Acarologia is proudly non-profit, with no page charges and free open access

Please help us maintain this system by encouraging your institutes to subscribe to the print version of the journal and by sending us your high quality research on the Acari.

Subscriptions: Year 2023 (Volume 63): 450 €
http://www1.montpellier.inra.fr/CBGP/acarologia/subscribe.php
Previous volumes (2010-2021): 250 € / year (4 issues)
Acarologia, CBGP, CS 30016, 34988 MONTFERRIER-sur-LEZ Cedex, France
ISSN 0044-586X (print), ISSN 2107-7207 (electronic)

The digitalization of Acarologia papers prior to 2000 was supported by Agropolis Fondation under the reference ID 1500-024 through the « Investissements d’avenir » programme (Labex Agro: ANR-10-LABX-0001-01)

Acarologia is under free license and distributed under the terms of the Creative Commons-BY
Some *Tydeus* mites (Acariformes: Prostigmata: Tydeidae) of Kermanshah province, western Iran, with remarks on *Tydeus caudatus*

Maryam DARBEMAMIEH¹, Hamidreza HAJIQANBAR¹*, Mohammad KHANJANI², Dariusz J. GWIAZDOWICZ³ and Andrzej KAŻMIERSKI⁴

(Received 02 April 2016; accepted 14 June 2016; published online 21 October 2016)

¹ Department of Entomology, Faculty of Agriculture, Tarbiat Modares University, 14115-336, Tehran, Iran. darbemamieh@gmail.com; hajiqanbar@modares.ac.ir (*Corresponding author)
² Department of Plant Protection, College of Agriculture, Bu Ali-Sina University, Hamedan, Iran. mkhanjani@gmail.com
³ Department of Forest Protection, Poznań University of Life Sciences, ul. Wojska Polskiego 71c, 60-625 Poznań, Poland. dagwiazd@up.poznan.pl
⁴ Department of Animal Morphology, Faculty of Biology, Adam Mickiewicz University, Umultowska 89, 61-614 Poznań, Poland. akazmierski@tlen.pl

ABSTRACT — During a survey in Kermanshah province, western Iran, seven species of mites of the genus *Tydeus* (Acari: Prostigmata: Tydeidae) were collected from 2006 to 2013. *Tydeus helenipanoue* Kaźmierski, 1998 is recorded for the first time in Iran. *Tydeus californicus* (Banks, 1904), *T. electus* Kuznetzov 1973, *T. inclutus* Livshitz, 1973, *T. kochi* Oudemans, 1928 and *T. mississippiensis* Baker 1970 are new for the fauna of this province. Previously invalidated *T. caudatus* is herein revalidated. Several new hosts for these species have been recorded, diagnoses for *T. caudatus* and *T. helenipanoue* proposed, and an identification key is provided for all these species. A list of previously recorded mites of genus *Tydeus* from Iran until 2015 is also added.

KEYWORDS — Tydeinae; new records; taxonomy; fauna; checklist; key

INTRODUCTION

The family Tydeidae (Trombidiformes: Prostigmata) is a large and taxonomically complex family with a worldwide distribution (Krantz 1978). These species are fast moving small soft-bodied mites with color ranged from white, yellow, green and orange to black, about 0.25 - 0.5 mm in length. They live in moss, lichen, soil, litter, rotten wood, humus, mushrooms and grass, on straw and hay, on trees, under the bark and on the bark of trees, on plants leaves, in bird nests and in stored products (Khanjani and Ueckermann 2003). Tydeids are reported as plants and fungi feeders, scavengers and predators. *Tydeus californicus* has been reported by Fleschner and Arakawa (1953) and Hernandes et al. (2006) feeding on plants. As fungivorus mites, they might play an important role in decreasing the impact of plant pathogens and as scavengers they are effective in cleaning the leaf surface. As an example, the mite Orthotydeus lambi (Baker) reported to decrease the population of the fungus Uncinula necator (Schwein) in grapes by feeding on its hyphae (English-Loeb et al. 1999). Several species are found associated with insects (Treat 1970) or harmful to human and domestic animals (Kaźmierski 1998).

Linnaeus (1758) introduced first a tydeid mite in
the "Fauna suecia" as *Acarus croceus* and then he described the same species in "Systema naturae" as *Acarus salicinae rosae* (Sepasgosarian 1997). Koch (1835), 77 years later, established the genus *Tydeus* for two species *T. velox* and *T. croceus*. In the following three years, Koch (1838) described 11 additional species. Berlese (1883) described one species, and Cannestrini (1886) described four species (Sepasgosarian 1997). Meanwhile, Ashmead (1879) has described one mite species as *Acarus gloveri* in the USA, known as *T. gloveri* today. Moniez (1894) described *T. molestus* in Belgium and Kramer (1877) created the family Tydeidae.

