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Ixodes schulzei Aragão & Fonseca, 1951 in Argentina

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Two females of *Ixodes schulzei* Aragão & Fonseca, 1951 were collected from *Nectomys squamipes* (Rodentia: Cricetidae: Sigmodontinae) at Iguazú National Park, Misiones Province, Argentina. This is the first record of this tick species in Argentina. All previous records of *I. schulzei* came from Brazil (some of them close to the border with Argentina) where larvae, nymphs and females of *I. schulzei* have been found parasitizing Sigmodontinae hosts. The current record of *I. schulzei* has been expected and its range may include Paraguay.

Key words: Ixodidae, *Ixodes schulzei*, Rodentia, Cricetidae, Sigmodontinae, Argentina

Ixodes schulzei Aragão & Fonseca, 1951 is a Neotropical species described from females collected from the sigmodontin *Nectomys squamipes* (named *Neotomys squammipes*), “wild rats” or their nests. Clifford *et al.* (1973) treated *I. schulzei* as a doubtful taxon, but clearly it is valid as stated in Guglielmone *et al.* (2003), Barros-Battesti *et al.* (2007), who described the larva and nymph of *I. schulzei* and others, but its male remains unknown. All records of this species are Brazilian, concentrated in the states of Paraná, Santa Catarina, Minas Gerais, São Paulo, Rio de Janeiro (southern and southeastern Brazil) with a disjunct record in the state of Rondônia, northwestern Brazil (Aragão & Fonseca 1951, Labruna *et al.* 2003, Arzua *et al.* 2005, Saraiva *et al.* 2012, Onofrio *et al.* 2013, Martins *et al.* 2015). The current Argentinian record of *I. schulzei* detailed below expands its distributional range.

Materials and methods. Two female ticks from the genus *Ixodes* were collected from one *N. squamipes* (**Rodentia: Cricetidae: Sigmodontinae**) trapped on December 3, 2015, during routine work for studies of tick ecology at Iguazú National Park, (25° 40' 39"S, 54° 27' 06"W), province of Misiones, Argentina. The ticks were provisionally identified using keys and descriptions for Neotropical *Ixodes*, and confirmed with the key and descriptions of Brazilian *Ixodes* by Onofrio *et al.* (2009). The specimens are deposited in the tick collection of the Instituto Nacional de Tecnología Agropecuaria at the Estación Experimental Agropecuaria Rafaela, Rafaela, Santa Fe, Argentina under accession number INTA 2327.

Results and discussion. Both female ticks presented a long pointed hypostome with dentition 2/2, basis capituli dorsally triangular with large oval adjacent porose areas, cornua absent; ventrally with noticeable triangular auriculae; scutum long with fine punctations; coxa I with two spurs being the external slightly larger than the internal, coxae II to IV with only external spurs; trochanters without spurs (Fig. 1). This combination of morphological characters led us to conclude that these ticks belong to *I. schulzei* as described in Onofrio *et al.* (2009).

Ixodes schulzei along with *Ixodes amarali* Fonseca, 1935, *Ixodes loricatus* Neumann, 1899 and *Ixodes luciae* Sénevet, 1940 are morphologically related and treated as the “*Ixodes loricatus* group”

by Onofrio *et al.* (2009). The porose areas are also large and oval in *I. amarali* but separated by a distance of almost the diameter of a porose area, a useful character to differentiate it from *I. schulzei*; both, *I. loricatus* and *I. luciae* have close porose areas but *I. loricatus* has a blunt short hypostome, while *I. luciae* is characterized by a notably long external spur in relation to internal spur, which are relevant morphological features to separate them from *I. schulzei* as stated by Onofrio *et al.* (2009).

