© Arachnologische Gesellschaft e.V. Frankfurt/Main; http://arages.de/

Arachnologische Mitteilungen / Arachnology Letters 53: 12-18 Karlsruhe, April 2017

Aliens in Europe: updates on the distributions of *Modisimus culicinus* and *Micropholcus fauroti* (Araneae, Pholcidae)

Bernhard A. Huber, Jonathan Neumann, Arno Grabolle & Vladimír Hula

doi: 10.5431/aramit5303

Abstract. The pholcid spiders *Modisimus culicinus* (Simon, 1893) and *Micropholcus fauroti* (Simon, 1887) are pantropical species that have spread around the world at least several decades ago. Here we present numerous new records for both species, most of which fall into the expected latitudes, i.e. between the Tropics of Cancer and Capricorn (93 % and 87 % of records respectively). However, we also report the first records for *M. culicinus* from Central Europe (Germany and Czech Republic, >50°N) and the first European record for *M. fauroti* from outside of Belgium (Germany). The fact that in both species several specimens have been found at more than one locality suggests that they may already be in the stage of establishment and spreading in Europe. Finally, we present an updated identification key to the genera of Pholcidae in Europe.

Key words: alien, harmless, invasive, pantropical, synanthropic

Zusammenfassung. Aliens in Europa: Zur Verbreitung der Zitterspinnenarten *Modisimus culicinus* und *Micropholcus fauroti* (Araneae, Pholcidae). Die Zitterspinnen *Modisimus culicinus* (Simon, 1893) und *Micropholcus fauroti* (Simon, 1887) sind pantropisch verbreitet und haben sich vermutlich bereits seit Jahrzehnten rund um den Globus etabliert. Wir dokumentieren zahlreiche neue Fundorte für beide Arten, die meisten davon innerhalb der erwarteten Breitengrade, d.h. zwischen dem nördlichen und südlichen Wendekreis (93 bzw. 87 % aller Fundorte). Darüber hinaus dokumentiert diese Arbeit den Erstnachweis von *M. culicinus* für Europa (Deutschland und Tschechische Republik, >50°N) sowie den ersten Europäischen Nachweis von *M. fauroti* außerhalb von Belgien (Deutschland). Die Tatsache, dass von beiden Arten mehrere Individuen an mehr als einem Standort gefunden wurden legt nahe, dass sich beide Arten in Europa bereits in einer Phase der Etablierung und Verbreitung befinden. Zusätzlich wird in dieser Arbeit ein aktualisierter Bestimmungsschlüssel zu den Gattungen der Zitterspinnen in Europa vorgestellt.

Even though invasion biology may suffer from blurry definitions of some of its key terms (Courchamp et al. 2017), there is a wide consensus that invasive alien species (i.e. introduced species with negative biodiversity, social or economic impact) are a major cause of extinction and that they impose enormous costs on agriculture, forestry, fisheries, and human health (Clavero & García-Berthou 2005, Wittenberg & Cock 2001). The causes are manifold, but a study on the impact of various socioeconomic, ecological, and biogeographical variables on the number of invasive alien species identified merchandise import as the most important explanatory variable (Westphal et al. 2008). Given the tremendous increase in real merchandise trade growth over the last decades (a four-fold increase in volume between 1980 and 2011, World Trade Organization 2013), the increasing interest in alien species is timely and justified.

The spider family Pholcidae currently includes some 1500 named species (with an estimated global total of about 4000-5000 species), mostly in tropical and subtropical regions (Huber 2011b, 2014, 2017). Several species in the family have spread over wide geographic areas, and circumstantial evidence suggests that human-mediated transport has been responsible for most if not all transcontinental distribution ranges (e.g., Fürst & Blandenier 1993, Huber 2011a, Huber et al. 2015). In Europe, Pholcidae are among the families with the highest numbers of introduced species, together with the much larger families Theridiidae and Salticidae (Kobelt & Nentwig 2008).

Bernhard A. HUBER, Alexander Koenig Research Museum of Zoology, Adenauerallee 160, 53113 Bonn, Germany; E-mail: b.huber@zfmk.de
Jonathan NEUMANN, Harrosteig 35, 12524 Berlin, Germany; E-mail: jonneuma@uni-potsdam.de
Arno GRABOLLE, Am Horn 13b, 99425 Weimar, Germany; E-mail: arnograbolle@gmx.de
Vladimír HULA, Department of Zoology, Faculty of AgricSciences, AF MENDELU, Zemědělská 1, Brno, CZ 613 00, Czech Republic; E-mail: hula@mendelu.cz

submitted 3.10.2016, accepted 5.1.2017, online 27.1.2017

However, none of the alien pholcid species in Europe and on other continents seem to cause or to have caused any measurable harm. Most or all seem to prefer human constructions and environments to natural habitats; they may compete against each other (e.g. Van Keer 2007), but none has been shown to replace native species; and none has been shown to harm humans directly by biting. By contrast, synanthropic pholcids could be even beneficial, e.g. by predating on mosquito vectors of dengue virus (Strickman et al. 1997), or (from a scientist's perspective) by serving as readily available model organisms for a wide range of studies (as e.g. in the case of *Pholcus phalangioides*).

Nevertheless, since the consequences of species introductions are often unexpected (and sometimes disastrous) (Wittenberg & Cock 2001), it is probably wise to report and monitor introduced species as early and closely as possible. Only this will allow a reasonable response, ranging from complete eradication to toleration and consideration of the alien species as enrichment to local biodiversity (Walther et al. 2009).

Material and methods

Specimens studied are deposited in the following institutions: AMNH, American Museum of Natural History, New York; CAS, California Academy of Sciences, San Francisco; CVH, personal collection V. Hula, Brno; FSCA, Florida State Collection of Arthropods, Gainesville; IRSB, Institut Royal des Sciences Naturelles de Belgique, Brussels; MCZ, Museum of Comparative Zoology, Cambridge; MHNG, Muséum d'histoire naturelle, Genève; MNHN, Muséum national d'Histoire naturelle, Paris; MRAC, Musée royal de l'Afrique Centrale, Tervuren; RMNH, Netherlands Centre for Biodiversity Naturalis, Leiden; SMF, Forschungsinstitut und Naturmuseum Senckenberg, Frankfurt; ZFMK, Zoologisches Forschungsmuseum Alexander Koenig, Bonn; ZMT, Museum of Zoology, Turku; ZMUC, Zoological Museum, University of Copenhagen, Copenhagen.

