

Ticks infesting wild and domestic animals and humans of Sri Lanka with new host records



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ABSTRACT

An island-wide collection of tick species infesting humans, domesticated and wild animals and questing ticks in domestic and peridomestic environments was carried out during 2009–2011. A total of 30,461 ticks were collected from 30 different hosts and free living stages from the ground. The collection consisted of 22 tick species from 30 different hosts recording 12 tick species from humans, 19 from domesticated animals and 21 from wild animals, with a total of 97 new host records. The most common tick species on humans were *Dermacentor auratus* and *Amblyomma testudinairum*, while *Haemaphysalis intermedia*, *Rhipicephalus microplus* and *Rhipicephalus sanguineus* were common in domesticated and wild animals sharing 20 host species. Among the questing ticks, immature *D. auratus* was the most abundant. Humans and domesticated animals were mostly infested by the nymphal stages while adult ticks were found on wild animals. High number of new host records could be due to domestic animals picking tick species from wildlife and vice versa at the human/animal interface. Habitat destruction due to forest fragmentation has led to wild animals roaming in urban and semi-urban neighbourhoods increasing the interactions of wild animals with domesticated animals. Wild animals play a significant role as a reservoir of many tick borne infections which can easily be spread to domesticated animals and then to humans via tick infestations. Data in this paper are useful for those interested in tick infesting wild and domestic animals and humans in describing the zoonotic potential of tick borne infections.

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1. Introduction

Ticks are ectoparasites of all terrestrial vertebrates. Up to now there are 896 described species of ticks in three families (Guglielmone et al., 2010). They are widely distributed around the world but the prevalence is higher in countries with warm, humid climates. Ticks are primarily parasites of wild animals and only 10% of the species feed on domestic animals (Lane and Crosskey, 1993; Jongejan and Uilenberge, 2004). Ticks also act as vectors of infectious agents many of which are zoonoses (Parola and Raoult, 2001). Wild animals can maintain and reintroduce ticks and tick borne diseases to livestock and humans via alternative hosts (Ruiz-Fons and Gilbert, 2010). Since the ticks, pathogens and their specific hosts are linked (Jongejan and Uilenberge, 2004; Petney et al., 2011) the information about diversity and distribution of tick fauna and the

host species is important to understand the zoonotic potential of tick borne diseases.

In recent years many factors have changed the interactions among humans, animals and the environment and this has caused the emergence and reemergence of many diseases. Human populations are growing and expanding into new geographic areas. As a result, more people live in close contact with wild and domestic animals. This provides more opportunities for diseases to pass between animals and people (Daszak et al., 2001). Moreover, the earth has experienced changes in climate and land use, such as deforestation and intensive farming practices (Naicke, 2011). Disruption in environmental conditions and habitats provides new opportunities for diseases to pass to animals (Nava et al., 2013). An increasing number of studies on emerging infectious diseases point to changes in land cover and land use, including deforestation and forest fragmentation along with urbanization and agricultural intensification, as major contributors. The majority of emerging infectious diseases originate from wildlife instead of companion animals (Smith et al., 2009). Many tick borne diseases such as Rocky Mountain spotted fever, babesiosis, Lyme disease, rickettsiae have come from wildlife to humans due to increased association of

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humans with forests. The geographic distribution of ticks and the rickettsiae they transmit depends on environmental factors like climate, biotope and on the abundance of ticks and their hosts. The impact of human behaviour on the environment, together with a changing climate undoubtedly affects the spread of ticks and the pathogens they carry (Jones et al., 2008; Gray, 2007; Estrada-Pena, 2009).

Until the turn of 19th century, Sri Lanka was almost entirely covered by natural forest. By the year 1900 the forest cover was estimated at 70% of the land area of the country. Since 1990–2005, Sri Lanka has showed one of the highest deforestation rates of primary forests in the world mainly due to agriculture, resettlements, and small-scale logging. Recent reports on of tick transmitted rickettsioses in Central (Kularatne et al., 2003; Weerakoon et al., 2011a,b) and Western (Premaratna et al., 2008) provinces of Sri Lanka as an emerging infection have generated renewed interest in ticks as vectors of human disease agents. In 2009, Stokes and Walters reported a case of travel-acquired tick-borne spotted fever rickettsiosis from Sri Lanka presented in Australia. This has been serologically diagnosed as *Rickettsia conorii* (Stokes and Walters, 2009). *R. conorii* is also commonly reported infection in travellers (Jensenijs et al., 2004). A more recent study reports spotted fever group rickettsiosis such as *Rickettsia felis* infection, scrub typhus, murine typhus, and Q fever are present in southern Sri Lanka (Angelakis et al., 2013). For a detailed analysis of epidemiological consequences, a comprehensive knowledge of the reservoirs of the tick borne pathogen as well as the host specificity of ticks is required. Knowledge of species

present in a given area and their hosts is important to physicians, veterinarians, wildlife biologists, and owners of livestock.

The earliest records of ticks in Sri Lanka appeared in Monographs of Neumann (1908), Nuttall et al. (1915), Sharif (1928), Trapido et al. (1963, 1964). Thereafter there have been few localized reports on tick infestations on animals and humans (Halim et al., 1983; Edussuriya and Weilgama, 2003; Dilrukshi et al., 2004; Ariyaratne et al., 2010; Liyanaarachchi et al., 2013) and the most comprehensive study dates back to 1965 by Seneviratne. Nevertheless, the information on tick species that infest wild and domestic animals as well as humans in Sri Lanka is scanty.

