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# First finding of the chigger mite *Blankaartia acuscutellaris* (Acari Trombiculidae) on a human host in Europe

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**Abstract**

A report on the finding of the chigger mite species *Blankaartia acuscutellaris* (WALCH, 1922) on a human in Hungary is presented. The species is a new record for the Hungarian fauna and is for the first time reported from a human in Europe.

**Keywords**: Hungary, Lake Velence, human parasite, trombidiosis

## Introduction

*Blankaartia acuscutellaris* (WALCH, 1922) is a widespread chigger mite species distributed mainly in the Oriental Region, but also reported many times from the Southern Palearctic and from Africa. In Europe *B. acuscutellaris* has been found in Spain, Moldova, Ukraine, and Russia (Krasnodar Territory). A detailed revision of this species, including comprehensive data on its nomenclature, morphology, and distribution was published by KUDRYASHOVA (1983). *Blankaartia acuscutellaris* inhabits banks of rivers, channels, swamps, etc., and parasitizes principally birds, but can be found on mammals as well. Cases of the *B. acuscutellaris* attacks on humans were reported from Sumatra (WALCH, 1927) and Malaya (GATER, 1932). The bites of larvae of this species cause trombidiosis, an acute dermatitis associated with chigger mites.

The aim of this paper is to present a report of the first finding of *B. acuscutellaris* on a human in Europe. Previously only two rare species, namely *Trombicula toldti* WINKLER, 1953 and *Neotrombicula desaleri* (METHLAGL, 1928) were found on humans in Europe besides the well known "harvest bug" *Neotrombicula autumnalis* (SHAW, 1790). Some other species were regarded as possible human parasites on the base of circumstantial evidence only (KEPKA, 1964). Thus, *B. acuscutellaris* is the fourth proved agent of trombidiosis in Europe.

## Material and methods

Chigger larvae were collected in Velencefürdő (Fejér County, Hungary) at 12 August 2004 by Dr. Kálmán SZEŐKE (Plant Protection and Soil Conservation Service of Fejér County). The mites were extracted from the skin of the patient with forceps and preserved in ethyl alcohol. Preparation was made by the senior author using Keifer's mounting method for eriophyoid mites (KEIFER, 1952). Although this procedure is not standard for chigger mites, the specimens prepared in this way proved to be quite suitable for exact identification. The mites were examined with a phase contrast microscope and identified by the junior author. All measurements are given in micrometres. Terminology follows GOFF *et al.* (1982), with some adaptation. The following abbreviations are used: AM - anteromedian seta of scutum; AL - anterolateral setae of scutum; PL - posterolateral setae of scutum; AW - distance between AL; PW - distance between PL; S - sensilla; SB - sensillary bases and distance between sensilla; ASB - distance from SB to extreme anterior margin of scutum; PSB - distance from SB to extreme posterior margin of scutum; SD = ASB + PSB; P-PL - distance from PL to posterior-most scutal margin; AP - distance from AL to PL on one side; H - humeral setae; D - dorsal idiosomal setae; DS - number of dorsal idiosomal and humeral setae; VS - number of ventral setae (excluding coxal and sternal); NDV = DS + VS; pa - leg I; pm - leg II; pp - leg III; Ip = pa + pm + pp; TaIII - length of leg III tarsus; TaW - width of leg III tarsus. The Mann-Whitney U test was used to evaluate the significance of the differences between our material and previously published morphometric data. This nonparametric method applicable to very small samples was performed by means of Statistica for Windows software (StatSoft Inc., Tulsa, OK, USA), version 6.0. The studied material includes 9 specimens on 2 slides deposited in the acarological collection of the Zoological Institute of Russian Academy of Sciences, Saint Petersburg, Russia.

## Results and discussion

The feeding mites were found on the scalp and scrotum of an approximately ten year old boy after his visit to the reedy margin of the Lake Velence. The boy was examined by health officers who established that the mites caused erythema and itchiness, though no fever was detected. Four of the 9 chigger specimens studied were distinctly engorged and two of them had developed stylostomes, indicating successful feeding (SHATROV, 2000).

The specimens examined show diagnostic characters as follows: Idiosoma. Eyes 2+2; pair of humeral setae; 26 dorsal idiosomal setae, arranged 6-6-6-4-4; 2 pairs of sternal setae and 12-16 ventral setae, arranged 6-2-2-2-2 with some variation; total idiosomal setae 40-44. Gnathosoma. Cheliceral blade with tricuspid cap and dorsal subapical tooth; gnathobase with pair of branched setae; galeala nude; palpal claw with 3 prongs; setae on palpal femur and genu branched; dorsal and lateral palpal tibial setae nude, ventral palpal tibial seta branched; palpal tarsus with 7 branched setae, nude subterminala

and tarsala. Scutum. Densely punctate, pentagonal, with anterolateral shoulders; PL longer than AM, AM much longer than AL; SB far anterior to level of PLs (difference PSB - P-PL is 10.3-11.9); sensilla flagelliform with distal 2/3 branched. Legs. Coxae unisetose; specialized leg setae as follows: leg I with 3 genualae, microgenuala, 2 tibialae, microtibiala, tarsala 19-20 long, microtarsala, subterminala, parasubterminala, pretarsala; leg II with genuala, 2 tibialae, tarsala 14 long, microtarsala, pretarsala; leg III with genuala, tibiala, and nude mastitarsala. Gnathocoxa, leg coxae, and posterior part of scutum with cuticular striations. Standard measurements are given in Table 1.

