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TICKS *(ACARI: IXODIDA: ARGASIDAE, IXODIDAE)* INFESTING HUMANS IN NORTHWESTERN CORDOBA PROVINCE, ARGENTINA

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Abstract Ticks infesting humans were collected from September 2004 to August 2005 in Northwestern Córdoba in an area with a southern limit in the locality of Dean Funes (30°25´S 64°20´W) and San José de las Salinas (30°00´S 64°37´W) in the North. The collections consisted in ticks found attached on man obtained from three sources: 1) specimens fixed on two workers during two successive days per month of field work in the northern part of the area which belongs to Western Chaco district of the phytogeographical Chaco domain, 2) ticks attached to a man working in a farm close to Dean Funes in the Chaco Serrano district of the Chaco domain and, 3) ticks collected from a collaborator visiting daily a suburban property with dogs in the vicinities of Dean Funes. Most ticks collected were larvae, nymphs and adults of *Amblyomma neumanni* from the Chaco Serrano district where a nymph of *Otobius megnini* was also found on man. Adults of *Amblyomma parvum* and *Amblyomma tigrinum* were detected feeding on humans in the Western Chaco district and in the property close to Dean Funes, respectively. *Amblyomma neumanni* was absent on man from December to April while most specimens of *A. parvum* and *A. tigrinum* were collected during summer. Their role as potential vector of tick-transmitted diseases in the area is unknown.

Key words: *Argasidae, Ixodidae*, humans, Córdoba, Argentina

Resumen ***Garrapatas infestando humanos en el noroeste de la provincia de Córdoba, Argentina.*** Se recolectaron garrapatas (*Acari: Ixodida: Argasidae, Ixodidae*) infestando humanos entre septiembre de 2004 y agosto de 2005 en un área del noroeste de Córdoba cuyo límite al sur es la localidad Deán Funes (30º25´S 64°20´W) y el límite al norte es la localidad de San José de las Salinas (30°00´S 64°37´W). Las colecciones consistieron en garrapatas fijadas a humanos obtenidas de tres fuentes: 1) garrapatas fijadas sobre dos trabajadores durante dos días sucesivos por mes de trabajo de campo en la parte norte del área, la cual pertenece al distrito chaqueño occidental del dominio fitogeográfico del Chaco, 2) garrapatas fijadas a un trabajador en un campo cercano a Deán Funes en el distrito chaqueño serrano del dominio del Chaco y 3) garrapatas recolectadas de un colaborador que visitaba diariamente una propiedad suburbana con perros en las vecindades de Deán Funes. La mayoría de las garrapatas recolectadas fueron larvas, ninfas y adultos de *Amblyomma neumanni* del distrito chaqueño serrano donde una ninfa de *Otobius megnini* fue también encontrada sobre humano. Adultos de *Amblyomma parvum* y *Amblyomma tigrinum* se detectaron alimentándose sobre humanos en el distrito Chaqueño occidental y en la propiedad cercana a Deán Funes respectivamente. *Amblyomma neumanni* estuvo ausente sobre humano de diciembre a abril mientras que la mayoría de lo especímenes de *A. parvum* y *A. tigrinum* fueron recolectados durante el verano. Sus papeles como potenciales vectores de enfermedades transmitidas por garrapatas en el área es desconocido.

Palabras clave: *Argasidae, Ixodidae*, humanos, Córdoba, Argentina

Ticks are obligatory hematophagous ectoparasites of vertebrates including man, in whom they may cause paralyses, toxicoses, irritation, allergy and transmit several infectious agents[1, 2, 3]. Hoogstraal[1] stated that ticks transmit a greater variety of infectious agents than any other group of hematophagous arthropods. The genus *Amblyomma* predominates among the neotropical ticks, and many species of this genus are known to bite humans[4]. Recent studies in South America reported several *Amblyomma* species as vector of rickettsial disease to the humans[5], and in Argentina in particular, *A. cajennense* has been involved in the *Rickettsia rickettsii* transmission[6]. In this sense, the research interest in ticks as a source of human pathogens has grown in many parts of the world, and new rickettsial strains were discovered, some being pathogenic and others apparently nonpathogenic for humans[7]. Nevertheless, reports of ticks infesting man are scanty for Argentina, which is a constraint to our knowledge of potential vector of tick-transmitted diseases. Stud-

