

## The *Ornithodoros hasei* (Schulze, 1935) (Acari: Argasidae) species group in Argentina

SANTIAGO NAVA<sup>1</sup>, JOSÉ M. VENZAL<sup>2</sup>, M. MÓNICA DÍAZ<sup>3,4</sup>, ATILIO J. MANGOLD<sup>1</sup> & ALBERTO A. GUGLIELMONE<sup>1</sup>

<sup>1</sup>Instituto Nacional de Tecnología Agropecuaria, CC 22, CP 2300 Rafaela, Santa Fe, Argentina.

E-mail: aguglielmone@rafaela.inta.gov.ar

<sup>2</sup>Departamento de Parasitología Veterinaria, Facultad de Veterinaria, Universidad de la República, Av. Alberto Lasplacas 1550, CP 11600 Montevideo, Uruguay

<sup>3</sup>Consejo Nacional de Investigaciones Científicas y Técnicas. Facultad de Ciencias Naturales e Instituto Miguel Lillo, Universidad Nacional de Tucumán, San Miguel de Tucumán (4000), Argentina

<sup>4</sup>PIDBA (Programa de Investigaciones de Biodiversidad Argentina), Universidad Nacional de Tucumán, Argentina

### Abstract

Six larvae of the genus *Ornithodoros* were collected in Rio Lavayén, approximately 1km north of Santa Rita, San Pedro Department (24° 28' S, 64° 48' W), Jujuy Province, Argentina, on three species of bats: *Molossops temminckii* (Burmeister, 1854) (Molossidae), *Myotis albescens* (E. Geoffroy, 1806) (Vespertilionidae) and *Histiotus laephotis* Thomas, 1916 (Vespertilionidae). All six larvae were identified as belonging to the *Ornithodoros hasei* species group, whose members are common parasites of bats throughout the Neotropical Zoogeographic Region. This is the first record of the *O. hasei* species group in Argentina, and *M. temminckii* and *H. laephotis* are new hosts for this tick. Studies of the morphology, genetics and ecology of *O. hasei* across its vast range will be necessary in order to determine whether sibling species are present.

**Key words:** Argasidae, *Ornithodoros hasei*, bats, Argentina

### Introduction

*Ornithodoros hasei* (Schulze, 1935) is a widely distributed bat parasite in the Neotropical Zoogeographic Region, with records from southern Mexico to Uruguay (Guglielmone *et al.* 2003). Klompen & Oliver (1993) classified this tick in the genus *Carios*, a position supported by Horak *et al.* (2002) but questioned by Guglielmone *et al.* (2005). We have elected to follow Hoogstraal's (1985) classification until the systematic position of this species is clarified. Major collections of *O. hasei* were made in Venezuela by Jones *et al.* (1972), who found morphological variation among ticks collected from different localities, and stated that specimens identified as *O. hasei* may represent more than one species.

To date, only three species of *Ornithodoros* have been reported from Argentina: *O. rostratus* Aragão, 1911, *O. talaje* (Guérin-Méneville, 1849) and *O. mimon* Kohls, Clifford and Jones, 1969 (Guglielmone *et al.* 2003; Venzal *et al.* 2004). Here we report the first Argentinean records of ticks belonging to the *O. hasei* group, collected on three species of bats.

### Materials and methods

Six ticks of the genus *Ornithodoros* were collected on bats by M. Mónica Díaz in Rio Lavayén,

approximately 1 km north of Santa Rita, San Pedro Department (24° 28' S, 64° 48' W), Jujuy Province, Argentina: 1 larva (field number: MMD 228), ex *Molossops temminckii* (Burmeister, 1854) (Molossidae), Oct. 05, 1995; 1 larva (field number: MMD 214), ex *M. temminckii*, Oct. 04, 1995; 1 larva (field number: MMD 227), ex *Myotis albescens* (E. Geoffroy, 1806) (Vespertilionidae), Oct. 06, 1995; 2 larvae (field number: MMD 212), ex *Histiotus laephotis* Thomas, 1916 (Vespertilionidae), Oct. 04, 1995; 1 larva (field number: MMD 234), ex *M. albescens*, Oct. 06, 1995. The ticks were slide-mounted in Hoyer's medium, identified using the keys and descriptions of Kohls *et al.* (1965) and Jones & Clifford (1972), and deposited in the annexes of the Colección Mamíferos Lillo (CML), Universidad Nacional de Tucumán, Tucumán, Argentina.

