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CONTRIBUTION TO THE KNOWLEDGE OF CHIGGER MITES
(ACARI: TROMBICULIDAE) PARASITIZING APODEMUS SYLVA TICUS (L.)
(RODENTIA, MURIDAE) ON THE IBERIAN PENINSULA

by A. IMAZ1, D. GALICIA1, M.L. MORAZA1,
& A.A. STEKOL’NIKOV2

(Accepted November 2005)

TAXONOMÍA
FAUNA
TROMBICULIDOS
ACARI
PARÁSITOS
RATONES
ESPAÑA

RESUMEN: Se describen dos nuevas especies, Neotrombicula jordana n. sp., e
Hirsutiella billabeta n. sp. sobre Apodemus sylvaticus (L.) muestreados en la
provincia de Navarra. Se citan por primera vez para la Península Ibérica tres
especies de ácaros trombicúlidos. Se presentan también los datos de distribución
y morfología de otras cinco especies.

TAXONOMY
FAUNA
CHIGGERS
ACARI
PARASITES
MICE
SPAIN

SUMMARY: Two new species, Neotrombicula jordana n. sp., and Hirsutiella billabeta
n. sp. are described from mice Apodemus sylvaticus (L.) collected in Navarra
Province. Three species of chigger mites are recorded for the first time on the
Iberic Peninsula. Data on distribution and morphology of other 5 species are
presented.

TAXINOMIE
FAUNE
TROMBICULIDÉS
ACARI
PARASITES
MULOTS
ESPAGNE

RÉSUMÉ: Deux espèces nouvelles, Neotrombicula jordana n. sp. et Hirsutiella
billabeta n. sp. sont décrites de mulots Apodemus sylvaticus (L) provenant de
Navarre. Trois espèces de Trombiculides sont signalées pour la première fois de la
péninsule ibérique. La distribution et la morphologie de 5 autres espèces sont
précisées.

Trombiculids of the Iberian Peninsula are still insufficiently studied. To the time only three works
devoted to the chiggers fauna of this territory had been published (not considering old or closely
parasitological publications which reported about finds of Neotrombicula autumnalis (Shaw, 1790), the
usual agent of trombidiosis in Europe). Papers by KERKA (1960a, 1960b) cover results of chiggers col-
collection in several localities from different regions of Spain. This author recorded 5 species of Trombicul
dae parasitizing rodents and reptiles in the country. PEREIRA-LORENZO (1993) found 9 species in Galicia,

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Acarologia, 2005 [2006], XLVI, 1-2 : 53-64.
including 7 for the first time recorded in Spain. Thus, till now 12 species of chiggers were known on the Iberian Peninsula. In the present paper two species new to science are described and 3 species are for the first time recorded in Spain. Besides that, data on distribution and morphology of 5 other species are presented.

**MATERIAL AND METHODS**

Hosts had been collected by D. Galicia and M.C. Escala in the Erro Valley, north of Navarra Province, Spain, since February 2001 till July 2002. The localities are designated as follows: “Ardaizt” — Ardaizt Village, marge of a pine forest, 600 m above sea level (UTM coordinates 30TXN2551); “Larraingoa” — Larraingoa Village, marge of a pine forest, 620 m (30TXN2552); “Oscariz” — Oscariz Village, field of grain crops, edge, 500 m (30TXN2642); “Lizoaioin” — Lizoaoin Village, field of grain crops, edge, 500 m (30TXN2539); “Villaveta-Billabeta” — Villaveta-Billabeta Village, field of grain crops, edge, 470 m (30TXN3036); “Sion de Liberti” — Sion de Liberti Village, field of grain crops, edge, 470 m (30TXN2836); “Urrilciqui” — Urrilciqui Village, marge of a pine forest, 570 m (30TXN2447); “Ureta” — Ureta Village, marge of a beech forest, 740 m (30TXN3058); “Casa Sorogain” — Sorogain Area near Mezkirit Village, marge of a beech forest, 800 m (30TXN2963); “Estacion Aforo Sorogain” — same data, 760 m (30TXN3059).