© Arachnologische Gesellschaft e.V. Frankfurt/Main; http://arages.de/

Locality coordinates are in round brackets when copied from labels and original publications or when received directly from collectors, in square brackets when originating from some other source (such as online gazetteers, Google Earth, etc.). The distribution maps were generated with ArcMap 10.0.

Results

***Modisimus culicinus* (Simon, 1893)** (Figs 1-3)

Selection of references with diagnostic illustrations. Gertsch & Peck 1992: figs 20-26. Huber 1997a: figs 2-4. Huber 1997b: figs 1-2. Huber 1998a: figs 7e-f. Saaristo 2001: figs 56-60. Tong & Li 2009: figs 13-15, 54-59.

Diagnosis. Small (body length ~1.5 mm) six-eyed pholcid with all eyes close together, globose abdomen, short legs (male leg 1 ~6-8 mm), carapace with median furrow and three pairs of distinctive marks (Figs 1-2).

Natural history. Most records of *M. culicinus* are from buildings where these spiders occupy sheltered spaces near the floor. They build simple irregular webs in which they hang, but when disturbed they do not vibrate but swiftly run away (Huber 1997a). Some aspects of the reproductive biology of this species were published in Huber (1997a, 1997b, 1998a), including details of genital mechanics and evidence for gustatorial courtship.

Distribution. *Modisimus culicinus* originated from the Neotropics (probably Central America or the Caribbean) but is now a pantropical spider, with most records from between the Tropics of Cancer and Capricorn (23.4°N and 23.4°S). The only exceptions so far are the Florida and Massachusetts records in Gertsch & Peck (1992) and the new records below from Czech Republic and Germany (Figs 3, 9). The species is here newly recorded for several countries and overseas municipalities and territories: Cuba, Ecuador, Brazil, Curaçao, Aruba, St. Kitts & Nevis, Saba Island, Germany, Czech Republic, Ascension Island, Angola, Mozambique, Madagascar, Malaysia, Singapore and the Philippines.

New records (all examined by BAH; arranged from West to East). ECUADOR, Galapagos Islands, Isla Floreana [1.276°S, 90.485°W], above "Las Palmas", 21-22.iv.1970 (R. Silberglied), 1♀, MCZ. COSTA RICA, Limón Province, Cahuita, Alby Lodge area (9.735°N, 82.840°W), 20 m a.s.l., 9.viii.2006 (B.A. Huber), 1♀, ZFMK (Ar 15815). CUBA, Camagüey, Sierra de Cubitas, Estación Limones-Tuabaquey, on walls of building (21.591°N, 77.788°W), 100 m a.s.l., 12.iv.2012 (B.A. Huber), 2♂♂ 1♀ 1 juv., ZFMK (Ar 16135). ECUADOR, Napo, 20 km E Puerto Napo, Alinahui (1.000°S, 77.417°W), 450 m a.s.l., i.1994 (V.D. & B. Roth), 2♀♀, CAS. ARUBA, [Arikok National Park, Guadirikiri

Figs 1-2: *Modisimus culicinus* (Simon), females with egg-sacs from Germany and Malaysia (photos BAH)

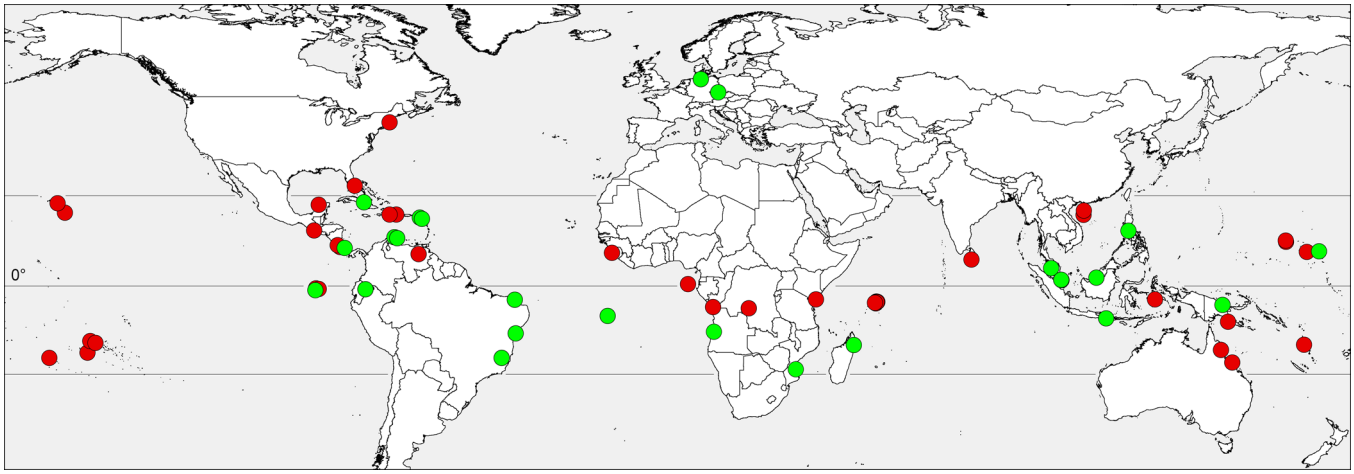


Fig. 3: Known distribution of *Modisimus culicinus* (Simon, 1893). Red [printed: dark grey]: previously published records. Green [printed: light grey]: new records. Latitudes shown: Tropic of Cancer, Equator and Tropic of Capricorn. Sources of previously published records: Beatty et al. (2008), Gertsch & Peck (1992), Huber (1997a, 1998b, 2001), Huber & Benjamin (2005), Huber et al. (2010, 2014), Huber & Kwapong (2013), Huber & Warui (2012), Lessert (1938), Saaristo (2001), Simon (1893), Tong & Li (2009)