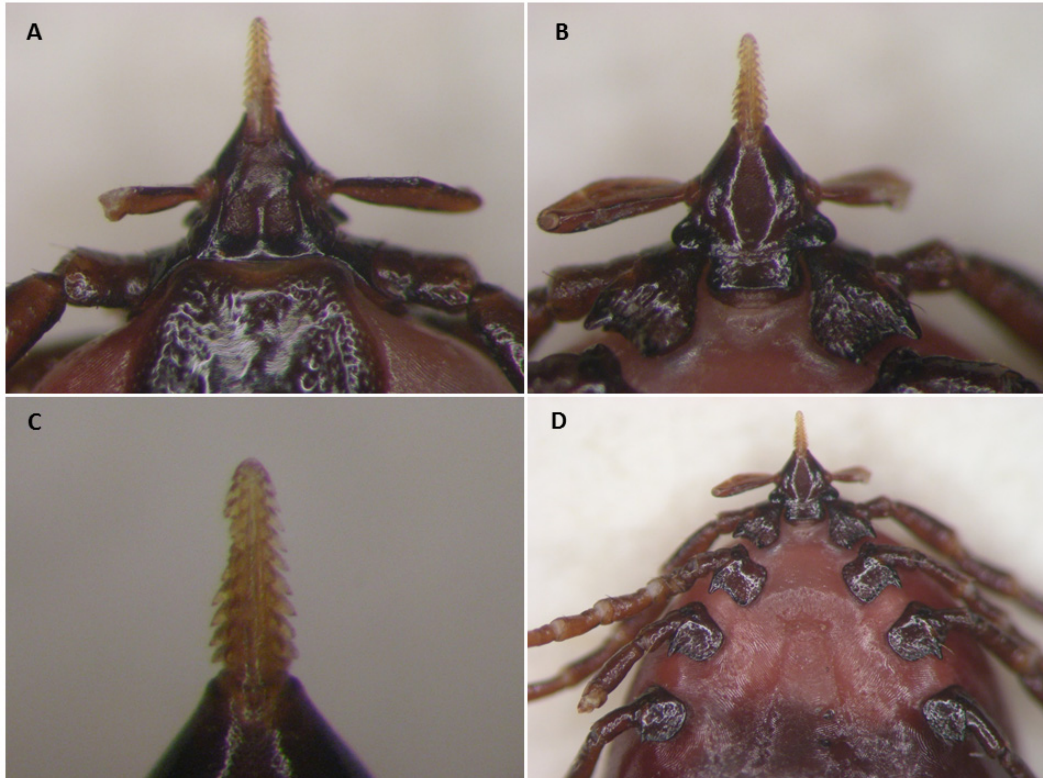


FIGURE 1. A) dorsal view of the capitulum of *Ixodes schulzei* female; B) ventral view of the capitulum of *Ixodes schulzei* female; C) hypostome of *Ixodes schulzei* female; D) view of coxae I to IV of *Ixodes schulzei* female.

There are ecological differences among the species forming the “*I. loricatus* group”; *I. amarali*, *I. loricatus* and *I. luciae* have life cycles based on larvae and nymphs feeding on Didelphidae and Sigmodontinae and adult ticks feeding on Didelphidae (Guglielmone & Nava 2011, Guglielmone *et al.* 2011), while all parasitic stages of *I. schulzei* appear to be prone to feed on Sigmodontinae hosts (Onofrio *et al.* 2013). The range of *I. schulzei* includes Rondônia, where *I. luciae* is also found, Minas Gerais and Rio de Janeiro where *I. amarali* and *I. loricatus* are established, and Paraná, Santa Catarina, São Paulo and now the province of Misiones, Argentina, where *I. loricatus* is also present (Guglielmone & Nava 2011, Guglielmone *et al.* 2011), requiring special attention to avoid confusion in diagnosing these species in the areas where hosts and ranges overlap. The locality for *I. schulzei* in Argentina belongs to the biogeographic province called Parana Forest (Neotropical Region) by Morrone (2006) which comprises southwestern Brazil, northeastern Argentina and eastern Paraguay. Future studies will probably find that *I. schulzei* is also established in Paraguay.