During the first half of the 20th century, Berlese (1908, 1910) described six genera, Thor (1933) four and Oudemans (1937) one, including several related species. Grandjean (1938) and other scientists described several species too. One of the most known mite specialists, Edward W. Baker, proposed six genera and described many new species from 1943 to 1974. Kuznetzov also described many new species with Livshitz and other authors (André 1980).

André (1979) started a series of publications called "Generic revision of family Tydeidae". He introduced some new genera and ignored some well-known genera such as: *Lorryia* Oudemans, 1925 and *Paralorryia* Baker, 1965. Kaźmierski started series of publications from 1978 on tydeid mites. He rehabilitated the genera *Lorryia* and *Paralorryia*, and recognized as synonyms the genera *Homoptydeus André*, 1981, *Orthotydeus André* 1980, *Homoiothydeus* Schiess, 1981 and some other valid genera from the system of André (Kaźmierski, 1989). Kaźmierski (1998) reviewed the Tydeinae of the world based on the genera and gave a key to all species.

The aim of this study was to determine the diversity and habitats of mites of the genus *Tydeus* in the Kermanshah agricultural ecosystems, located in western Iran and to review their taxonomic status. As some Tydeidae species might be beneficial organisms, it is important to have accurate species descriptions for their correct identification (Darbemamieh et al. 2010).

### MATERIAL AND METHODS

Sampling was carried out from 2006 to 2013 on farms and in orchards of Kermanshah province, Iran. Mites were collected on leaves by two methods:

(i) placing plant, bark and branch samples into plastic zip-kip bags for stereomicroscopic examination later,

(ii) beating branches over a white plastic board (with a screen above to prevent unwanted materials and insects), and then transferring mites with a 00 paintbrush into vials containing 75 % ethanol. The soil mites were extracted with a Tullgren funnel and collected under a stereomicroscope. After clarifying in lactic acid, permanent mountings were made using Hoyer’s solution (Walter and Krantz 2009). Specimens were identified under a phase contrast microscope (Olympus BX 51). The nomenclatural-terms and setal notations of the idiosoma and appendages follow that of Kaźmierski (1998). All specimens have been collected by the senior author and are deposited at the Acarological Collection of Agricultural Faculty, Tarbiat Modares University, Tehran, Iran.

### RESULTS

**Family Tydeidae Kramer, 1877**

**Subfamily Tydeinae André, 1979 sensu Kaźmierski, 1996b**

**Genus Tydeus Koch, 1835 sensu Kaźmierski (1989)**

Collected material from Kermanshah Province:

**Tydeus californicus** (Banks, 1904)

Locality and habitat where specimens have been presently found: Songhor, Cherry leaf, 12 Oct. 2013, 34°45’58”N, 47°34’45”E, Altitude: 1663 m, 1♀ & 3 TN (Tritonymph).

**Tydeus caudatus** (Dugès, 1834) sensu Baker, 1970

Locality and habitat where specimens have been presently found:

1) Kermanshah, Sour cherry leaf, 05 Sep. 2007, 34°21’41”N, 47°56’16”E, Altitude: 1298 m, 1♀,
2) Rijab, Walnut leaf, 10 Aug. 2011, 34°24’57”N, 46°54’29”E, Altitude: 1531.5 m, 1 TN,
3) Sahne, Apple leaf, 19 Oct. 2010, 34°29’09”N, 47°41’29”E, Altitude: 1376.5 m, 1 TN,
4) Kermanshah, Soil, 30 Apr. 2011, 34°19’28”N, 47°05’56”E, Altitude: 1326 m, 1 DN,
5) Kermanshah, plum leaf, 05 Sep. 2007, 34°20’11”N, 47°05’38”E, Altitude: 1323 m, 1 TN,
6) Songhor, Cherry leaf, 12 Oct. 2013, 34°45’58”N, 47°34’45”E, Altitude: 1663 m, 2 TN.

**Figure 1:** Tydeus caudatus collected from Kermanshah orchards.

**Figure 2:** Tydeus caudatus female with eggs and prelarva inside. Spatulate setae are visible.

**Tydeus electus** Kuznetzov, 1973

Locality and habitat where specimens have been presently found:
1) Ravansar, Apple leaf, 25 Aug. 2012, 34°42’09”N, 46°39’13”E, Altitude: 1345 m, 1♀ with 4 eggs.,
2) Songhor, Soil, 05 Sep. 2012, 34°44’23”N, 47°36’24”E, Altitude: 1695 m, 1♂,
3) Kermanshah, Soil, 02 Oct. 2011, 34°21’43”N, 47°06’19”E, H: 1299 m, 1♂,
4) Kermanshah, Soil, 26 Jul. 2011, 34°19’35”N, 47°06’43”E, Altitude: 1315 m, 1 TN,
5) Rijab, Apple leaf, 08 Sep. 2011, 34°24’56”N, 46°54’38”E, Altitude: 1540 m, 1♀,