Mites were cleared in Nesbitt’s fluid and mounted in Faure-Berlese’s medium. All measurements are given in micrometres (µm). Terminology follows Goff et al. (1982), with some adaptation: “ventral setae” (V) — setae on the ventral surface of idiosoma excluding coxal and sternal setae; VS — number of ventral setae; D — dorsal idiosomal setae; DS — number of dorsal idiosomal and humeral setae (Kudryavshova, 1998); TaIII — length of leg III tarsus; TaW — width of leg III tarsus; m-t — ratio between distance from mastitarsala to the base of leg III tarsus and length of leg III tarsus (Stekol’nikov, 2001a). We also use the ratio between TaIII and TaW being significant taxonomic character in the genus *Neotrombicula* Hirst, 1925. Type specimens are deposited in the Museum of Zoology, University of Navarra (MZNA).

**RESULTS**

*Neotrombicula jordana* n.sp. (Figs. 1-10, Table 1)

**DIAGNOSIS:** SIF = 7BS-N-3-3111.1000; fPp = B/B/NBB; fCx = 1.1.1; fSt = 2.2; fSc: PL > AM > AL; Ip = 921; fD = 2H-8-6-6-4-2-2-2; DS = 32; VS = 33; NDV = 65.

**DESCRIPTION. Larva. Idiosoma.** Eyes 2 + 2, on ocular plate, anterior larger. One pair of humeral setae; 30-34 dorsal idiosomal setae, densely covering with rather thick and short barbs, arranged 8-6-6-4-2-2-2; 2 pairs of sternal setae and 33-42 ventral setae; total idiosomal setae 66-74.

Gnathosoma. Cheliceral blade with tricuspip cap; gnathobase moderately punctate, bearing a pair of branched setae; galeal nude; palpal claw 3-pronged; setae on palpal femur and genu branched; ventral and lateral palpal tibial setae branched, dorsal palpal tibial seta nude; palpal tarsus with 7 branched setae, nude subterminala and tarsala.

Scutum. Moderately punctate, subpentagonal, with broadly rounded posterior margin; AM base posterior to level of ALS; SB on level of PLs or slightly posterior; PL>AM>AL; sensilla flagelliform with branches in distal 2/3, nude basally.

Legs. All 7-segmented, with a pair of claws and clawlike empodium. Leg I: coxa with 1 non-specialized branched seta (1B); trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 3 genualae, microgenua; tibia 8B, 2 tibialae, microtibiala; tarsus 22B, tarsala, microtarsala, subterminala, parasubterminala, pretarsala. Leg II: coxa 1B; trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, genuala; tibia 6B, 2 tibialae; tarsus 16B, tarsala, microtarsala, pretarsala. Leg III: coxa 1B; trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, genuala; tibia 6B, tibiala; tarsus 14B, mastitarsala.

DIFFERENTIAL DIAGNOSIS: The new species is similar to *Neotrombicula solida* Schluger & Davidov, 1967 and *N. texana* Schluger, 1962, and differs from the both species in having 3 genualae I versus 2, nude
Neotrombicula jordana n.sp., standard measurements (n = 13).

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<td>307</td>
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<td>34</td>
<td>66</td>
<td>100</td>
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<td>0.207</td>
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<td>74</td>
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<td>943</td>
<td>32</td>
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<td>71</td>
<td>105</td>
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<td>0.251</td>
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</tr>
</tbody>
</table>

T. αβΩ
1: Neotrombicula jordana

Neotrombicula autumnalis (Shaw, 1790)

DISTRIBUTION: Throughout Continental Europe (excepting Northern Scandinavia and Northwest Russia), and on British Isles. The only reliable finding in Asia took place in Turkmenistan, the Western Kopet Dagh (Stekol’nikov, 1997b). On Iberian Peninsula the species previously was recorded on A. sylvaticus and other species of mammal hosts by Kepka (1960b), Pereira-Lorenzo (1993) and other authors.


REMARKS: Usually N. autumnalis have fPp=B/B/NNB, but variation of lateral palpal tibial seta were observed in this species. Thus, several specimens from Western Caucasus had this seta branched on one or both palps (Stekol’nikov, 1997a). Specimens from our material expose also variation of dorsal palpal tibial seta (Table 2).

<table>
<thead>
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<td>0.6</td>
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<tr>
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<td>0.6</td>
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<tr>
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<tr>
<td>NBB/NNB</td>
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<td>83.8</td>
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<tr>
<td>Total</td>
<td>308</td>
<td>100</td>
</tr>
</tbody>
</table>

Neotrombicula vulgaris (Schluger, 1955)

DISTRIBUTION: Hungary, Bulgaria, Moldova, Ukraine, Russia (the Western and Northern Cauca-
sus), Georgia, Azerbaijan, Turkmenistan (the Western Kopet Dagh) (Stekoln’ikov, 1999). Recorded on Iberian Peninsula for the first time.