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ies on tick ecology were recently started in northwestern Córdoba where five species of Ixodidae (*Amblyomma argentinae, Amblyomma neumanni*, *Amblyomma parvum*, *Amblyomma tigrinum* and *Rhipicephalus sanguineus*) and three species of Argasidae (*Argas monachus*, *Ornithodoros* sp. and *Otobius megnini*) are established (Nava and Guglielmone, study in progress). Of these species, *A. neumanni*, *A. parvum*, *A. tigrinum*, *R. sanguineus* and *O. megnini* were reported to infest humans in Argentina and other neotropical countries[4]. There is no previous report of ticks attacking human in northwestern Córdoba. The aim of this work is provide preliminary information about tick species infesting human in the northwestern of Córdoba Province, showing that human tick infestation is a relatively frequent event.

Materials and Methods

Ticks attached to man were collected from September 2004 to August 2005 in the northwestern of Córdoba province, in an area with a southern limit in the locality of Dean Funes (30°25´S 64°20´W) and San José de las Salinas (30°00´S 64°37´W) in the North. The area is located *in toto* within the Chaco phytogeographical province of the Chaco domain but the southern part corresponds to the Chaco Serrano district and the northern part belongs to the dry Western district as defined by Cabrera[8].

The collections consisted of ticks found attached on man from three sources: 1) specimens fixed on two workers during two successive days per month of field work in the northern part of the area in the Western Chaco district where *A. argentinae*, *A. parvum*, *A. tigrinum*, *A. monachus*, *Ornithodoros* sp., *O. megnini* and *R. sanguineus* are present, 2) ticks attached to a man working in a farm with the natural forest preserved 7 km North from Deán Funes in the Chaco Serrano district where *A. neumanni*, *A. tigrinum*, *A. monachus* and *O. megnini* are established and, 3) ticks collected from a collaborator visiting daily a suburban property with dogs known to be infested with *A. tigrinum*, in the vicinities of Dean Funes. Ticks were identified by using keys and descriptions from Boero[9], Guglielmone et al.[10] and Estrada-Peña et al.[11], but the species of *Ornithodoros* from the Western Chaco district remains uncertain.

Results

Specimens of *A. neumanni*, *A. parvum*, *A. tigrinum* and *O. megnini* were detected attached to humans. As expected *A. neumanni* was determined only in the farm located in the Chaco Serrano district and *A. parvum* was exclusively found in the Western district. All specimens of *A. tigrinum* found on man were from the collaborator visiting the property in the vicinities of Dean Funes. The only specimen of *O. megnini* found on man originated in the Chaco Serrano. The numbers of specimens according to tick stage and month of finding are presented in Table 1.

All specimens of *A. parvum* and *A. tigrinum* feeding on man were adult ticks found in summer with the exception of an *A. parvum* male collected in November. On the other hand all parasitic stages of *A. neumanni* were found on man, larvae form May to July, nymphs and adult ticks from May to November (Table 1).

TABLE 1.– *Numbers per stage of* Amblyomma neumanni, A. parvum, A. tigrinum *and* Otobius megnini f*ound on humans in northwestern Córdoba from September 2004 to August 2005. L= larvae, N= nymphs, M= males, F= females*

	A. neumanni				*A. parvum*				*A. tigrinum*				*O. megnini**	
	L	N	M	F	L	N	M	F	L	N	M	F	L	N
Sep 04	0	54	11	5	0	0	0	0	0	0	0	0	0	0
Oct	0	22	11	12	0	0	0	0	0	0	0	0	0	0
Nov	0	3	7	9	0	0	1	0	0	0	0	0	0	1
Dec	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Jan	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Feb	0	0	0	0	0	0	0	2	0	0	1	1	0	0
Mar	0	0	0	0	0	0	0	4	0	0	0	1	0	0
Apr	0	0	0	0	0	0	0	0	0	0	0	0	0	0
May	15	3	1	5	0	0	0	0	0	0	0	0	0	0
Jun	14	20	2	2	0	0	0	0	0	0	0	0	0	0
Jul	10	26	3	7	0	0	0	0	0	0	0	0	0	0
Aug 05	0	29	1	5	0	0	0	0	0	0	0	0	0	0
Total	39	157	36	45	0	0	1	7	0	0	1	3	0	1