2. Materials and methods

An island wide collection of ticks was carried out in selected sites in Sri Lanka for a period of two and a half years from January 2009 to August 2011. Ticks were collected from domesticated and farm animals and injured or dead wild animals which were brought to veterinary hospitals or clinics in Kandy and to wildlife parks and nature reserves in Minipe, Mihintale, Udawalawa, Randeni-gala, Yala, Bundala, and Wasgamuwa and also from wild animals roaming in neighbourhoods. Ticks infesting human ear canal were

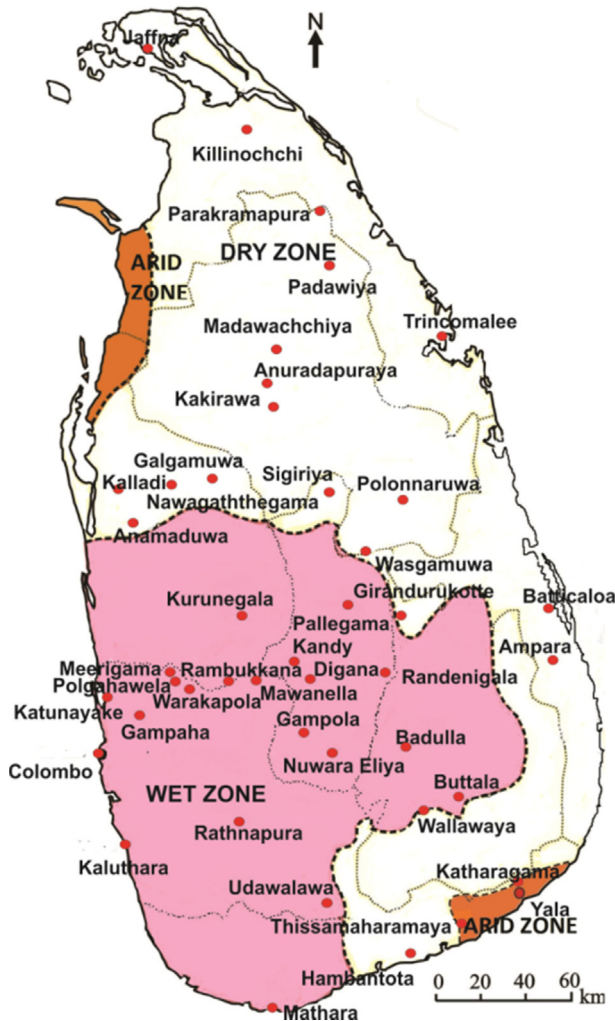


Fig. 1. Collection sites of ticks from domestic animals ●.

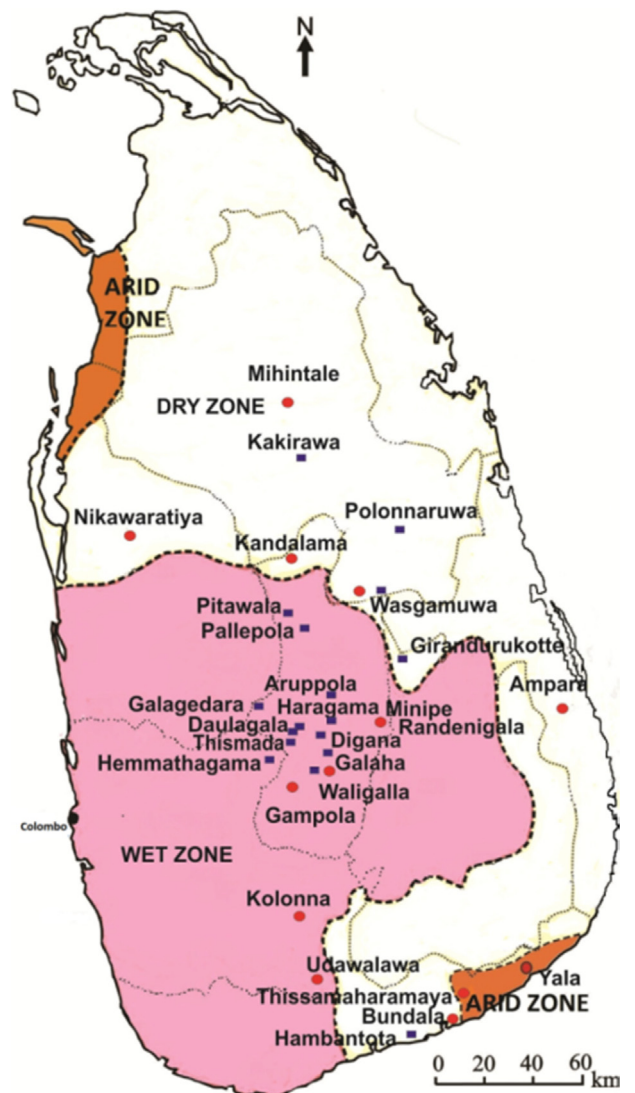


Fig. 2. Collection sites of ticks from wild animals ● and questing ticks ■.

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