Diagnosis — This species (figure 1) has a short, slender $\omega l$ which is not 1/2 as long as tarsus width; the dorsal leg setae are slightly lanceolate and serrate; the dorsal setae of genua III and tibiae III-IV are blunt distally; the coxae may have faint reticulate patterns; there are no empodial claws. Palpi are typically elongate. Dorsal body striae are typical; the ventral hysterosomal striae are longitudinal. The propodosomal trichobothria are stout, slightly serrate and not much longer than the other dorsal body setae; the dorsal body setae are slightly lanceolate and serrate except $h1$, $h2$ and ps1 which are spatulate distally. Gravid female contain many eggs (figure 2). This species is widespread on many plants in the most temperate areas of the world (Baker 1970).
6) Kermanshah, Apple leaf, 02 Sep. 2012, 34°23′21″N, 47°07′33″E, Altitude: 1356 m, 1♀, 7) Kermanshah, Maple leaf, 07 Aug. 2013, 34°19′33″N, 47°05′55″E, Altitude: 1324 m, 1♀.

Tydeus helenipanoue Każmierski, 1998

Locality and habitat where specimens have been presently found: Kermanshah, Koozaran, soil, 21 Oct. 2011, 34°24′34″N, 46°51′52″E, Altitude: 1325 m, 1 TN.

Diagnosis — Dorsal idiosomal setae are equal in shape, narrowly lanceolate and serrate, but unequal in length (caudal ones are slightly longer). Setae f1 longer than half distance f1-h1. Setae ps1 situated dorsally. Ventral striation between mt longitudinally. Adults of this species has four pairs of genital setae.

This species is related to T. munsteri Meyer and Ryke (1959) and T. quadrisetosus (Schiss 1981) but can be distinguished from the former by narrower and longer dorsal idiosomal setae and from the latter by having serrated setae (Każmierski 1998).

Remark — There is a very small ω1 on tarsus I that is much smaller than in the description. This difference is because collected mite was in tritonymph stage where as the description is based on females. This is first record of this mite from Iran.

Tydeus inclutus Livshitz, 1973

Locality and habitat where specimens have been presently found: Songhor, soil under Cupressus sp., 4 Sep. 2013, 34°46′22″N, 46°36′48″E, Altitude: 1713 m, 1♀.

Tydeus kochi Oudemans, 1928

Locality and habitat where specimens have been presently found: 1) Kandooleh, Grape leaf, 03 Oct. 2011, 34°38′59″N, 47°14′20″E, Altitude: 1590 m, 2♀, 2) Kangavar, soil, 29 Apr. 2012, 34°35′22″N, 47°56′46″E, Altitude: 1505 m, 1♀ with two eggs inside.

Tydeus mississippiensis Baker, 1970

Locality and habitat where specimens have been presently found: Sarab Ghanbar, plum leaf, 5 Sep. 2007, 34°15′52″N, 47°02′44″E, Altitude: 1526 m, 1♀.

Key to Tydeus species from Kermanshah province (Females)

1. Dorsal idiosomal setae similar in shape ........... 2
— Dorsal idiosomal setae different in shape ....... 6

2. Cheliceral stiletto as long as palp tarsus; setae f1 nearly as long as f1-h1 distance or even longer; solenidion ω1 shorter than half distance f1-tc ................. T. electus Kuznetzov, 1973
— Cheliceral stiletto shorter than palp tarsus .......3

3. Dorsal setae long and serrate, especially f or f and h (about 40 µm or more); body elongate; f1 more or less reaches to base of h1 ........................................... T. mississippiensis Baker, 1970
— Dorsal setae not so long, f1 obviously not reaching to base of h1 .......................... 4

4. Body small, about 220 µm in length; female with four pairs of genital setae ....................... T. helenipanoue Każmierski, 1998
— Body longer, at least 280 µm in length; female with six pairs of genital setae .................... 5

5. Gnathosoma almost hidden under aspidiosoma and only its distal part is visible from above; ventral striae between mtβ is in "U" shape pattern; bothridial setae (50) rough and longer than other dorsal setae ....................... T. inclutus livshitz, 1973
— Gnathosoma visible from above and ventral striae between metasternals are "V" shape; bothridial setae long, simple and significantly longer than other setae .................. T. kochi Oudemans, 1928

6. Dorsal idiosomal setae slender, spindle like or narrowly lanceolate with exception of h1, h2 and ps1 which are broadened for 2/3 their end distally; fertile female with many eggs inside .................
Acarologia 56(4): 603–611 (2016)

T. caudatus (Dugès, 1834) sensu Baker, 1970
— Five pairs of caudal dorsal setae spindle and spoon-like and rounded distally, f1 not reaches to base of h1, ω1 one third of tarsus width; bothridial setae longer than other dorsal setae; striae between d1 setae are obtuse "U" shape .................

