Understanding the Impact of Ticks

Cattle producers often focus on protecting their herds from internal pathogens, but external pathogens can cause just as much damage to the animal's economic productivity. Ticks are one of the biggest public health and veterinary problems in the world, affecting 80% of the global cattle population. Approximately 1 billion cattle live in areas at risk of being affected by ticks.

Ticks can cause both direct and indirect effects, including even death of affected animals. Direct losses are related to the damage produced by the ticks when feeding on the blood of their hosts, while the indirect losses are related to the infectious agents transmitted by the ticks and costs associated to the treatment and control (Hurtado and Giraldo-Rios, 2018).

Predatory Opportunists

There are two main families of ticks, Ixodidae (hard bodied) and Argasidae (soft bodied), and 899 tick species that parasitize vertebrates (Rajput, 2006). Although ticks and the pathogens they transmit have co-evolved in equilibrium with animals that serve as their hosts, *Rhipicephalus microplus* has the greatest economic impact because of its wide distribution, vector capacity, blood-sucking habits and the number of cattle affected. Hard ticks feed for extended periods of time on their hosts, varying from several days to weeks, depending on life stage, host type, and tick species.

Dermacentor is the primary vector of anaplasmosis in cattle, with outbreaks on the rise and significant concern in the industry.

Asian Longhorn ticks are spreading and infestations have been severe enough that cattle have been killed simply by feeding, in addition to transmitting several diseases. This species is especially problematic because males aren't required for reproduction, so they easily spread.

Ticks prefer places on the animal's body where skin is thin and hair is short with an abundant blood supply, such as the inguinal region and external genitals. In adult ticks, their body grows to accommodate the large volume of blood ingested, which can be anywhere from 200-600 times their unfed body weight.

Ticks can transmit infectious agents such as viruses, bacteria, rickettsiae and protozoa, so they play a major role in the transmission of zoonotic diseases. Ticks can also transmit parasitic diseases such as babesiosis, theileriosis and anaplasmosis, which generate important economic losses.

Ticks are periodically fed with blood and can go long intervals between meals, even years (Rajput, 2006). When they bite, they injure tissue at the feeding site, causing irritation, inflammation or hypersensitivity. Tick bites cause lesions that can predispose that animal to localized dermatitis, secondary bacterial infections, or invasion by flies attracted to the blood. Hot and humid climates favor tick survival.

Each tick bite causes stress and weakens the host's immune response, affecting its productivity. This permanent state of stress affects the animal's behavior and welfare, and constant movement due to a tick infestation drains the animal's energy.

Massive tick infestations can cause anemia from blood loss. Certain tick species contain paralyzing toxins in their saliva that can even cause the death of host animals.

Symptoms

Ticks are a major veterinary problem because they transmit diseases, produce paralysis or toxicosis, and cause physical damage to livestock. Massive infestations can cause "tick worry", irritation, unrest and injure hides.

If an animal is affected with hemoparasitic disease, it will show symptoms including fever, anemia, decreased appetite, reduction in milk production, lower weight gain, loss of body condition, reproductive effects in both males and females, abortions in the last third of gestation, lower pregnancy and birth rate, and even death.

Certain ticks inject a toxin while feeding that results in acute ascending flaccid motor paralysis. Tick paralysis is most common in late winter and spring when adult ticks are active, but can occur anytime the weather is warm and humid.

Tick fever organisms are significant causes of cattle morbidity in the U.S., Australia, China and other countries.

Treatment

Ticks must be controlled if livestock production will meet world needs for animal protein. Chemical control with acaricides was considered one of the best treatment methods, but repeated use of chemical acaricides has resulted in establishing resistant tick populations, insecticide residues in livestock products and environmental pollution (Singh, 2022). These chemicals are also costly. There are a wide range of acaricides available for controlling ticks on livestock, and the performance of these chemicals on tick control depends on the product's activity and on the quality and quantity of active ingredient deposited on cattle.

Various methods including dipping, spraying, ear tagging or pour on have been used to apply chemicals to protect livestock against ticks. However, resistance is now expected in ticks within 5-10 years of introduction of any new type of acaricide, unless control practices change. Vaccination is a promising tool for protecting livestock from tick infestations and tickborne diseases (Manjunathachar, 2014).

Vaccines against ticks for cattle damage the tick by cutting short their feeding time and inhibiting their reproduction, ultimately inhibiting their reproduction and shutting down the disease transmission cycle by killing the tick before it can bite another animal. The Gavac vaccine is effective and has been used for years to combat babesiosis in Cuba and southern Central America, but is not available in the U.S.

Economic Impact

The economic toll of ticks is strongly linked to the epidemiology of disease, but skin that is sold for by-product use can also be an economic loss. Indirect economic losses can correspond to treatment costs, tick control expenses, unearned income or inefficiencies in production, and even trade restrictions of animals between areas and countries. Experts have calculated the economic losses caused by tick infestation, associated diseases and control at $13.9-$18.7 billion per year worldwide.

Tick resistance to acaricides is a real economic threat to the livestock and allied industries. Resistance has led to instability and increased costs in areas where one-host cattle ticks have acquired resistance to a variety of chemicals.

Medgene

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