© Arachnologische Gesellschaft e.V. Frankfurt/Main; http://arages.de/

Caves], Tunnel of Love [12.482°N, 69.899°W], 12.ii.1985 (P. Strinati, V. Aellen), 2♀♀, MHNG. CURAÇAO, Santa Martha Bay [12.268°N, 69.127°W], 5.vii.1962 (B. Hazlett), 1♂ 1♀, AMNH. NETHERLANDS ANTILLES, Saba Island, Giles Quarter Trail (17.614°N, 63.240°W), sea level, 12.iii.2008 (J. Slowik), 1♂ 1♀, FSCA. SAINT KITTS AND NEVIS, St. Kitts [17.30°N, 62.72°W], 14-22.ix.1966 (A.M. Chickering), 1♂, AMNH. BRAZIL, Bahia, Mata de São João, building (12.462°S, 38.258°W), ~100 m a.s.l., 8.x.2011 (B.A. Huber, A. Pérez-G., M. Alves Dias), 1♀, ZFMK (Ar 16137). Ceará, Fortaleza [3.736°S, 38.527°W], 5.ii.1959 (A.M. Nadler), 1♂ 4♀♀ 1 juv., AMNH. Minas Gerais, Governador Valadares [18.85°S, 41.96°W], roadside, under boards, rocks, 15.x.1981 (L.N. Sorkin, F. Cunha Castanheira), 1♀, AMNH. SAINT HELENA, ASCENSION AND TRISTAN DA CUNHA, Ascension Island [7.94°S, 14.37°W], crater, lava lake, ii.1990 (P. Ashmole), 1♂ 1♀, collection J. Murphy (21816). GERMANY, Hamburg, Zoo Hagenbeck (53.595°N, 9.941°E), 1.iv.2016 (J. Neumann), 1♀ in abs. ethanol, ZFMK (G139). CZECH REPUBLIC, Bohemia, Prague, Zoo, Pavilion Chambal, *Gavialis gangeticus* exposition (50.116°N, 14.408°E), 2.i.2016 (V. Pešan, V. Hula), 2♂♂, ZFMK (Ar 16138); same locality, 3♀♀, 12.viii.2016 and 1♂, 26.ix.2016 (V. Hula), CVH. ANGOLA, Lobito [~12.38°S, 13.56°E], karstic hills, under stones, 30.xii.1948 (A. de Barros Machado, ANG 1264.11), 1♀, SMF. MOZAMBIQUE, Vilankulos, Casa Chibububo (22.021°S, 35.321°E), leaf litter, coastal bush, 12.xii.2007 (C. Haddad, R. Lyle, R. Fourie), 2♂♂ 1♀ 2 juvs, ZFMK (Ar 5238). MADAGASCAR, Analanjirofo Region, Maroantsetra [15.44°S, 49.74°E], in house, vii.1947 (J. Millot), 1♀, MNHN. MALAYSIA, Johor, Johor Bahru, in building (1.470°N, 103.758°E), 16.ii.2015 (B.A. Huber), 1♀ in abs. ethanol, ZFMK (Mal236). Perak, Gunung Lanno [4.52°N, 101.145°E], Gua Selari, 13.xi.2001 (H. Steiner), 1♀, MHNG. SINGAPORE, Upper Selatar Reservoir Park (1.399°N, 103.807°E), 20 m a.s.l., on building, 15.ii.2015 (B.A. Huber, D. Court), 1♂ 1♀, ZFMK (Ar 16140). INDONESIA, Bali, "Uluwatu, Goa Lawah" [8.55°S, 115.47°E?], 7.ii.1988 (V. Aellen, P. Strinati), 1♀, MHNG. PHILIPPINES, Luzon Island, Laguna Province, UP Los Baños campus, 2.5 km ESE Los Baños (14.153°N, 121.234°E), 140 m a.s.l., 26-27.v.2011 (H. Wood et al.), 1♂ in abs. ethanol, CAS (9045404). PAPUA NEW GUINEA, Madang, Baiteta [5.017°S, 145.75°E], "canopy mission, AR26", no further data, 1♂, IRSB. MARSHALL ISLANDS, Maloelap Atoll, Kaven Island [8.898°N, 170.841°E], litter, old thatch, 22.ii.1969 (Sabath), 1♂ 1♀, MCZ (76625). Unidentified locality: "New Guinea, Kurivo", 5.x.1973 (J. Nieminen), 2♂♂, ZMT (AA 3477).

***Micropholcus fauroti* (Simon, 1887)** (Figs 4-8)

Selection of references with diagnostic illustrations. Millot 1946: figs 2a-b. Deeleman-Reinhold & Prinsen 1987: figs 1-9. Irie 2000: figs 1-4. Saaristo 2001: figs 7-15. Huber 2011a: figs 30-31, 48-49, 83-89.

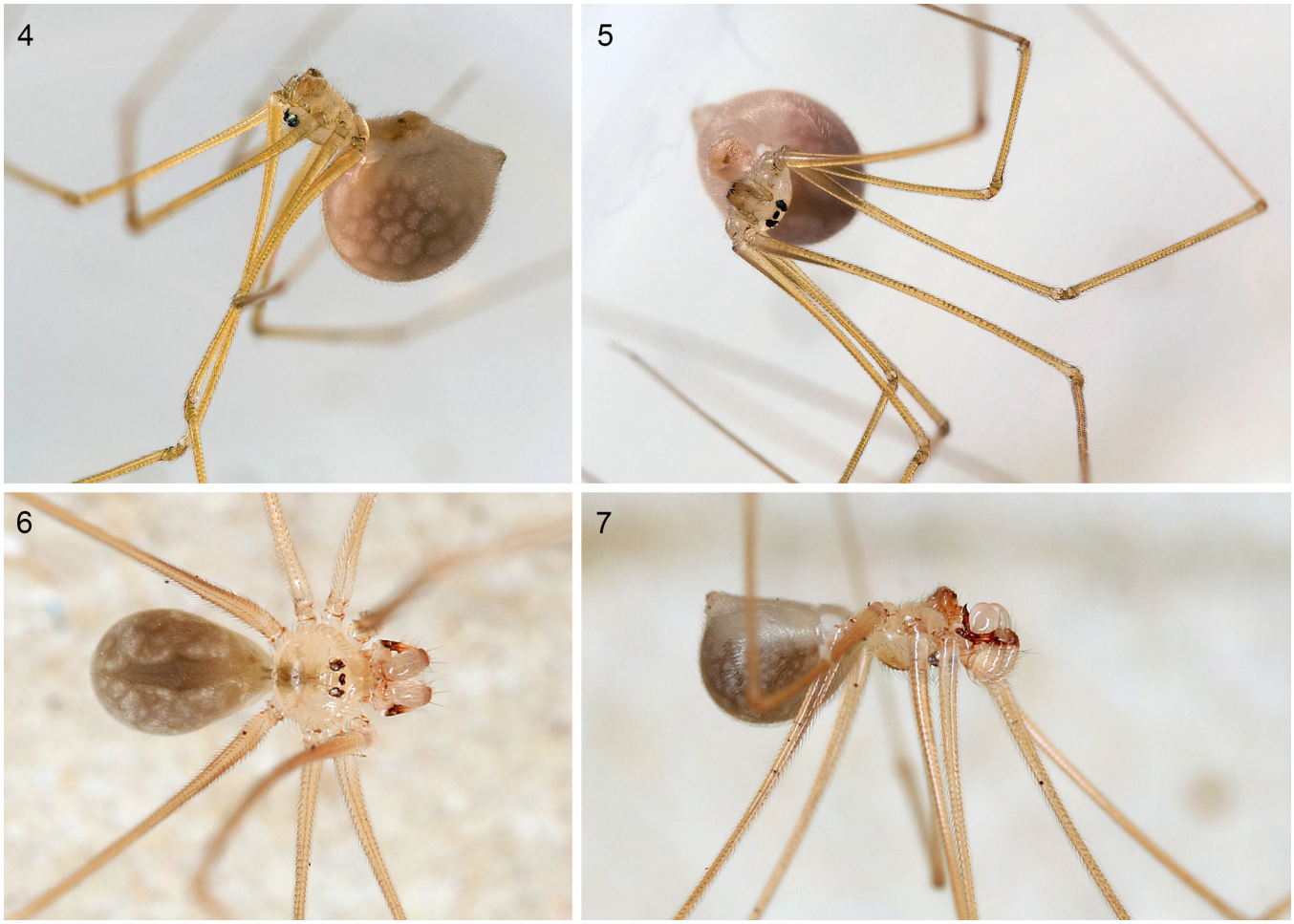
Diagnosis. Small (body length ~2-3 mm) pale pholcid with eight-eyes, globose abdomen, long legs (male leg 1 ~25 mm), male paracymbium ('procursus') with long dorsal process (Fig. 7), female internal genitalia with internal dark median structure visible through cuticle (Figs 4-5).