## Results and discussion

The six larvae were found to belong to the *O. hasei* species group. Their morphology was homogeneous. Larvae of *O. hasei* can be separated from those of other *Ornithodoros* parasites of bats by the following characters: hypostome tapers to a point, with dentition 3/3 along anterior two-thirds and 2/2 posteriorly to base, file 1 with 16–18 denticles, 2 with 15–18, and 3 with 8–12; dorsal plate pyriform, narrow (132 $\mu$ –150 $\mu$ ), length less than 250 $\mu$ ; and distance between anterolateral setae less than 0.100 $\mu$ . Measurements of our specimens appear in Table 1, alongside those presented by Kohls *et al.* (1965) to describe the larva of *O. hasei*. The only significant difference between Argentinean specimens and those of Kohls *et al.* (1965) lies in the length of the basis capituli, which is shorter in Argentinean larvae.

These specimens constitute the first records of the *O. hasei* species group from Argentina. Elsewhere, *O. hasei* has been found on a total of 29 species of bats and on one sigmodontine rodent (Cooley & Kohls, 1944; Kohls *et al.* 1965; Fairchild *et al.* 1966; Morel, 1967; Kohls, 1969; Jones *et al.* 1972; Marinkelle & Grose, 1981). Two of the hosts examined in this study, *M. temminckii* and *H. laephotis*, are new for this tick species. This new record of *O. hasei* in Argentina is not unexpected, since *O. hasei* is present in neighboring Brazil, Bolivia and Uruguay (Guglielmone *et al.* 2003).

Several members of the genus *Ornithodoros* are known to be associated with bats. However, in Argentina, where 60 bat species have been recorded (Barquez 2006), only *O. mimon* has been found parasitizing this order of mammals (Venzal *et al.* 2004). This is probably due to poor sampling of Argentinean bats rather than an absence of tick parasitism.

As noted above, morphological dissimilarity among larvae of *O. hasei* from different Venezuelan localities has been established (Jones *et al.* 1972). It is unclear whether this is related to the existence of sibling species or to intraspecific variation. Comparative morphological, genetic and ecological studies of *O. hasei* throughout its vast Neotropical range may help to resolve this issue.

## Acknowledgements

We acknowledge the support of INTA and the Asoc. Coop. INTA Rafaela to SN, AAG and AJM.

Fieldwork was supported by grants from CONICET (Consejo de Investigaciones Científicas y Técnicas, Argentina) and CIUNT (Consejo de Investigaciones de la Universidad Nacional de Tucumán, Argentina) with the collaboration of the members of PIDBA (Programa de Investigaciones de Biodiversidad Argentina) and its director Dr. Rubén Barquez.

**TABLE 1.** Comparative measurements of larvae belonging to the *Ornithodoros hasei* species group.

	Argentinean*	Kohls <i>et al.</i> (1965)
Scutal length	235–247.5 $\mu$	220–240 $\mu$
Scutal width	132.5–150 $\mu$	127–150 $\mu$
Dorsal setae (number of pairs)	19 (15 dorsolateral; 4 central)	17–20 (14–15 dorsolateral; 3–5 central)
Anterolateral dorsal setae (distance)	75–95 $\mu$	98 $\mu$ (average)
Posterolateral dorsal setae (distance)	70–85 $\mu$	75 $\mu$ (average)
Ventral setae (number of pairs)	8	8
Ventral setae circumanal 1	37.5–47.5 $\mu$	44 $\mu$ (average)
Ventral setae circumanal 2	50–52.5 $\mu$	60 $\mu$ (average)
Ventral setae circumanal 3	67.5–75 $\mu$	78 $\mu$ (average)
Length of basis capituli	130–137.5 $\mu$	153–190 $\mu$
Width of basis capituli	175–200 $\mu$	170–234 $\mu$
Posthypostomal setae 1 (distance)	20 $\mu$	20 $\mu$ (average)
Posthypostomal setae 2 (distance)	70–85 $\mu$	76 $\mu$ (average)
Palpal length	225–240 $\mu$	208–252 $\mu$
Palpal width	37,5 $\mu$	38–44 $\mu$
Palpal article I (length)	55–62.5 $\mu$	62 $\mu$ (average)
Palpal article II (length)	70–75 $\mu$	72 $\mu$ (average)
Palpal article III (length)	62.5–65 $\mu$	64 $\mu$ (average)
Palpal article IV (length)	40–45 $\mu$	41 $\mu$ (average)
Palpal setae article I	0	0
Palpal setae article II	4	4
Palpal setae article III	5	5
Palpal setae article IV	9	9
Hypostome length (toothed portion)	160–162.5 $\mu$	135–182 $\mu$
Hypostome width	47.5–57.5 $\mu$	49–61 $\mu$
Apical dental formula	3/3	3/3
Median dental formula	3/3	3/3
Basal dental formula	2/2	2/2
Denticles row 1	16	16–18
Denticles row 2	15	15–18
Denticles row 3	12	8–12

\* Ranges based on 3 to 6 specimens.

