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First records of *Ixodes boliviensis* Neumann, 1904 and *Dermacentor dissimilis* Cooley, 1947 (Ixodida: Ixodidae) as parasites of domestic mammals in Nicaragua

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Ixodes boliviensis Neumann, 1904 was originally described from a male, female and nymph collected from a bush dog *Speothus venaticus* Lund, 1842 in Bolivia (Neumann 1904). Subsequently, this tick has been reported parasitizing several species of mammals, especially Carnivora, in locations ranging from Mexico to Bolivia (Guglielmone *et al*. 2004). Throughout Mexico and Central America this species is more common in mountainous areas, at altitudes varying from 800 to 2500 m (Álvarez *et al*. 2005, Bermúdez & Miranda 2011, Troyo *et al*. 2014); though in Mexico has also been reported in lowlands (Guzmán *et al.* 2007).

Dermacentor dissimilis Cooley, 1947 was described from females and nymphs collected from horses in Chiapas, Mexico (Cooley 1947), and has also been reported in Guatemala (Kohls & Dalmat 1952), Honduras (Anonymous 1984) and El Salvador (United States National Tick Collection record). These scarce records are all from areas above 900 m, therefore its distribution seems restricted to temperate mountainous areas with high humidity. According to Guglielmone *et al*. (2004), this species is a parasite of Artiodactyla and Perissodactyla, and it is possible that it completes its cycle on a single host (Kohls & Dalmat 1952).

To our knowledge, there are no references of *I. boliviensis* and *D. dissimilis* in Nicaragua. The only species of these genera that have been recorded before are *Ixodes luciae* Sénevet, 1942, *Ixodes sinaloa* Kohls and Clifford, 1966, *Ixodes bequaerti* Cooley and Kohls, 1945, (Guglielmone *et al.* 2004), *Dermacentor nitens* Neumann, 1897 (Maes 1999), a species close to *Dermacentor imitans* Warburton, 1933 (Maes 1999), and *Dermacentor panamensis* Apanaskevich and Bermúdez, 2013 (Apanaskevich & Bermúdez 2013). The present communication reports the initial discovery of *I. boliviensis* and *D. dissimilis* in this country, based on material deposited in the recently created Colección de Referencia de Garrapatas of the Universidad Nacional Autónoma de Nicaragua, León.

All specimens were preliminary separated by genus (Fairchild *et al.* 1966), and then identified to species using the keys of Onofrio *et al*. (2006) and Yunker *et al.* (1986), which are specific to *Ixodes* and *Dermacentor*, respectively. The identifications were also confirmed by comparison with the original descriptions of *I. boliviensis* (Neumann 1904), and *D. dissimilis* (Cooley 1947, Kohls & Dalmat 1952).

Material examinad

Ixodes boliviensis Neumann, 1904: pp. 457.

3♀ NUEVA SEGOVIA, Wiwili. 800 m. 13° 37´N-85° 50´W. January 2010. Ex: Dog. Col: I. López, J. Cáceres. (Ref. IX0057, IX0058). 8♀ JINOTEGA, San José de Las Latas. 1200m. 13°3'13"N-85°56'3"W. 13 March 2015. Ex: Dog. Col: S. Bermúdez, L. Mejía, L. Hernández. (Ref. IX0012).

Note. The specimens collected in Nueva Segovia were mistakenly identified as *Ixodes scapularis* (sic. *escapularis*).

Dermacentor dissimilis Cooley 1947.

9♀, 7♂ JINOTEGA, Las Mesitas. 1308m. January 2010. Ex: Horse. Col: W. Altamirano, M. Palacios. (Ref. IX0059). 3♀, 4♂ ESTELÍ, La Trinidad. 940m. 13° 03´N-85° 56´W. April 2010. Ex: Horse. (Ref. IX0060). 12♀, 9♂ MATAGALPA, Macizo de Peñas Blancas. 13 March 2015. Ex: Horse. Col: S. Bermúdez, L. Mejía, L. Hernández. (Ref. IX0020). 28♀, 9♂ JINOTEGA, San José de Las Latas. 1200m. 13°3'13"N 85°56'3"W. 13 March 2015. Ex: Horse. Col: S. Bermúdez, L. Mejía, L. Hernández. (Ref. IX0021).

Note. In the vial from San José de Las Latas, there are also nymphs and exuviae.

Since *I. boliviensis* has a wide distribution in the Neotropics, its presence in Nicaragua was not totally unexpected. In the case of *D. dissimilis*, these records represent new information about the southern distribution of its range. Findings of both species in rural localities in the highlands could mean that their presence was unnoticed or misidentified, because the main efforts to study ticks in Nicaragua have been in lowland environments that appear inadequate for these species. Thus, additional studies in these regions could provide new information about presence and ecology of other tick species in Nicaragua. For example, one female identified as a "possible" *D. imitans* was cited by Maes (1999) from Jinotega, who pointed out marked differences in the color pattern of the scutum. Because this sample is missing, the identification has never been confirmed.

Finally, the presence of both species parasitizing domestic animals close to human dwellings deserves further research to determine if they could be reservoirs or vectors of pathogens that affect animals or humans. This concern is reinforced by the mention of human parasitized by *I. boliviensis* in Mexico (Guzmán *et al.* 2007) and the recent reports of this species infected with *Rickettsia* spp. in Costa Rica (Troyo *et al.* 2014).

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