Natural history. Most records of *M. fauroti* are from buildings where these spiders build very flimsy webs in corners between walls and between the wall and ceiling. During the day, their bodies are tightly pressed against the substrate, with the prolateral sides of the flexed legs touching the wall. It seems that the biology of this widespread species has never been studied in any detail.

Distribution. *Micropholcus fauroti* is a pantropical spider, with most records from between 25°S and 31°N. The only exceptions so far are some Belgian records (Van Keer & Van Keer 2001, 2004, Van Keer 2007) and the new record below from Germany (Figs 8, 9). The species is here newly recorded for several countries: Germany, Angola, Egypt, Tanzania, United Arab Emirates, Yemen, Mauritius and Taiwan.

New records (all examined by BAH; arranged from West to East). CUBA, Guantanamo, Baracoa (20.358°N, 74.505°W), 25 m a.s.l., in building, 5.iv.2012 (B.A. Huber), 1♂ 5♀♀, ZFMK (Ar 16141). PUERTO RICO, Cayey [18.11°N, 66.17°W], 28.xii.1985 (V. & B. Roth), 3♂♂ 1♀, CAS (9027284). BRAZIL, Acre, Rio Branco, in building (9.973°S, 67.811°W), 155 m a.s.l., 26.x.2016 (B.A. Huber, L.S. Carvalho), 1♂, ZFMK (Ar 17103). Acre, Cruzeiro do Sul, Residencial Samaúma, in building [7.63°S, 72.67°W, 195 m a.s.l.], 6.ix.2016 (E.O. Machado), 1♂ 1♀, ZFMK (Ar 17104). Amazonas, Santarem, in building (2.425°S, 54.787°W), 60 m a.s.l., 18.x.2016 (B.A. Huber, L.S. Carvalho), 1♀, ZFMK (Ar 17102). Pará, Marabá, in building (5.37°S, 49.13°W), 100 m a.s.l., 7.x.2016 (B.A. Huber, L.S. Carvalho), 1♂, ZFMK (Ar 17100). Amapá, Macapá, in building (0.02°N, 51.07°W), 20 m a.s.l., 13.x.2016 (B.A. Huber, L.S. Carvalho) 1♂, ZFMK (Ar 17101). Rio Grande do Norte, Apodi (5.66°S, 37.80°W), 80 m a.s.l., in building, 8.vi.2015 (B.A. Huber, L.S. Carvalho), 2♂♂, ZFMK (Ar 17098-99). GERMANY, Hamburg, Zoo Hagenbeck (53.595°N, 9.941°E), Tropenhaus, 30.i.2015 (A. Grabolle), 1♀ 1 juv. in abs. ethanol, ZFMK (G141); same locality, 1.iv.2016 (J. Neumann), 2♂♂ 4♀♀, ZFMK (2♂♂ 2♀♀ in 80 % ethanol: Ar 16142, 2♀♀ in abs. ethanol: G140). ANGOLA, Malanje Province, Tala Mungongo [9.72°S, 17.23°E], iii.1949 (A. de Barros Machado, ANG 1414.13), 1♀, SMF. EGYPT, Cairo [~30.0°N, 31.2°E] and Alexandria [~31.2°N, 29.9°E], no further data, 3♂♂ 2♀♀, MNHN (AR 10191) (E. Simon collection # 5929 and 5989). UGANDA, locality not specified ("compound house"), 1994 (D. Penney), 1♀, MRAC (219545). TANZANIA, Kigamboni [6.825°S, 39.315°E], 30.v.1952 (Kuipper), 2♂♂ 5♀♀, SMF. Zanzibar [~6.1°S, 39.3°E], no further data, 1♂, MNHN (AR 10190) (E. Simon collection # 3808). YEMEN, Aden [~12.85°N, 45.0°E], [1889, E. Simon], 2♂♂ 3♀♀, MNHN (AR 10196) (E. Simon collection # 10745). "Al Kawd x Ja'ar" [~13.15°N, 45.33°E], 16.i.2001 (A. van Harten), 1♀, ZFMK (Ar 5176). UNITED ARAB EMIRATES, Sharjah (25.35°N, 55.40°E), in house, 29.xi.2004 (F. van Harten), 1♂, ZFMK (Ar 16143). MAURITIUS, Grand Baie [20.014°S, 57.585°E], vi.2008 (S. Huber), 1♂, ZFMK (Ar 16144). INDIA, "Poona et Koukan" [=Pune, 18.5°N, 73.85°E], no further data, 1♂, MNHN (AR 10207) (E. Simon collection # 18686). MALAYSIA, Pulau Pinang, Penang, Teluk Bahang (5.458°N, 100.215°E), 10 m a.s.l., in house, 28.ii.2015 (B.A. Huber), 1♂, ZFMK (Ar 16145). THAILAND, Narathiwat, Hala Bala Wildlife Sanctuary (5.800°N, 101.832°E), in house 140 m a.s.l., 2.iii.2015 (B.A. Huber, B. Petcharad), 1♂ 1♀, ZFMK (Ar 16146). Bangkok [~13.75°N, 100.5°E], 1908 (Collin de Plancy), 2♀♀ 1 juv., MNHN; same locality, 22.i.2013 (H.