** Adults of this tick species are non-parasitic*

Discussion

The present study is descriptive since the exposure to tick infested environments of the collaborators were not uniform with higher chances to collect more specimens in the Chaco Serrano than in Western Chaco and vicinities of Dean Funes. Nevertheless the number of *A. neumanni* collected is high even considering that the collector lives and works in an infested farm. *Amblyomma neumanni* is a tick species whose parasitic stages are common on domestic animals in the Chaco Serrano with a life cycle characterized by summer diapause[12, 13] that explains its absence on man from December to April. The capacity of *A. neumanni* to infest man has been previously reported by Guglielmone *et al*.[13] who found that a 3% of total *A. neumanni* collected from 1976 to 1990 in Catamarca, Jujuy, Salta and Tucumán were from man.

Amblyomma parvum was also found on man in provinces of northwestern Argentina amounting to 0.9% of total specimens of this species collected[13] while *A. tigrinum* was registered previously on one occasion on man in Argentina[14]. Adults of *A. parvum* are frequently reported on domestic animals in the Western Chaco district while adults of *A. tigrinum* are prone to infest domestic and wild Canidae in contrasting ecological regions sharing with *A. parvum* a prevalence of adult ticks during summer[10, 14]. The hosts of larvae and nymphs of *A. parvum* are largely unknown while the immature stages of *A. tigrinum* have been found infesting birds and rodents in nature[15, 16]. Probably, larvae and nymphs of both species are nidicolous with small interaction with domestic animals and man.

Otobius megnini is a tick species characterized by non-parasitic adult stages and immature stages that feed deeply in the inner part of the ear canal of herbivores and eventually other type of hosts[1]. This tick species has been reporting as causing otitis in humans in Argentina[17, 18] and in the maintenance of the agent of Q fever in nature[19].

It is unknown if *A. neumanni*, *A. parvum* and *A. tigrinum* may represent a source of infectious agents to man in Argentina similar to the risks involved with *Amblyomma cajennense* and *Amblyomma triste* as vectors of human rickettsiosis in Argentina and Uruguay, respectively [6, 20]. In the last years, the increased use of more sensitive and specific molecular identification methods has resulted in the discovery of new rickettsiae in ixodid ticks and the detection of known species in some geographic areas where they were not reported [21, 22]. Therefore, considering the high level infestation of some tick species on humans reported in this study, further studies about the role of these ticks as vectors of pathogens for humans in Argentina are clearly necessary.

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In his research, Wilkins was neither a visionary nor a deep thinker like Crick. Rather, he was a meticulous, inventive, and infinitely patient experimentalist. He loved instruments, and had an especial rapport with the workshop machinists. He adhered to the old string-and-sealing wax tradition of experimental physics. He would prod about in dustbins for useful bits of metal, and visitors to the laboratory were sometimes startled to see a condom put to use as a gas box surrounding an X-ray camera. Wilkins had an almost tactile appreciation of interference and diffraction phenomena, and a pictorial perception of molecular structure. He liked models and mistrusted mathematical abstraction. His approach to structure, in the words of one collaborator, was "incredibly shrewd".

En sus investigaciones, Wilkins no era ni un visionario ni un pensador profundo como Crick. Más bien era un meticuloso, inventivo e infinitamente paciente experimentador. Amaba los instrumentos y tenía una especial relación con los mecánicos del taller. Adhería a la antigua tradición del "piolín y lacre" de la física experimental. Hurgaba en los tachos de basura buscando pedazos útiles de metal, y los visitantes a su laboratorio a veces se sorprendían al ver un condón, empleado como caja de gas, rodeando una cámara de rayos X. Wilkins tenía una impresión casi táctil de los fenómenos de interferencia y difracción y una percepción pictórica de la estructura molecular. Le gustaban los modelos y desconfiaba de las abstracciones matemáticas. Su enfoque a la estructura era, en las palabras de un colaborador, "increíblemente sagaz".

Walter Gratzer

Obituary. Maurice Wilkins (1916-2004). *Nature* 2004; 431-922.

Nota: Maurice Wilkins compartió el Premio Nobel con James Watson y Francis Crick en 1962, otorgado por su participación en el descubrimiento de la estructura del ADN. Falleció el 5 de octubre de 2004.