T. californicus (Banks, 1904) sensu Baker, 1970

List of reported Tydeus species from Iran until the end of 2015

Tydeus Koch, 1835

1) Tydeus calabrus (Castagnoli, 1984)
Habitat or host: Citrus trees
Distribution in Iran: Mazandaran (Faraji and Kamali 1993, Sadeghi et al. 2012).

2) Tydeus californicus (Bank, 1904) sensu Baker, 1970
Habitats or hosts: Apple, pear, apricot, peach, almond, walnut, grape, plum, coco weed, citrus, sainfoin, pomegranate, soil.
Distribution in Iran: Caspian sea areas, Hamedan, East Azerbaijan, Saveh, Mazandaran, Khorasan razavi, Shabestar (Abaii 1984, Behdad 1988, Daneshvar 1978a,b, 1990, Faraji and Kamali 1993, Khanjani and Kamali 1993, Modarres Awal 1994, 1997, Sorush 1994, Khanjani 1996, Sadeghi et al. 2012, Akbari et al. 2014).

3) Tydeus caryae Khanjani and Ueckermann, 2003
Habitats or hosts: Juglans regia L., pomegranate, palm, citrus, soil
Habitat or hosts: Galls of Eriophyes tristriatus (Nalepa), the walnut leaf gall mite, orchards
Distribution in Iran: Hamadam, Tuiserkan, Kermanshah, Kerman, Shabestar (Khanjani and Ueckermann 2003, Babakfard et al. 2008, Izadi et al. 2010, Akbari et al. 2014).

4) Tydeus caudatus (Dugès, 1834)
Habitats or hosts: sour cherry, grape, plum, walnut, greengage, soil
Distribution in Iran: Kermanshah, Shabestar (East Azerbaijan) (Darbemamieh et al. 2010, Akbari et al. 2014)

5) Tydeus darekiwani Sadeghi, Łaniecka and Kaźmierski, 2012
Habitat or hosts: Apple, pear
Distribution in Iran: Khorasan Razavi (Sadeghi et al. 2012)

6) Tydeus electus Kuznetzov, 1973
Habitat or hosts: Apple, pear, pomegranate
Distribution in Iran: Khorasan, Tehran (Modarres Awal 1997, Sadeghi Nameghi 1995, Sorush 1994)

7) Tydeus gloveri (Ashmead, 1879)
Habitat or host: Unknown
Distribution in Iran: Northern provinces (Khalilmanesh 1979, Modarres Awal 1994, 1997)

8) Tydeus inclutus Livshitz, 1973
Habitats or hosts: Tea, Austrian pine, oriental arbor vitae, soil
Distribution in Iran: Mazandaran, Shabestar (Barimani-Varandi 1996, Barimani-Varandi and Kamali 1998, Taghavi 1996, Taghavi et al. 1998, Akbari et al. 2014).

9) Tydeus kabutarahangensis Khanjani and Ueckermann, 2003
Habitats or hosts: Soil covered with wheat
Distribution in Iran: Hamadan (Khanjani and Ueckermann 2003)

10) Tydeus kochi Oudemans, 1928
Habitats or hosts: Cereals, apple, apricot, sugar beet, soil
Distribution in Iran: Chahar Mahal and Bakhtiari, West Azerbaijan, Shabestar (Noorbakhsh 1993, Noorbakhsh and Kamali 1995, Modarres Awal 1997, Haddad Irani Nejad et al. 2005, Akbari et al. 2014).

11) Tydeus longisetosus (El Bagoury and Momen, 1988)
Habitat or hosts: Apple, bean
Distribution in Iran: Maragheh (Khodayari et al. 2010)

12) Tydeus meshkinensis André, Ueckermann and Rahmani, 2010
Habitat or hosts: apple, soil
Distribution in Iran: Meshkinshahr (Zanjan), Shabestar (East Azerbaijan) (André et al. 2010, Akbari et al. 2014)

13) Tydeus mississippiensis Baker, 1970
Habitat or hosts: pear, peach, pistachio, plum, walnut, apricot and sour cherry

607
14) Tydeus shabestariensis Akbari, Haddad and Kaźmierski, 2015
Habitat or hosts: soil of apple orchards
Distribution in Iran: East Azarbaijan (Akbari et al. 2015).