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References

- Aragão, H.B. & Fonseca, F. (1951) Notas de ixodologia. I. Duas novas espécies do género *Ixodes* e um novo nomen para *Haemaphysalis kochi* Aragão, 1908 (Acari: Ixodidae). *Memórias do Instituto Oswaldo Cruz*, 49, 567–574.
<http://dx.doi.org/10.1590/S0074-02761951000100011>
- Arzua, M., Onofrio, V.C. & Barros-Battesti, D.M. (2005) Catalogue of the tick collection (Acari, Ixodida) of the Museu de História Natural Capão da Imbuia, Curitiba, Paraná, Brazil. *Revista Brasileira de Zoologia*, 22, 623–632.
<http://dx.doi.org/10.1590/S0101-81752005000300015>
- Barros-Battesti, D.M., Onofrio, V.C., Faccini, J.L.H., Labruna, M.B., Arruda-Santos, A.D. & Giacomini, F.G. (2007) Description of the immature stages and redescription of the female of *Ixodes schulzei* Aragão & Fonseca, 1951 (Acari: Ixodidae), an endemic tick species of Brazil. *Systematic Parasitology*, 68, 157–166.
<http://dx.doi.org/10.1007/s11230-007-9100-z>
- Clifford, C.M., Sonenshine, D.E., Keirans, J.E. & Kohls, G.M. (1973) Systematics of the subfamily Ixodinae (Acarina: Ixodidae). 1. the subgenera of *Ixodes*. *Annals of the Entomological Society of America*, 66, 489–500.
<http://dx.doi.org/10.1093/aesa/66.3.489>
- Guglielmone, A.A. & Nava, S. (2011) Rodents of the subfamily Sigmodontinae (Myomorpha: Cricetidae) as hosts for South American hard ticks (Acari: Ixodidae) with hypothesis on life history. *Zootaxa*, 2904: 45–65.
- Guglielmone, A.A., Estrada-Peña, A., Keirans, J.E. & Robbins, R.G. (2003) *Ticks (Acari: Ixodida) of the Neotropical Zoogeographic Region*. Special Publication of the International Consortium on Ticks and Tick-borne Diseases-2, Atalanta, Houten, The Netherlands, 173 pp.
- Guglielmone, A.A., Nava, S. & Díaz, M.M. (2011) Relationships of South American marsupials (Didelphimorphia, Microbiotheria and Paucituberculata) and hard ticks (Acari: Ixodidae) with distribution of four species of *Ixodes*. *Zootaxa*, 3086, 1–30.
- Labruna, M.B., Da Silva, M.N.J., De Oliveira, M.D.F., Barros-Battesti, D.M. & Keirans, J.E. (2003) New records and laboratory-rearing data for *Ixodes schulzei* (Acari: Ixodidae) in Brazil. *Journal of Medical Entomology*, 40, 116–118.
- Martins, T.F., Diniz-Reis, T.R., Libardi, G.S., Percequillo, A.R., Verdade, L.M., Matushima, E.R. & Labruna, M.B. (2015) Ticks (Acari: Ixodidae) identified from prey-predator interactions via faecal analysis of Brazilian wild carnivores. *Experimental and Applied Acarology*, 66, 119–25.
<http://dx.doi.org/10.1007/s10493-015-9886-3>
- Morrone, J.J. (2006) Biogeographic areas and transition zones of Latin America and the Caribbean Islands based on panbiogeographic and cladistic analyses of the entomofauna. *Annual Review of Entomology*, 51, 467–494.
<http://dx.doi.org/10.1146/annurev.ento.50.071803.130447>
- Onofrio, V.C., Barros-Battesti, D.M., Labruna, M.B. & Faccini, J.L.H. (2009) Diagnoses of and illustrated key to the species of *Ixodes* Latreille, 1795 (Acari: Ixodidae) from Brazil. *Systematic Parasitology*, 72, 143–157.
<http://dx.doi.org/10.1007/s11230-008-9169-z>
- Onofrio, V.C., Nieri-Bastos, F.A., Sampaio, J.S., Soares, J.F., Silva, M.J.J. & Barros-Battesti, D.M. (2013) Noteworthy records of *Ixodes schulzei* (Acari: Ixodidae) on rodents from the State of Paraná, southern Brazil. *Revista Brasileira de Parasitologia Veterinária*, 22, 159–161.
<http://dx.doi.org/10.1590/S1984-29612013000100030>
- Saraiva, D.G., Fournier, G.F.S.R., Martins, T.F., Leal, K.P.G., Vieira, F.N., Câmara, M.V.C., Costa, C.G., Onofrio, V.C., Barros-Battesti, D.M., Guglielmone, A.A. & Labruna, M.B. (2012) Ticks (Acari: Ixodidae) associated with small terrestrial mammals in the State of Minas Gerais, southeastern Brazil. *Experimental and Applied Acarology*, 58, 159–166.
<http://dx.doi.org/10.1007/s10493-012-9570-9>

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