



***Amblyomma tigrinum* (Acari: Ixodidae) in relation to phytogeography of central-northern Argentina with notes on hosts and seasonal distribution**

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Abstract. The findings of *Amblyomma tigrinum* in continental Argentina north of 40°S are presented according to phytogeographic domains (Andean–Patagonic, Amazonian and Chaco) and the seasonal distribution is depicted on a monthly basis. A total of 718 adult ticks and four nymphs were found. *A. tigrinum* ticks were present in all domains. Adult ticks were found all year round but they were more abundant during the summer. Most ticks were found on domestic dogs but the survey has a bias to domestic hosts. It is speculated that the cycle of immature is bound to shelters that mitigate extreme climatic conditions, thus explaining the finding of this tick species in contrasting ecological areas.

Key words: *Amblyomma tigrinum*, Argentina, tick ecology, phytogeographical distribution, seasonal distribution

Introduction

Amblyomma tigrinum Koch, 1844 is a poorly known neotropical tick found from Venezuela to Argentina (Jones *et al.*, 1972), and formerly confused with *Amblyomma maculatum* (Kohls, 1956; Tagle and Alvarez, 1959; Ivancovich, 1980; Guglielmone *et al.*, 1982). The majority of findings were made on wild and domestic carnivores, and Hoogstraal and Aeschlimann (1982) classified *A. tigrinum* as a tick whose adult stages have strict to moderate specificity for Carnivora. With few exceptions (Jones *et al.*, 1972; Massi Pallarés and Benítez Usher, 1982) the reports of *A. tigrinum* comprised adult tick stages.

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Most references on this tick species concern sites and hosts. An exception is the study of Estrada-Peña *et al.* (1993) who described the immature stages of *A. tigrinum* and concluded that, according to the palpal structure, it is a primitive species in comparison with *Amblyomma neumanni*. These authors suggested that they belong to different subgeneric levels, in contrast to Santos Dias (1991) who grouped both tick species in the subgenus *Anastosiella*. More recently, Souza *et al.* (1999) studied the biology of *A. tigrinum* using different hosts under laboratory conditions.

Evans (1975) stated that ecological knowledge on *A. tigrinum* was non-existent, and little information has been obtained on the ecology of *A. tigrinum* since. Ivancovich (1980) stated that adults of *A. tigrinum* could be found all year round. Guglielmone *et al.* (1982) reported localities of *A. tigrinum* in Argentina from 1976 to 1980 based on political divisions instead of ecological characteristics of the country. Several records of *A. tigrinum* have been made in Argentina from 1981 to date. In this article we present finding sites of *A. tigrinum* in relation to the phytogeography of central-northern continental Argentinean territory (area north of 40°S) along with information on hosts and seasonal distribution of adult stages.

Materials and Methods

The material for the analysis has been obtained from Guglielmone *et al.* (1982) plus samples of *A. tigrinum* obtained by collaborators (listed in the acknowledgement section) and the authors from January 1981 to present. The majority of ticks were obtained from domestic hosts mainly from the Chaco phytogeographical province (see below). These biases mean that the number of ticks per host obtained from this study is not an undeniable indication of preference, and higher tick findings in this phytogeographical province do not necessarily indicate that this region is better suited to sustain *A. tigrinum* populations than other phytogeographical regions.

The tick identification was carried out by using the key for *Amblyomma* species from America bearing spurs in metatarsi II–IV (Guglielmone and Hadani, 1985) to differentiate *A. tigrinum* from the morphologically closely related species *A. neumanni* and *Amblyomma maculatum* and also from, *Amblyomma parvitarsum* and *Amblyomma triste* along with the key provided by Jones *et al.* (1972).

The seasonal distribution of adult stages was established according to the number of ticks collected on a monthly basis. Most of the ticks used in this study are maintained in the tick collections currently in INTA Colonia Benítez and Rafaela Stations. They are available for research upon request.