Neotrombicula japonica
(Tanaka, Kaiwa, Teramura & Kagaya, 1930)
(= Trombicula dubinini Schluger, 1950)

Distribution: Spain, France, Austria, Czechia, Slovakia, Albania, Bulgaria, Yugoslavia, Belarus,
<table>
<thead>
<tr>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
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</thead>
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<tr>
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<td>59</td>
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<td>69</td>
<td>85</td>
<td>34</td>
</tr>
<tr>
<td>64</td>
<td>81</td>
<td>32</td>
</tr>
</tbody>
</table>

Table 3: Neotrombicula hispanica, standard measurements (n = 7).

Ukraine, Moldova, Russia (from the Arkhangelsk and Moscow Regions up to the Far East), Azerbaijan, Japan, Northern Korea (Kudryashova, 1998). The species was recorded for the first time on the Iberian Peninsula by Pereira-Lorenzo (1993), under the name Neotrombicula dubinini.


Neotrombicula hispanica Kepka, 1960

(Table 3)

Diagnosis: SIF = 7BS-N-3-3111.1000; fPp = B/B/NNB; fCx = 1-1-1; fSt = 2.2; fSc: PL > AM > AL; Ip = 709; fD = 2H-8-8-8-...; DS = 40-46; VS = 25-32; NDV = 66–72.

Distribution: Spain (“Zarzua”, in Bizkaia Province or neighboring territories) (Kepka, 1960b), France (Ardèche Department) (Kolebinova, 1970).


Hirsutiella billabeta n.sp.

(Figs. 11-20, Table 4)

Diagnosis: SIF = 7BS-B-3-2111.1000; fPp = B/B/BBB; fCx = 1.1.1; fSt = 2.2; fSc: PL > AM > AL; Ip = 1015; fD = 4H-[16-8]-[17-15]-[15-8]-14-9-7-9-2; DS = 122; VS = 116; NDV = 238.

Description. Larva. Idiosoma. Eyes 2 + 2, on ocular plate, anterior larger. Two pairs of humeral setae; 109–126 dorsal idiosomal setae, densely covering with rather thick and long barbs, arranged [16-8]-[17-15]-[15-8]-14-9-7-9-2 (first 3 rows double); 2 pairs of sternal setae and 112-138 ventral setae; total idiosomal setae 226–259.

Gnathosoma. Cheliceral blade with tricuspid cap; gnathobase densely punctate, bearing a pair of branched setae; galeala branched; palpal claw 3-pronged; setae on palpal femur, genu, and tibia branched; palpal tarsus with 7 branched setae, nude subterminala and tarsala.

Scutum. Densely punctate, trapezoidal, with convex rounded posterior margin; AM base posterior to level of ALs; SB posterior to level of PLs; PL > AM > AL; sensilla flagelliform with few branches in distal 2/3, nude basally.

Legs. All 7-segmented, with a pair of claws and clawlike empodium. Leg I: coxa with 1 non-specialized branched seta (1B); trochanter 1B; basifemur 1B; telofemur 5B; genu 4B, 2 genualae, microgenua; tibia 8B, 2 tibialae, microtibiala; tarsus 22B, tarsala, microtarsala, subterminala, parasubterminala, pretarsala. Leg II: coxa 1B; trochanter 1B; basifemur 2B; telofemur 4B; genu 3B, genuala; tibia 6B, 2 tibialae; tarsus 16B, tarsala, microtarsala, pretarsala. Leg III: coxa 1B; trochanter 1B; basifemur 2B; telofemur 3B; genu 3B, genuala; tibia 6B, tibiala; tarsus 14B, mastitarsala.

Differential Diagnosis. The new species is similar to Hirsutiella zachvatkini (Schluger, 1948), and differs from this species in having much more numerous idiosomal setae (NDV = 226-259 versus 145–180), somewhat smaller scutum (PW = 84 versus 88, ASB = 38-41 versus 41-48, SD = 53-59 versus 57-66), longer AM (53-83 versus 47-60), and lesser m-t (0.236 versus 0.271). H. billabeta resembles...
**H. alpina** Stekolnikov, 2000 by large NDV, but differs in having smaller scutum (PW = 81-88 versus 95-108, SD = 53-59 versus 64-69), shorter legs (Ip = 926-1015 versus 1183-1341, TaIII = 98-105 versus 113-133), and lesser m-t (0.236 versus 0.271).