DISCUSSION

The species *T. electus* and *T. caudatus* were the most abundant Tydeus species collected in the Kermanshah province. *Tydeus caudatus* is the most common tydeid species in Italian vineyards (Castagnoli 1984); it is reported as predator of *Colomerus vitis* in the laboratory (Camporese and Duso 1995). Studies showed that *T. caudatus* populations can persist and increase in vineyards without eriophyids and other potential preys, as a result of non-prey foods in its diet (Duso et al. 2005). Darbemamieh et al. (2010) first recorded *T. caudatus* for Iranian fauna from Kermanshah orchards and discussed some aspects of its biology and foraging behavior. Akbari et al. (2014) reported this species from Shabestar, East Azerbaijan province of Iran again. In this study we collected this mite from most parts of Kermanshah province on many hosts; that show its host diversity and abundance in western part of Iran.

Dugès’ *caudatus* is a mite listed in both Tenuipalpidae and Tydeidae, based on different publications (André 2011, Castro et al. 2016). André (2011) collected mites on laurustinus shrubs (Viburnum tinus) around Montpellier (France) to retrieve the species described by the French scientist. He suggested that Dugès’ *caudatus* is probably a Tenuipalpidae not a Tydeidae. Then he re-described *Tenuipalpus caudatus* (Dugès, 1834) from specimens collected in Montpellier and a neotype that is deposited at Paris. Recently, Castro et al. (2016) provided another new description for this tenuipalpid. The most frequent tydeid observed by André on *Viburnum tinus* in Montpellier was *Tydeus goetzi* Schruft, 1972, and therefore he provided a re-description for it (André 2011). Based on this information, he introduced *Tydeus caudatus* as an invalid name according to his findings and mentioned that *T. goetzi* can be the appropriate name that represents *T. caudatus* characters.

The mysterious question is that if Dugès described two species with one description? Or he saw *T. goetzi* and did not understand that was something different with tenuipalpid one in case that they have completely different appearance? The other hypothesis is that, there were two descriptions and one was lost. If we accept the presence of both species in Dugès slides, why he wrote only one note for both? If we consider that he described tenuipalpid mite and did not talk about tydeid one, so why should we consider *T. goetzi* (another species) presenting name for *caudatus* in case that we have older descriptions of it?

Baker (1970) re-described *Tydeus caudatus* and provided figures and measurements for it that followed and supported by Jeppson et al. (1975). This description is older than schruft’s *T. goetzi* and even followed by lots of scientists. Also, we have some older descriptions from Oudemans (1928) and Thor (1933) with measurements and information about *T. caudatus* that prove the presence of this species. On the other hand, there are some differences between these two near species based on their descriptions. In *T. goetzi*, spatulate setae (20 – 25 µm) abruptly broadened in distal 1/3 and rounded distally, nearly spoon like otherwise in *T. caudatus* relatively long (30 – 36 µm) spatulate setae tapered distal and maximally broadened in at most 2/3 of their length (Figures 1 and 2). Even if the Dugès *caudatus* is tenuipalpid mite, because of these old descriptions on *T. caudatus* and its differences with *T. goetzi*, we can’t omit the species name easily.

Lots of ecological changes may cause moving one species from its habitat and sampling is a random process that cannot be representative of all inhabitants of one place in all seasons and all times. We cannot expect to find a species after 180 years in the same place because of ecological and climatic changes as well as usage of pesticides or other treatments. Since *T. caudatus* is older name than *T. goetzi*, reported in many papers, belongs to real characters that observed in lots of places on different plants and reported as an abundant species in different places of the world, it does not seem that lack of
collecting this species after many years in one place can invalid this old and frequent name. *T. caudatus* and *T. goetzi* are two near species, but if considering descriptions of Schruft (1972), Baker (1970) and André (2005, 2011) they were synonyms, *T. caudatus* is older and valid name based on Baker’s re-description even with omitting Dugès description. Meanwhile, no one has information about the holotype of Dugès species and no one has checked it before crystallization.

**ACKNOWLEDGEMENTS**

The authors want to thank Dr Sabrina Simon, department of Biosystematics, Wageningen University for her nice cooperation during the writing process of this paper in Netherlands.

**REFERENCES**

Abaii M. 1984 — List of pests of forest trees and shrubs in Iran — Tehran, Plant Pests and Disease Research Institute, 147 pp.

Akbari A., Haddad Irani Nejhad K., Khanjani M., Arzanello M. 2014 — Introducing a part of mites family Tydeidae (Acari: Prostigmata) in Shabestar area (East Azerbaijan province) — In: Proceedings of 21th Iranian Plant Protection Congress; Urmia: Iran. p. 994.

Akbari A., Haddad Irani Nejad K., Khanjani M., Arzanello M., Kažmierski A. 2015 — *Tydeus shabestariensis* sp. nov. and description of the male of *Neopronematus sepasgosariani* (Acari: Tydeidae) — Zootaxa, 4032 (3): 264-276.