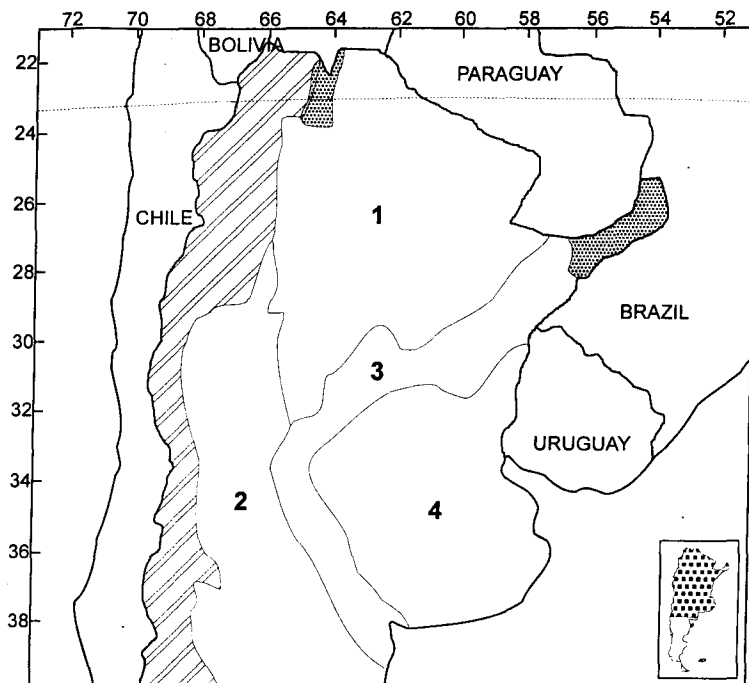


Figure 1. Phytogeographical division of continental Argentina north of 40°S (compiled from Ragonese, 1967; Cabrera, 1976 and Neumann, unpublished). ▨ Andean–Patagonian domain, ● Amazonian domain, □ Chaco domain: 1) Chaco province, 2) Monte province, 3) Espinal province, 4) Pampean province.

The collection sites were plotted according to the main phytogeographical regions of the continental territory of Argentina north of 40°S (Figure 1) compiled after Ragonese (1967), Cabrera (1976) and Neumann R.A. (Departamento de Recursos Naturales, EEA INTA Salta, CC 228, CP 4400, Salta, Argentina, unpublished). Three pytogeographic domains are presented in this region:

- I. *Andean Patagonian*: It is characterised by an annual rainfall below 350 mm. Frost may occur throughout the year with snow during the winter. The dominant vegetation is formed by a steppe of scattered shrubs and grasses.
- II. *Amazonian*: The climate is hot and humid. The annual rainfall ranges between 900 and 2500 mm. The dominant vegetation is rainforest.
- III. *Chaco*: It is formed by four main phytogeographical provinces:
 - (1) *Chaco*: The climate is hot with mainly summer rainfall (ranging from 500 to more than 1,000 mm per year). The region is characterised by the presence of trees belonging to the genus *Schinopsis*.

- (2) *Monte*: The climate is hot and dry. The annual rainfall is below 200 mm. The dominant vegetation consists of xerophytic, psammophytic and halophytic bushes.
- (3) *Espinal*: It is characterised by a hot and humid climate in the north and temperate and less humid elsewhere. The rainfall is concentrated mainly in summer; it ranges from 400 to 1,000 mm yearly. *Prosopis* bushes are the dominant vegetation.
- (4) *Pampean*: The climate is temperate. The rainfall ranges from 600 to 1,000 mm yearly, being more abundant in autumn and spring. The dominant vegetation is grassland in the east and steppe to the west, according to the amount of rainfall.

Results

A total of 718 adults and four nymphs of *A. tigrinum* ticks were collected; 489 of them were females and the remainder were males. The majority of ticks

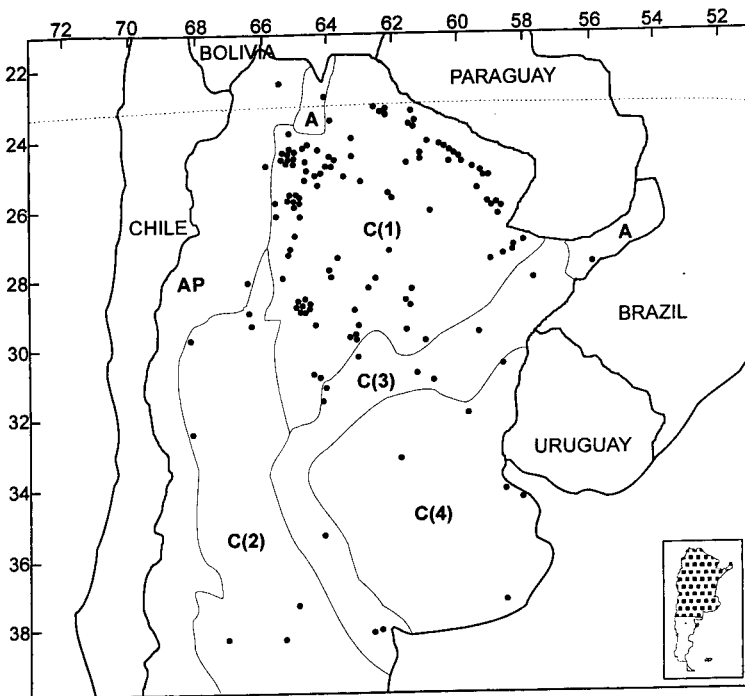


Figure 2. Geographical distribution of *Amblyomma tigrinum* (●) according to the phyto-geography of continental Argentina north of 40°S. AP: Andean Patagonian domain, A: Amazonian domain, C: Chaco domain: C (1): Chaco province, C (2): Monte province, C (3): Espinal province, C (4): Pampean province.