© Arachnologische Gesellschaft e.V. Frankfurt/Main; http://arages.de/



Figs 4-7: *Micropholcus fauroti* (Simon), female from Germany, Hamburg (photos AG) and male from Brazil, Macapá (photos BAH)

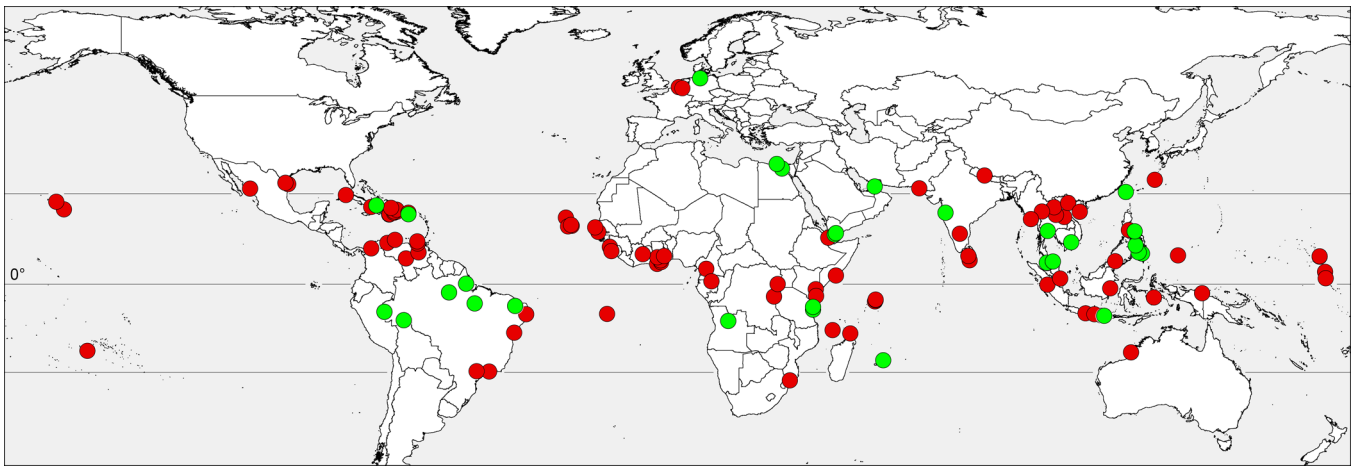


Fig. 8: Known distribution of *Micropholcus fauroti* (Simon, 1887). Red [printed: dark grey]: previously published records. Green [printed: light grey]: new records. Latitudes shown: Tropic of Cancer, Equator and Tropic of Capricorn. Sources of previously published records: Araujo et al. (2005), Beatty et al. (2008), Brazil et al. (2005), Colmenares (2008), Deeleman-Reinhold & Prinsen (1987), Gertsch & Davis (1942), Gertsch & Mulaik (1940), González-Sponga (2004), Huber (2011a), Huber & Kwapong (2013), Huber et al. (2014), Irie (2000), Mello-Leitão (1929), Millot (1941, 1946), Penney (1996), Pérez González (1995), Petrunkevitch (1929), Saaristo (2001), Simon (1887), Song et al. (1999), Thorell (1895), Van Keer (2007), Van Keer & Van Keer (2001, 2004)

Vanuytven), 1♀ 1 juv., ZFMK (Ar 16147). VIETNAM, Ho Chi Minh City [~10.8°N, 106.65°E], no further data, 1♂ 2♀♀, MNHN (AR 10194) (E. Simon collection # 11173). INDONESIA, Bali, Sanur (8.673°S, 115.260°E), 8 m a.s.l., "litter in urban ruderat", 7.vii.2014 (J. Pedersen, A. Schomann), 2♂♂, ZMUC. TAIWAN, Nantou, Lienhuachih (23.918°N, 120.884°E), in building, 700 m a.s.l., 20.vi.2013 (B.A. Huber), 1♂ 1♀ in abs. ethanol, ZFMK (Tai71). PHILIPPINES, Mindanao, Bukidnon Province, Central Mindanao Univ. (7.859°N, 125.051°E), 350 m a.s.l., in building, 10.ii.2014 (B.A. Huber, E. Mondejar), 1♀, ZFMK (Ar 16149). Mindanao, Misamis Occidental Province, Iligan (8.187°N, 124.166°E), 5 m a.s.l., in building, 16.ii.2014 (B.A. Huber), 3♀♀, ZFMK (Ar 16150). Cebu, Moalboal, Panagsama Beach

© Arachnologische Gesellschaft e.V. Frankfurt/Main; http://arages.de/

(9.944°N, 123.368°E), 24/31.iii.2014 (S. Huber), 1♂ 2♀♀, ZFMK (Ar 16151-52). Luzon, Camarines Sur Prov., Naga (13.624°N, 123.188°E), 10 m a.s.l., in building, 23.ii.2014 (B.A. Huber), 2♂♂ 2♀♀ 1 juv., ZFMK (Ar 16153); same data, 1♂ 2♀♀ in abs. ethanol, ZFMK (Phi228).

Updated key to the genera of Pholcidae in Europe

The following key uses the concept of "Europe" in Spiders of Europe (Nentwig et al. 2017), i.e. excluding the Canary Islands and other Atlantic islands close to Africa but including the Asian part of Turkey, Cyprus and the Caucasus states.

