affecting livestock, humans and companion animals, and transmit several pathogenic organisms like protozoan, rickettsiae, spirochaetes and viruses. From public health perspective, the ticks are considered to be important ectoparasites of both humans and animals, which are responsible for the transmission of various infectious agents and for causing injuries to their host. Moreover, zoonotic pathogens are responsible for emergence of most of the infectious diseases and many of them are transmitted by tick vectors. The infestation of hard ticks, particularly the tropical cattle tick, Rhipicephalus (Boophilus) microplus, in dairy cattle is a major health concern affecting the productivity throughout the world and is more serious in areas of hot and humid climatic conditions, which is conducive for the development of the ticks. In India, a total of 106 tick species have been reported, out of which one-host cattle tick, R. (B.) microplus is distributed widely throughout the country, infesting various species of animals.

The blood sucking habit of ticks, particularly in high burdens cause anaemia, while the bites from the ticks cause damage to hides and teats, ultimately resulting in production losses. R. microplus ticks causes huge production losses to dairy animals, both directly (reduced weight gain, milk production and even mortalities) and indirectly by transmitting various disease-causing pathogens. Tick-borne infectious diseases are growing steadily probably due to climate change owing to the establishment of the tick vector in urban/new areas and posing threat to the world health problems. Because of the harmful effects on their hosts, ticks are considered to be not only a serious threat to successful livestock production but also interfere with the economy of a country. The financial losses associated with nagging, irritation and deterioration of the value of hides (up to 20-30%) are also significant. The

tick infestation has huge and disastrous impact on the availability of good quality hides for leather industry of India, which is suffering from a tremendous shortfall of 3000 million pieces of hides and skin every year. In India, economic losses due to tick infestation in livestock have been estimated to be around US$ 498.7 million per annum. The control of the ticks, therefore, is of great importance due to their effects on livestock profitability and the health status of the animal. Since few decades, the use of various synthetic pyrethroids, organophosphates, formamidine and avermectin compounds are in practice among the small and marginal farmers in India for the control of livestock and poultry pests. However, the increased continual application of acaricidal treatments exerts a strong selective force on the tick populations so that they become resistant to them. The increased frequency in widespread use of acaricides has led to emergence of resistance among tick populations, and resistance has been reported against nearly all commercially available acaricides. Beside development of resistance, large scale and repeated applications of the acaricides are often accompanied by serious drawbacks, including environmental contamination, and even contamination of milk and meat products with insecticide residues. As per the report of a questionnaire-based study published by FAO (2004), the tick population in India has developed resistance against all the available acaricides. Several reports on acaricidal resistance in R. (B.) microplus against synthetic pyrethroids, organophosphates and formamidines are available from various states of India, including Punjab.

In order to improve tick control methods, there has been emphasis on the importance of understanding the underlying mechanisms of acaricide resistance based on the recent reports concerning ivermectin resistant cattle tick populations from various places of the world. To protect the animal population of a region from ticks, periodic monitoring of acaricide resistance is crucial to slow down the process of spreading resistance as well as essential to recommend the appropriate acaricide and develop region-specific strategy for effective control of ticks and tick-borne diseases. To prevent the further selection of resistant ticks using the same active ingredient and to delay the subsequent spread of resistance against acaricides, the early detection of resistance is the target. To decrease the dependence on the chemical compounds with reduced efficacies, other alternative approaches need to be explored. The prospect of using the locally available medicinal plants as a potential substitute to chemical acaricides can be considered as future option. The tick management protocol based on the use of natural plant products has shown a lot of promise. The indigenous ethno-veterinary and medicinal knowledge of Indian farmers presents a range of herbs for their various properties like insecticidal and acaricidal.