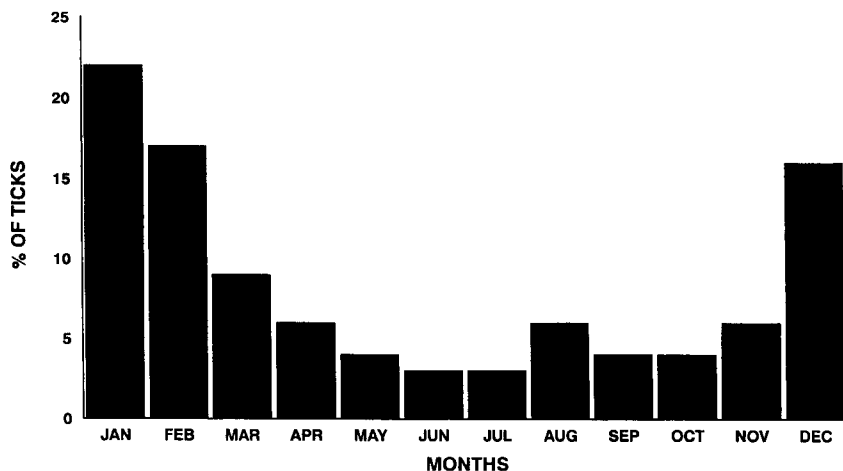


Figure 3. Monthly distribution of *Amblyomma tigrinum* on their hosts.

were found on hosts of the Chaco province of the Chaco domain; however *A. tigrinum* was also found in the other provinces of the Chaco domain as well as in the Andean–Patagonian and Amazonian domains of central-northern Argentina (Figure 2). Most findings were made from domestic dogs (663 adult ticks and four nymphs); the rest of adult ticks were found on foxes of the genus *Cerdocyon* and *Dusicyon* (15 ticks), nine ticks were from cattle, six ticks were found on domestic cat, two ticks on deer of the genus *Mazama*, two ticks were found on capibara (*Hydrochaeris hydrochaeris*) and one tick on a human being. Apart from this we found 20 unfed adults of *A. tigrinum* at the premises of INTA Salta; 15 of them were found on the walls (at a short distance from the ground) of a building in demolition.

The seasonal distribution of *A. tigrinum* showed that it is present during all months of the year (Figure 3). However, the majority of ticks (55%) were collected from December to February.

Discussion

The finding of *A. tigrinum* in all phytogeographical regions showed the plasticity of this tick species. This is unusual for *Amblyomma*. Even species widely distributed from southern USA to northern Argentina, including Caribbean islands, like *Amblyomma cajennense* (Jones *et al.*, 1972) were not found in dry or temperate climates within Argentina (Mangold *et al.*, 1990). The only other representative of *Amblyomma* found in the Andean–Patagonic domain is the South American camelid tick, *Amblyomma parvitarsum*, a tick species rarely found outside this domain (Guglielmone and Viñabal, 1994).

It is feasible that *A. tigrinum*, being a parasite of domestic carnivores (apart from wild Carnivora), has a life cycle bound to microhabitats and/or premises that mitigate climatic factors. We found only four nymphs of *A. tigrinum* on dogs and the common hosts for larvae and nymphs are unknown. The detection of unfed adults on buildings is of interest. Perhaps rodents play a role in feeding nymphs. Souza *et al.* (1999) fed nymphs and/or larvae on *Gallus gallus*, *Rattus rattus*, *Calomys callosus*, *Oryctolagus cuniculus* and *Canis familiaris*. The highest recovery success was obtained with ticks fed on *G. gallus*; it is possible that birds could sustain part of the life cycle of *A. tigrinum* in nature. In any situation if immature stages are able to seek shelter in premises or nests to moult, they could be partially independent of harsh climate in open environments, thus explaining the findings of adults under contrasting ecological areas.

In agreement with Ivancovich (1980) adult ticks were found during all months of the year with a peak during summer. In this sense the seasonality of adult stages is similar to that of *A. cajennense* (Guglielmone *et al.*, 1990; Mangold *et al.*, 1990), a tick common in the Chaco province of the Chaco domain within Argentina. Finally, the higher proportion of female ticks obtained during this study does not indicate a biased sex ratio since females are usually bigger than males, therefore easier to find.

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