We used data on *H. zachvatkini* from Germany, Czech Republic, Slovakia, Moldova, and Russia (ŠTEKOL’NIKOV, 2001b) for the above comparison. But *H. billabeta* differs even more from our Spanish material on *H. zachvatkini*. Thus, the difference in the size of scutum is more clear in this case (PW = 81-88 versus 93-103, AP = 25-30 versus 30-38), and additional differences are also observed, namely shorter scutal and idiosomal setae (AL = 50-55 versus 60-68, PL = 73-80 versus 88-106, H = 73-80 versus 93-100, D$_{\text{min}}$ = 44-60 versus 65-80), and somewhat shorter legs (Ip = 926-1015 versus 1020-1119, TaIII = 98-105 versus 101-115) in *H. billabeta*.

**Host:** *Apodemus sylvaticus* (L.)


The holotype and paratypes are deposited in MZNA.

**Etymology:** The species name refers to the type locality.

**Hirsutiella zachvatkini** (Schluger, 1948) (Table 5)

**Distribution:** Spain, France, Switzerland, Austria, Sweden, Czechia, Slovakia, Germany, Poland, Romania, Slovenia, Macedonia, Albania, Bulgaria, Latvia, Belarus, Ukraine, Moldova, European Russia (ŠTEKOL’NIKOV, 2001b). On Iberian Peninsula the species previously was recorded on *A. sylvaticus* and other species of mammal hosts by PEREIRA-LORENZO (1993).


### Table 4: *Hirsutiella billabeta* n.sp., standard measurements (n = 19).

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<td>53</td>
<td>50</td>
<td>73</td>
<td>88</td>
<td>73</td>
<td>44-69</td>
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<td>Maximum</td>
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<td>88</td>
<td>34</td>
<td>41</td>
<td>18</td>
<td>59</td>
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<td>53</td>
<td>75</td>
<td>95</td>
<td>76</td>
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### Table 5: *Hirsutiella zachvatkini*, standard measurements (n = 11).

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<td>38</td>
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| Minimum | 337 | 327 | 356 | 1020 | 68  | 64  | 150 | 101 | 20  | 0.244 |
| Maximum | 386 | 356 | 396 | 1119 | 95  | 112 | 185 | 115 | 23  | 0.289 |
| Mean    | 363 | 342 | 382 | 1087 | 76  | 92  | 168 | 110 | 21  | 0.267 |


Remarks: Our specimens differ from *H. zachvatkinii* materials which was collected in Germany, Czech Republic, Slovakia, Moldova, and Russia (*Stekolnikov*, 2001b) in having broader scutum (PW = 93-103 versus 78-95), longer scutal and idiosomal setae (AL = 60-68 versus 45-63, PL = 88-106 versus 67-87, H = 93-100 versus 59-85, Dmin = 65-80 versus 41-58, Dmax = 75-90 versus 63-77), and slightly longer legs (TaIII = 101-115 versus 86-103).

*Leptotrombidium europaeum*
(Daniel & Brelich, 1959)

Distribution: Spain, France, Austria, Czechia, Slovakia, Romania, Yugoslavia, Albania, Bulgaria, Ukraine, Moldova, Russia (Northern Caucasus), Azerbaijan, Turkey. On Iberian Peninsula the species previously was recorded on *A. sylvaticus* and other species of mammal hosts by *Kepka* (1960b) and *Pereira-Lorenzo* (1993).

**Schoutedenichia krampitzi** (Willmann, 1955)  
*(Table 6)*

**Distribution:** Spain, France, Switzerland, Italia, Yugoslavia, Albania, Bulgaria, Ukraine, Moldova, Azerbaijan, Turkey (Kudryashova, 1998). On Iberian Peninsula the species previously was recorded on *A. sylvaticus* and *A. flavicollis* (Melchior, 1834) by Kepka (1960b).


**Remarks:** A variation of fCx (1.1.1 or 1.1.2) is observed in this species, as stated by Kepka (1960b), Kudryashova (1998) and other authors. The form having fCx=1.1.2 was described as a separate species, *Schoutedenichia donaldi* (Kepka, 1958) being recognised by some authors. In our material fCx=1.1.2 was a predominant variant (Table 7).