1 Six eyes (anterior median eyes absent) 2
- Eight eyes. 4
2 Carapace with median furrow, eye triads on median turret, very high in males . . . . . ***Modisimus***
[Only the introduced *M. culicinus* (Simon, 1893)]
- Carapace without median furrow; eye triads on very low humps 3
3 Male paracymbium ('procursus') with ventral flap; posterior epigynal plate without pockets . . . . . ***Spermophora***
[The Mediterranean *S. senoculata* (Dugès, 1836) and the introduced *S. kerinci* Huber, 2005]
- Male paracymbium ('procursus') without ventral flap; posterior epigynal plate with pair of pockets . . . . . ***Spermophorides***
[Eight nominal species, Mediterranean]
4 Carapace evenly domed, without median furrow or pit 5
- Carapace with median furrow or pit 7
5 Large species (body length >4 mm) with cylindrical abdomen . . . . . ***Pholcus***
[Eleven species, mostly eastern and south-eastern Europe]
- Small species (body length ≤3 mm) with short abdomen (about at high as long) 6
6 Procursus with long dorsal process (Fig. 7), female genitalia without external pockets, with internal semi-circular or bullet-shaped median structure visible through cuticle (Figs 4, 5) . . . . . ***Micropholcus***
[Only the introduced *M. fauroti* (Simon, 1887)]
- Procursus without dorsal process, female genitalia with pair of external pockets, without internal median structure visible through cuticle . . . . . ***Quamtana***
[Two undescribed introduced species, Huber et al. 2015]
7 Small species (body length 3 mm), carapace with median furrow . . . . . ***Psilochorus***
[Only the introduced *P. simoni* (Berland, 1911)]
- Larger (body length 5-10 mm), carapace with median pit 8
8 Abdomen higher than long . . . . . ***Artema***
[The introduced *A. atlanta* Walckenaer, 1837 and an eastern Mediterranean unnamed species]
- Abdomen longer than high 9
9 Legs with many small black spots/lines 10
- Legs without small black spots/lines 11
10 Abdomen pointed dorso-posteriorly, male chelicerae with two pairs of frontal apophyses . . . . . ***Crossopriza***
[Only the introduced *C. lyoni* (Blackwall, 1867)]
- Abdomen rounded dorso-posteriorly, male chelicerae with single pair of frontal apophyses . . . . . ***Holocnemus***
[*H. pluchei* (Scopoli, 1763), *H. hispanicus* Wiehle, 1933 and *H. caudatus* (Dufour, 1820)]
11 Male chelicerae frontally with many modified (club-shaped) hairs . . . . . ***Stygopholcus***
[*S. absoloni* (Kulczyński, 1914), *S. photophilus* Senglet, 1971, *S. skotophilus* Kratochvíl, 1940]

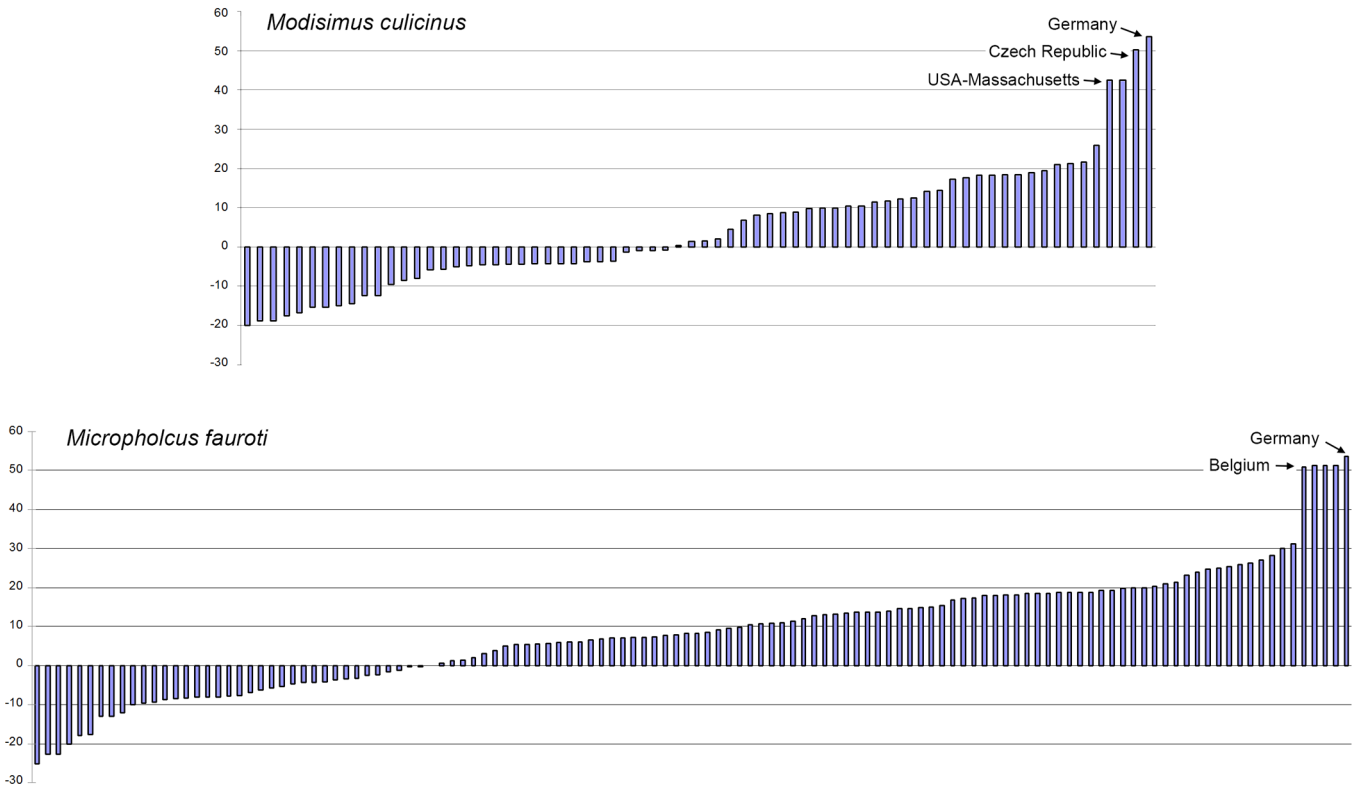


Fig. 9. Latitudes of all records of *Modisimus culicinus* and *Micropholcus fauroti*. Only 'outliers' are labeled.

© Arachnologische Gesellschaft e.V. Frankfurt/Main; http://arages.de/

- Male chelicerae frontally with apophyses provided with 1-3 modified hairs each 12
12 Male femora 1 with ventral spines, epigynum roughly triangular . . . . . ***Hoplopholcus***
[Eight nominal species, mainly Greece and Turkey]
- Male femora 1 without spines, epigynum roughly rectangular . . . . . ***Smeringopus***
[The originally African *S. pallidus* (Blackwall, 1858) has not established in Europe (contra Nentwig 2015). The two known European records (Hasselt 1885, Boettger 1929) may or may not denote this species, and no record has been published since 1929. It is included here because it is pantropical and has reached countries such as Chile, USA and Australia].