Table 1. Standard measurements of *Blankaartia acuscutellaris* from Hungary (N = 5).

| | AW | PW | SB | ASB | PSB | SD | P-PL | AP | AM | AL | PL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Minimum | 82 | 87 | 40 | 30 | 41 | 71 | 31 | 27 | 59 | 32 | 74 |
| Maximum | 87 | 90 | 41 | 36 | 47 | 83 | 35 | 34 | 70 | 45 | 85 |
| Mean | 85 | 88 | 40 | 32 | 44 | 76 | 33 | 30 | 63 | 39 | 80 |

| S | H | D | DS | VS | NDV | pa | pm | pp | Ip | TaIII | TaW |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 77 | 83 | 52-68 | 28 | 12 | 40 | 355 | 326 | 380 | 1060 | 95 | 21 |
| 85 | 94 | 63-90 | 28 | 16 | 44 | 387 | 367 | 421 | 1170 | 103 | 23 |
| 81 | 87 | 58-78 | 28 | 14 | 42 | 374 | 353 | 408 | 1135 | 99 | 22 |

All above morphological characters agree with numerous previously published redescriptions of *B. acuscutellaris* which were based partly on the specimens from *terra typica* or adjacent countries. The most recent redescription is that by STAN FERNANDES & KULKARNI (2003). Besides *B. acuscutellaris*, one other species of the genus *Blankaartia* OUDEMANS, 1911, *B. rageaui* TAUFFLIEB ET MOUCHET, 1959, has been recorded in Europe (KOLEBINOVA, 1992). This species clearly differs from *B. acuscutellaris* in having gigantic solenidion I ($S_1$ = 63), branched galeala, very long setae (PL and H > 100), and in other characters.

The quantitative characters of our material are in good agreement with those in the collections from Kazakhstan, Moldova, and Azerbaijan, but differ from the measurements of the specimens from Sumatra (*terra typica*), Malaya, and China given by different authors (KUDRYASHOVA, 1983). Scutum and lenghs of some setae are larger in our specimens. So, AW, PW, SB, AP, AM, and H are larger in 5 measured specimens from Lake Velence than in 5 specimens from Malaya and one from Sumatra at the p-level of 0.01 (AW 72-76, PW 76-83, SB 30-32) or 0.05 (AP 25-28, AM 52-57, H 72-78). Also AW, PW, SB, SD, and AM are larger in our material than in 3 specimens from China at the p-level of 0.05. On the other hand, only two measurements are significantly larger ($p < 0.05$) in our material as compared with 3 specimens from Maldive

Islands, SB (40-41 versus 32-34) and AM (59-70 versus 57). All above differences should probably be considered as a geographic variation.

Most of authors give the formula 6-6-6-4-2 for the arrangement of dorsal idiosomal setae in this species. A difference with our formula (6-6-6-4-4) is caused obviously by the considering of two lateral setae in the caudal region of idiosoma as ventral. Differences in the number and arrangement of ventral idiosomal setae, for example, VS = 20 by STAN FERNANDES & KULKARNI (2003), 16-20 by KUDRYASHOVA (1983), and 12-16 according to our data, may be explained by individual and geographic variation.

The Velencefürdő settlement is located near the southeastern margin of the northeastern part of the Lake Velence. This is the third largest natural lake in Hungary (24 $km^2$, 47°10'N 18°32'E) and a popular summer health resort. Reeds are the most important plant association of the lake. The reedbeds cover approximately 40% of it, forming an extensive area on the western part of the lake, together with a number of natural islands of various sizes on the central and eastern part. The bird fauna of Lake Velence consists of 32 species (BÁLDI & KISBENEDEK, 2000), including those which were recorded previously as hosts of *B. acuscutellaris*, namely the little bittern *Ixobrychus minutus* (LINNAEUS, 1766), purple heron *Ardea purpurea* (LINNAEUS, 1766), ruff *Philomachus pugnax* (LINNAEUS, 1758), and the starling *Sturnus vulgaris* LINNAEUS, 1758 (KUDRYASHOVA, 1983). All these species excluding the last one are associated with the reedbeds. Thus, the reed patches surrounding Lake Velence can serve as habitats for the free living postlarval *B. acuscutellaris* instars and can be the place where its parasitic larvae may attack the bird hosts, as well as less usual mammal hosts, including humans.

The chigger mite fauna of Hungary is studied rather weakly. The presence of *Leptotrombidium russicum* (OUDEMANS, 1902) in this country, which was reported in older literature (WHARTON & FULLER, 1952), later has been verified by BERON (1965). Moreover, HAITLINGER (1979) found 5 chigger species parasitizing small mammals in Hungary, including *Neotrombicula autumnalis*, and KOVAČIK (1982) revealed 3 additional species. Thus, *B. acuscutellaris* is the 10$^{th}$ chigger species recorded in Hungary.

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