André H.M. 1979 — A generic revision of the family Tydeidae (Acari: Actinedida). I. Introduction, paradigms and general classification — *Annales de la Société myab Zoologique de Bekque*, 108: 189-208.

André H.M. 1980 — A generic revision of the family Tydeidae (Acari: Actinedida). IV. Generic descriptions, keys and conclusions — Bull. Ann. Soc. R. Entomol. Belg, Entomol., 116: 103-130, 139-168.

André H.M. 2005 — In search of the true *Tydeus* (Acari: Tydeidae) — *J. Nat. Hist.*, 39(13): 975-1001. doi:10.1080/00222930400002838

André H.M. 2011 — Dugès’ *Caudatus* is a Tenuipalpidae and not a Tydeidae (Acari) — *Acarologia*, 51(1): 69-85. doi:10.1051/acarologia/20111990

André H.M., Ueckermann E.A., Rahmani H. 2010 — Description of two new species closely related to *Tydeus spathulatus* (Acari: Tydeidae) from Zimbabwe and Iran — *J. Afrotropical Zool.*, 6: 111-116.

Ashmead W.H. 1879 — Injurious and beneficial insects found on the orange trees of Florida — *Can. Ent.*, 11(8): 159-160. doi:10.4039/Ent11159-8

Babakfard A., Khanjani M., Pourmizra A.A., Mirablou M., Zahedi-Keyvan M. 2008 — Study on Acari fauna (Acari: Prostigmata) of fruit trees of Rijab area (Kermanshah Province). Hamadan: Proceedings of the 18th Iranian Plant Protection Congress, p. 270.

Banks N. 1904 — Four new species of injurious mites — *New York Entomol. Soc.*, 12:54-56.

Baker E.W. 1943 — Nuevos *Tydeidae* Mexicanos (Acarina) — *Rev. Soc. Mex. Hist. Natur.*, 4(3-4): 181-190.

Baker E.W. 1970 — The genus *Tydeus*: Subgenera and species groups with a description of new species (Acarina: Tydeidae) — *Ann. Entomol. Soc. Am.*, 63(1): 163-177. doi:10.1093/aeas/63.1.163

Baker E.W., Delfinado M.D. 1974 — Pseudotydeinae, a new subfamily of Tydeidae (acarina) — In: Proceedings of Entomological Society of Washington, 76: 444-447.

Barimani-Varandi H. 1996 — Mites (Acari) associated with conifers in Mazandaran and biology of spruce spider mite *Oligonychus ununguis* (Jacubi) in Kelardasht [M.Sc. thesis] — Shahid Chamran University, Ahwaz, Iran, 158 pp.

Barimani-Varandi H., Kamali K. 1998 — Mites (Acari) associated with conifers in Mazandaran, Northern Province of Iran — In: Proceedings of 13th Iranian Plant Protection Congress, Karaj, p. 174.

Behdad E. 1988 — Pest and disease of forest trees and shrubs in Iran — *Esfahan: Neshat Publisher*, 824 pp.

Berlese A. 1883 — Acarifauna Sicula — *Bull. Entomol. Soc. Italy*, 8: 1-15.

Berlese A. 1908 — Elenco di generi e specie nuove di Acari — *Redia*, 5:1-15.

Berlese A. 1910 — Acari nuovi — *Redia*, 6:199-234.

Campanale P., Duso C. 1995 — *Tenuipalpus talbii* — *Entomol. Exp. Appl.*, 77:149-157. doi:10.1111/j.1570-7458.1995.tb01995.x

Canestrini G. 1886 — prospetto dell’ *Acarofauna Italiana* — Atti Inst. Veneto Sci. Lett. Arti 6, 4: 693-734.

Castagnoli M. 1984 — Contributo alla conoscenza dei *Tydeidae* (Acarina: *Tydeidae*) delle piante coltivate in Italia[In Italian with English summary] — *Redia*, 67:307-322.

Castro E.B., Kane E.C., Feres R.J.F., Ochoa R., Bauchan G.R. 2016 — *Definition of Tenuipalpus sensu stricto* (Acari, Tenuipalpidae), with redescription of *Tenuipalpus caudatus* (Dugès) and description of a new species from Costa Rica — *Int. J. Acarol.*, 42(20): 106-126.
Daneshvar H. 1978a — Fauna of plant mites in Azerbaijan — J. Appl. Entomol. Phytopathol., 46(1,2): 117-128.

Daneshvar H. 1978b — Fauna of plant mites in Azerbaijan — Pazhouhandeh, Ministry Science & Higher Education, 22(4): 29-46.