Acknowledgements
For the loan or donation of specimens BAH thanks Julia Altmann, Léon Baert, Christa L. Deeleman-Reinhold, Charles E. Griswold, Charles Haddad, Siegfried Huber, Rudy Jocqué, Laura Leibensperger, Norman I. Platnick, Christine Rollard, the late Michael Saaristo, Peter Schwendinger, Jozef Slowik, Lou Sorkin, Antonius van Harten and Herman Vanuytven. Many thanks also to the Prague Zoo for allowing the collection of spiders, and to Koen Van Keer, Theo Blick and an anonymous reviewer for valuable comments on a previous version of the manuscript.

References

Araujo D, Brescovit AD, Rheims CA & Cella DM 2005 Chromosomal data of two pholcids (Araneae, Haplogynae): a new diploid number and the first cytogenetical record for the New World clade. – Journal of Arachnology 33: 591-596 – doi: 10.1636/04-105.1

Beatty JA, Berry JW, Huber BA 2008 The pholcid spiders of Micronesia and Polynesia (Araneae, Pholcidae). – Journal of Arachnology 36: 1-25 – doi: 10.1636/H05-66.1

Boettger CR 1929 Eingeschleppte Tiere in Berliner Gewächshäusern. – Zeitschrift für Morphologie und Ökologie der Tiere 15: 674-705 - doi: 10.1007/BF00407387

Brazil TK, Almeida-Silva LM, Pinto-Leite CM, Lira-da-Silva RM, Lima Peres MC & Brescovit AD 2005 Aranhas sinantrópicas em três bairros da cidade de Salvador, Bahia, Brasil (Arachnida, Araneae). – Biota Neotropica 5(1a): [163-169 = a13: 1-7] – doi: 10.1590/S1676-06032005000200014

Clavero M & García-Berthou E 2005 Invasive species are a leading cause of animal extinctions. – Trends in Ecology and Evolution 20: 110 – doi: 10.1016/j.tree.2005.01.003

Colmenares GPA 2008 Tres nuevos registros para la araneofauna Venezolana (Arachnida, Araneae, Pholcidae). – Boletín del Centro de Investigaciones Biológicas, Universidad del Zulia 42: 85-92

Courchamp F, Fournier A, Bellard C, Bertelsmeier C, Bonnaud E, Jeschke JM & Russell JC 2017 Invasion biology: specific problems and possible solutions. – Trends in Ecology and Evolution 32: 13-22 – doi: 10.1016/j.tree.2016.11.001

Deeleman-Reinhold CL & Prinsen JD 1987 *Micropholcus fauroti* (Simon) n. comb., a pantropical, synanthropic spider (Araneae: Pholcidae). – Entomologische Berichten, Amsterdam 47: 73-77

Fürst P-A & Blandenier G 1993 *Psilochorus simoni* (Berland, 1911) (Araneae, Pholcidae): Découvertes de nouvelles stations suisses et discussion de son écologie. – Bulletin de la Société neuchâteloise des sciences naturelles 116: 75-85 – doi: 10.5169/seals-89369

Gertsch WJ & Davis IL 1942 Report on a collection of spiders from Mexico, IV. – American Museum Novitates 1158: 1-19

Gertsch WJ & Mulaik S 1940 The spiders of Texas, I. – Bulletin of the American Museum of Natural History 77: 307-340

Gertsch WJ & Peck SB 1992 The pholcid spiders of the Galápagos Islands, Ecuador (Araneae: Pholcidae). – Canadian Journal of Zoology 70: 1185-1199 – doi: 10.1139/z92-166

González-Sponga MA 2004 Arácnidos de Venezuela. Un nuevo género y nuevas especies de la familia Pholcidae (Araneae). – Aula y Ambiente 8: 63-76

Hasselt AWM van 1885 Catalogus Aranearum hucusque in Hollandia inventarum. – Tijdschrift voor Entomologie 28: 113-188

Huber BA 1997a On the distinction between *Modisimus* and *Hedypsilus* (Araneae, Pholcidae), with notes on behavior and natural history. – Zoologica Scripta 25: 233-240 – doi: 10.1111/j.1463-6409.1996.tb00164.x

Huber BA 1997b Evidence for gustatorial courtship in a haplogyne spider (*Hedypsilus culicinus*: Pholcidae: Araneae). – Netherlands Journal of Zoology 47: 95-98 – doi: 10.1163/156854297X00265

Huber BA 1998a Genital mechanics in some neotropical pholcid spiders (Araneae: Pholcidae), with implications for systematics. – Journal of Zoology, London 244: 587-599 – doi: 10.1111/j.1469-7998.1998.tb00063.x

Huber BA 1998b The pholcid spiders of Costa Rica (Araneae: Pholcidae). – Revista de Biología Tropical 45: 1583-1634

Huber BA 2001 The pholcids of Australia (Araneae; Pholcidae): Taxonomy, biogeography, and relationships. – Bulletin of the American Museum of Natural History 260: 1-144 – doi: 10.1206/0003-0090(2001)260%3C0001:TPOAAP%3E2.0.CO;2

Huber BA 2011a Revision and cladistic analysis of *Pholcus* and closely related taxa (Araneae, Pholcidae). – Bonner zoologische Monographien 58: 1-509

Huber BA 2011b Phylogeny and classification of Pholcidae (Araneae): an update. – Journal of Arachnology 39: 211-222 – doi: 10.1636/CA10-57.1

Huber BA 2014 Progress and prospects in taxonomy: what is our goal and are we ever going to reach it? – Journal of Arachnology 42: 142-147 – doi: 10.1636/CK13-69.1

Huber BA 2017 Pholcidae – the longest legs in the web. – Internet: http://www.pholcidae.de (3 Jan. 2017)

Huber BA & Benjamin S 2005 The pholcid spiders from Sri Lanka: redescription of *Pholcus ceylonicus* and description of *Wanniyala* new genus (Araneae: Pholcidae). – Journal of Natural History 39: 3305-3319 – doi: 10.1080/00222930500145123

Huber BA, Fischer N & Astrin JJ 2010 High level of endemism in Haiti's last remaining forests: a revision of *Modisimus* (Araneae: Pholcidae) on Hispaniola, using morphology and molecules. – Zoological Journal of the Linnean Society 158: 244-299 – doi: 10.1111/j.1096-3642.2009.00559.x

Huber BA & Kwapong P 2013 West African pholcid spiders: an overview, with descriptions of five new species (Araneae, Pholcidae). – European Journal of Taxonomy 59: 1-44 – doi: 10.5852/ejt.2013.59