<table>
<thead>
<tr>
<th>fCx</th>
<th>Spec.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1.1</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>1.1.1/1.1.2</td>
<td>32</td>
<td>4.1</td>
</tr>
<tr>
<td>1.1.2</td>
<td>700</td>
<td>90.3</td>
</tr>
<tr>
<td>1.1.2/1.1.3</td>
<td>41</td>
<td>5.3</td>
</tr>
<tr>
<td>Total</td>
<td>775</td>
<td>100</td>
</tr>
</tbody>
</table>

**Brunehaldia bulgarica**  
*(Vercammen-Grandjean & Kolebinova, 1966) (Table 8)*

**Distribution:** Bulgaria, Yugoslavia, and Corsica Island (Kolebinova, 1992). Recorded on Iberian Peninsula for the first time.

**Table 9: Cheladonta pannonica**, standard measurements (n = 8).

<table>
<thead>
<tr>
<th></th>
<th>pa</th>
<th>pm</th>
<th>pp</th>
<th>Ip</th>
<th>DS</th>
<th>VS</th>
<th>NVD</th>
<th>TaIII</th>
<th>TaW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum</td>
<td>200</td>
<td>175</td>
<td>193</td>
<td>573</td>
<td>41</td>
<td>31</td>
<td>74</td>
<td>45</td>
<td>15</td>
</tr>
<tr>
<td>Maximum</td>
<td>225</td>
<td>200</td>
<td>223</td>
<td>648</td>
<td>45</td>
<td>38</td>
<td>83</td>
<td>55</td>
<td>18</td>
</tr>
<tr>
<td>Mean</td>
<td>208</td>
<td>189</td>
<td>203</td>
<td>600</td>
<td>42</td>
<td>35</td>
<td>78</td>
<td>49</td>
<td>16</td>
</tr>
</tbody>
</table>

**Cheladonta pannonica** (Kepka, 1956)

(Kepka, 1956: 9, Abb. 1, 2 (Euschoengastia; Austria, Burgenland, Parndorfer); 1958: 12 [transferred to the genus Cheladonta Lipovsky, Crossley & Loomis, 1955, and rejected as subjective synonym of Cheladonta ikaoensis (Sasa et al., 1951)]; Kudryashova, 1998: 264.

**Diagnosis:** SIF = 4B-N-7-2110.0000; fPp = B/B/BBB; fCx = 1.1.1; fSt = 2.2; fSc: PL > AL > AM; Ip = 611; fD = 4H-10(10-12)-8-4-...; DS = 41-45; VS = 31-38; NVD = 74-83.

**Distribution and hosts:** Described from susliks Spermophilus citellus (L.) collected in Austria. Recorded on Iberian Peninsula and on A. sylvaticus for the first time.


**Remarks:** The holotype and paratypes of the species were preserved in the Zoological Institute of Graz University, Austria. But a thorough revision of the chiggers collection undertaken in this Institute by Prof. R. Schuster in 2005 have not revealed these specimens (R. Schuster, personal communication). Thus, they should be considered as lost. According to the original description, some paratypes were also kept in the Museum of Burgenland (Burgenländischen Landesmuseum), Eisenstadt, Austria. But our efforts to find an information about this material in the Museum were unsuccessful.

The original description of *Ch. pannonica* is incomplete. So, only separate variations for fD, VS, and legs lengths there are presented instead of NVD and Ip. But measurements of scutum and setae in this description are very close to those given in the above table of standard measurements. Some differences in non-metric characters between our material and the original description (branched dorsal palpal tibial seta versus nude, absence of palpal subterminala) most probably are a result of an inaccuracy of the latter. The difference in the number of palpal claw prongs (4 in our material, 5 in the original description) may be accounted for an individual variation.

**Kepka** (1958) did not adduced sufficient proofs of that *Ch. pannonica* should be considered a synonym of *Ch. ikaoensis*. **Kudryashova** (1998) supposes that *Ch. pannonica* may be a synonym of *Ch. flavia* (Schluger, 1955) (a steppe species which parasitizes susliks too) rather than of *Ch. ikaoensis*, and that presence of *Ch. ikaoensis* in Europe is doubtful. A complete revision of European Cheladonta is need for the final solution of this problem.

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REFERENCES