Daneshvar H. 1990 — Studies on the morphology and biomics of Typhlodromips caspiansis (Acari: Phytosei- dae) in north Iran — J. Appl. Entomol. Phytopathol., 57(1,2): 21-34.

Darbemamieh M., Kamali K., Fathipour Y. 2010 — First report of Tydeus caudatus (Acari: Tydeidae) from Iran — J. Entomol. Soc. Iran., 30(1): 63-65.

Dugès A. 1834 — Recherches sur l’ordre des Acariens en général et la famille des Trombidiés en particulier (Premier mémoire) — Annls Sci. nat. (sér. 2), 1: 5-46 (The periodical available at http://www;biodiversitylibrary.org/item/19445).

Duso C., Pozzebon A., Capuzzo C., Malagnini V., Otto S., Darbemamieh M., Kamali K., Fathipour Y. 2010 — First report of Tydeus caudatus (Acari: Tydeidae) from Iran — J. Entomol. Soc. Iran., 30(1): 63-65.

El Bagoury M.E., Norton A.P., Gadoury D.M., Seemoph H. 1988 — Description of two new species of Tydeus from Egypt (Acari, Tydeidae) — En- d. Bol. Mus. Hist. nat., (2) 10: 593-600.

Fleschner C.A., Arakawa K.Y. 1953 — The mite Tydeus califor nicus on citrus and avocado leaves — J. Econ. En- tomol., 45(6): 1092. doi:10.1093/jee/45.6.1092.

Grandjean F. 1938 — Observations sur les Tydeidae (2e serie) — Paris: Bull. Mus. Hist. nat., (2) 10: 593-600.

Haddad Irani-Nejad K., Hajiganbar H.R., Talebi Chaichi P. 2005 — An introduction of the prostigmatic mites in sugar beet fields in Miandoab plain — Iranian J. of Agric. Sci., 36(1): 247-262.

Hernandes F.A., Feres R.J.F., Nomura F. 2006 — Biological Cycle of Lorrya formosa(Acari, Tydeidae) on Rubber Tree Leaves: A Case of Thelytoky — Exp. Appl. Acarol., 38:237-242. doi:10.1007/s10493-006-0014-2.

Hazd H., Asadabadi A., Khanjani M., Payandehe A. 2010 — Some predatory mites associated with pomegranate, palm and citrus from southeast of Iran — In: Moraes G.J.de, Castillo R.C., Flechtmann C.H.W. (Eds.), Abstract Book of the XIIIth International Congress of Acarology, Recife, Brazil, p. 112.

Jeppson L.R., Keifer H.H., Baker E.W. 1975 — Mites injurious to economic plants — University of California Press, Berkeley, USA, 614 pp.

Kamali K., Ostovan H., Atamehr A. 2001 — A Catalog of the Mites and ticks (Acari) of Iran — Islamic Azad Scientific Publication center, 192 pp.

Kaźmierski A. 1978a — Revision of the genera Tydeus Koch sensu André, Homeotydeus Andre and Orthotydeus Andre with description of a new genus and four new species of Tydeinae (Acari: Actinidae: Tydeidae) — Mitt. Hambg. Zool. Mus. Inst., 86:289-314.

Kaźmierski A. 1989a — A revision of the subfamilies Pre- tydeinae and Tydeinae (Acari, Actinidae: Tydeidae). Part II. The subfamily Pretydeinae André, 1979 - new taxa, species, review, key and considerations — Mitt. Hambg. Zool. Mus. Inst., 93: 171-198.

Kaźmierski A. 1996a — A revision of the subfamilies Pre- tydeinae and Tydeinae (Acari, Actinidae: Tydeidae). Part III. Seven new genera and some new species of the Tydeinae, with a generic key — Mitt. Hambg. Zool. Mus. Inst., 93: 199-227.

Kaźmierski A. 1990a — Tydeinae of the world: generic relationships, new and redescribed taxa and keys to all species. A revision of the subfamilies Pretydeinae and Tydeinae (Acari: Actinidae: Tydeidae) - part IV — Acta Zool. Cracoviensia, 42(1): 283-455.

Khalilmanesh B. 1979 — Studies related to the action of Amblyseius abberans (Oudemans) on Tydeus gloveri (Ashmead) — J. Appl. Entomol. Phytopathol., 47(2):131-145.

Khanjani M. 1996 — Mites (Acari) Associated with Fabaceae plants in Hamedan province and functional responses of Anystis baccarum (L.) and Erythraeas sp. to developmental stages of Tetranychus turkestani (U. & N.) [Ph.D. thesis] — Tarbiat Modarres University, Tehran, Iran, 437 pp.

Khanjani M., Kamali K. 1993 — Mites (Acari: Actinidae) associated with Fabaceae plants in Hamedan — Proceeding of 11th Plant Protection Congress, Iran, Rasht, p. 186.