Huber BA, Le Gall P & Mavoungou JF 2014 Pholcid spiders from the Lower Guinean region of Central Africa: an overview, with descriptions of seven new species (Araneae, Pholcidae). – European Journal of Taxonomy 81: 1-46 – doi: 10.5852/ejt.2014.81

Huber BA, Neumann J, Rehfeldt S, Grabolle A & Reiser N 2015 Back in Europe: *Quamtana* spiders (Araneae: Pholcidae) in Germany. – Arachnologische Mitteilungen 50: 51-56 – doi: 10.5431/aramit5007

Huber BA & Warui CM 2012 East African pholcid spiders: an overview, with descriptions of eight new species (Araneae, Pholcidae). – European Journal of Taxonomy 29: 1-44 – doi: 10.5852/ejt.2012.29

Irie T 2000 A newly recorded spider from Japan, *Micropholcus fauroti* (Simon 1887) (Araneae: Pholcidae). – Acta Arachnologica 49: 215-217 – doi: 10.2476/asjaa.49.215

Kobelt M & Nentwig W 2008 Alien spider introductions to Europe supported by global trade. – Diversity and Distributions 14: 273-280 – doi: 10.1111/j.1472-4642.2007.00426.x

Lessert R de 1938 Araignées du Congo Belge. – Revue de zoologie et de botanique africaines 30: 424-457

Mello-Leitão C de 1929 Aranhas de Pernambuco, colhidas por D. Bento Pickel. – Anais da Academia Brasileira de Ciências 1(2): 91-112, pl. 1-24

© Arachnologische Gesellschaft e.V. Frankfurt/Main; http://arages.de/

Millot J 1941 Les araignées de l'Afrique occidentale Francaise. Sicariides et pholcides. – Mémoires de l'académie des sciences de l'institut de France 64: 1-30

Millot J 1946 Les pholcides de Madagascar (Aranéides). – Mémoires du Muséum national d'Histoire naturelle, Nouvelle Série 22: 127-158

Nentwig W 2015 Introduction, establishment rate, pathways and impact of spiders alien to Europe. – Biological Invasions 17: 2757-2778 – doi: 10.1007/s10530-015-0912-5

Nentwig W, Blick T, Gloor D, Hänggi A & Kropf C 2017 Spiders of Europe. Version 01.2017. – Internet: http://www.araneae.unibe.ch (3 Jan. 2017)

Penney D 1996 *Micropholcus fauroti* (Simon, 1887), a new spider record for Panama. – Newsletter of the British arachnological Society 77: 11

Pérez González A 1995 Registro nuevo de una araña cosmotropical y sinantrópica para Cuba (Araneae: Pholcidae). – Cocuyo 4: 11

Petrunkevitch A 1929 The spiders of Porto Rico. – Transactions of the Connecticut Academy of Arts and Sciences 30: 1-158

Saaristo MI 2001 Pholcid spiders of the granitic Seychelles (Araneae, Pholcidae). – Phelsuma 9: 9-28

Simon E 1887 Arachnides recueillis a Obock en 1886 par M. le Dr L. Faurot. – Bulletin de la Société zoologique de France 12: 452-455

Simon E 1893 Descriptions d'espèces et de genres nouveaux de l'ordre des Araneae. – Annales de la Société entomologique de France 62: 299-330

Song D, Zhu M & Chen J 1999 The spiders of China. Hebei Science and Technology Publishing House, Shijiazhuang. 640 pp., 4 plates

Strickman D, Sithiprasasna R & Southard D 1997 Bionomics of the spider, *Crossopriza lyoni* (Araneae, Pholcidae), a predator of Dengue vectors in Thailand. – Journal of Arachnology 25: 194-201

Thorell T 1895 Descriptive catalogue of the spiders of Burma. British Museum, London. 406 pp. – doi: 10.5962/bhl.title.7163

Tong Y & Li S 2009 Six new cave-dwelling pholcid spiders (Araneae: Pholcidae) from Hainan Island, with two newly recorded genera from China. – Zootaxa 1988: 17-32 – doi: 10.15468/7arb2g

Van Keer K 2007 Exotic spiders (Araneae): Verified reports from Belgium of imported species (1976-2006) and some notes on apparent neozoan invasive species. – Nieuwsbrief van de Belgische Arachnologische Vereniging 22: 45-54

Van Keer K & Van Keer J 2001 Ingeburgerde exotische trilspinnen (Araneae: Pholcidae) in Antwerpse haven en enkele algemene bedenkingen bij spinnenmigratie. – Nieuwsbrief van de Belgische Arachnologische Vereniging 16: 81-86

Van Keer K & Van Keer J 2004 In België aangetroffen exoten (*Araneae*) uit de collectie J. Van Keer. – Nieuwsbrief van de Belgische Arachnologische Vereniging 18: 78-83

Walther GR, Roques A, Hulme PE, Sykes MT, Pyšek P, Kühn I, Zobel M, Bacher S, Botta-Dukát Z, Bugmann H, Czúcz B, Dauber J, Hickler T, Jarošík V, Kenis M, Klotz S, Minchin D, Moora M, Nentwig W, Ott J, Panov VE, Reineking B, Robinet C, Semenchenko V, Solarz W, Thuiller W, Vilà M, Vohland K & Settele J 2009 Alien species in a warmer world: risks and opportunities. – Trends in Ecology and Evolution 24: 686-693 – doi: 10.1016/j.tree.2009.06.008

Westphal MI, Browne M, MacKinnon K & Noble I 2008 The link between international trade and the global distribution of invasive alien species. – Biological Invasions 10: 391-398 – doi: 10.1007/s10530-007-9138-5

Wittenberg R & Cock MJ (eds) 2001 Invasive alien species: a toolkit of best prevention and management practices. CAB International, Wallingford, Oxon, UK. 228 pp.

World Trade Organization 2013 World Trade Report 2013. Factors shaping the future of world trade. Geneva. 333 pp.

ZOBODAT - www.zobodat.at

Zoologisch-Botanische Datenbank/Zoological-Botanical Database

Digitale Literatur/Digital Literature

Zeitschrift/Journal: Arachnologische Mitteilungen

Jahr/Year: 2017

Band/Volume: 53

Autor(en)/Author(s): Huber Bernhard A., Neumann Jonathan, Grabolle Arno, Hula Vladimir

Artikel/Article: Aliens in Europe: updates on the distributions of Modisimus culicinus and Micropholcus fauroti (Araneae, Pholcidae) 12-18