## References

- Barquez, R.M. (2006) Orden Chiroptera. In: Barquez, R.M., Díaz, M.M. & Ojeda, R.A. (eds.) Los mamíferos de Argentina: sistemática y distribución. *Mastozoología Neotropical*. Publicaciones Especiales, SAREM. pp. 56–87.

- Cooley, R.A. & Kohls, G.M. (1944) The genus *Amblyomma* (Ixodidae) in the United States. *Journal of Parasitology*, 30, 77–111.
- Fairchild, G.B., Kohls, G.M. & Tipton, V.J. (1966) The ticks of Panama (Acarina: Ixodoidea). In: Wenzel, R.L. & Tipton, V.J. (eds.) *Ectoparasites of Panama*. Field Museum of Natural History, Chicago, pp. 167–219.
- Guglielmone, A.A., Estrada-Peña, A., Keirans, J.E. & Robbins, R.G. (2003) *Ticks (Acari: Ixodida) of the Neotropical zoogeographic region*. Spec. Publ. Int. Cons. Ticks Tick-Borne Dis., Atalanta, Houten, The Netherlands. 173 pp.
- Guglielmone, A. A., Mangold, A. J. & Estrada-Peña, A. (2005) Are *Antricola* species proper representatives of the genus *Carios*? *Newsletter on Ticks and Tick-Borne Diseases of Livestock in the Tropics*, 27, 42–43.
- Horak, I.G., Camicas, J.L. & Keirans, J.E. (2002) The Argasidae, Ixodidae and Nuttalliellidae (Acari: Ixodida): a world list of valid tick names. *Experimental and Applied Acarology*, 28, 25–54.
- Hoogstraal, H. (1985) Argasid and nuttalliellid ticks as parasites and vectors. *Advances in Parasitology*, 24, 135–238.
- Jones, E.K. & Clifford, C.M. (1972) The systematics of the subfamily Ornithodorinae (Acarina: Argasidae). V. A revised key to larval Argasidae of the Western Hemisphere and description of seven new species of *Ornithodoros*. *Annals of the Entomological Society of America*, 65, 730–740.
- Jones, E.K., Clifford, C.M., Keirans, J.E. & Kohls, G.M. (1972) The ticks of Venezuela (Acarina: Ixodoidea) with a key to the species of *Amblyomma* in the Western Hemisphere. *Brigham Young University, Science Bulletin, Biological Series*, 17, 1–40.
- Klompen, J.S.H. & Oliver, J.H. (1993) Systematic relationships in the soft ticks (Acari: Ixodida: Argasidae). *Systematic Entomology*, 18, 313–331.
- Kohls, G.M. (1969) New records of ticks from the Lesser Antilles. *Studies on the Fauna of Curaçao and other Caribbean Islands*, 28, 126–134.
- Kohls, G.M., Sonenshine, D.E. & Clifford, C.M. (1965) The systematics of the subfamily Ornithodorinae (Acarina: Argasidae). II. Identification of the larvae of the Western Hemisphere and description of three new species. *Annals of the Entomological Society of America*, 58, 331–364.
- Marinkelle, C.J. & Grose, E.S. (1981) A list of ectoparasites of Colombian bats. *Revista de Biología Tropical*, 29, 11–20.
- Morel, P.C. (1967) Les tiques des animaux sauvages des Antilles (Acariens, Ixodoidea). *Acarologia*, 9, 341–352.
- Venzal, J.M., Autino, A.G., Nava, S. & Guglielmone, A.A. (2004) *Ornithodoros mimon* Kohls, Clifford & Jones, 1969 (Acari: Argasidae) on Argentinean bats, and new records from Uruguay. *Systematic and Applied Acarology*, 9, 37–39.

Accepted by Richard G. Robbins: 31 Jan. 2007