Khanjani M., Kamali K. 2001 — A Catalog of the Mites and ticks (Acari) of Iran — Islamic Azad Scientific Publication center, 192 pp.

Khodayari S., Fathipour Y., Kamali K., Naseri B. 2010 — Some predatory mites associated with pomegranate, palm and citrus from southeast of Iran — In: Moraes G.J.de, Castillo R.C., Flechtmann C.H.W. (Eds.), Abstract Book of the XIIIth International Congress of Acarology, Recife, Brazil, p. 112.
Koch C.L. 1835 — *Tydeus* — In: D.C.M.A, H.4, No: 11,12. Regensburg.

Koch C.L. 1838 — *Tydeus* — In: D.C.M.A., H. 17, No. 13,17,18 and H 20, No: 3-14. Regensburg.

Kramer P. 1877 — Tydeidae — Arch. Naturg., 43:232-246.

Krantz G.W. 1978 — A manual of acarology — 2nd ed. Corvallis: Oregon State University Book Stores, 509 PP.

Kuznetzov N.N., Livshitz I.Z. 1973 — Genus *Tydeus* (Acariformes, Tydeidae) in materials from Crimea and Caucasus — Zool. Zh., 52(1): 45-53.

Linnaeus C. 1758 — Systema Naturae per Regna Tria Naturae, Secundum Classes, Ordines, Genera, Species, cum Characteribus, Differentiis, Synonymis, Locis — Stockholm: Laurentius Salvius (10th ed.), 824 pp.

Meyer M.K.P. (Smith), Ryke P.A.J. 1959 — New species of mites of the families Tydeidae and Labidostommiidae (Acarina: Prostigmata) collected from South African plants — Acarologia, 1(4): 408-420.

Noorbakhsh S.H. 1993 — Faunistic study of cereal mites in eastern Chahar Mahal & Bakhtiari and biology of brown wheat mite *Petrobia latens* (Muller) [M.Sc. thesis] — College of Agriculture shahid Chamran University, Ahwaz, Iran, 103 pp.

Noorbakhsh S.H., Kamali K. 1995 — Mites associated with tea plant in western regions of Mazandaran province — Proceedings of 13th Plant Protection Congress, Karaj, Iran, p. 100.

Oudemans A.C. 1928 — Acarologische Aanteekeningen XCVIV. Entomol. Berichten, 7: 374-382.

Sepasgosarian H. 1997 — The world genera and species of the family Tydeidae (Actinida: Acaridia). J. Entomol. Soc. Iran. Supplement 7:1-54.

Sorush M.J. 1994 — Identification of pomegranate mites and biology of *Tenuipalpus puniceus* P. & B. in Saveh [M.Sc. thesis] — Shahid Chamran University, Ahwaz, Iran. 103 pp.

Scheid T. 1981 — Neue Tydeidenarten (Acari, Actinedida, Tydeidae) aus einem alpinen Rasen (Caricetum firmae, 2500 m) des Schweizer Nationalparkes — Entomol. Basiliensia, 6: 78-107.

Schiess T. 1981 — Neue Tydeidenarten (Acari, Actinedida, Tydeidae) aus einem alpinen Rasen (Caricetum firmae, 2500 m) des Schweizer Nationalparkes — Entomol. Basiliensia, 6: 78-107.

Schruft G. 1972 — Das Vorkommen von Milben aus der Familie Tydeidae (Acari) an Reben — Z. Angew. Entomol., 71: 124-133. doi:10.1111/j.1439-0418.1972.tb01729.x

Taghavi A. 1996 — Faunistic study of mites and biology of *Brevipalpus obovatus* on tea plant *Camellia sinensis* (L.) in west Mazandaran [M.Sc. thesis] — College of Agriculture, Shahid Chamran University, Ahwaz, 151 pp.

Taghavi A., Kamali K., Sahragard A. 1998 — Mites associated with tea plant in western regions of Mazandaran province — Proceedings of 13th Plant Protection Congress Karaj, Iran, p. 100.

Thor S. 1933 — Tydeidae, Ereynetidae — Das Tierreich, 60:1-84.

Treat A.E. 1970 — Two tydeid mites from the ears of noctuid moths — American Museum Novitates, New York, No.2426: 1-14.

Walter D., Krantz G.W. 2009 — Collection, rearing and preparing specimens — In: Krantz G.W., Walter D.E. (Eds.), A Manual of Acarology (3rd Edition). Texas Tech University, Lubbock, pp. 83-96.

Copyright

Darbemamieh M. et al. Acarologia is under free license. This open-access article is distributed under the terms of the Creative Commons-BY-NC-ND which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original author and source are credited.